PATTERN IDENTIFICATION EVOLUTIONARY AND TECHNICAL IN THE CARING BEHAVIORS AMONG HUMANS IN PREHISTORY USING INDICATORS BASED ON THE METHOD OF THE BIOARCHAEOLOGY OF CARE

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SUMMARY

For the past two decades, there has been a noticeable increase in research interest in understanding the Care as an important element of ancestral human cultures. To this end, we must to understand care as the provision of assistance to an individual who was experiencing Disabilities of short, medium, or long duration, resulting from a pathology. These problems They posed a significant physical impediment and a functional challenge for the individual and for the group. Scars and pathologies left on the bones can indicate what happened to a individual around a key moment in his life, after which he overcame his health problems. The fossil record can reveal signs of disability in individuals whose recovery He necessarily had to rely on the help of other humans who provided care. The evidence on the decision to provide care in prehistoric societies, as well as the decision to Accepting them and the form these care measures took provide important information for understand the values, beliefs, knowledge, skills, and social organization and economic impact on all those involved, including patients, caregivers, and others directly or indirectly affected indirectly due to the situation and its management.

This is the framework of research in the Bioarchaeology of Care, which seeks to achieve the greatest possible understanding in relation to the individual being cared for, and to enable the passage of said understanding at the population level. In this discipline, a methodology is used that includes the description, diagnosis and documentation of skeletal remains and their context (stage 1), the disability assessment, and measurement of the need for care and its magnitude (stage 2), the construction of a care model (stage 3), and the interpretation of its implications actions (stage 4). This work identifies a set of quantitative and qualitative indicators obtained mainly through markers based on the Bioarchaeology method of Care, to find an evolutionary pattern in caring behavior among humans from Prehistory. Through these markers, which cover all stages of the method of Bioarchaeology of Care: A Care Indicator (CI) is constructed.

Furthermore, a sample of 101 cases is described and analyzed, representing a minimum of 275 individuals, and that cover all prehistoric periods. The IC applied to the sample reveals a continued growth in care behaviors over time, with relatively more pronounced increases in the Middle Paleolithic, as well as in the Upper Paleolithic and the beginning of the Holocene. Subsequently, a certain stabilization is observed in the groups of the

Late prehistory in both Eurasia and America, with similar IC values in these two subsets, suggesting comparable practices in different geographical regions. Therefore, it is It highlights that caring behavior among humans was sustained and recurrent. During prehistory, there was an increase in the skills employed. Likewise, the following are identified: bioarchaeological signs of certain milestones in the development of specialized techniques, which They began to be used for a therapeutic purpose or as a precursor to medical care, including amputations, trepanations, dental caries treatments, and the use of products with pharmacological properties. The known antiquity of the evidence of the use of these techniques is has increased significantly in recent decades.

Segmenting the analysis by human species indicates a starting point for behaviors precursors of caregiving more than 1.5 million years ago. This is observed in four individuals from *Homo erectus,* and more extensively in the Neanderthal lineage, with up to 28 individuals. In *Homo* The first cases of possible amputations for purposes related *to Neanderthals* are also documented. Surgical procedures and the use of products with medicinal properties. From the end of the Pleistocene There is an intensification of care among *Homo sapiens* groups across various geographical areas, and the introduction of specialized dental trepanation and drilling treatments for the Tooth decay. The age-based segmentation of the study also warns of an exacerbation of the Healthcare for children in all prehistoric periods. It is suggested that the Care between adults had a primarily biological origin, supported by behaviors typically linked to upbringing, and which acquired a cultural component that gradually gained greater strength as the degree of collaboration in hominins increased.

The provision of healthcare in prehistory falls within a broader set of collaborative strategies, such as hunting, specialization in the procurement of materials raw materials, the development of production chains, the organization and distribution of spaces activities, food distribution, and co-parenting. Within this framework, we must understand that different distinctly human abilities have common roots, and that their combination allowed for addressing greater risks.

The study of the sample used in this thesis also points to the existence of links between burial practices and the provision of care during life. It is concluded that burial is It could be used to highlight or honor the difference of an individual who received special care, sometimes also considering their social status, regardless of awareness of a transcendental meaning of death.

It is proposed to advance the development of the Bioarchaeology of Care method at the level population, to try to understand the continuous flow of care to individuals who in any society suffers from a variety of pathologies with varying degrees of severity and cure in a at a given moment, as well as the social identities that these actions may suggest. This thesis It analyzes a series of population cases and argues that, without the need for relevant adjustments to method for using it at the population level, future approaches should delve deeper into the correlation of different individual cases within the same group or sociocultural context next. In this sense, the database resulting from this thesis is made available to the scientific community, to enrich it with new records and as a reference for the review of other published cases, whether or not they are described under the Bioarchaeology of Care approach.

The origin and evolution of care among human beings in prehistory awaken a deep curiosity, due to the universality of these experiences and the nuances they bring social and cultural context of each community. Therefore, the need to disseminate these is highlighted. discoveries among the scientific community and the general public, and to promote a debate Enriching. The dissemination of lessons learned in the research of Bioarchaeology of Care can be carried out through various approaches, including raising awareness about the need for care since ancient times, its relationship with violence throughout history prehistory and the narration of the stories of those who played caregiving roles in the past.

Finally, the need to ensure a transdisciplinary approach in the teams is emphasized. They investigate such complex behavior, encompassing the perspectives of diverse fields such as Anthropology, archaeology, philosophy, and education. Care and compassion are skills. increasingly valuable and appreciated in communities and their social structures, extending their influence on business activities.

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I am grateful to two people from Uniclau for their support at several important moments in the thesis: a Marcos Mendoza, because of him *for* inviting me to apply to the doctoral program; to my advisor of

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PROLOGUE

When I submitted the manuscript of my book to the Almuzara publishing house in 2019, its provisional title It was *Prehistory of Compassion.* This was a tribute to the title of the text *Prehistory of* Compassion. *compassion* (Hublin, 2009), where I first read ideas about caregiving in the Prehistory. It impacted me so much that, since then, this topic has formed an important part of my life. life. That provisional title , *Prehistory of Compassion ,* combined simplicity and literary beauty, a combination I loved. However, after some exchanges of ideas, the publisher He suggested the final title under which the book was actually published: *Human Evolution: Prehistory and origin of compassion.* The reason for this change had a certain commercial undertone. given that the original title could have given the work an apparent philosophical focus and This confuses the buyer. Although marketing was successful at the time, we will see more about this later. that, in reality, moral reflections are very important to give the topic a multidisciplinary approach, which allows it to be understood in its full scope as behavior markedly human.

In short, going back to the final title of the book, even though it seemed a bit long and lost its meaning That aesthetic connotation, not only did I end up liking it, but the two parts that it The title I composed led me to a big question: to what extent does such a relationship exist between the Human evolution and the origin of compassion? Furthermore, in the book I paused at the end of Paleolithic, and many loose ends remained regarding what happened afterwards, starting from a a period as challenging for human socio-economic structures as the Neolithic.

I decided to delve deeper and expand my research on this issue after the book's publication. To begin, if we narrow the concept further to care between humans and isolate the term from its of a more moral nature, we can explore different sub-questions that arise from that Reflection: What about pre-human species? Didn't individuals take care of themselves? Were they the Care of a "spark" that appeared overnight? You don't need to know much about paleontology. nor from anthropology to deduce that it did not happen that way. An important starting point for the Understanding this behavior involves considering it from a group perspective. Another point is... to assume it as a skill or practice that was part of the package of *being human* that was going developing, along with spatial organization, the invention of tools, and the exploitation of the environment On a large scale, the use of fire, the division of labor, the precursor forms of speech, the ability symbolic… This *package* combines natural or instinctive elements with cultural elements, with

such a reach that these almost eclipsed those. A practical example that everyone
What humans understand perfectly is the care of our children. But it's very different from...
parental care that enables the survival of offspring in the early stages of their lives, which
the care they receive when they experience certain serious health problems. This
The process involves complex motivations and decisions. The role of children, and also that of the
Decisions are central points of discussion in the evolution of human cognition, and could
to be the basis for developing specific skills in caring for humans.

1. INTRODUCTION

As a social science, anthropology draws on data from various cultural processes and establishes bridges between them. Examples of such processes are symbols, social structures, the agents, identity, power, and ideology. Bioarchaeology, for its part, is a subspecialty. of physical anthropology that studies biological and cultural diversity in human populations ancestral, through information obtained from bone remains from sites Archaeological. The study of human bodies from past cultures has become a an important field of social research. Combining knowledge from archaeology, the biology and cultural anthropology with theories and methods taken from sociology, demography, History, biochemistry, statistics, and forensic anthropology; bioarchaeology provides a multidisciplinary perspective on humanity's past.

This discipline gained significant prominence in the United States in the 1970s, driven by the advance of renewed archaeological methods, and applied basically to the knowledge of development of humanity in the last 9000 years, when in general the process of sedentarization began in different primary centers of domestication in Eurasia, Africa and America, Although in the New World, although different crops appeared 8500 years ago, sedentary life It doesn't begin until much later, around 4,000 years ago. At the same time, with the This push led to the discovery of numerous very old skeletal remains, mainly in In Africa, from the 1960s onwards, the field of study of bioarchaeology expanded rapidly, encompassing the entire Pleistocene. Since then, and following the same intense pace of the findings, bioarchaeology has been growing in the last half-century, thanks to the creation of international research groups, to a greater homogenization of methods Research, and a certain standardization of training in this specialty. Furthermore, it has been It is essential to have the support of new disciplines, including paleogenomics and paleoproteomics, as well as with GIS, dating technologies and many others that have recently constituted a decisive lever for digital paleoanthropology and, with it, the growing access to fossils, both the originals and their digital copies, and open access publications.

In this context, there is a growing interest in investigating human behavior in the Prehistory. The archaeological record is growing and continues to provide valuable data about who... who owned those fossil bones, how they were organized and related to others, what Activities they performed, and what problems they had. The scars and pathologies left on the bones.

They can indicate what happened to an individual around a specific key moment. In
In many cases, the problems shown by the bone were not the cause of the individual's death, but
that were healed wounds, possibly some of them with the help of other humans who
They took care of it. From the 1990s onwards, bioarchaeology took on a new investigative appetite that before
it had barely been addressed. Collaboration between paleoanthropologists, archaeologists, paleoneurologists
and neuropsychiatrists are pushing to explore new perspectives to understand the evolution of our
behaviors and our mind. Care is a capacity that tends to stand out when it is defined
the fundamental set of human behaviors, and can even influence skills
Cognitive processes such as the perception and interpretation of what happens around us. This
This would be essential for ancestral human groups, which were very few and isolated, practically
indistinguishable from any other animal in the habitats where they lived, could develop and
develop.

For two decades, researchers such as Lorna Tilley, Marc Oxenham, Erik Trinkaus, Jean-
Jacques Hublin, Penny Spikins, and others begin to raise more profound questions about care.
It was an important element and driving force of ancestral human cultures, understanding this action
such as "the provision of assistance to an individual who is experiencing disabilities of
short, medium, or long duration, as a result of a pathology" (Tilley, 2015). Disability is
unlike a physical impairment, which refers to a direct medical condition and its
resulting physical limitations, while disability implies a complex social condition.
that results from the interaction between an individual and a specific cultural context.

When studying how diseases are managed in societies (both past and present),
as well as the current ones), we know that certain factors with great importance must be taken into account.
Cultural influences can impact daily life when a person becomes ill, in the way of
treatment of their illness, and in the care of the person themselves during that period. Among these
Among the factors, we find hygiene measures, the availability of supplies, dietary practices, and the
economic activities of the group, family relationships, tolerance towards disability and
decision-making processes. Therefore, the indications regarding the decision to provide care in
prehistoric societies, as well as the decision to accept them and the form they took
care, provides important information for understanding values, beliefs,
knowledge, skills, and the social and economic organization of all those involved, whether
directly or indirectly.

This is how research in the Bioarchaeology of Care *(BoC)* took shape.
to examine aspects of the lives and ways of life of those they cared for and those they were
care that might otherwise remain invisible. For this, Bioarchaeology of
Care identifies and analyzes evidence of disability and health-related care in the
past, based on the physical indicators of the human remains that suggest a period of
Survival with serious and/or functionally limiting pathologies. From this, there are two
principles embedded in the research approach:

1) On the one hand, the human remains being investigated must be viewed simultaneously as
actor or agent and as object: actor, because the skeletal remains represent a human
who lived and experienced a disability, in whose own care he had an active role;
object, because skeletal indicators of disability only exist by virtue of the
care provided by others, which made the survival of that individual possible over time
enough for the pathology to be recorded in the bone.

2) The provision of care is understood as an expression of the actions performed as
result of decisions made by those humans who, directly or indirectly,
were involved in providing such care to the first individual.

For care to take place, there must be a perception of need; caregivers
Potential candidates must have the willingness and ability to provide direct help and/or adapt, and the
The individual who needs care must accept and allow the intervention of the various actions.
so that these can begin and continue over time. This entire process involves a
A multitude of factors make each care experience unique. Therefore, it is a matter of
of a transdisciplinary investigation, since it combines descriptive studies that contribute to the
Anthropology with elements from other subdisciplines and schools of thought (biology, osteology,
paleopathology, cognitive archaeology, forensics, social archaeology, etc.), as well as additional elements
taken from other disciplines far removed from archaeology and paleontology, but relevant to the
consideration of caring behaviors (clinical medicine, nursing, philosophy, sociology,
psychology, etc.), adapted to the demands and limitations of the archaeological field.

In the Bioarchaeology of Care, it is particularly important that the research is
contextualized. The understanding of the individual's physical characteristics must be put into
relationship with their cultural and social context to try to determine the care that would be provided, and the
implications that this action would have for the group and for the agents and individual identities.

In its initial basic conception, it is an investigation based on case studies
individuals, although these include not only the recipient of care but also the
caregivers. This set leads to inferring complex, interrelated behaviors,
interactive and continuously adjusted processes that involve providing and receiving care. Furthermore, these
Behaviors develop in a specific cultural, social, economic, and physical environment of
way of life of the populations. It is based on empirical references, with inductive methods
that help to provide feedback between references, so that both the procedures
Applied conclusions can be dynamically adjusted as progress and incorporation are made.
of new case studies.

In this way, the Bioarchaeology of Care offers a research methodology for
To identify, organize, analyze, and interpret data systematically. To do this, it consists of
four sequential stages (Tilley, 2015), each of them built on the basis of information,
Observations and conclusions from the previous stage. The order of these stages describes a progression from
the recording of osteological and archaeological data, through increasing levels of deduction and
inference, up to interpretation:

- Stage 1: Gather details about the subject, their pathology, and their lifestyle. The information
  The information gathered at this stage is fundamental for further study.

- Stage 2: assesses the clinical and functional impacts of the disability and determines whether it is
  It is likely that care will be required. Clinical sources should be used to assess the former.
  modern and ethnographic references. To evaluate the latter, the requirements are examined,
  obstacles and opportunities that characterized the individual's life environment are evaluated
  the likely effects of clinical symptoms on the individual's ability to perform
  basic daily living tasks and/or to participate regularly in the group. If so
  It was likely that there would be a significant functional impact, so it can be inferred that the
  The disability required the provision of care, which can be given in two ways: 1)
  through actions of help or direct support to the individual, usually of a
  intensive, in which the individual is totally or partially dependent on others; and 2)
  through the adaptation or accommodation of the group to the difference, through the adoption of
  different strategies that make it easier for the individual to take part in their community, when the
  illness makes normal participation difficult or impossible.

- Stage 3: Develop a basic estimated model of the care that would be provided, based on the health-related needs associated with clinical and functional outcomes of the disease raised in stage 2, and with different levels of probability depending of what is known about the life context. This model also takes into account the probable duration of care and associated costs, such as the needs of efforts and resources. At this stage, Schrenk (2019) suggests exploring different possibilities for providing care beyond those found in the clinical literature, as well as other healing practices based on ethnographic and archaeological references.

- Stage 4: Explore the broader implications of the constituent elements of model (separately and in combination) for the group, social relations and identity Group and individual care of the care recipient. As a guide, the following four can be considered: possible community responses to the disabilities experienced by its members which Roberts (1999) identifies: 1) are seen as acceptable and are addressed; 2) are seen as unacceptable and are not addressed; 3) are seen as a special individual status and are They attend; 4) are accepted as long as the disability does not affect performance.

This method covers a new area of research in which it is possible to discuss the processes of disability, illness and impairment with a specific focus, and taking into account clinical knowledge and physicians appropriate to paleopathology. The fundamental challenge of this research arises when to expand the reference data to an interpretation of care, as well as the agent's role by part of the individual with the health problem and by other close individuals (relatives, family) extended, group). The case study-based approach requires this research to present carefully, in each subject, the considerations that allow moving from the realm of data empirical findings derived from the skeleton, to the reconstruction of more cultural behaviors and community members involved in the provision of care and the capabilities of caregivers.

2. LINES OF RESEARCH

Considering afflictions as a constant part of human existence, the will to
Attending to or caring for those who suffer from them is a widely recognized characteristic as
defining characteristic of being human. As mentioned, in bioarchaeology the provision of
Care is inferred from the physical evidence in a set of human remains that indicate the
recovery from a disabling condition in circumstances where, without such actions, the
That individual would not normally have survived to the actual age he reached. Although he is
It expands the documentation of cases with severe pathologies, and in some cases the probability is explicitly stated.
In providing/receiving care, this possible action and its consequences are rarely explained or
detailed in scientific publications, and are not usually part of a specific focus of
study.

As a result, an important source of knowledge about the subject has been overlooked for decades.
human behavior in the past, and the different axes or typologies of actions that this
involves, including:

- Social aspects, such as organization, resilience, adaptation…
- Cultural aspects, such as personality, identity…
- Physical and economic factors, encompassing access to resources, the relationship with the environment…

Bioarchaeology of Care was developed to fill the gap and exploit the valuable information
which fossils provide from this perspective. It was first used by Lorna Tilley and
Marc Oxenham in 2011, to describe the case of a 25-year-old quadriplegic individual who was
cared for for a decade by their Neolithic community in Man Bac (Vietnam). The theoretical basis of
This methodology was developed by Tilley (2015) in his book *Theory and Practice in the*
Bioarchaeology of Care. Since then, it has been applied in at least 33 cases ranging from
the Middle Paleolithic to the 19th century, which are included in the sample of this thesis, along with others
68 bioarchaeological reports in which the authors suggest the probable provision of care to
one or more individuals in response to a specific pathology.

The Bioarchaeology of Care method was followed by the development of the Care Index
(Index of Care, IoC) by Tilley and Cameron (2014). This is an online application for
to operationalize the Bioarchaeology of Care approach, and supports researchers to
to reflect through it. To do this, it provides tools that facilitate the collection and

ordering of variables and biological and archaeological evidence, as well as the articulation of the Key concepts of the research. It contains four steps that correspond to the stages of the Bioarchaeology of Care, and help to structure information and provide explanation to the study materials, with a qualitative approach in which most of its incoming data They are in text format.

Another line of research in this field is the one proposed by Alexis Boutin in 2016 called Bioarchaeology of Personality , which has as its central focus the narration of the stories that skeletons tell about how personality was incarnated in all stages of their lives. For bodies that were not "normative," disability could have has been a particularly prominent aspect of personality, and the Bioarchaeology model of Personality seeks to explore the social construction of this disability, in combination with traditional analytical techniques. This model is based on five principles:

1) Modern Western constructions of identity and individuality are not universals.

2) Personality cannot be divided according to the different facets that make it up, such as gender, religion, social class, or disability, but all of them are interrelated and have different situational priorities.

3) A longitudinal life course approach is well suited to the research bioarchaeological aspects of personality. Although age should not take precedence over other axes of analysis (sex, kinship ties, social status…), its comparative immutability allows that age supports the fluidity of the other axes throughout life, to facilitate the division interpretative relationship between biological processes and their cultural interpretations, placing the duration of human life within the social measures of time.

4) Personality can go beyond biological life and extend from conception until the commemoration and remembrance of death. The bodies of ancestors, martyrs, Dead children, etc., can have a profoundly vital and influential social presence *post mortem.* The Bioarchaeology of Personality model examines the final stages of life, like agony, death, funeral rites, and the veneration of the forefathers.

5) Bioarchaeologists must be open to alternative modes of interpretation and Dissemination other than that formally regulated by academic standards: hypertext, fictional narrative, open access discussions... The interpretive format used for the model of Bioarchaeology of Personality is the osteobiography in the form of an official narrative.

The Bioarchaeology of Personality method is structured on interdisciplinary tests, access to diverse academic and public audiences, and a strong tool component pedagogical, articulated with other theoretical frameworks such as the Bioarchaeology of Care. It was used for the first time with the case study of a young disabled woman from Dilmun (Bahrain), dated in 2050-1800 BC, whose body exhibits multiple bone deformities. This method yielded as resulting in a fictional narrative surrounding this individual's experience of disability and of treatment received from his family and community.

The World Health Organization (WHO) provides a methodology called Global Burden of Disease. of the *Global Burden of Disease (GBD)* to quantify the impacts and understand the Dimensions of different diseases, injuries, and risk factors in population health. has been used in communities dependent on hunting and gathering, agriculture, herding, and Horticulture. GBD is also a useful tool for quantifying paleopathological data. beyond the descriptive prevalence of diseases in prehistoric societies, examining the social and economic costs of diseases to the community.

The burden of disease is estimated in disability-adjusted life years. *(Disability-adjusted life years,* DALYs). This is a measure of time that combines Projections of years of life lost due to premature death and years of life lost due to time lived with illness and/or disability (Harvard University, The University of Washington Institute for Health Metrics, John Hopkins University, University of Queensland, & The World Health Organization, 2009). The GBD addresses eight basic domains of health (mobility, self-care, pain, cognition, interpersonal activities, vision, sleep and effect), for which analyzes the deterioration of functioning in the physical, social, and emotional domains of life. The result is a nuanced understanding of how changes in subsistence and size population factors can affect the burden of disease both at the individual level and population.

The calculation of disability-adjusted life years (DALYs) takes into account several factors:

- Disability weightings for specific conditions established by the classification WHO of functioning, disability and health *(Internal Classification of Functioning, Disability and Health, Disability and Health,* ICF).
- Years lived with a disability.
- Years of life lost due to premature death.
- Number of cases observed in a population.
- Life expectancy.
- Number of deaths due to a disease.

In another related line of research, Alecia Schrenk (2019) combined the Bioarchaeology of Beware of the GBD method. With this approach, the hunter-gatherer community was studied— Collectors from Carrier Mills (Illinois, USA). This is a collection of 441 adult individuals. and subadults between 8000 and 2000 years old, of which 62 are identified as cases of care, totaling 65 years lived with disability according to the GBD method.

The approach called Bioarchaeology of Disability *(BoD)*
It was defined by Solange Bohling, Karina Croucher and Jo Buckberry (2022), based on a collective medieval of 28 disabled individuals in a population sample of 1543 individuals of the Late Anglo-Saxon period (8th-9th centuries). The method combines paleopathological and funerary analyses. and consists of three phases: 1) contextualization, including the specific bibliographic review of the period; 2) data collection, with the paleopathological review of all individuals with physical disability and the comparison of funeral treatment data; and 3) analysis, which integrates the data collected, the literature review, and the theoretical frameworks to explore perceptions contemporary disability. This method seems to place a more specific focus on mild unique aspects of the funeral treatment given to individuals with apparent disabilities, possibly influenced by religious beliefs.

In 2022, Roberto Sáez and Lorna Tilley promoted the creation of a research group of the Bioarchaeology of Care in Spanish (Sáez, 2023), with the following objectives:

- To raise awareness and disseminate information among the Spanish-speaking scientific community about the methodology of the Bioarchaeology of Care and on the subjects studied with it.
- To promote the identification of new case studies, and their review under this method of previous cases.

- Help define what care requires, including its approach as an attitude and moral conduct, as well as its proto-moral precedents.
- Organize conferences and discussion forums on the subject.
- Disseminate and facilitate materials, presentations and bibliography.
- To help spread the Bioarchaeology of Care among the general Spanish-speaking public.

One of the current focuses of this group is to study how research and information on the Past experience of disability, care, and compassion can help shape and to improve behaviors and values in the present. The goal of this is to address, with the multidisciplinary perspective (anthropology, archaeology, philosophy, education, and psychology) a complex question that they all pose in different ways: what is the point of knowing What is the purpose of our origins if they don't aim to improve humans and societies? Despite this? that prehistoric and historical archaeology enjoys great popularity among the public, in the Over the last decade, the number of studies exploring evidence that people lived with disabilities and received care at different times. Disability and care are Experiences so common that all humans can identify with them. Universality. This type of experience is supported by documented cases spanning all eras. and diverse geographical locations, and which accompany the evolution and development of humans. However, The media attention given to these reflections has essentially reached the platforms of communication in English, therefore there is a gap to be filled regarding research, discussion and dissemination in Spanish.

3. PROBLEM STATEMENT

In its early years, the Bioarchaeology of Care had a primary focus on
the study of skeletons to identify cases of individuals who are candidates for receiving care.
Tilley and Schrenk (2017) suggested some new possible directions for this methodology:

- A more focused approach to bioarchaeological research on disability and the
  care observed in specific sectors of the population:

  Or, a particular application of the above would be that of children, for
  addressing the complexity of distinguishing between normal altricial care and
  which are more specifically health-related, especially during the breastfeeding and
  early childhood. In this case, one question to explore is whether, in situations of
  high infant morbidity and mortality that often characterize the communities
  prehistoric, the Bioarchaeology of Care model could be used to
  Explore childcare provision at the population level.

  Another application sector would be that of elderly individuals, who normally
  There is an increased need for care due to issues such as frailty.
  of their health, insecurity, disability, vulnerability, abandonment or the
  abuse, contrasting possible conclusions drawn from the past with perspectives
  of the present on the matter.

- Extending the methodology to groups or populations. Similar to the previous point,
  In order to extend the Bioarchaeology of Care to the population level, one can analyze
  the effectiveness of care received by patients from healthcare centers or institutions
  Long stays and reception in historical periods. The extension of the method in periods
  Prehistoric studies can be supported by ethnographic research of present-day societies
  hunter-gatherers, for example, to link group care with variables of
  mortality segmented by age, epidemiological incidences, etc.

- The extension of the methodology to emotional, psychological and spiritual practices of
  Care. The Bioarchaeology of Care reconstructs a care practice and its
  general parameters based predominantly on the physical evidence of the remains
  humans, so that the impact of the disease can be estimated in terms of

bodily dysfunction. However, psychological, emotional, and spiritual support is available. They are invisible in the archaeological record, and can be equally essential to the care practice. Some of these intangible aspects of care can be inferred, for example, from osteobiographies and historical sources from health centers or religiously supported welfare programs in the Modern Age.

- Furthering paleopathological research through the exploitation of new technologies that, for example, detail certain manifestations of bone damage and their effects on the functional capabilities of the human body.

- The extension of the analysis to include not only skeletal remains, but also mummified soft tissues. The number of pathologies that manifest in bones is limited. In contrast, in tissues In soft tissues, the number of potential signs of observable diseases is greater, and Traces of treatments used on the individual can also be found (consumption of substances, application of ointments, tattoos in damaged areas, etc.).

Problem

Much of the context of the aspects described above has investigative efficacy. primarily focused on historical periods, where medical practices acquire a systematic and extensive knowledge and, ultimately, a structural sense. In the 5th century BC, The treatment of the disease underwent a significant shift since ancient Greece. Hippocrates of Kos introduced a deductive-associative approach that allowed for the establishment of a diagnosis, a prognosis, and an action therapeutic (Littré, 1841). This is the beginning of scientific medicine, based on foundations incipient technical and physiological approaches, which we now know as the Hippocratic school. However, Similar practices existed centuries earlier in Egypt, as mentioned by Homer and Herodotus. and Strabo. It is not the purpose of this work to develop the origin of Hippocratic medicine, but rather to highlight this milestone in order to contextualize the moment when certain things began to occur changes in the treatment of disabling problems, but these do not replace the actions folk healing practices and other prehistoric rituals to care for individuals with problems.

For their part, caregivers are also evolving the role of tasks Nursing. Knowledge of these tasks was acquired primarily through transmission. oral and through practical learning. A common trait of caregivers would be their desire to do the

work necessary for the care to be effective, and the development of skills such as
Empathy and respect for the dignity of patients. Those are the foundations of medicine and nursing.
They were modified, but they persisted, even without undergoing major alterations with the advances of
Renaissance, up to the 19th century. In any case, the actions we've been discussing throughout
This thesis must always be analyzed from a joint perspective of care and
treatment.

However, the Bioarchaeology of Care is also applicable to potential developments
additional aspects of the method that can address a problem more deeply rooted in the
Prehistory. In this period, the limitations of our knowledge of physical aspects are greater.
accused, imposed by the size and fragmentation of the fossil record, and the absence of many
elements of anthropological study that do not fossilize and create an immense hole in the
epistemology of the social and cultural manifestations of human communities
prehistoric. But equally noteworthy is the appetite to expand research into origins
of human behavior and, in particular, of one so unique because of what it means for progress
social, such as the care between humans.

These areas of focus constitute the starting point for the issues to be addressed in this
document, and can be grouped into five main types of questions:

1) Is it possible to identify certain elements of care in pre-human groups?

Tentatively, some components of the model could be recognized in specific subjects.
with a likelihood of having received some treatment, typically for resulting injuries
of their economic activity, or explore the emotions linked to child subjects with
Evidence of having been abruptly separated from their group. Related to the latter
In this case, the possible causes of the great [population] are still being debated among anthropologists.
accumulation of young *Australopithecus afarensis* individuals at site AL 333 of
Hadar (Ethiopia). There are at least thirteen, of which at least four are children. To this
The group is often referred to as the First Family, and may have constituted a buried collective
due to a flood, taking into account the lack of signs of deterioration from exposure to the elements or attacks
by carnivores. At this early point in human evolution, the interpretation of certain
Behaviors can be supported by primatological references, albeit in a limited way,
because we must not forget that present-day non-human primates have followed their own
evolutionary course parallel to that of humans. In fact, the brain size in *Au.*
afarensis is slightly superior to that of modern chimpanzees and bonobos, but its

Brain organization was similar, suggesting a period of somewhat different brain development greater (Gunz et al., 2020). But it is clear that, for the moment, the major lack of Information is a factor that makes the exploration of Bioarchaeology inadvisable. Care beyond the appearance of our genus *Homo,* when the deployment of the human behaviors begin to include certain inferred care actions of findings in the bones.

2) Can the specific bases of care for infants be outlined in the Prehistory? The record of child cases from prehistoric times analyzable according to the Bioarchaeology of Care involves more than ten individuals. The study of this group It will allow the generation of criteria for future research on children's health care; In particular, to identify the parameters of exceptionality of the attributes of said care in prehistoric communities, and to characterize the typologies of actions and of agents that are involved, tracing the possible singularities of a model of care for these vital stages.

3) Can any precursor elements of medical techniques be identified in prehistory? and correlate them with the care observed? In this area, in the fossil record We found several possible scenarios to explore: limb amputations body, trepanations (a surgical technique that involves drilling a hole in the skull), the dental treatments with therapeutic use, and the use of plants with medicinal properties.

4) How to evolve the methodology of Bioarchaeology of Care towards application in prehistoric human groups? Although these are scarce, certain groups hominin fossils such as those from the Sima de los Huesos in Atapuerca (Spain) provide a clear scenario of potential research in this regard.

5) Can the Bioarchaeology of Care method be given an evolutionary approach? Analyzing a set of cases representing different human species from Pleistocene, and another set of specimens from the cultural periods prehistoric Holocene (Epipaleolithic, Mesolithic, Neolithic and Metal Ages), Can similar practices be found throughout evolution and across different societies? human species? Is there a way to quantify the magnitude of care and to find evolutionary patterns based on quantitative and qualitative markers?

4. OBJECTIVES

The fundamental objective of this thesis is to propose the development of the methodology of the Bioarchaeology of Care with a particular focus on prehistory, starting from the compilation and study of all care cases published to date, and across five axes:

- To demonstrate that care has been a consistent behavior in human evolution, and forms part of the package of behaviors considered uniquely or markedly humans, which began to develop with the origin of our genus *Homo.*

- Establish criteria for extending the method to human populations, where it has been evidenced experiences of illness and care in more than one individual belonging to the same group.

- Identify basic health care criteria for children in prehistory, on which to base future research.

- Recognize early components of therapeutic and pharmacological practices or techniques, and correlate them with the care provided in prehistory.

Along with the above, an additional goal of this work will be to create a knowledge base a living document that compiles all the cases where the Bioarchaeology of Care method has been applied, as well as others in which his research has shown the existence of care elements received by the subject studied. For each of the cases, this work will provide markers quantitative and qualitative data on potential evidence of health care and its probable intensity, which will complement the qualitative criteria proposed by the Care Index (Tilley) and Cameron, 2014). This knowledge base aggregates and summarizes more than two decades of study in This field, and can serve as a point of reference for future research.

Finally, one of the fundamental objectives of this thesis is to serve as a vehicle for disseminating Information and data on the experience of disability and its care in the past, with the The purpose is to raise awareness and provide training on these types of behaviors today. Understanding can, first of all, challenge long-held beliefs about the prevalence of

violence in ancestral human societies and, secondly, to stimulate reflection on
of specific values in contemporary societies.

The possible outcomes range from a deeper understanding of the universality of these
shared experiences, even the motivation to explore approaches towards more positive behaviors
compassionate. In this context, the outreach activities carried out during the
period 2019-2023 and the main lessons learned from these initiatives will be presented.

For the identification of evolutionary patterns and techniques in caregiving behaviors among Humans in prehistory, quantitative and qualitative markers will be used based on Elements of the Bioarchaeology of Care. This method consists of four stages sequential (Tilley, 2015) to identify, order, analyze and interpret data in a systematic. Each stage is built on the basis of information, observations, and conclusions. of the above, and are described below.

Stage 1: Description, diagnosis and documentation

In this first stage, all possible information is gathered about the individual and their way of life. It is an exhaustive and indiscriminate data collection process, in which certain data Though seemingly less important, these can provide useful information for later stages of the behavior and identity, both of the caregiver and the care recipient. The quantity and reliability of the The content of this first stage will determine the quality, scope, and depth of the analysis, as well as such as the interpretation of care.

For each individual, the search and recording of information must be carried out with at least the following minimal structure:

- Basic descriptors of age, sex, integrity and condition of the remains.

- The nature and distribution of disease indicators, differential diagnoses and the most likely diagnosis.

- The context of the recovery, the arrangement of the remains and possible associated artifacts.

Although in some case studies a specific diagnosis may not be possible, the description Detailed pathological indicators can provide sufficient information to consider in the next stage possible impacts on functional capacity.

Documentation of the context of life forms in stage 1 includes:

- The explanation of geography, topography, and climate, independent variables that can to influence what is considered a disability in this particular case, as well as what care is needed. are necessary and in which are they possible.

- Information on the organization and cultural, social, political practices and economic factors of the community to which the subject belonged, including parameters such as Group size and composition, food production and diet, lifestyle domestic, occupations, belief systems and/or ritual activities, differences of gender and/or status, technological development, production of artifacts, trade or exchange between groups, internal or intergroup violence, and funeral traditions.

- Estimation of the general health status of the population and identification of previous cases of care in it, if any.

Bioarchaeological analysis of evidence of care can begin long after the examination of the remains outside the site, based on the description and analysis of the skeleton published. Sometimes, during the excavation process, they can already be observed indicators of pathology are evident while the remains are still *in situ,* allowing for estimation implications of survival in the context where it occurred, and thus guide the analysis detailed bioarchaeological.

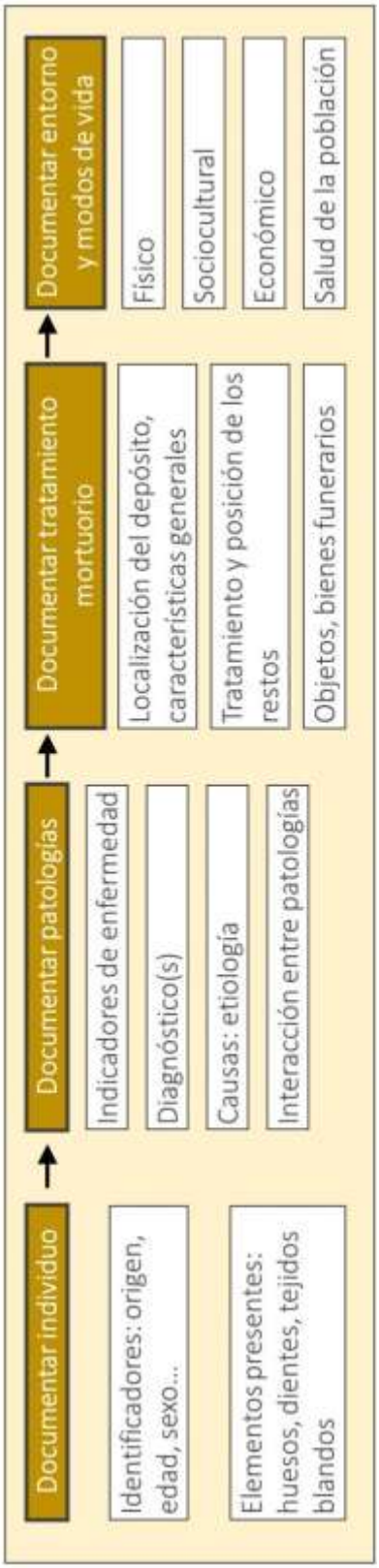


Figure 1. Stage 1 of the Bioarchaeology of Care methodology: Description, diagnosis and documentation.

Stage 2: Assessment of disability and care needs

This second stage is divided into two sections:

- The range of known clinical symptoms associated with the nature and extent of the pathology indicated by the skeletal evidence, and which ones are noted The individual could have had them.

- The likely impact of these potential symptoms on the individual's ability is examined. to function successfully in their everyday environment.

Based on the results of the analysis, it is assessed whether the subject experienced a level of disability that required the provision of care, according to different probability ranges.

Clinical Impacts

It begins with a consideration of the potential primary and secondary clinical impacts of the pathology of the individual, based on modern medical literature, assuming that the responses basic human biological factors are reasonably linked to certain disease symptoms independent of time and culture for the purposes of this examination.

The process of working with the Care Index provides a list of body systems and functions Adapted from the International Classification of Functioning, Disability and Health (ICF) of the World Health Organization (WHO):

1) Neuro-musculoskeletal and movement-related.
2) Mental: intellectual, consciousness, attention, language.
3) Cardiovascular.
4) Respiratory.
5) Digestive, metabolic and endocrine.
6) Integumentary.
7) Sensory functions / nervous system (I): pain, for example, acute, chronic, intermittent.
8) Sensory functions / nervous system (II): others, for example, sight, hearing, balance.
9) Hematological.

10) Immune.

11) Genitourinary, reproductive.

12) Others.

From this, it is identified which of these areas may be potentially affected by the disease in question, which ones were likely affected in the case of the subject (qualified ranging from "not involved/impossible to say" to "probable"), the symptoms that the subject may have experienced in each area (rated as "likely" or "highly likely") and the severity and probable duration of each symptom according to the ICF criteria (available on the ICF website) https://icd.who.int/dev11/l-icf/en). Certain diseases can be commonly associated with Specific complications and/or comorbidities that are not likely to leave a skeletal trace. In In some circumstances, these impacts can be taken into account in the analyses of stages 2 and 3. and, if so, detail the reasons.

When the remains of an individual show evidence of more than one disease, or when there are In cases of conflicting diagnoses, the previous exercise is repeated for each pathology.

The assessment of the individual experience of disease symptoms based on the Bone injuries should be treated with the utmost caution and a conservative approach, and the following should be considered: minimum level of clinical impact suggested by skeletal testing. However, this level minimal impact may be sufficient to justify considering how the disease It could affect the individual's ability to function normally in their community.

Functional implications

The second part of stage 2 addresses the possible limitations of the activity and restrictions of the participation that affects the individual as a consequence of the pathology. Examines the functional implications of clinical impacts in terms of the individual's potential to To perform essential and instrumental activities of daily living. For this purpose, the following are considered: reference modern widely used health assessment measures.

Essential activities

Essential activities of daily living refer to those basic tasks in which the
Competence is a prerequisite for enabling a minimum level of self-care. The assessment according to the Care Index is based on six activities:

- Access to food and water nearby.

- Eat and drink without help.

- Manage personal hygiene.

- Handling objects in the immediate vicinity, including dressing oneself.

- To travel a limited distance.

- Controlling body position, for example, moving from a resting position to one of
  sitting.

If any of these tasks exceeds a person's capacity, it implies that they will depend to some extent on others.
measure of others to survive, regardless of the environment.

Instrumental activities

Instrumental activities are those tasks that make up the fabric of everyday life.
economic, social, domestic and interpersonal tasks within a community, which would be considered normal and appropriate for the members of a given group. The assessment of ability
The likely functional capacity to perform instrumental activities depends almost entirely on the environment.
A sick person may still be able to perform essential activities of daily living,
but finding it impossible to participate in all the instrumental aspects of community life
a level that meets the needs and/or expectations of the community.

The process followed to carry out the assessment according to the process proposed by the Index of
The following is a warning:

1) Seven domains of instrumental activity are taken as a reference (based on Australian Department of Veterans' Affairs, 1998; Chong, 1995, Lawton and Brody, 1969; ICF of the WHO, 2003):

or Basic lifestyle (e.g., settlement practices).
or Economic activities.
or Domestic activities.
or Mobility patterns.
or Community life (social and cultural activities not covered above).
or Interpersonal relationships.
or Learning/application of knowledge.

2) The context established in stage 1 is used to describe, in relation to each domain, the activities typically addressed, and the physical, social and economic factors of lifestyles that can affect, positively or negatively, their fulfillment on the part of the subject.

3) The subject's ability to participate in tasks in each domain is evaluated at a level appropriate.

4) Based on the results obtained, it is considered whether the effects of the disease compromise the subject's ability to perform instrumental activities to the point of needing direct or indirect help, postulating the minimum probable impact on the operational capacity.

At the end of stage 2, it is proposed whether the individual likely required any related help with health to ensure survival with their disability. If it cannot be justified Care provision, concludes the analysis of the Bioarchaeology of Care.

Figure 2. Stage 2 of the Bioarchaeology of Care methodology: Assessment of disability and of the need for care.

Stage 3: Development of a Care Model

If it has been concluded that the individual was likely to receive health care,
The analysis for stage 3 should address the following tasks:

- To situate what has been deduced about the clinical and functional repercussions of the pathology (stage 2) in the subject's life context (stage 1).

- Examine what responses, along a continuous scenario that ranges from support Directly related to adapting to difference, resources could have been provided to address the effects of these impacts.

- Consider the likely duration of care, possible changes in practice care over time, the effort and likely resources involved in the provision of care, and its effectiveness.

The results should allow for the construction of a plausible model of the aspects of care received. by the subject, bearing in mind that it will always be a partial view. For example, it will not be able to include the psychological or spiritual needs of the individual, although their existence would contribute to to determine the form and content of their care. Information is generally scarce or nonexistent. about how a particular disease was understood in a specific cultural environment, but this Understanding influences both the way the community views the individual and the type of the treatment offered. Finally, the conservative approach necessary when interpreting the The likely clinical and functional implications of the disease could lead to undervalue some practical requirements of the care of the subject.

Despite these limitations, the model proposes the identification of a series of components basic aspects of care practice that occurred with a high probability. This approach It is based on the fact that, just as there is a general uniformity in physiological responses to certain disease stimuli, which allows for the analysis of the clinical impact in stage 2, There is also equivalent uniformity in the basic measures to address these These responses transcend cultural and individual constraints. These measures are classified in two large groups:

Provision of care in the form of direct help or support

The Bioarchaeology of Care proposes ten possible "constants of care" (based on Henderson, 1964, 1966):

1) Food and water supply: may include special diet and assistance with eating or drinking.

2) Maintaining body temperature within the normal range: may incorporate protective actions such as providing shade or shelter.

3) Aid for rest and sleep, such as postural adjustment and pain relief.

4) Ensuring physical security, including protection against threats from self-harm and other domestic and environmental injuries, for example, from predators or others animals, or from other human groups; it may also require periodic supervision [see 6].

5) Maintenance/mobility assistance, as an essential part of the management/recovery of disease, since immobility can be fatal [see also 8].

6) Monitoring health status, to respond in a timely manner to physiological needs and to avoid health crises [see 7, 8 and 9].

7) Maintaining personal hygiene and cleanliness, to protect the integrity of the skin and prevent and treat infections.

8) Physical manipulation: turning, lifting, facilitating stretches and massages essential for to maintain/improve the function of body organs and systems in cases of immobility [see 9].

9) Maintenance of physiological function: involves timely response to metabolic, respiratory, gastrointestinal, circulatory, urinary, etc. dysfunctions; It includes physical handling, temperature control, diet, and hydration.

10) Specific interventions/technologies, involving invasive or non-invasive surgical actions invasive, orthopedics, trepanation, amputation, hemorrhage control, application of medicinal products, prostheses, etc.

With this reference, the following steps are followed to identify direct support:

- It is indicated whether one or more of these care constants were an element of care
  of the subject with a high or some probability.

- It describes what this component of care might have consisted of in practice.

- The period during which this form of care was provided is estimated, and how it may have occurred
  changed over that period.

- The probable costs incurred in providing said element are considered
  Care, in terms of resources used and additional work directly or
  indirectly.

Adaptation or accommodation to difference

The consideration of adaptation to difference is based on the instrumental activities of the
daily life of stage 2, assessing the individual's probable functional capacity in relation to
the activities of each instrumental domain.

When it is considered unlikely that the subject was able to perform "normally",
An attempt is made to identify possible adjustments to the group's expectations and practices necessary to
to accommodate or adapt to the individual's disability. To do this, one can reflect on a
a variety of adjustments and alternative activities suitable for an individual with a disability
specifically.

Although the strategies applied cannot be known for certain, this exercise allows us to identify
a range of options for care delivery, and reference to context (stage 1) may
Justify that they be classified by order of probability. This leads to a consideration of the nature
of the care provided and the community that provides it, as preparation for stage 4.

This is done in the same way as in the analysis of direct support options:

- The domains of instrumental activity are listed (see the *Activities* section).
  instrumentals in stage 2).

- Possible necessary adaptation strategies are identified, with much or some probability.

- The period during which these strategies were applied is estimated, and how they may have changed.

- Costs incurred are taken into account.

Although the level of detail will depend on the quality of the anthropological and archaeological evidence available, at the end of stage 3, the combination of the components of the provision of Care identified with certain probabilities allows the construction of the Care Model specific to the individual and their context.

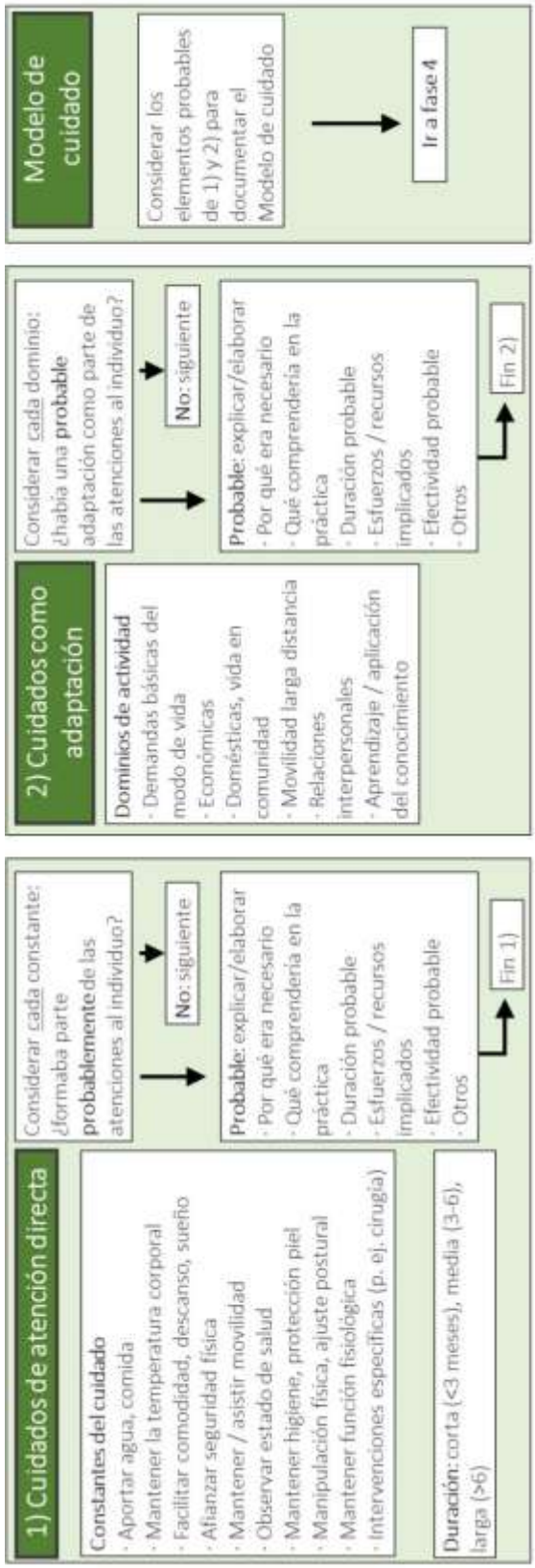


Figure 3. Stage 3 of the Bioarchaeology of Care methodology: Development of a Model of Careful.

Stage 4: Interpretation, Agency, and Identity

The analysis of stage 4 is based on the premise that the behaviors involved in both the
The provision of care, as in the receipt of care, expresses the capacity for action (agency) of the
individuals who receive them, and that this capacity allows for the identification of aspects of group identity
and individual. To this end, based on the Care Model, reflection on its elements and its
Possible combinations or recombinations lead to exploring what a specific case of care can
reveal about the social relationships, organization, and practices of the community where he had
place, and about the life experience and personality of the individual being cared for.

Thus, given a certain living environment where a certain form of
care, or survival occurred in relation to a pathology with certain impacts
Given these findings, the conclusion of the investigation must answer the question of what these findings suggest.
findings on the context of care and/or on the group providing it and/or on the individual who
He receives them.

All stage 4 analysis involves an interpretation of inferred behaviors and, therefore,
It is speculative, although based on the findings resulting from the methodology followed. Therefore,
The investigation can end in stage 3, or continue in stage 4, indicating the
assumptions made and the possibility of containing subjective biases.

Collective action and identity

The first part of stage 4 addresses what the decision to provide care consisted of and how it was carried out
was able to reach her, what care options would be available and which ones could have been applied,
And what do the answers to these questions suggest about how the community functions in
In general, through a generic decision path:

1. Identify the need for health-related care.

2. Evaluate considerations for and against the provision of care.

3. Deciding to provide care.

4. Develop strategies for the provision of care (support / adaptation).

5. Decide to start care.

6. Observe the progress.

7. Review the strategy continuously, incorporating feedback from observations of progress. To abandon care during the process, or to cease it when the individual recovers or when it dies.

8. Additionally, perform funeral arrangements. This procedure is not interpreted as an extension of treatment during life, but it does provide possible information about this.

The aim is to infer what these decisions imply about the goals and motivations of the individuals involved, and details of the lifestyle, environment, skills, and traditions from which We have no direct archaeological evidence.

One aspect of the motivation to provide care could be analyzed from the perspective of the costs or efforts that caregivers were willing to assume. The provision of care among Human behavior is complex, and there can be multiple motivations, even contradictory, difficult to capture with a simple model. Similarly, the objectives They could focus in terms of primary purpose as practical outcomes of care immediately achievable, but many other factors influence these results.

They move away from a cause-and-effect perspective. Among them, we can highlight the improvement or deterioration of the state of the subject's health status, as well as the variability of their psychological state, the presence of people willing and able to provide care and the nature of their relationship with the recipient of These factors include changes in the physical environment and the availability of resources.

In any case, the decision path described above should not be taken as an inventory of sequential behaviors, but as a basic map to undertake the search interpretive.

At each point along the decision path, the elements of the Model are incorporated. Care developed in stages 1 to 3, resulting in decision domains in which the following are addressed the implications of the most likely decision or action taken for understanding the aspects of the community: organization and relationships among its members, objectives and motivations that

What do these hypothetical goals and motivations suggest about identity that drive care?
social group.

This process lays the foundation for the next task, in which specific questions are formulated about each case study, in order to obtain the most complete picture possible of the community where care was provided:

- Suggestions regarding culture, values, and identity, stemming from the decision to caring for a specific individual in a lifestyle with signs of interpersonal violence frequent.

- Implications for social relationships of the decision to provide long-term care to a severely disabled individual in a subsistence environment.

Individual action and identity

The second part of stage 4 is about creating an impression of the individual subject of the case study. The search for the individual identity of the care recipient is a difficult investigation that to try to unravel the collective identity of the community that provided it.
In the bioarchaeological study of care, the beneficiary of said care is identified only by the skeletal indicators of the pathology experienced, but no one is simply the product of his illness. On the other hand, the response to the experience of living with a disability serious enough to require care reflects and shapes aspects of identity staff.

Although the nature of the pathology and the environment in which it occurs largely determine The nature of care is also shaped by the individual and their caregivers. function of traits such as strength of character or role and status in the group. The subject of the Care possesses agency, although this is limited to choosing between cooperating or not cooperating with the The care offered to you. Through information from this agency's statement, you can to obtain clues about their personality, especially when the individual needed direct support for a severe disability over a long period of time. In these cases, survival It can be interpreted as both a personal achievement and a result of the quality of care, which can provide clues about social and even individual personality. When attention has

Since it has been in the form of accommodation, the investigation is much more complex to determine, from From the bioarchaeological evidence, where does the community's adaptation to disability end? and where personal fulfillment begins, or vice versa.

Individual identity comprises biological, behavioral, and social characteristics that are They combine to create a person unlike any other. This research seeks to... an approach to understanding who the recipient of care was, as follows:

- A comprehensive osteobiography of the subject is prepared, covering their physical characteristics, family and social factors, possible experiences of disability and care, and variables of the lifestyles that can influence cultural, economic, and social performance.

- The subject is presented as an agent or actor, adapting the generic questions as appropriate. focused on aspects of the care experience and the response to it.

- New, specific questions arise regarding the subject's personality and motivation, the demands of cooperation in their own care, and what such cooperation entails in terms of required contribution to the community and personality traits.

- Discussions focus on how an individual adapts to having an illness or disability. In terms of resilience, habit, severity, and impacts… Always with a critical perspective, it must to reflect on the degree of self-reliance that he/she may have had individual in their social and environmental context.

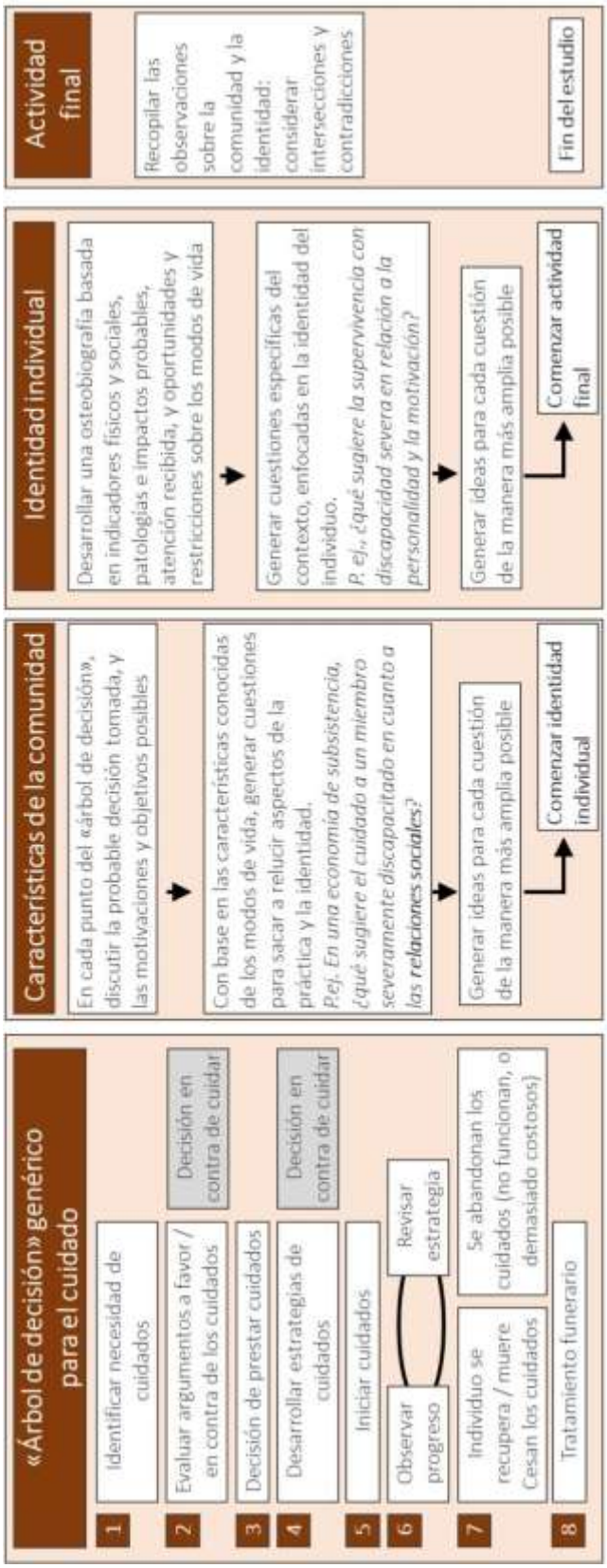


Figure 4. Stage 4 of the Bioarchaeology of Care methodology: Interpretation, agency and identity.

6. METHODOLOGICAL FRAMEWORK

Research to identify an evolutionary pattern in caregiving behaviors among Humans is based on the use of quantitative and qualitative markers based on the Bioarchaeology of Care. The methodology used for its definition is described below.

and calculation:

1) Review of secondary literature and consultation with experts to understand the state of the art of the theme.

2) Study of care experiences provided to individuals with disabilities and health problems. 101 cases are reviewed and compiled from their primary sources, corresponding to at least 275 individuals, and are segmented into the following periods temporary:

Period	Number of cases	Minimum number of individuals
Lower Paleolithic	7	7
Middle Paleolithic	21	31
Upper Paleolithic	8	9
Mesolithic	4	5
Neolithic	22	52
Chalcolithic	1	1
Bronze Age	5	9
Late pre-colonial prehistory	19	143
Middle Ages	7	11
Modern Age	7	7

Table 1. Number of cases and individuals in the sample of this thesis, distributed by period.

For the last two periods (Middle Ages and Modern Age), a limited sample is taken of cases with the specific objective of comparing the conclusions obtained in the previous periods.



Figure 5. Geographic distribution of the 101 cases in the sample. Legend: Lower Paleolithic (yellow), Middle Paleolithic (orange), Upper Paleolithic (red), Mesolithic (dark gray), Neolithic (brown), Metal Ages (light gray), Late Pre-colonial Prehistory (green), Middle Ages (purple), Age Modern (blue). Map accessible at https://www.google.com/maps/d/u/0/edit?mid=1RO2jBL6F-ZYyUizl3OTwLfNYhQJbNszJ&usp=sharing

3) Definition and structuring of a database that integrates care experiences,

as well as other informative dimensions extracted from its analysis required to design a evaluation system:

a. Dating and period

b. Site

c. Number of individuals

d. Specimens

e. Human species

f. Scientific publication

g. Summary

h. Study according to the methodology of Bioarchaeology of Care (yes/no)

i. Main and additional types (if applicable) of impacts

4) Definition of a set of markers to identify and segment behaviors of

care, representatives of the four stages of the Bioarchaeology of Care, that

will allow for the evaluation of the analyzed case studies:

Stage	**Scoreboards**	**Definition**
Description, diagnosis and documentation	Multiple cases of careful	Individual case or association with multiple cases of care within the same population
	Child	Child individual
	Advanced age	Elderly individual
	Hunter-gatherers	Individual belonging to a society with an economy hunting and gathering
Evaluation of disabilities and need to care	Clinical characteristics	Number of systems/functions with impacts clinical
	Functional Impacts	Number of essential daily activities committed
		Number of instrumental activity domains committed
	Direct support	Number of estimated care constants that were provided as direct support

Stage	Scoreboards	Definition
Construction of model of attention	Adaptation based on duration of careful	Estimated degree of adaptation or accommodation in function of the duration of care
Interpretation of implications of the care	Collective action	Number of episodes or decision cycles on care
	Individual action	Implication of survival or disability in relationship with the individual's identity
	Medical intervention or pharmacological specific	Documentation of a therapeutic treatment or specific pharmacological treatment, including trepanation, assisted amputation, treatment dental, pharmaceutical residues…
	Burial	Individual with Paleolithic burial, or burial with unique characteristics in later periods

Table 2. Markers to identify and segment care behaviors.

5) Evaluation of the level of care experienced in each case study, through the obtaining a Care Indicator (CI), as described in the Process section practical.

This methodology allows combining a quantitative and qualitative approach to measure intensity probable care, which complements the qualitative perspective introduced by applying the Care Index to the study of each case. In this way, it is possible to outline what the evolution of caregiving behaviors among humans based on documented cases And, on the other hand, a more general reflection on this behavior can be carried out. comparing some cases with others, according to different axes of analysis (period temporal, infant cases, correlation with hunting-gathering economy, with burials special, intervention of therapeutic techniques, etc.). Each of the defined markers They previously constituted filters in the database of care cases on which to perform sample segmentations and future in-depth work.

7. HYPOTHESIS

The central hypothesis of this research argues that it is possible to identify an evolutionary pattern in The behavior of care among humans in prehistory. This can be achieved through the evaluation of quantitative and qualitative evidence, primarily acquired through of markers based on the Bioarchaeology of Care method. It is proposed that this process It facilitates obtaining information about the origins and related bioarchaeological signals with specific milestones in the development of specialized skills and techniques aimed at caring the health of disabled individuals.

These health conditions or injuries not only posed a physical difficulty for the individual affected, but also a significant functional challenge for the group as a whole. In this In this context, it is suggested that the cultural environment of human groups can provide Additional manifestations that frame care in relation to other strategies collaborative projects, which are developed in various geographical regions that have been the subject of human expansion.

8. REFERENCE FRAMEWORK

To carry out this research, a number of cases as large as possible is needed and representative of different prehistoric periods, cultures, human species and geographies.

Given that the fundamental theoretical framework is the aforementioned method of Bioarchaeology of Caution, a clear sample for the present research consists of 33 cases of study where this methodology has been applied, as well as other methods used to a lesser extent measure, such as the Bioarchaeology of Personality (Boutin, 2016) and the Burden of Disease (Stodder, 2017).

This initial frame of reference is complemented by another 68 cases identified in the scientific literature (primary and secondary sources) with documented characteristics linked to the needs and provision of care, totaling 101 cases in the sample analyzed for this research, which correspond to at least 275 individuals, and which are summarized below:

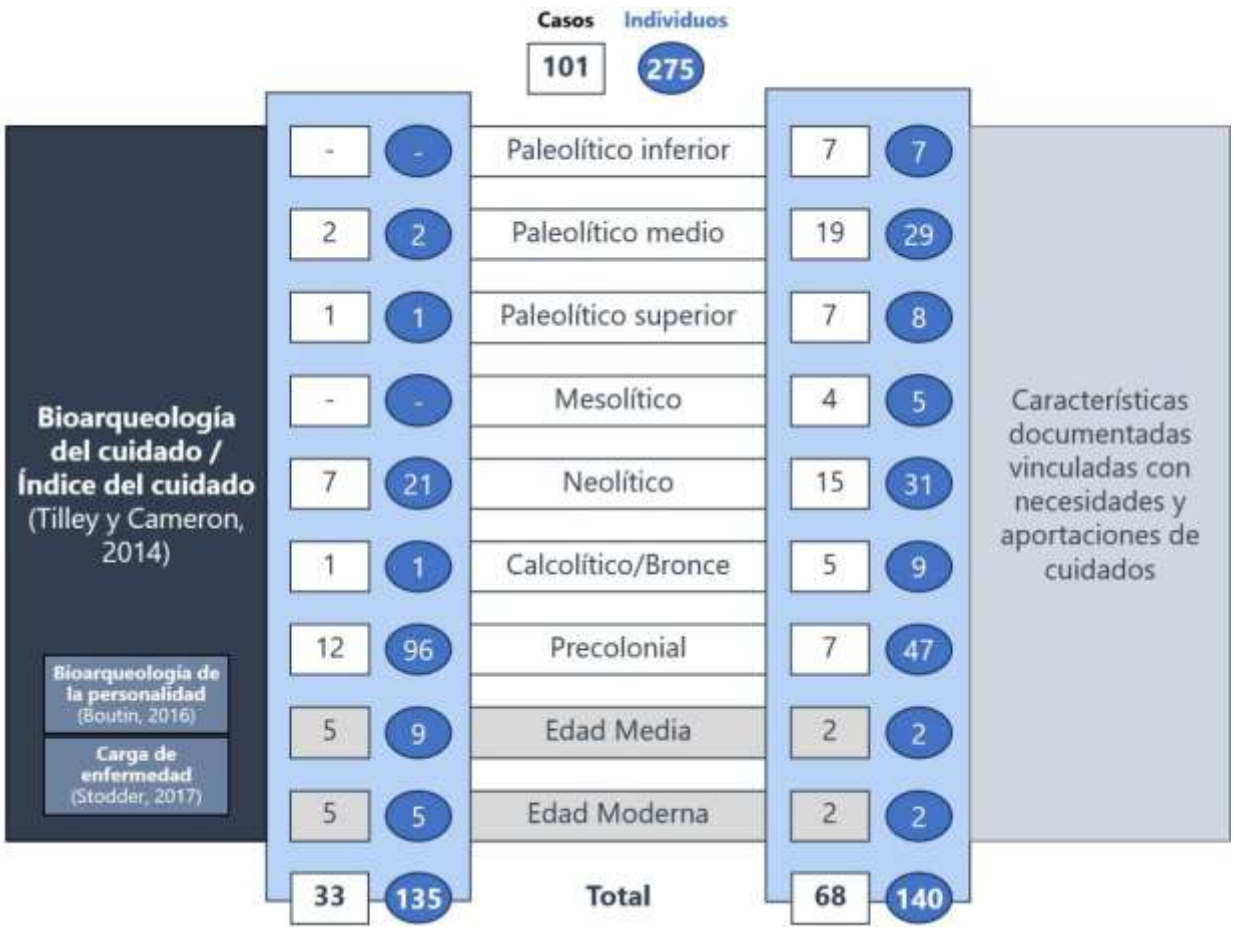


Figure 6. Graphic summary of the Reference Framework of this thesis.

N	Dating Period		Place	Specimen	Source Species	
1	1.77 Ma (millions of years)	Lower Paleolithic	Dmanisi, Georgia	Dmanisi hominid 4 (D3444/D3900)	*Homo erectus*	Lordkipanidze et al. (2005, 2006)

Skull and jaw of an adult *Homo erectus male,* who lived without teeth for a time
It was very prolonged before death, except for the lower left canine. Apparently, it survived.
without consuming anything that required strong chewing, possibly only soft foods
plants and animals and/or by virtue of the help of other individuals.

In the same layer, lithic tools and animal bones with cut marks were recovered.
and percussion, indicative of the processing and consumption of meat that must have been key for those
Hominins in the high latitudes where they lived, especially in winter. The ingestion of tissues
soft foods like bone marrow or brain, or previously chewed meat, would increase the
chances of survival for this individual with chewing problems, who would benefit
of the group's cooperation to obtain the nutrition necessary to survive.

Primatological references to edentulous apes have limited utility in this case, since
that no living ape inhabits an environment similar to that of Dmanisi 1.8 million years ago. Therefore, the
Implications regarding possible assistance to edentulous hominins, in the context of biocultural data
preserved at the site, raise interesting questions about social structure and the
subsistence strategies of the first *Homo* (Lordkipanidze et al., 2005).



Figure 7. Edentulous individual from Dmanisi (skull 4).

N	Dating Period		Place	Specimen Species	Source	
2	1.5-1.7 Ma	Lower Paleolithic	Koobi Fora, Kenya	KNM ER-1808	*Homo erectus*	Walker et al. (1982) and Walker and Shipman (1996)

Remains of an adult female *Homo erectus* with evidence of chronic hypervitaminosis A, a
A condition that causes periosteal calcification of long bones and is associated with complications
severe musculoskeletal and vascular complications. Known clinical consequences suggest that
He survived for weeks or perhaps months, suffering from blood clots so extensive that he must have been
completely immobilized by the pain.

It is concluded that he had dedicated caregivers who provided him with food, water, and protection.
against predators, and it is suggested that their prolonged survival marks the beginning of the
Human sociability. Their care reflects strong bonds between individuals that came to exceed the
bond and friendship that we see between baboons or chimpanzees or other non-human species (Walker
and Shipman, 1996).

N	Dating Period		Place	Specimen Species	Source	
3	1.5-1.7 Ma	1- LP	West Turkana, Kenya	KNM WT-15000	*Homo erectus*	Haeusler et al. (2013), Romero et al. (2022)

Extensive bone remodeling of the L4 and L5 articular process in the Nariokotome Boy
(Homo erectus) suggests a herniated disc that occurred several months before his death. The pain of
Back pain and recurring sciatica would limit their daily activities at least temporarily, such as
Hunting, running, or long-distance running. This indicates the attention span of the
health and social care in early *Homo* (Haeusler et al., 2013; Romero et al., 2022).
Finally, this individual suffered a severe infection in a molar, which may have been the cause of the
death by generalized septicemia.

N	Dating Period		Place	Specimen Species	SH	Fountain
4,430	ka (thousands of years)	Lower Paleolithic	Abyss of the Bones, Spain	Cr-14 Pre-	Neanderthal Gracia et al.	(2009)

Skull 14 from the Sima de los Huesos, belonging to a girl between 8 and 12 years old, shows
evidence of single-suture lambdoid craniosynostosis with endo- and ectocranial deformities
severe, probably associated with elevated intracranial pressure. This rare congenital condition

It is associated with a progressive decline in cognitive ability and physical appearance. Gracia et al. (2009) emphasize that the cranial deformity was evident at birth or shortly thereafter, and their survival This indicates that the hominins of Sima de los Huesos tolerated abnormal/sick individuals. during childhood. Nicknamed Benjamina ("the most beloved"), this girl may have required Extraordinary care allowed them to survive for several years before dying at the end of childhood. It is noteworthy. the nuance that his condition was not an impediment to receiving the same attention as anyone else another child in this Middle Pleistocene group.

Some primatological studies of chimpanzees in the wild also point to cases of disabilities, especially of individuals with severe limb injuries caused by humane traps, even leading to complete amputations (Stokes and Byrne, 2001). Without However, these observations occur in adults already well integrated into their groups, whereas What seems to be missing from the repertoire of apes is the survival of individuals with serious congenital anomalies such as Benjamina's (Hublin, 2009).

N	Dating	Period		Place	Specimen	Species	Fountain
	5,430 ka		Lower Paleolithic	Abyss of the Bones, Spain	SH Pelvis-1	Preneanderthal	Bonmatí et al (2011)

This specimen, nicknamed Elvis, includes the pelvic bones and lumbar vertebrae. Its study suggests that the individual suffered spondylolisthesis (displacement of the lumbar vertebrae) and Lumbar kyphosis, which would cause postural problems and pain. Daily physical activities The individual's rights would have been restricted to some extent. This individual died at over 45 years of age. according to the pattern of changes in the articular surfaces of the os coxae in modern humans. The presence of degenerative pathological lesions in this individual makes it evidence oldest postcranial bone of an elderly individual in the human fossil record.

N	Dating	Period		Place	Specimen	Pre-Neanderthal	Fountain
	6,430 ka		Lower Paleolithic	Abyss of the Bones, Spain	SH Cr-5	Species Ros Velasco (2019) and Romero et al. (2022)	

The hominin from skull 5 of Sima de los Huesos suffered a severe blow to the left jaw of his face, which caused his death from generalized septicemia a few days or weeks later of this event. In the period from the blow to his death, he suffered great agony that It would prevent them from carrying out daily activities under normal conditions, and even from eating and drinking.

Symptoms during that time may have included fever, difficulty breathing, tachycardia, hypotension, chills, fatigue, drowsiness, delirium, mental confusion, etc.



Figure 8. Skull 5 from Sima de los Huesos (Atapuerca). It presents a midfacial traumatic injury in the left side.

N	Dating	Period	Place	Specimen	Species	Fountain
7,400	ka	Lower Paleolithic	I left, Morocco	Salé-1	*Homo erectus*	Hublin (1985; 2009) and Bower (1994)

Cranial remains of a young adult showing cranial distortion and muscle trauma
Derivatives of congenital torticollis. This condition is also associated with limitations in movement. of the limbs, hip displacement and clubfoot (serious malformation congenital musculoskeletal).

The Salé individual had reduced mobility, but still survived to adulthood, which This implies a certain degree of compassion in early social groups (Bower, 1994). The survival of the individual Salé is explained as a product of "evolved altruism" (Hublin, 2009).

Although after its publication it was classified in the species *Homo erectus* (Jaeger, 1975), different Subsequent evaluations of the skull highlight the difficulty of classifying it due to the distortion of the fossil. It could also represent a basal group of *Homo sapiens* (Hublin, 1985).

N	Dating	Period		Place	Specimen	Species	Fountain
	8,180 ka	Middle	Paleolithic	Bau de l'Aubesier, France	Bau de l'Aubesier 11	*Homo neanderthalensis*	Lebel et al. (2001), Lebel and Trinkaus (2002)

This is an elderly Neanderthal individual. His right hemimandible, which is
It is complete and extends to the alveolar margin of the left canine, showing evidence of a
generalized active infection for a long time before death, with loss of all
teeth. This individual likely experienced severe pain that prevented chewing, and
He would have lost this function during the final stage of his life, which was prolonged. It is unlikely.
that he survived as a collector without social assistance.

The abundant archaeological remains suggest that this individual was part of a very high social group
active in that place, where the consumption of animal meat was far greater than that of vegetables. The form
The assistance could have ranged from the selective placement of softer foods to the
Assistance in preparing food in a form suitable for swallowing. This assistance
It could have made the difference between rapid starvation and a prolonged life (Lebel and
Trinkaus, 2002).

The survival of Aubesier 11 supports the existence of an important social component in the
persistence of the individuals during that period of time, and the conclusion that their group had
reached a level of sociocultural development sufficient to sustain individuals
weakened and provide the motivation to do so (Lebel et al., 2001). DeGusta (2003) rules out
that it is a case of specific care for Neanderthals, comparing the limited number of
documented cases of archaic human species with those of adult non-human primates.

N	Dating	Period		Place	Specimen	Species	Singa,	Fountain
	9,133 ka	Middle	Paleolithic	Sudan Singa	*Homo sapiens*	Spoor et al. (1998)		

Calvaria of an early modern human, with no identified sex or age, showing signs of a
blood disease that resulted in an irregular shape of the parietal bones and growth
anomalous bone in the right temporal region. Probably lived with labyrinthine ossification.
extensive, which would result in loss of auditory and vestibular functions, and with anemia.

This individual would go through a period characterized, at a minimum, by bodily coordination.
severely affected and, in the worst cases, by a serious infection such as bacterial meningitis

or septicemia. In addition, he had a considerable disability due to permanent hearing loss and Other symptoms associated with the blood problem. Cautiously, the study by Spoor et al. (1998) introduces the discussion that the survival of the individual might have required the care of others.

N	Dating	Period		Place	Specimen	Species	Fountain
10,1	30 ka	Middle	Paleolithic	Krapina, Croatia	10 individuals	*Homo neanderthalensis*	Eddie (2013), Estabrook and Frayer (2014), Spikins et al. (2018)

Osteological analysis of the ulna Krapina 180 indicates that it suffered an amputation (Eddie, 2013) long before the individual's death (Estabrook and Frayer, 2014). In the collection In the Neanderthal from Krapina, it is observed that the frequency and location of traumatic injuries are within the range observed in modern hunter-gatherer groups and nomadic groups in which interpersonal violence is part of the way of life (Estabrook and Frayer, 2014).

Spikins et al. (2018) compile other individuals from Krapina with potential care needs. Krapina 4, 5, 20, 31 and 34.7 have blunt force trauma to the head, with evidence of scarring, as well as purulent infection in the case of Krapina 4, which may have required Cleanliness and care. In addition, postcranial traumas are noted in individuals 106-110 (affecting vertebrae C4-C7), fibrous dysplasia at 120.71 (with care required in case (if symptomatic), right clavicle fracture at 149, and right ulna fracture at 188.8.

N	Dating	Period		Place	Specimen	Species	Source	
11	95 ka	Middle Paleolithic		Qafzeh, Israel	Qafzeh 11	*Homo sapiens*		Tillier (1995), Tillier et al. (2001), Shea (2003) and Coqueugniot et al. (2014)
12	95 ka	Middle Paleolithic		Qafzeh, Israel	Qafzeh 12	*Homo sapiens*		Tillier (1995), Tillier et al. (2001), Shea (2003) and Coqueugniot et al. (2014)

The remains of the adolescent *Homo sapiens* Qafzeh 11 show evidence of a healed injury in the head, and those of the child Qafzeh 12 indicate a survival of about three years with hydrocephalus congenital or acquired early on, and related postcranial morbidity, a pathology that It often has a fatal outcome.

In relation to Qafzeh 12, Tillier et al. (2001) observe that paleopathological research can to help understand contemporary cultural behaviors, but they do not raise directly addresses the issue of care provision. Shea (2003) suggests that the power of the Intragroup affective relationships can be observed in Qafzeh 11's survival of trauma severe cranial and in Qafzeh hydrocephalus 12. In addition to alterations in morphology In the cranial region, Qafzeh 12 also exhibits anomalous cranial vascularization and irregularities in the postcranial morphology (vertebral column and upper limbs).

In 2014, Coqueugniot et al. used 3D imaging methods to reanalyze the lesion in the Qafzeh 11 skull, and concluded that both the injury and its aftereffects were much more serious From the above assumptions, this likely resulted in lasting damage that caused delay. in development and affected cognitive, psychological, and motor function aspects. Although it was not It directly addresses the issue of the care required by this adolescent, and is associated with Qafzeh 11's unique funerary treatment (which includes deer antlers placed on the part upper body) with their disability status, noting that this biological evidence and Archaeological findings reflect an elaborate social behavior among Middle Paleolithic groups from Qafzeh.

N	Dating	Period	Place	Specimen	Species	Fountain
13	80-130 ka	Middle Paleolithic	Rebourdou, France	Rebourdou 1	*Homo neanderthalensis*	Gómez-Olivencia et al. (2012, 2013), Maureille et al. (2015), Spikins et al. (2018)

This young individual, approximately 25 years old, of undetermined sex, had osteoarthritis of the spine vertebral with osteophytosis, abnormal bone growth in C4, ossification of the ligamentum flavum in T2, torsion of the spinous process at T9, ossification of the vertebral ligament insertion at C5, and fusion and asymmetry in the sacrum, with possible scoliosis and related pathology in the femur. These Pathologies suggest mobility restrictions and pain.

N	Dating	Period	Place	Specimen	Species	Fountain
14	60-130 ka	Middle Paleolithic	Kiik-Koba, Crimea	Kiik-Koba 1	*Homo neanderthalensis*	Trinkaus et al. (2008), Spikins et al (2018)

This is a male Neanderthal, 40-50 years old, with various pathologies that would restrict the mobility of the individual and would cause pain, including: ossifications and stiffness along the

spine, enthesopathies of the patellar and Achilles tendons, ossification in intertarsal joints and spurs in the left medial cuneiform bone, problems in phalanges associated with osteomyelitis, fractures and/or muscle hypertrophy, hypercementosis of a canine mandibular linked to extreme wear or periodontal disease.

The individual would need short-term direct attention and group adaptation to facilitate the recovery from injuries, and long-term adaptation to the limited range of motion of limbs and trunk.

N	Dating	Period	Place	Specimen	Species	Fountain
15	65 ka	Middle Paleolithic	Quinine, France	La Quina 5	*Homo neanderthalensis*	Condemi et al (2012), Straus and Cave (1957), Spikins et al (2018)

Individual 5 from La Quina (or 9/18, with doubt) has very severe temporomandibular osteoarthritis, which could limit his ability to chew food and use his mouth as a third hand or his teeth as useful. He possibly required help to adapt his contribution to other activities or to be fed. In addition, individual 5 presents hypoplasia/atrophy of the left humerus, which could restricting some activities, typically foraging, and requiring an adaptation of the group.

N	Dating	Period	Place	Specimen	Species	Fountain
16	65 ka	Middle Paleolithic	Ein Qashish, Israel	EQH3	*Homo neanderthalensis*	Been et al. (2017)

The remains of a young Neanderthal who died at 15-22 years of age are described, and he presents the combination morphological features of a narrow intercondylar notch and a robust intercondylar tubercle, typically associated with an avulsion fracture of the anterior cruciate ligament. The small articular surface The distal femur of this individual could be the result of said pathology, given that the surface The joint is directly related to the amount of axial pressure exerted on the joint, in such a way as to minimize the weight supported by the left leg.

This type of traumatic injury occurs most frequently in skeletally impaired individuals immature individuals, between 8 and 14 years of age, and it produces instability of the knee joint and limitations in weight-bearing capacity. It would restrict the individual's mobility, with various episodes possible instability and displacement of the joint, pain and temporary immobilization.

In addition to adapting, the group would provide him with direct support after the injury and for its short-term recovery.

N	Dating	Period		Place	Specimen	Species	Fountain
17	57-51 ka	Middle Paleolithic		The Sidrón (Spain)	Adults 1 and 4	*Homo neanderthalensis*	Hardy et al (2012), Hardy et al (2015) and Weyrich (2017)

The tartar particles from Adult 4's SD1604 tooth show remains of two plants without Nutrients: yarrow, which has anti-inflammatory properties, and chamomile, which facilitates digestion (Hardy, 2012).

Genetic traces of poplar have also been found in the tartar of Adult 1, suggesting that I would chew the rind of this vegetable, which is a natural source of the pain reliever salicylic acid, as well as of *Penicillium rubens,* a fungus with antibiotic properties (Weyrich, 2017).

This case is considered not for the calculation of the Care Indicator, but for the discussion on the application of pharmacological treatments.

N	Dating	Period		Place	Specimen	Species	Fountain
18	50-60 ka	Middle Paleolithic		Grotta Guattari, Circeo, Italy	Guattari 1	*Homo neanderthalensis*	Sergi et al. (1972), Spikins et al. (2018)

Adult individual presenting with periodontal inflammation and edentulism with remodeling and atrophy from the bone, suggesting that it had limited chewing and mouth use capabilities as a tool or third hand.

N	Dating	Period	Site		Specimen	Species	Fountain
19	47-56 ka	Middle Paleolithic		La Chapelle-aux-Saints, France	La Chapelle-aux-Saints 1	*Homo neanderthalensis*	Straus and Cave (1957), Trinkaus (1985), Tappen (1985), Dawson and Trinkaus (1997), Gómez-Olivencia (2013), Tilley (2015), Spikins et al. (2018)

This individual is estimated to have lived for about 40 years. His jaw is missing almost all of its teeth. due to the use of the incisors as a third hand, a common behavior among Neanderthals.

His jawbone indicates that he suffered from chronic periodontitis and joint arthritis.
temporomandibular joint. Severe resorption of the dental alveoli suggests a possible need for intervention.
from being fed for years.

She had severe degenerative arthritis in several cervical and thoracic vertebrae, and in both
shoulder joints. This affected the flexibility and strength of his body, and probably
restricted its capacity to transport weights.

His left hip had severe degeneration and probable chronic osteomyelitis, causing him
frequent pain and limitations in using her left leg when bearing weight,
Maintaining balance was difficult, and mobility was generally impaired. Additionally, the bones in his right foot...
They also have problems. He could walk, but he couldn't participate in certain activities.
Physical demands such as hunting. His injury list is completed with a fractured rib.

Therefore, during various health crises, including the one that caused his infection, he required care for
to treat his fever and pain and to give him food that, in turn, would be soft and processed
so that he could eat them without teeth. He required a lot of help during the group's transfers.
This individual could likely perform certain tasks to help their community, such as
Processing food, making tools or other objects, or caring for children. But chronic infection
This diminished his ability to contribute work to the group, and increased his dependence on the
himself during the last months of his life.



Figure 9. Edentulous skull from Grotta Guattari 1 (Monte Circeo).



Figure 10. Skull of La Chapelle-aux-Saints 1. It only retains one first premolar in the maxilla, and a second premolar in the mandible. The strong alveolar resorption in the mandible is clearly visible. probably due to periodontal disease.

N	Dating	Period		Place	Specimen Species		Fountain
20	45-60 ka	Middle Paleolithic		Shanidar, Iraq	Shanidar 1	*Homo neanderthalensis*	Solecki (1971), Trinkaus (1978), Trinkaus (1983) and Trinkaus and Zimmerman (1982), Spikins et al. (2018)

The male Neanderthal individual Shanidar 1, nicknamed Nandy, lived between 35 and 45 years. a blow to the head during his youth, perhaps due to a hunting accident or a bad fall, It crushed the left side of his face and probably caused blindness in his left eye and Probable damage to the left motor cortex of the brain. The bones of his arm and leg on that side. right side shows great weakness, indicative of paralysis in the right half of their body, either due to the blow described, or due to a congenital malformation.

He has two fractures of the distal diaphysis of the right humerus, as well as a transverse fracture through the right olecranon fossa, which resulted in the probable amputation of the humerus at the level of the elbow, osteomyelitis of the right clavicle, fracture in the right foot, and joint disease degenerative of the right knee and ankle.

In addition, he had exostoses in the external auditory canal of both ears, an abnormal development. of the bone that likely caused his deafness in both ears, complete in the right. This problem would pose a significant restriction to the way of life of those hominins, in sometimes more serious than the loss of the forearm, partial blindness, limping and other injuries.

This set of problems demonstrates that he was unable to participate in most activities of his group, but he was treated for injuries sustained in his beating when he was young, and later He depended on other members of his group to survive for many years.

N	Dating	Period		Place	Specimen Species		Fountain
21	45-60 ka	Middle Paleolithic		Shanidar, Iraq	Shanidar 2	*Homo neanderthalensis*	Trinkaus and Zimmerman (1982), Spikins et al. (2018)

This male individual, aged 20-35, had a degenerative disease along the spine vertebral, with possibly compromised mobility and pain, requiring an adaptation of the community.



Figure 11. Shanidar 1, skull and right humerus compared to the humerus of La Ferrassie 1, also Neanderthal. The asymmetrical morphology of its skull in frontal view allows one to appreciate the blow that It crushed the left side of Nandy's head during his youth. The right humerus is very atrophied, and suggests a probable amputation of the hand and part of the forearm.

N	Dating	Period	Place	Specimen	Species	Fountain
22	45-60 ka	Middle Paleolithic	Shanidar, Iraq	Shanidar 3	*Homo neanderthalensis*	Solecki (1971), Trinkaus (1978), Trinkaus (1983) and Trinkaus and Zimmerman (1982), Spikins et al. (2018)

This male individual, aged 35-50, possibly lived for years with severe osteoarthritis. of the right foot, possibly as a result of trauma, with probable limitation of the mobility. He also survived an injury that perforated the left pulmonary pleura and It possibly penetrated the left lung for at least several weeks, a period during which which would have been immobilized.

N	Dating	Period		Place	Specimen	Species	Fountain
23	45-60 ka	Middle	Paleolithic	Shanidar, Iraq	Shanidar 4	*Homo neanderthalensis*	Trinkaus and Zimmerman (1982), Crubézy and Trinkaus (1992), Spikins et al. (2018)

This male individual, aged 35-50 years, presents with a healed fracture of the seventh/eighth rib, with areas of callus developed, occurring a few weeks before her death. It would cause her pain and restrictions on breathing and movement, and limitations on physical activity during some weeks, with the consequent adaptation of the group. It also presents other problems. (hyperostosis, mild degenerative disease), but probably asymptomatic.

N	Dating	Period		Place	Specimen	Species	Fountain
24	45-60 ka	Middle	Paleolithic	Shanidar, Iraq	Shanidar 5	*Homo neanderthalensis*	Trinkaus and Zimmerman (1982), Wu et al. (2011), Spikins et al. (2018)

This male individual, aged 35-50, presents with a wound on the forehead with evidence of healing. There would be pain and bleeding. Its location suggests assistance with cleaning and protect the wound for a short period of time.



Figure 12. Shanidar 5 skull.

N	Dating	Period	Place	Specimen	Species	Fountain
26	43–45 ka	Middle Paleolithic	La Ferrassie, France	La Ferrassie 2	*Homo neanderthalensis*	Heim (1976), Guérin et al. (2015/6), Spikins et al. (2018)

This young adult female Neanderthal presents with a healed tibial fracture and a diaphyseal fracture. Infection of the fibula. There would be pain and, in the short term, restricted mobility. These signs They suggest a short group adaptation period and direct attention to facilitate placement the bones.

N	Dating	Period	Place	Specimen	Species	Fountain
27	40 ka	Middle Paleolithic	Feldhofer, Germany	Neanderthal 1	*Homo neanderthalensis*	Schmitz et al. (2002), Schultz (2006), Cowgill et al. (2015), Spikins et al. (2018)

This is the holotype of the *Homo neanderthalensis species,* a male individual who lived about

She was 50 years old and suffered from severe chronic sinusitis, which was the basis for the development of a tumor process.

until his death (Schultz, 2006). There are skeletal indications of recovery from an illness Meningeal involvement associated with hemorrhagic activity, caused by meningitis or trauma closed, the latter evidenced by a healed lesion in the right supraorbital arch.

A healed, malaligned fracture of the left elbow, resulting in flexion
The reduced size and hypotrophy of the remaining left humerus and ulna suggests that a Trauma before skeletal development is complete. Microscopic examination reveals processes osteoclasts in the compact bone of the upper and lower limbs, probably debilitating from a systemic point of view. This individual suffered from several serious illnesses. which made their lives extremely difficult, therefore, without the social care of their group He probably wouldn't have survived that long, and his injuries wouldn't have had the chance. to heal so completely (Schulz, 2006).



Figure 13. Neanderthal skull-1. It shows a healed lesion in the right supraorbital arch.

N	Dating	Period	Place	Specimen	Species	Fountain
28	36 ka	Middle Paleolithic	Saint-Césaire, France	Saint-Césaire 1	*Homo neanderthalensis*	Zollikofer et al. (2002), Spikins et al. (2018)

Description of a healed trauma to the cranial vault of a young adult male Neanderthal St Césaire 1. Shows extensive remodeling, without signs of post-traumatic infection, despite that the original wound penetrated to the inner lamina, causing fracture and displacement of the bone.

Skeletal evidence indicates that St Césaire 1 lived at least several months after the injury. The immediate effects of the trauma were likely severe, involving bleeding. abundant, concussion and temporary disability, and although it is possible that the individual If he suffered these adverse effects autonomously, it can be assumed that he benefited at least up to a certain point of initial intragroup assistance (Zollikofer et al., 2002).

N	Dating	Period	Place	Specimen	Species	Fountain
29	31 ka	Upper Paleolithic	Liang Tebo, Borneo	TB1	*Homo sapiens*	Maloney et al. (2022)

The skeletal remains of a young hunter-gatherer are described, whose lower leg The left leg was amputated (tibia and fibula), possibly when he was still a child, so the bones The cuts did not reach the adult size seen in the right leg.

This is the oldest evidence of such a complex medical procedure, predating it by many millennia. The following evidence is known to date. During surgery, the surrounding tissue, including

The veins, vessels, and nerves were treated in such a way that it allowed this individual not only to not only kept him alive, but also allowed him to retain some mobility, albeit impaired. The actions of Nursing and intensive postoperative care would have been vital, as would the regulation of the temperature, regular feeding, bathing and movement to prevent pressure ulcers while the individual was immobile. The wound would have been cleaned, bandaged, and disinfected. regularly, perhaps using locally available botanical resources with properties medicinal to prevent infections and provide anesthetics to relieve pain.

Furthermore, the axis vertebra broke at some point during the individual's life, which It disrupted its alignment with the third cervical vertebra. In addition to the neck fracture, the The individual's right knee joint had begun to degenerate, possibly as result of the different walking pattern that the individual must have adopted after losing the left foot.

It can be inferred that life without a lower limb, combined with the other traumas Identified in a rugged and mountainous karst terrain, it presented a series of practical challenges, several of which would be overcome thanks to a high level of community care.

N	Dating	Period	Place	Specimen	Species	Fountain
30	26.6 ka	Upper Paleolithic	Dolní Vestonice, Republic Check	DV 15	*Homo sapiens*	Formicola et al. (2001) and Trinkaus et al. (2001)

Skeletal anomalies in the remains of this male individual, who would have been between 21 and 25 years old Upon death, they suggest X-linked dominant chondrodysplasia punctata, a condition congenital calcifying disease with life-threatening complications in childhood, including recurrent respiratory and gastrointestinal infections, feeding problems, and developmental delays general growth. It has long-term effects such as skin disorders, cataracts, joint contracture, asymmetric shortening of the limbs, and bowing of the bones long (these last two are evident in the remains of DV15).

This individual also experienced one or more upper limb fractures. There is evidence Due to multiple serious health crises during childhood, he possibly required timely care. during this stage and with more generalized attention later on.

DV15 survival to maturity indicates considerable social support for an individual.
whose deformities and diseases must have been evident from childhood, which reinforces the perception of a highly coherent and supportive social system among those populations (Trinkaus, 2001). Furthermore, it provides clues about the therapeutic knowledge of populations in Upper Paleolithic, since the survival of similarly affected children is very problematic in the absence of adequate treatment and care (Formicola et al., 2001).

The robust upper and lower limb morphology of DV15, combined with the evidence of severe osteoarthritis of the upper extremities, suggest that, despite the problems of early and continuous health care, later participated in normal group activities, including long journeys and transport of heavy loads. This reflects the need for all Individuals will actively participate in the high levels of mobility and activity of these populations of the early Upper Paleolithic (Trinkaus et al., 2001).

DV15 is one of the three bodies from the famous Gravettian burial site of Dolní Vÿstonice (Mittnik, 2016),

N	Dating	Period	Place	Specimen	Species	Fountain
31	24 ka	Upper Paleolithic	Sunghir, Russia	Sunghir 2 and Sunghir 3	*Homo sapiens*	Formicola and Buzhilova (2004), Trinkaus and Bizhilova (2018)

Among ten individuals found at this site, two children (Sunghir 2 and 3) stand out. head to head along with thousands of offerings of objects: 10,000 mammoth ivory beads, bracelets, perforated fox teeth, 16 mammoth ivory spears, engraved objects, antlers deer, two human bones… The bodies of these children had some unusual physical features. Both suffered repeated and prolonged periods of developmental disturbances.

The oldest child (Sunghir 2, about 12 years old) has a very abnormal midfacial prognathism for a modern human, and his teeth showed hardly any wear, as if he had been fed His entire life has been on soft, prepared food. Meanwhile, the youngest child (Sunghir 3, of (around 10 years old) presents robust bones and extraordinarily short and curved femurs. No The causes of death of these individuals have not been determined, but it is suggested that they were related to such physical anomalies (Trinkaus and Bizhilova, 2018).

The burials at Sunghir and Dolní Vÿstonice share significant elements: both are multiple burials of young individuals, of different sexes, buried at the same time; they show

an unusual position of the skeletons and include an abnormal individual. These associations
They reaffirm the possibility of ideological connections between "abnormality" and funeral patterns
extraordinary features emphasized elsewhere. This suggests that such anomaly would be part of a
complex belief system reflected by sophisticated ritual activity and symbolism
highly developed, evident in the record of the mid-Upper Paleolithic (Roebroeks et
al., 2000). The severe deformities affecting Romito 2 (case #36), an adolescent dwarf from
Late Upper Paleolithic from southern Italy, found in a double burial with an adult female
in a cave rich in parietal art (Frayer et al., 1988), lend further support to this hypothesis. and point out
to the spread of these beliefs among Upper Paleolithic societies over time and
space.

N	Dating	Period	Place	Specimen	Species	Fountain
32	14 ka	Upper Paleolithic	Riparo Villabruna, Italy	Villabruna 1	*Homo sapiens*	Oxilia et al. (2015)
33	13 ka	Upper Paleolithic	Riparo Fredian, Italy	Fredian 5	*Homo sapiens*	Oxilia et al. (2017)

A right third molar, belonging to an individual of about 25 years of age, recovered in 1988
in Riparo Villabruna (Italy), it has striations resulting from the manipulation of a large hole
occlusal surface of said tooth. Through experimental analysis and functional reconstruction, it was determined that
determined that the identified striations and extensive chipping of the enamel associated on the mesial wall
The holes were the result of *antemortem* scraping and prying actions , performed with
lithic or bone tools. Dating from the late Upper Paleolithic, Villabruna 1 is the evidence
oldest known dental caries intervention.

Also from the same period, two central incisors with manipulated caries are documented.
through dental treatment, originating from the Riparo Fredian site (Italy). Each tooth
It has a large opening on the surface that extends into the pulp chamber. Different techniques
Microscopic examination reveals striations that would correspond to perforated and enlarged cavities
probably using lytic tools to remove necrotic or infected tissue in vivo.

Additionally, traces of bitumen and fibers were also found in the Fredian 5 holes.
Vegetable matter and hair. The bitumen may have been used as an antiseptic, or as a filler to reduce
The pain acts as a barrier or organic filling between the exterior and the pulp chamber. The fibers

Vegetable matter and hair may have been part of the filler compound, but there is no evidence of its intentional placement in cavities, as there is with bitumen.

These two subjects are not considered for the calculation of the Care Indicator, but for the discussion on the application of dental treatments.

N	Dating	Period	Place	Specimen	Species	Fountain
34	11 ka	Upper Paleolithic	Arene Candide, Italy	AC 2	*Homo sapiens*	Formicola et al. (1990)
35	11 ka	Upper Paleolithic	Arene Candide, Italy	AC 3	*Homo sapiens*	Formicola et al. (1990), Formicola (1995), Sparacello et al. (2018)

The remains from AC 2 correspond to a robust man of about 25 years of age, from a society of Hunter-gatherers in the mountainous region of Liguria. They show bilateral absence of the lesser trochanters (bony prominence located between the diaphysis and the neck of the femur), very probably as a result of avulsion fractures that occurred before
It could be around 17 years old, or it could be due to congenital hypophosphatemic rickets linked to the X chromosome. It was likely that he maintained excessive muscular effort, in which the epiphysis of the lesser trochanter of the femur and compromising the related muscle insertions.

Recovery requires a period of immobility and is followed by a return to functional ability. temporarily reduced. This individual would have been moderately to severely debilitated during approximately three months according to modern recovery rates, and during this period would have required the assistance of his local group during recovery (Formicola et al., 1990).

AC 3, on the other hand, is an individual with short stature, bowed limbs, and changes abnormal entheses, suggesting X-linked congenital hypophosphatemic rickets (Formicola, 1995). Likewise, the associated AC 2 skeleton shows signs of rickets such as frontal thickening, enlargement of the metaphyses and curvature of the long bones (Formicola, 1995), as well as the absence of the lesser trochanter of both femurs (Formicola et al., 1990). Although This last trait may have had a traumatic origin, and is also understood in a context of disorders of bone and cartilage ossification due to the same hypophosphatemic rickets syndrome linked to the X chromosome (Formicola, 1995).

Although the diagnosis is tentative (especially for AC 2), in the absence of a genetic test, The presence of such a rare congenital condition in two individuals would suggest a maternal lineage

shared. In the burial, it is observed that the oldest skull (AC 3) was rearranged nearby AC 2 skull, which may express a sign of kinship recognized by the people who They buried both individuals (Sparacello et al., 2018).

N	Dating	Period		Place	Specimen	Species	Fountain
36	11 ka		Upper Paleolithic	Romito, Italy	Romito 2	*Homo sapiens*	Frayer et al (1987; 1988) and Tilley (2015)

Description of the remains of Romito 2, male, 17-20 years old, 110-120 cm tall, showing chondrodystrophic dwarfism (acromesomelic dysplasia) with associated complications, including Restricted bilateral extension of the elbow. This condition is associated with developmental delay. Physically, it would pose mobility problems in the rugged terrain of Calabria, and would restrict the Participation in the typical activities of hunter-gatherers. Despite Romito's disability 2, was buried in a cave with apparent cultural significance.

Both his survival and his funeral treatment attest to his acceptance by the group despite his severe disability and limited ability to contribute to subsistence and other needs economic activities (Frayer et al., 1987), and care and affection towards a disabled member of an Upper Paleolithic society (Frayer et al., 1988). It is noted that the acceptance and the Support was given to an individual whose disability was visible from birth, not acquired. later in his life.

The fact that this individual reached late adolescence testifies to the tolerance of the groups from the Upper Paleolithic towards severely abnormal individuals, and their ability to support members who had limited economic value to the social group.

N	Dating	Period		Place	Specimen	Species	Fountain
37	9-10 ka	Mesolithic	Taforalt, Morocco		TF 1	*Homo sapiens*	Dastugue (1959), Crubézy et al. (2001), School (2022)

Skull found by Abbé Jean Roche in the 1950s, belonging to the Mechta-Afalou group, with a trepanation described in *Un orifice cranien préhistorique* (Dastugue, 1959) and in *Cranes protohistoriques trépanés ou pathologiques d'Afrique du Nord* (Dastugue, 1973).

Another incomplete trepanation is documented in a skull fragment found at the same level of the site, although it raises more doubts (Crubézy et al., 2001).

N	Dating	Period		Place	Specimen	Species	No.	Fountain
38	9-10 ka	Mesolithic	Vasiliyevka III, Ukraine		6462-20	*Homo sapiens*	Goikhman (1966), Crubézy et al. (2001), Escolà (2022)	

Trepanation with probable therapeutic purpose described in *O trepanatchii tcherepa v epochov mezolitika* (Goikhman VA, 1966) and mentioned by Crubézy et al. (2001) and Escolà (2022).

N	Dating	Period		Place	Specimen	Species		Fountain
39	7 ka	Mesolithic	Samouqueira, Portugal		Samouqueira	*Homo sapiens*	1	Lubell and Jackes (1985); Lubel et al. (2004)

The partial remains of two adults, Samouqueira 1 (male) and 2 (possibly male), from A coastal Mesolithic site shows evidence of survival with/after pathologies.

Samouqueira 1 had an infected compound fracture of the right distal humerus, considerably before death. The misaligned scarring resulted in abnormal function.

A pathological third metatarsal on the right suggests an infection in the sole of the foot. It raises the question of the characteristics of that society that helped an individual like Samouquiera 1, for whom walking would have been extremely painful (Lubell and Jackes, 1985).

Only the upper limbs of Samouqueira 2 recovered; he presents with traumatic arthritis in Both wrists. None of these individuals could have functioned normally, and their groups They provided support to individuals who could not fully participate in all activities of subsistence (Lubell et al., 2004).

N	Dating	Period		Place	Specimen	Species		Fountain
40	3-3.5 ka	Mesolithic	Hokkaido, Japan		Irie 9	*Homo sapiens*		Suzuki et al. (1984)

The remains of Irie 9, a young adult aged 17 to 20 from a coastal community of the Jomon period late-onset, with no identified sex, show evidence of severe disuse atrophy, with a

Proposed diagnosis of acute anterior poliomyelitis (infantile spinal paralysis), a disease that
It usually affects children under 5 years old. Irie 9 would be forced to spend his entire life in bed.

It is clear that such a disabled individual received careful treatment and was accepted by that
hunter-gatherer population in the Mesolithic-Neolithic transition (Suzuki et al., 1984).

N	Dating Period		Place	Specimen Species 9		Fountain
41	7.5-9 ka	Neolithic	MR3 Site, Mehrgarh, Pakistan	individuals *Homo sapiens*	Coppa et al (2006)	

Nine individuals were identified (4 female, 2 male, 3 with no identified sex) in which a total
Of 11 permanent molar crowns, 7 were drilled while the patient was alive. Seven of the perforations are
mandibular and 4 maxillary. In 4 of them it was performed on the M1, and in 7 on the M2. One individual
One individual had three drilled molars, and another had one molar with two perforations. 4 of the 11
The teeth had cavities, indicating at least therapeutic or palliative treatment in them.

An aesthetic motive for these interventions is ruled out, given the depth of the pieces treated.
This practice continued for 1500 years at the MR3 site, but then it stopped and in the
In the Chalcolithic cemetery MR2, these treatments are no longer observed, despite the poor health.
buccal-dental observed in their skeletons.

This case is not considered for the calculation of the CI, but for the discussion about the treatments
dental.

N	Dating Period	Site		Specimen Species		Fountain
42	7.5 ka	Neolithic	Windover, Florida, USA	Windover Boy	*Homo sapiens*	Dickel and Doran (1989)

The skeletal remains of Windover Boy, around 15 years old, show evidence of severe spina bifida.
open symptomatic and disabling complications directly and indirectly associated with, including the
Disuse atrophy of the upper and lower limbs, suggesting progressive loss
of sensitivity and mobility and, as a likely consequence, a chronic and serious infection in the
Lower part of the right leg. The lower part of the left leg is missing.

This case may indicate a society's ability to financially support its members
which can contribute to, and thus to, a successful adaptation. This case of severe disability, with the

The chronic nature of the disease and infectious processes helps to understand the high level of prolonged care and attention. The deterioration of mobility would be especially difficult in seasonal movements and the exploitation of dispersed resources, and the The need for chronic care would be exacerbated by the increasingly severe chronic infection.

Despite the older stereotypes that are often found in the popular image of the Among the earliest prehistoric peoples, there were instances of capacity and willingness to help and support others. chronically ill and disabled people (Dickel and Doran, 1989).

N	Dating	Period		Place	Specimen	Species	Fountain
43	7-9 ka		Neolithic	Shamanka, Siberia, Russia	Shamanka 29.1	*Homo sapiens*	Lieverse et al. (2008)

In the remains of this male individual aged 20-30 years, extensive atrophy of all the bones of the right upper limb from the clavicle to the manual phalanges, indicative of paralysis of the entire right arm as a result of a long-term pathology, probably congenital. This tremendous disability would have been particularly hard on a hunter-forager society and, certainly, their status was widely recognized by his peers and probably provoked at least some assistance and intervention to the individual (Lieverse et al., 2008, although they do not analyze the functional consequences of this disability).

N	Dating	Period		Place	Specimen	Species	8 skulls	Fountain
44	7 ka		Neolithic	Petit Morin, France	*Homo sapiens*		Dastugue (1973)	

Eight skulls show trepanations performed on living subjects, six of which were followed of survival and healing. These examples are evidence of trepanation as a surgical procedure. which implies a methodical technique and precise anatomical knowledge.

Three other skulls show *post-mortem* processes whose study suggests that they were practices of trepanation as anatomical research.

N	Dating	Period		Place	Specimen	Species	*Homo*	Fountain
45	7 ka		Neolithic	Ensisheim, Alsace, France	Burial 44		*sapiens* Alt et al. (1997)	

The skull of a male individual who died at about 50 years of age shows two trepanations with large openings, one of which involved a complete renovation and another a partial one, indicative of long-term survival.

N	Dating	Period		Place	Specimen	Species	Fountain
46	7 ka		Neolithic	Schletz, Austria	Ind. Skulls 61 and 1996/3	*Homo sapiens*	Pieler and Teschler-Nicola (2023, ip)

Among the human remains discovered in trench II of the site, two skulls not only They exhibit *perimortem* lethal injuries likely caused during a large massacre that happened towards the end of the Late Linear Pottery (LBK) culture, but they also show signs trepanation, possibly surgical treatments of cranial vault wounds years earlier of dying.

Skull 1996/3 belonged to a male individual who died between the ages of 35 and 50. He had a number of pathomorphological bone alterations, for example, porotic hyperostosis, symptoms of deficiency of vitamin C, inflammatory changes (stomatitis, sinusitis, periostitis, lytic defects of the type granuloma in some vertebral bodies) and a healed compression fracture of the tenth thoracic vertebra. It has a trepanation in the left parietal bone, near the sagittal suture, with remodeling. The person survived the traumatic event and the subsequent procedure. for several years.

Individual 61 is also male and lived 40-50 years. He has *perimortem* fatal fractures. resulting from blunt force trauma, which the authors associate with the the event of a previous massacre in the community, and a small osteoma. The skull shows a trepanation in the right parietal bone, with characteristics indicative of a prolonged survival, prior to the trauma that possibly caused his death.

N	Dating	Period		Place	Specimen	Species	Fountain
47	7 ka		Neolithic	Herxheim, Germany	E 96/ 102 282-14-8	*Homo sapiens*	Orschiedt et al. (2003)

The cranial remains of an adult male from the early Neolithic period, aged 40 to 50 years, show four healed injuries that suggest survival after at least two separate incidents of

Severe head trauma. The injuries were probably due to violence.
interpersonal, would probably be temporarily disabling and entail harm
neurological, perhaps permanent, with motor function problems and/or intellectual deficit or
behavioral.

The individual may have received some medical treatment and social care, which must have exceeded the mere care of the wounds due to the mental disorders that the patient may have suffered during convalescence (Orscheidt et al., 2003).

There is evidence of trepanation in nearby burials, although in this case it was not used.
procedure, which may reflect the absence of this ability in people in the group, or
that trepanation was *prescribed* only for specific conditions that do not apply to this case.

N	Dating	Period	Place	Specimen	Species	Buthiers-	Fountain
48	7 ka	Neolithic	Buthiers-Boulancourt, France	Boulancourt (not id.)	*Homo sapiens*	Buquet-Marcon et al. (2007)	

The skeletal remains of this elderly man, belonging to an agro-pastoral community, suggest that survived for months, possibly years, after the surgical amputation of part
lower left forearm. There is no evidence of associated infection, and Buquet-Marcon et al. (2007) point to "sophisticated medical skills" in relation to surgery and treatment post-surgical.

The remains also show edentulism and arthritis in the joints of the limbs.
lower back and spinal length, and this would likely result in pain
The man suffered from debilitating arthritic back pain. He was buried with a particularly elaborate grave goods collection.
rich, which suggests that he would have a particular social status.

This man's survival, thanks to the care and technical skills in surgery
provided by this Neolithic group confirms the existence at that time of some form of assistance Mutual support and solidarity towards disabled people suggests a considerable level of development social, medical and even moral, and reflects an understanding of needs, means and skills advanced medical technologies to maintain the health of societies, and in particular to stop the flow of blood and treat disinfection and healing in this individual.

N	Dating	Period		Place	Specimen	Species		Fountain
49	6.2-6.61 ka		Neolithic	Touched Enoque, Brazil	Individual 9 Burial 2		*Homo sapiens*	Solari et al. (2020)

The remains of a baby approximately 9 months old show evidence of severe illness in the weeks/months before death, and that he received a burial with ritual elements exceptionally rich and intricate, including necklaces and earrings of bone and beads of dog teeth. The disease affected almost the entire skeleton: hypertrophic lesions ectocranial porosity, abnormal bone formation, generalized abnormal porosity... and not observe in other children of the burial.

The duration of survival indicates a level of care that exceeds ordinary childcare. and that funeral treatment suggests continued care after death.

N	Dating	Period		Place	Specimen	Species	*Homo*	Fountain
50	6 ka		Neolithic	Arene Candide, Italy	Arene Candide 5		*sapiens* Formicola et al. (1987)	

The deformation and destruction of the lower thoracic and lumbar vertebrae in the remains of Arene Candide 5, a man of about 15 years, indicates that he had tuberculosis since he was 11-12 years old. He came from a small community that was transitioning to herding and farming while still relying in part on hunting and gathering. The serious illness would greatly limit their physical capabilities and social life; however, Formicola et al. (1987) suggest that survival during the long illness and burial prove the support and care of the group, indicating integration rather than discrimination.

N	Dating	Period		Place	Specimen	Species		Fountain
51	5.5-6 ka		Neolithic	Guanjia, China M53			*Homo sapiens* Hernández (2011)	

The severely restricted growth and delayed epiphyseal fusion observed in the remains of An adult individual (M53), aged 26 to 33 years, and 1.5 m tall, with no identified sex, suggests Hypopituitarism. He received ordinary burial treatment in a Neolithic cemetery. It is not known They observe the impacts of other diseases.

Hernández (2011) relates this case to that of others with short stature/skeletal dysplasia, where One can observe the treatment of individuals with physical anomalies in those societies or developmental disabilities, conditions that could have been a disadvantage, but there are no signs that suggest that M53 should be treated differently from the rest.

N	Dating	Period	Place	Specimen	Species	Fountain
52	5.5 ka	Neolithic	Ascott-under-Wychwood, United Kingdom	Deposit B (mixed adult material)	*Homo sapiens*	Galer (2007)

The first and second fused cervical vertebrae of an individual recovered from a deposit of mixed adult skeletal elements from the elongated mound of Ascott-under-Wychwood, of Early Neolithic, they indicate that the subject survived after a major injury in which the body The vertebral axis (C2) and the odontoid process were significantly displaced in relation to the normal articulation with the atlas (C1). Ankylosis of the axis and atlas served to stabilize the injury. which indicates a substantial period of survival after the trauma.

This individual survived both the original injury and the subsequent complications that They have the potential to compromise the function of the central nervous system, so it seems very It was likely that he required care after the injury. Based on paleopathological evidence, Galer (2007) argues that the individuals recovered from the mound were perhaps a closed family group who could have cared for his sick and wounded.

N	Dating	Period	Place	Specimen	Species	Fountain
53	5.4-5.8 ka	Neolithic	Lanhill Long Barrow, Kingdom United	LB7	*Homo sapiens*	Tilley (2015)

Of the seven adults recovered from the northwest burial chamber at Lanhill Long Barrow, four They show indicators of serious, chronic, and degenerative pathologies, in each case probably associated with some level of disability. However, the study focuses on lived experience. by individual LB7, because his pathology was possibly the oldest and is the easiest to interpret in terms of impact, based on the experience of the disease, the disability and the possible receipt of care by the other individuals LB1, LB2 and LB5 (which They probably had some limitation of movement, but without any notable conditions).

LB7 was of advanced age (around 50 years old) and had a left elbow injury, probably suffered during adolescence, poorly treated, which caused a permanent flexion of the arm, unable to stretch. The long-term abnormal posture caused him problems with his collarbones and left shoulder blade.

N	Dating	Period		Place	Specimen	Species	Fountain
54	4.82 ka	Neolithic		Byneskranskop, South Africa	SAM-AP	*Homo sapiens*	Pfeiffer and Crowder 6060 (2004)

The skeletal remains of SAM-AP 6060, a child of about 5 months old, show evidence of rickets hypertrophic, associated with symptoms ranging from restlessness and irritability to pathologies respiratory and gastrointestinal issues, and seizures. The meticulous care would have kept them with The baby was given life support and buried in a manner similar to other deceased members of the group. Pfeiffer and Crowder (2004) suggest that, if infanticide was practiced, it was an option only during the immediate perinatal period, when this baby would appear normal, which is consistent with the documentation of infanticide practices among historical foragers in southern Africa.

N	Dating	Period		Place	Specimen	Species	Fountain
55	4.6-4.8 ka	Neolithic	Can Tintorer, Spain		Mine 28, Burial 10	*Homo sapiens*	Villalba (1999), Juan-Tresserras and Villalba (1999)

The consumption of a plant has been detected in the tartar of individual 10 from burial 28 medicinal, specifically opium poppy *(Papaver somniferum).* This subject has two trepanations. It cannot be concluded whether poppy consumption occurred exclusively for one use. therapeutic related to surgical practices, taking advantage of its sedative properties, analgesics and narcotics, or as support for work-related occupational stress intensive mining that he carried out.

N	Dating	Period		Place	Specimen	Species	Fountain
56	4-5 ka	Neolithic		Mashiki Azamabaru, Okinawa, Japan	Mashiki 15	*Homo sapiens*	Ogami-Takamura et al. (2021)

Young adult individual from the late Jomon or early Yayoi period, showing strong asymmetry due to a bone growth disorder in the left upper limb. The diameter of his humerus

The left side measured 13.8 mm, while the right side measured 21.2 mm. A paralysis was diagnosed.
birth, brachial plexus injury, or acute poliomyelitis in childhood. This person would have
survived into young adulthood with severe paralysis of the left upper limb
due to injury or illness at a young age. He did not have paralysis of the nervous system
central, but with limitations in his daily life. He was buried separately from 58 other bodies, at one end
from the cemetery. He is compared to the Neolithic individual from Shamanka (Russia).

"Even in ancient times, when the medical and healthcare environment was not as developed as
Now, there was a strong sense of camaraderie and a mentally stable society that accepted the
existence of individuals with long-term physical disabilities, as in this case" (Ogami-
Takamura et al., 2021).

N	Dating	Period		Place	Specimen	Species	Östra	Fountain
57	4.5 ka		Neolithic	Östra Torp 4, Sweden	Torp 4 (no id)	*Homo sapiens*	Tornberg and Jacobsson (2018)	

A collaboration between bioarchaeology and rehabilitation medicine presents the case of a man
elderly patient (45-90 years old) with evidence of two healed head injuries, identifying probable
immediate and long-term cognitive, psychological, and behavioral consequences, the care received, and
evidence regarding social and organizational relationships. He probably suffered from a motor impairment and
sensory impairment on the right side of the body, and problems with social cognition and attention.

Neolithic and Bronze Age remains from northern Europe suggest high rates of
survival after head trauma. Extrapolating this study #57 to the
sociocultural implications of high-frequency brain injuries during this period of
For about 4000 years, it can be inferred that providing care to people with this condition was a
need for the survival and maintenance of a socially sustainable society.

N	Dating	Period		Place	Specimen	Species		Fountain
58	4 ka		Neolithic Man Bac, Vietnam		M9	*Homo sapiens*	Tilley and Oxenham (2011)	

The remains of a man of about 25 years (M9) show a survival of about one
a decade after the onset of tetraplegia, indicating that she received continuous, dedicated care, and
sometimes intensive during this period.

He was buried differently from the rest of the group members, in a flexed NS position. while the normal position in the group was supine EO. Two vessels associated with the burial.

Tilley and Oxenham (2011) analyze the level of disability of M9 in terms of clinical impact and functional in the context of their lifestyle, their basic care requirements, and assess the meaning of those cares about the M9 community and the individual himself.

N	Dating Period		Place	Specimen Species	41	Fountain
59	4 ka	Neolithic Man Bac,	Vietnam	individuals subadults	*Homo sapiens* Oxenham and Willis	(2017)

Study of the 41 subadult individuals preserved from the Neolithic community of Man Bac.
To begin with, the high incidence of dental hypoplasia suggests poor maternal and neonatal health Problems in the community. Among those children, there is a very high frequency of problems. nonspecific skeletal and dental abnormalities (affecting all but one individual under 8 years of age), and a high fertility rate associated with high infant mortality. This group had three Peaks: in newborns, at 18 months and 4 years, and would be particularly hard on health group psychology. This would explain the special funeral treatment given to those children: From 18 months old, babies are buried with nephrite beads, and the number of beads varies. a peak in the bodies around age 4. Also, from age 4 onwards, it begins to to include tools in the funerary goods.

Furthermore, the bioarchaeological record of that population allows for a comparison with the diseases that affect present-day Vietnamese people and other communities in Southeast Asia, where infant morbidity and mortality rates are high. The diseases they suffer from They produce a variety of symptoms ranging from debilitating to severe (fevers, diarrhea, dehydration, lethargy, apathy, and varying degrees of pain), which would also be suffered by individuals affected by these diseases in the Neolithic community of Man Bac.

The combination of these factors indicates a clear need for healthcare in many cases. intensive, for most of the children in Man Bac. Although this was provided by a With a limited number of caregivers, the entire community experienced an adaptation to the high childhood morbidity, and their response was positive regarding the funeral treatment of children deceased, expressing their individual identities through the placement of the bodies and the assignment of specific objects.

N	Dating	Period		Place	Specimen	Species	Fountain
60	4 ka		Neolithic	Tell Abraq, United Arab Emirates	Burial	*Homo sapiens*	Schrenk and Martin 1 (2017)

The Care Index method is applied to the remains of a young woman that show evidence of paralysis of the lower limbs, probably as a result of poliomyelitis or paralysis Brain diseases with different trajectories throughout life. The uncertainty with Regarding diagnosis, it is common in paleopathology, and Schrenk and Martin (2017) address it. through the construction of parallel models of disability and care, each based on the same physical indicators of pathology, but exploring possible differences in experience clinical, functional impacts and sociocultural traditions of care.

N	Dating	Period		Place	Specimen	Species	Fountain
61	3.5 ka		Neolithic	Naughty, Spain	Individual 1 (Mountain)	*Homo sapiens*	EPPEX/IPHES (May 22, 2009). Presentation of the paleoanthropological and paleopathological study of the human remains found in the Maltravieso cave [press release]

A young woman, 20-25 years old, presented with an induced lesion in the left parietal bone, identified as a trepanation injury (Álvarez, 1984; Mateos, 1995). The lesion showed signs of bone remodeling, which implies that the individual survived the surgical intervention. most likely diagnosis due to the lesions identified in the skull (bone asymmetries) left temporal bone, occipital condyles and zygomatic bones) is a torticollis congenital.

The injuries suffered by the individual would be the result of a long degenerative process initiated by this pathology. Therefore, it is inferred that the trepanation was a consequence of the torticollis and not the other way around.



Figure 14. Trepanned skull of Maltravieso, individual 1.

N	Dating	Period	Place	Specimen	Species	Fountain
62	3-4 ka	Neolithic Tumulus	B-5, Bahrain	Individual 12-10146	*Homo sapiens*	Boutin (2016)

The Care Index method is used to analyze the likely functional impacts and the care required in response to multiple bone deformities identified in the remains of a young woman aged 18-23, nicknamed Beltani, primarily: varus deformity of the humerus in varus, coxa valga and abnormally short stature.

Applying the Bioarchaeology of Personality approach, the study produces a narrative A fictional osteobiographical work that revolves around Beltani's experience of disability and the treatment by their group and their wider community, especially during their childhood and in the beginning of adolescence. She may need support not only for her physical health, but also for her mental well-being, as she had to accept the physical anomalies that made her different visibly different from the rest of the population. Their elaborate burial indicates that the members of their The community held her in unusual esteem.

N	Dating	Period		Place	Specimen	Species	Skeleton	Fountain
63	6 ka		Chalcolithic Tell	Yunatsite, Bulgaria	105	*Homo sapiens*	Zäuner et al. (2011)	

Evidence of a well-healed amputation of the right hand of a woman over 60 years old
A Late Chalcolithic settlement suggests well-established skills in both surgery and
in wound management. The study discusses the possible reasons for amputation, techniques, and
technologies employed, analgesic options available for use in surgery, and possible
relationships between access to surgery and social status, although there is no evidence to assess the
status of this individual.

Zäuner et al. (2011) propose that the precision of the surgical intervention and the long time of
Survival rates indicate a highly developed medical knowledge throughout Europe at this time,
including the likely use of anesthetics.

N	Dating	Period		Place	Specimen	Species		Fountain
64	4-5 ka	Age of	Bronze	Buckinghamshire, United Kingdom	Individual 5605	*Homo sapiens*	Anderson (2002)	

The remains of this individual, aged 35 to 45, belonging to a Bronze Age community,
They show a healed oblique shear fracture of the right tibial plateau and portion
lateral aspect of the right proximal tibial diaphysis. This severe injury would have resulted in immobility.
Temporary and permanent impairment of gait efficiency. The individual would receive care,
including basic splinting of the injury and food preparation and service during the
periods of immobilization.

Anderson (2002) emphasizes that, in the physically demanding peri-agricultural economy, this individual
He was possibly a burden on the community, but his careful burial indicates that a
The degree of physical disability was not in itself a barrier to the recognition of high status
in this community.

N	Dating	Period	Site		Specimen	Species	Fountain
65	4 ka	Age of Bronze	Dayr al-Barsha, Egypt		First Intermediate Period (2 cases) and Middle Kingdom (2 cases)	*Homo sapiens*	Dupras et al. (2010)

An adult individual recovered from zone 4 of the site has bilateral amputations of
both feet. In an adult of about 25 years of age from zone 7, the healed amputation of the

left ulna near the elbow, in addition to evidence of four *perimortem fractures.* In another Individual from area 9A, a man aged 40-45, shows bilateral amputations of the feet, in addition to numerous fractures and hyperostosis, with 4 or more fused vertebrae. These three Some subjects lived a long time after their amputations. In contrast, another individual from the area 9B had *perimortem* amputation of the distal end of the right humerus as part of the treatment of a set of fractures sustained in a serious accident a few days before his death.

Although amputation is not mentioned in the papyri of the ancient Egyptians as part of the regular medical treatments, these four cases indicate a therapeutic use of this method for certain diseases or injuries. In addition, the bone healing patterns of the Individuals from zones 4 and 9A suggest the use of some type of prosthetic or textile devices to help with walking.

N	Dating	Period	Place	Specimen	Species	Grave	Fountain
66	3.5 ka	Age of Bronze	Tel Megiddo, Israel	45, individuals 1 and 2	*Homo sapiens*	Kalisher et al. (2023)	

Two young adult men, identified as brothers by their DNA, are documented as having They were buried together under the floor of an early upper-class domestic structure. Bronze Age in the urban center of Megiddo (present-day Israel). Both individuals showed uncommon morphological variants related to developmental conditions, and each It exhibited extensive bone remodeling consistent with a chronic infectious disease. Regardless of the diagnosis, the extensive periosteal and osteolytic lesions, especially Those of the articular surfaces would affect the overlying soft tissue and, by extension, the mobility of the two individuals, thus hindering certain movements and routine activities. The advanced nature of the lesions indicates that they were able to survive with the infection during several years before he died.

If compared with contemporary middle-status groups in Megiddo, it can be stated that The elite individuals of Tomb 45 were relatively well supplied during their lifetime, as demonstrated by their survival despite possible congenital anomalies and diseases infectious diseases. The shared genetic background predisposed the siblings to acquire a disease infectious disease and their elite status privileged them enough to withstand it.

In addition, Individual 1 had a healed nasal fracture, as well as a large square piece
from a cut bone in the frontal bone (cranial trepanation). The severity of the pathological lesions
This suggests that the procedure possibly had a curative purpose for the deteriorating health.
The low frequency of trepanation in the region indicates that only certain individuals could
access to such a procedure. It is estimated that he died during the procedure, or in the week following.
Next. Both brothers were buried with the same rites as the other members of their family.
community.

N	Dating	Period	Place	Specimen	Species	Fountain
67	2.5 ka	Metal Period (Bronze-Iron)	Napa, Philippines	B243	*Homo sapiens*	Vlok et al. (2017)

This middle-aged man suffered a severe injury to his right leg at least six months ago.
before his death, which considerably limited his mobility and required maintenance
of care actions such as food provision and hygiene. It is likely that B243
He would need the help of others to survive for some time before dying. As
At a minimum, the period of immobility was 4-6 weeks.

Bioarchaeology of Care is used to evaluate the types of healthcare that
probably needed B243 and the potential social and biological impacts of both B243 and
for their community. It is suggested that the B243 community had access to resources related to
health, knowledge about the treatment of their injuries, and underlying values in the group for
to preserve human life in case of injury or disability.

N	Dating	Period	Place	Specimen	Species	Fountain
68	1.2-1.4 ka	Age of Bronze	Castello Del Tartar, Verona, Italy	Burial 396	*Homo sapiens*	Pasini et al. (2019)

The remains of an adult woman (25-35 years old) from the Bronze Age, with trepanation, are being studied
frontal and abnormal burial in prone position, and at one end of the necropolis, away from the
remaining tombs. In comparison with others in the necropolis, only 2 out of 700 tombs were found
in the same position as the individual in question; the other bodies were buried lying down
Supine, with the head oriented west-east. The bone did not heal, and it is estimated that the individual died.
5 days after treatment.

N	Dating Period		Place	Specimen Species		Fountain
69	2-7 ka	Pre-colonial coastal populations	of southern and southeastern Brazil (regions of Rio de Janeiro and Santa Catalina)	119 adult individuals	*Homo sapiens* Lessa (2011)	

An extensive analysis of fracture rates and types among 64 men and 55 women from populations pre-colonial coastal areas of southern and southeastern Brazil (regions of Rio de Janeiro and Santa Catarina), spanning from 4000 BC to 1000 AD, it found evidence of healed fractures between 19% and 27% of the sample studied. It is almost certain that the fractures were the result of activities of subsistence and many probably had serious consequences, particularly femur fractures (present in 10.2% of all people with fractures). Some observed complications of Femoral fractures include limb shortening, joint involvement, circulatory problems, nervous system and pseudoarthrosis.

Since recovery under modern clinical care takes at least 3-4 months, it is He argues that healing in the studied group would take much longer, requiring support extended community. Lessa (2011) observes that the duration of special care, along with The severe functional limitations suffered after recovery suggest the existence of a strong social support to compensate for the morbidity resulting from the injury.

N	Dating Period	Site		Specimen Species	16	Fountain
70	3-8 ka	Precolonial Mulberry Creek, Alabama, USA		individuals (15 adults and 1 subadult)	*Homo sapiens* Simpson (2022)	

Study of the Mulberry Creek site community (USA), and in particular of an individual from Middle Archaic period (8-5 ka ago), 14 subjects from the Late Archaic period (5-3 ka) and another whose age is undetermined period. Of these, 8 are male, 1 female and 1 subadult whose sex is not determined.

Considering the nomadic nature of the communities that occupied the place, applying the Bioarchaeology of Care: these subjects are identified as potential recipients of care in form of adaptation, manifested by problems (fractures, osteoarthritis, osteomas, infections, etc.) that impaired their mobility. Seven of them would also require direct support.

Three individuals stand out due to the severity of their injuries, which demonstrate the need for care. They also show episodes of violence close to their death. In 2 of them (burials 8 and

135), the violence would be explained by the possible incursion of an outside group that would take advantage of the weakness of these individuals. But in the third (burial 12), the manifestations of a infection (acute osteomyelitis or perhaps treponemal infection) spread through different regions postcranial injuries, and multiple fracture injuries, possibly associated with a large fall, They express the care this individual would receive for a long time until his death. Without However, at the end of his life, this care would neither alleviate his pain nor slow the progression of his illness. systemic infection, therefore, according to ethnographic sources of Native Americans, it is suggests that the *perimortem* violence of this individual would have been an assisted death.

N	Dating Period		Place	Specimen	Species	Source
71	4.5-5.6 ka	Precolonial	Barrett site, Middle Green River Valley, Kentucky, USA	8 individuals and adults	*Homo sapiens*	Casserly Moore (2022)

125 individuals from the Green River communities who lived in the Archaic period are studied Finally. Their way of life depended on agility and dexterity when moving between places topographically very varied, depending on the season and the availability of resources. The individuals Those with mobility limitations impacted the entire community, and the Their survival would depend on receiving care from others.

Eight adult individuals were identified (two male, four female, two of unknown sex). identified) with injuries or pathologies in the spine, pelvis or lower extremities which have a direct and severe impact on their mobility. Two of them would have limitations for perform essential activities and would require direct support. Six would have limitations in the instrumental activities, and one of these also in the essential ones in the final stretch of his life.

The need for adaptation of the community and the care provided is evident. walking, carrying weight, facilitating recovery and rest, assisting with feeding, and managing the pain. On the other hand, there is no evidence that her reduced mobility created an identity or influenced unique characteristics of the burial of these eight individuals, which does not have differential factors compared to other members of the community.

N	Dating Period		Place	Specimen	Species	Fountain
72	1-10 ka	Precolonial	Carrier Mills, Illinois, USA	441 adult and subadult individuals	*Homo sapiens*	Schrenk (2019)

The Carrier Mills hunter-gatherer communities that lived in the Archaic period
The Middle Ages (6000-3000 BC) and the Woodland period (1000-200 BC) show different cases of cranial and postcranial injuries, nutritional stress, infections and chronic diseases, which indicate a heavy socioeconomic burden from the disease. Despite these difficulties, the Communities were able to assist the sick and injured members, and to compensate for the burdens of ill health adapting to the differences of disabled members.

Schrenk (2019) is the first to combine the Bioarchaeology of Care approach with the methodology for estimating the burden of disease in the past (Stodder, 2017). When studying multiple remains of communities from different periods, his doctoral thesis includes numerous detailed individual case studies of disability and care, as well as estimates of the costs of disability experienced by both the individual and their group, calculated in terms of years lived with a disability.

N	Dating	Period		Place	Specimen	Species	Fountain
73	465-1265 AD		Precolonial	Averbuch, Tennessee, USA	B271A	*Homo sapiens* Worne (2017) in Tilley and Schrank (2017)	

Possible trauma-related disability of a middle-aged to older adult woman
a late prehistoric farming community. This person survived significant injuries
traumatic injuries to the pelvis, as well as fractures to the ribs, spine, and bones of
the face.

Worne (2017) believes that the instability of her pelvis would force her to walk slowly and carefully, without apparently having long-term immobility. His possible
Disability and care are considered within the contexts of accidental injury and violence intentional.

N	Dating	Period		Place	Specimen	Species	(not id.)	Fountain
74	500-1000 AD		Precolonial	Grider Site, Pike County, Indiana, USA		*Homo sapiens*	Phillips and Sivilich (2006)	

The remains of a man aged 20 to 30 years from the late Woodland or Silvico culture

Observe complete bilateral cleft palate. Related morphological anomalies (affecting

The nasal bones and the opening would not prevent survival into adulthood. However, the active intervention of other people to completely cover the nasal opening and allow the Sucking and swallowing would have been essential for surviving infancy. Cultural mechanisms They could have helped this individual survive the complications of a cleft palate that can lead to infant death (Phillips and Sivilich, 2006). Brothwell (2010) suggests a Alternative diagnosis: rhinomaxillary changes resulting from adult-acquired trepanematosis (In this case, the receipt of the aforementioned childcare would not apply).

N	Dating	Period	Place	Specimen	Species	Fountain
75,700	AD	Precolonial	Hacienda Agua Salada, Nazca, Peru	Child of Nazca	*Homo sapiens*	Tilley and Nystrom (2018)

Re-examination of the Nazca Child, first published by Allison (1973). This is a case of Pott's disease (a form of extrapulmonary tuberculosis that affects the spine) and acute miliary tuberculosis in a child from the Nazca culture of southern Peru, whose first symptoms They would begin at the age of 1-2 years. He lived for about 8 years. He shows evidence of a psoas abscess. tuberculosis of the lung, pleura, liver and right kidney with acid-fast organisms, and pericarditis. He received special funeral treatment, with his body seated in a squatting position on a device in the form of a bench and unique objects.

N	Dating	Period	Place	Specimen:	Species	Fountain
76	800-1100 AD	Precolonial	Libben, Ohio, USA	Long bones (c. 250~400 of each bone)	*Homo sapiens*	Lovejoy and Heiple (1981)

Long bone fractures are analyzed in a sedentary community of the Silvico culture or Woodland final, whose context indicates a strong dependence on foraging. There is a 45% probability of long bone fracture in any individual, with more The probability is higher in the 10-25 age range and in those over 45. Most fractures occur as a result of an accident, not violence. There are high rates of successful healing. Lovejoy and Heiple (1981) points out that probably no major disability would occur, such as the result of a healed fracture, which they attribute to specialized intervention and care efficient and laborious for individuals with fractures, since such a complete healing process It involves considerable knowledge and skill in treating traumatic injuries.

N	Dating Period		Place	Specimen Species		Fountain
77	900-1100 AD	Precolonial Quadrangle	Tello, Valley of Pachacamac, Peru	Individual H3-CF3	*Homo sapiens* Palma	Malaga and Makowski (2018)

She was an elderly woman with a congenital condition that compromised both her mobility, such as the independence to perform certain basic tasks, and that it generated needs long-term care in the form of direct support and adaptation. The remains show a rib cervical (extension of the transverse process of the seventh cervical vertebra), destruction severe osteoarthritis in the right shoulder joint and a healed skull trepanation. She had thoracic outlet syndrome (TOS), a group of disorders that are They occur when blood vessels or nerves in the space between the clavicle and the first The ribs (thoracic outlet) are compressed, and this produces sensory, mobility, and other problems. neurological.

Palma Málaga and Makowski (2018) estimate that he suffered some of these problems several years earlier of his death, and propose that cranial trepanation would be associated with a treatment of care to relieve the symptoms of neurological or vascular compression. They apply the methodology of the Bioarchaeology of Care in the context of the Ychsma culture, and suggest that care would be a relatively common practice in this society.

N	Dating Period		Place	Specimen Species		Fountain
78	1000-1250 AD	Precolonial Achanchi, Peru ACH 3			*Homo sapiens* Jolly	and Kurin (2017) in Tilley and Schrenk (eds.) (2017)

The study of a young man showing cranial and postcranial fractures is used as evidence of mobility problems and three healed trepanations. The response of the care is explored. doctors to the injuries resulting from interpersonal violence and their cultural context (the Chanka It was a very violent society).

Jolly and Kurin (2017) examine the complex interaction between care and violence, focusing in the social organization necessary to manage the treatment and outcomes of injuries brain injuries, as well as the impact of brain lesions on social identity. The authors They conclude that the study of medical care and disability "illuminates the ramifications of the war and conflict for community decision-making."

N	Dating Period		Place	Specimen Species		Fountain
79	1000-1534 AD	Precolonial	Rinconada la Molina, Peru	FA 54	*Homo sapiens*	Sutherland (2019)

Use of computed tomography for the study of the mummified remains of a man from
Middle-aged patient with chronic osteomyelitis of the right tibia. In a secondary burial,
They inserted human newborn remains attached to this bone, and the grave goods included seeds with medicinal properties.

Through the Care Index, Sutherland (2019) develops a detailed description of treatment of man in his final years of life and after death, delving deeper into to other previous studies of mummies with a technological approach.

N	Dating Period		Place	Specimen Species	Burial	Fountain
80	1000-1600 AD	Precolonial	Chenque I, The Pampa, Argentina	12 *Homo sapiens*	Luna et al. (2008)	

The remains of a male aged 40 to 50 years from a highly hunter-gatherer community
mobile cells show multiple osteolytic lesions consistent with late-stage metastasis (probable primary cancer of the lung, kidney, thyroid, or intestine). The individual most likely suffered intense pain, weakness, fatigue, and muscle atrophy for several months before dying.

Luna et al., (2008) emphasize that this individual would need increasing help from other members of the social group to move around and satisfy their basic needs and, in recent days, its severity
It would make him completely dependent on other people.

N	Dating Period		Place	Specimen	*Homo*	Fountain
81	1100-1290 AD	Precolonial	Aztec Ruins, New Mexico, USA	Burial 88	*sapiens* **species**	Willett and Harrod (2017) in Tilley and Schrenk (eds.) (2017)

The Care Index method is used for the case of an adult woman who experienced a severe blow with significant pelvic fracture and other postcranial injuries (mainly in the femur), permanently limiting mobility. Through a wide range of
Using ethnographic and ethnohistorical references, Willett and Harrod (2017) analyze the likely social role of the individual and the care received, including coverage of the skills required in the provision of care and the possible participation of traditional healers.

N	Dating	Period		Place	Specimen	Species	*Homo*	Fountain
82	1117-1022 AD		Precolonial	Dead Black 3, Patagonia, Argentina	NM3_4		*sapiens* Romano et al. (2022)	

An adult male aged 30-39 years presents with a fracture of the lateral tibial plateau, a very serious injury. disabling of the lower limb, which limited its locomotion and could have caused new Demands on other parts of the body, as well as changes in group dynamics. Mobility The restricted nature of this type of fracture and the remodeling state imply that the individual She received different levels of interpersonal care throughout the healing process.

The Care Model for this individual would have at least one stage of direct support for tasks basic in the short/medium term and then a long-term adaptation of the group, while It was gradually acquiring greater autonomy. The case provides clear evidence of strategies of interpersonal care among Patagonian hunter-gatherers.

N	Dating	Period		Place	Specimen	Species	Burial	Fountain
83	1150-1300 AD		Precolonial	La Plaza, Arizona, USA	*Homo sapiens*		Dongoske et al. 167 (2015)	

A young woman lived for more than a decade with a systemic infection, scoliosis, and premature degenerative bone disease, resulting in clinical and functional impacts progressively severe, initially requiring group adaptation and, ultimately, intensive direct support.

Analyzing the implications of care in relation to the cultural context and the organization social, and considering the possible importance of its rich funerary assemblage, Dongoske et al. (2015) They emphasize the analysis of the individual's social identity.

N	Dating	Period		Place	Specimen	Species	Fountain
84	1200-1400 AD		Precolonial	Moundville, Alabama, USA	#228400	*Homo sapiens*	Mann et al. (1998)

The partial skeleton of a 20-30 year old woman from the Mississippian agricultural culture (Mississippian Moundville), shows a congenital malformation of the right arm that includes synostosis complete humeroradial joint, absence of the ulna, curved and hypoplastic radius, and probable deformity of the right hand (although it is missing bones), resulting in little or no effective use of

This limb. Regardless of their range of physical abilities and degree of self-sufficiency,
His deformity would certainly have been evident to others. Mann et al. (1998) see his survival
into adulthood, as a reflection of both their ability to adapt to the disability and
The acceptance, support, or at least the indulgence of society towards people with
potentially disabling deformities.

N	Dating Period		Place	Specimen Species Burial 50		Fountain
85	1300-1500 AD	Precolonial	DeArmond, Tennessee, USA	*Homo sapiens*	Di Gangi et al. (2010)	

The remains of a woman aged 29 to 51 from the Mississippian agricultural period (Mississippi Moundville),
They show evidence of cartilaginous dysplasia resulting in significant differences in length
between the right (181 mm) and left (263 mm) humerus, and between the left (287 mm) and femur
the right one (345 mm). Its calculated height (118.8-137.4 cm) is at least 15 cm shorter than the
Minimum average height for an adult woman in this population. Skeletal deformities
They probably manifested during his first decade of life; he would have walked with a limp.
pronounced since childhood, and skeletal markers indicate continuous biomechanical stress.
Survival to adulthood indicates that the community offered some type of social support to the
people with physical disabilities.

She was buried in a mound, typically reserved for men. DiGangi et al. (2010)
They propose that women who received funeral treatment like this would be of special value
or importance to the community. In this case, its inclusion in the mound could have been symbolic.
community status related to their marked physical differences. Their survival informs
about the possible nature of the particular connections he had with others, and about the
nature of social assistance systems in this society.

N	Dating Period		Place	Specimen H.	Species	Fountain
86	1100-1535 AD	Precolonial	Huaca Las Balsas and Huaca Las Bees, Peru	Las Abejas, unit XA, Ent. 1 and H. Las Balsas, unit IB, Ent. 1	*Homo sapiens*	Phillips et al. (2021)

These are two cases of successful amputation of the left foot in young adult females excavated
from Huaca Las Balsas (Late Intermediate Period, AD 1100–1470) and Huaca Las Abejas
(Late Horizon, AD 1470–1535) in the ancient religious and administrative center of Túcume.

Contextual evidence supports a therapeutic motivation for the procedure, since the
individualized treatment and burial placement within an elite cemetery group
Social modification is not consistent with ritualistic or punitive action. The modification of the malleoli, the
extensive bone proliferation covering the talar joints and asymmetric cortical bone thickness
The findings in the tibias and fibulas (revealed radiographically) suggest a return of some mobility.
functional use of the affected limb after healing. This long-term recovery
This is evidence of access to quality medical care and accommodation for functional impairment within
from the amputee communities.

The research by Phillips et al. (2021) uses Bioarchaeology of Care ("bioarchaeology
of charity," in the original Spanish translation within the same publication) to explore
the lived experiences of these amputees and their social identities, making a contribution
important to the anthropology of disability across cultures and time periods.

These individuals did not appear to be stigmatized for having lost their left foot. The signs in the
mortuary procedures point towards a social norm for these young amputees, in
place of social isolation. It is inferred that they would be two individuals with social positions and
not exceptional reputations whose feet were amputated and received care in a context
of medical treatment.

N	Dating Period		Place	Specimen Species (no id)	Fountain
87	1788 AD	Precolonial	Bourke, New South Wales, Australia	*Homo sapiens* Webb and Thorne	(1985), Webb (1995)

The remains of a young adult female, around 20 years old, from the late Australian Holocene, show evidence
the presence of congenital meningocele, with complete perforation of internal cranial planes and
external. The meningeal sac protruded through this opening and there was trauma to the membrane
This would likely have resulted in infection and death. However, the woman survived until...
adulthood in a hunter-gatherer economy, suggesting care and monitoring
continuous during childhood and also later.

His survival with an obvious deformity means that the common belief must be reevaluated.
that Australian Aborigines, before contact with Europeans, normally used the
Infanticide to get rid of every baby with congenital deformities. Cases are documented.
additional survival rates with other disabling conditions, including amputations of

legs and cleft palate. Examining the skeletal evidence of paleopathology up to and
Around the time of European contact, Wells (1995) concludes that in Australian society
There was great tolerance and a willingness to care for malformed and seriously injured individuals.
and mutilated.

N	Dating Period		Place	Specimen Species		Fountain
88	400-600 AD	Medieval West	Heslerton, United Kingdom	2BA466 (G114)	*Homo sapiens*	Cox (1999)

The bones of the left upper limb of the incomplete remains of a young adult woman,
From 17 to 25 years old, recovered from a cemetery from the early Anglo-Saxon period, they show atrophy
significant diaphyseal, probably as a result of asymmetric paralysis such as
as a result of a stroke that affected the right hemisphere. This woman would be
severely disabled for some time before her death, with mobility problems,
probable partial or total loss of bladder and rectal control, limited contribution to life
community and family. Cox (1999) emphasizes that the special care that was probably required
After her disability, she reflects the versatility and values of the society in which she lived.

N	Dating Period		Place	Specimen Species		Fountain
89	450-650 AD	Middle Ages	Worthy Park cemetery, Kingsworthy, United Kingdom	B38 (amelia), B14 and 11 other individuals (fractures), 33 individuals (osteoarthritis)	*Homo sapiens*	Tilley and Cave (2023)

These are 3 different case studies of pathologies examined using the Bioarchaeology method of
Be careful, in a cemetery with 69 individuals.

Individual 38 was missing his left arm and shoulder girdle due to congenital absence (amelia).
Clinical problems would include back, neck, and head pain, as well as fatigue. The vertebrae
Impacted and rotated lumbar spine suggests neurological problems, with weakness and pain in one or
both lower limbs. Their pelvic asymmetry would be associated with gait disturbance and
Limiting fatigue and mobility. His asymmetrical rib cage and muscle deficiencies
would restrict breathing. These conditions throughout his life (more than 50 years) and his
Ordinary burials reflect a clear management and adaptation of difference by the community.

Furthermore, 12 individuals were documented with fractures in various skeletal parts. One of
They (individual 14) suffered permanent functional loss following fractures in their right arm.
Care would include attempts at alignment and immobilization through splinting and/or bandaging, and the
use of medicinal plants for pain and inflammation.

Finally, 33 individuals with osteoarthritis were documented, who would suffer pain and limitation of
movement. The settlement consisted of 5-8 households (approximately 40 people),
each composed of a nuclear family with possibly one or two elderly relatives or
single people and/or a servant/worker (Hawkes and Grainger, 2003). Households owned small
neighboring farms where they worked largely independently. They interacted
(trade, marriage and migration) with other contemporary settlements along the valley
and with Winchester, an important urban center. The agricultural economy included cereal cultivation.
and legumes, with meadows that provided pasture and hay. Their livestock consisted of oxen,
Horses, cows, sheep, pigs, and poultry and geese. Apples, berries, and other fruits were grown or gathered.
hazelnuts. They had small-scale home gardens. Some seeds indicate the possible
Knowledge of medicinal herbs. They worked with textiles, bones and horns, and some metallurgy.
possibly pottery. In this context, the instrumental activities of daily life would suffer
alterations in the level and nature of the participation of such a high number of individuals with
osteoarthritis, requiring community adaptation, but not direct support.

N	Dating Period		Place	Specimen Species		Fountain
90	550-800 AD	Middle Ages	Kulubnarti, Sudan	S-16	*Homo sapiens*	Kilgore and Van Gerven (2010)

A young adult male from a medieval Nubian community survived for 20 to 25 years with a
Extreme congenital scoliosis, which severely restricted mobility. This disease is
associated with problems of genitourinary, neurological and/or gastrointestinal functions and that
This resulted in cardiopulmonary dysfunction. This individual experienced disability and perhaps pain throughout his life.
and the symptoms worsened with age, so there is no doubt that she received considerable care
and support from family and others, without whom I could not have survived for so long.

Kilgore and Van Gerven (2010) suggest that he was probably a well-integrated member of the
society; it is possible that in the past there was a tradition of disabled people receiving
a favored status.

N	Dating Period		Place	Specimen Species		Fountain
91	1050 AD	Middle Ages	Kaÿdus, Poland Site 1,	Burial 101/98 (and 39 others)	*Homo sapiens*	Matczak and Kozlowski (2017) in Tilley and Schrenk (eds.) (2017)

Ethnohistorical sources are used to document the life context and detailed osteobiographies.
of an adult woman aged 25-30 with advanced leprosy, a chronic infection that attacks the immune system
nervous system, skin, nasal bones, and postcranial skeleton. He would have difficulty performing the
daily activities, and would gradually lose his vision. In addition, he has congenital fusion of the vertebrae.
C2 and C3, causing him mobility problems.

Another possible case of leprosy was found in Burial 80/98, but without definitive evidence.

Other cases identified in Kaldus are: anemia, scurvy, tuberculosis (Pott's disease),
periosteal reactions, post-traumatic injuries and fractures, degenerative joint disease,
Bone tumors, cavities, and abscesses. In particular, those who would have significant functional limitations would be affected.
Individuals with evidence of poliomyelitis, osteomyelitis, rickets, very degenerative lesions
advanced (painful and probably preventing movement), vertebral disc herniation,
hip dysplasia, multiple myeloma, and amputation.

Matczak and Kozlowski (2017) use the Bioarchaeology of Care framework to structure
the assessment of the functional implications of the pathology and health needs
related, and to help consider the interactions between social status, treatments
medical, magical and religious practices in common use, and the likely care received.

N	Dating Period		Place	Specimen Species	Burial	Fountain
92	1100-1300 AD	Middle Ages	Ostrów Lednicki Island, Poland	*Homo sapiens*	Matczak and 23/77	Kozlowski (2017) in Tilley and Schrenk (eds.) (2017)

Ethnohistorical sources are used to document the life context and detailed osteobiographies.
of an adult woman aged 25-30 years with gigantism (2.15 cm in height) since childhood,
Acromegaly and traumatic injuries. He possibly suffered from one or more of these problems: diabetes,
hypertension, headaches, visual defects, sleep apnea, sweating/oily skin, alterations
skin lesions, swelling of soft tissues (including the tongue), enlargement of hands and feet,
menstrual dysfunction. It is very likely that she suffered from a mental disorder.

N	Dating Period		Place	Specimen Species		Fountain
93	1100-1700 AD	Middle Ages St	James and St Mary Cemetery Magdalene, Chichester, Sussex, United Kingdom	C148	*Homo sapiens*	Roberts (2017) in Tilley and Schrenk (2017)

The Care Index method is used for the case of a 25-35 year old man who had leprosy, with involvement of the bones of the skull and the postcranial skeleton (ribs, vertebrae, extremities…). In addition, her teeth showed evidence of periodontitis. She had sinusitis and a skin infection. or scurvy, as well as meningitis, head trauma, anemia, tuberculosis, or rickets. He suffered from lung conditions, bone degeneration of the vertebrae, and multiple bone problems. Circulatory problems in the hands, feet, arms, and legs. Their symptoms possibly began during at least five years.

N	Dating Period		Place	Specimen Species	Source	
94	940-1454 AD	Middle Ages	Cemeteries All Saints by the Castle and hospital of St John the Evangelist, Cambridge, United Kingdom	PSN 335, PSN 93, *sapiens* PSN 723	*Homo*	Dittmar et al (2023)

Bioarchaeology of Care is used to study three medieval individuals: PSN 335 (woman (45-65 years old), PSN 93 (man over 60 years old), PSN 723 (man over 60 years old). They were three working-class members who suffered significant injuries at some point in their lives, which caused multiple fractures and asymmetries in their lower limbs. Survival Of the three, PSN 335 and PSN 93 indicate different care requirements at different stages of recovery. They suffered lasting complications from their injuries that likely contributed to their hospitalization. in the hospital in whose cemetery they were buried. PSN 723 was injured at a young age, and although He lived with a substantially altered gait; this problem may not have affected his ability to to fend for himself until death.

These cases illustrate that the concept of disability does not depend solely on physical condition. not from the individual, but from multiple factors, including the ability to fend for oneself and the perception of moral behavior.

N	Dating Period		Place	Specimen Species (not id.)		Fountain
95	1200-1600 AD	Age Modern	Ballyhanna, Donegal, Ireland		*Homo sapiens*	McKenzie et al. (2022)

The experience of a middle-aged man who suffered several injuries is analyzed, the most serious a fracture and dislocation of the hip. He required medical attention in the months following the injury. and long-term group adaptation until death. The potential impacts of disability, the Care options and the altered status of the community are contextualized within a diverse set from historical, ethnohistorical, anthropological, literary, and popular sources. The use of these Materials for exploring the potential psychological challenges of living with a disability address the effectively as in the Neolithic subject Beltani (Boutin, 2016), described in case #62.

N	Dating Period	Site		Specimen Species	*Homo*	Fountain
96	1348-1535 AD	Age Modern	Holliston Mills, Tennessee, USA	Burial 86	*sapiens* Zuckermann	et al. (2019)

Application of the Care Index method to multiple pathologies derived from treponematosis and a poorly healed fracture of the right tibia in the remains of a young woman (18-25 years old). concludes that he experienced systemic bodily deterioration throughout his life, which resulted in problems with essential activities of daily living and probably in increasingly demanding care more demanding. No evidence suggests the possession of a special status that would explain this careful.

Zuckermann et al. (2019) describe the contemporary culture of the individual to argue that the The provision of care likely reflected an egalitarian sociopolitical structure of the community, which was unusual for that period.

N	Dating Period		Place	Specimen Species		Fountain
97	1550-1672 AD	Age Modern	Gran Quivira Pueblo, New Mexico, USA	Great Quivira 391	*Homo sapiens* Hawkey	(1998)

The skeletal remains of this adult male show evidence of progressive and eventual deterioration near total loss of physical functionality as a result of systemic juvenile chronic arthritis. By adolescence, he would be unable to walk. He died at approximately 40 years of age, almost All joints were immobilized and this individual's ability to move was It was limited to the head, neck, shoulders, and possibly the fingers. Its deterioration indicates that depended on other people for a prolonged period of time.

A combination of indicators, joint mobility estimates, and clinical progression data
The details of the illness suggest that, although he was severely affected, he received care
special traits that allowed it to survive for many years. It was probably able to feed itself.
himself, although, given the seriousness of his condition, he would have required someone to provide him
Food. No other possible types of care are described. According to the treatment
funeral home, there is no evidence that he was treated differently, even though he could not
contribute like others. Hawkey (1998) adds that he may have been subject to the documented practice
ethnohistorically of tying an individual to a board to try to *cure* kyphosis during the stage
early onset of his illness, which would have worsened his condition "disastrously".

N	Dating Period		Place	Specimen Species		Fountain
98	1703- 1852 AD	Age Modern	St Bride's Church, London, United Kingdom	SB79-105 *Homo sapiens*	Conlogue et al (2017) in Tilley and Schrenk (2017).	

Post-mortem evaluation using direct digital radiography (DR) and computed tomography
multidetector computed tomography (MDCT) of an individual between 25-30 years old. He suffered from severe kyphoscoliosis, with
asymmetry of the skull and jaw, atresia of the left auditory meatus, and possible neurofibromatosis.
She had reduced mobility in her daily activities and suffered from respiratory problems.

N	Dating Period		Place	Specimen Species		Fountain
99	1800- 1900 AD	Age Modern	Cromwell Gorge, Central Otago, New Zealand	E224	*Homo sapiens*	Buckey et al (2021)

In line with other evidence of trauma and injuries in skeletons from the "fever" populations
"gold", very relevant in the Otago region in the 19th century, individual E224 shows a
Ossification of the ligaments in your leg, probably caused by working or walking on
difficult paths, for which he required help from his community for two or three months.

Furthermore, the evidence in his mouth indicates a difficult childhood and subsequent improvement.
Nutrition during adolescence, but poor oral health in adulthood. It is used
Bioarchaeology of Personality to create a narrative about the life of this individual.

N	Dating Period		Place	Specimen Species *Homo*	Fountain
100	1850-1875 AD	Age Modern	St. John's burial ground, Milton, New Zealand	B21	*sapiens* Snoddy et al. (2020)

A middle-aged man is described, and all the basic biographical details are known: age (42 years), cause of death (hemoptysis), occupation, marital status, origins, route of migration… Combining empirical approaches from paleopathology, morphological analysis and isotope analysis with the interpretive approaches of Bioarchaeology of Care and Bioarchaeology of Personality, Snoddy et al. (2020) narrate the life and death story of subject, which includes a period of disability due to tuberculosis, with pulmonary and skeletal involvement.

N	Dating Period		Place	Specimen Species		Fountain
101	1888–1890 AD	Age Modern	Philippi, West Virginia, USA U.S.	Patient of asylum (2018) Allegheny	*Homo sapiens* Beckett and Conlogue Trans-	

The soft tissue remnants of chronic obstructive pulmonary disease with emphysema are examined. and moderate-to-severe anthracosis of a mummified adult woman from the Trans- mental asylum Allegheny, identifying details of the impacts of the disease and the care required. Pathophysiological analyses allow the description of disease processes at the cellular level, of organs and systems, which allows the use of modern tools to assess the effects likely in everyday functioning.

While it does not reach the level of interpretation of stage 4 of the Bioarchaeology of Care, this study It stands out for its accuracy in reconstructing the experience and lifestyles of the individual, and demonstrates the potential of pathophysiological analysis and transdisciplinary collaboration.

9. PRACTICAL PROCESS

DEFINITION OF VARIABLES

Establishing a quantitative Care Indicator (CI) requires two characteristics
fundamental. First, the difficulty of measuring such complex behavior necessitates
determine a sufficient number of variables to cover a perimeter of analysis as broad as possible
as broad as possible. We must seek to leverage any opportunities they can contribute to.
various scientific disciplines, capable of providing any valuable information on actions of
care and the conditions these would impose on the community. Secondly, the
search for the three major questions of this research (recurrence or sustainability of
behavior, increase in the skills used, introduction of new techniques), must
to enable the possibility of establishing comparisons between the individuals in the sample, which makes
The simplicity of the IC calculation procedure is necessary.

With all this, a definition of variables guided by the method of Bioarchaeology is adopted
of Care, corresponding to the four stages of the methodology, as defined in the Framework
methodological. The following table lists these variables, and the range of values they can have.
adopt in the procedure for obtaining a quantitative CI in each case study:

Variable Number		Range
ICV01	Number of systems with clinical impacts	1-12
ICV02	Number of essential activities committed	0-6
ICV03	Number of domains of instrumental activity involved	0-7
ICV04	Number of care constants as direct support	0-10
ICV05	Adaptation based on the duration of care	1-3
ICV06	Collective action based on the number of episodes or cycles	1-3
ICV07	Individual identity	0-3
ICV08	Multiple care cases	0-1
ICV09	Paleolithic or differential burial	0-1
ICV10	Period	N/A

Variable Number		Range
ICV11	Human species	N/A
ICV12	Hunter-gatherers	N/A
ICV13	Children's	N/A
ICV14	Advanced age	N/A
ICV15	Medical attention	N/A

Table 3. Variables defined to calculate the Care Indicator (CI).

All these variables constitute addends to the IC, except for adaptation based on duration of care (ICV05), which multiplies the resulting effect of all the others. Likewise, the variables ICV10 to ICV15 are also not addends, but are used to perform segmentations in the IC analysis.

The detailed definition of each variable is set out below:

ICV01 - Number of systems with clinical impacts. Takes a value from 1 to 12 depending on the affected body systems according to skeletal analysis, identifiable from the next list:

1. Neuro-musculoskeletal and movement-related.
2. Mental: intellectual, consciousness, attention, language.
3. Cardiovascular.
4. Respiratory.
5. Digestive, metabolic and endocrine.
6. Integumentary.
7. Sensory functions / nervous system (i): pain (e.g., acute, chronic, intermittent).
8. Sensory functions / nervous system (i): other (e.g. sight, hearing, balance).
9. Hematological.
10. Immune.
11. Genitourinary, reproductive.
12. Others.

ICV02 - Number of essential activities committed. Takes a value from 0 to 6, according to the Number of essential activities affected, taking into account the following inventory:

1. Access to food and water nearby.
2. Eat and drink without help.
3. Manage personal hygiene.
4. Handling objects in the immediate vicinity, including dressing oneself.
5. Travel a limited distance.
6. Controlling body position, for example, moving from a resting position to a standing position sitting.

ICV03 - Number of instrumental activity domains involved. Takes a value from 0 to 7. according to the number of selectable instrumental activity domains in the following list:

1. Basic lifestyle (e.g., settlement practices).
2. Economic activities.
3. Domestic activities.
4. Mobility patterns.
5. Community life (social and cultural activities not covered above).
6. Interpersonal relationships.
7. Learning/application of knowledge.

ICV04 - Number of care constants as direct support. Takes a value from 0 to 10 in function of the direct aid actions identifiable from the following inventory:

1. Food and water supply: may include special diet, help with eating/drinking.
2. Maintaining body temperature within the normal range: may incorporate protective actions such as providing shade or shelter.
3. Aid for rest and sleep, such as postural adjustment and pain relief.
4. Ensuring physical security, including protection against threats from self-harm and other domestic and environmental injuries, for example, from predators or others animals, or from other human groups; it may also require periodic supervision [see 6].
5. Maintenance/mobility assistance, as an essential part of the management/recovery of disease, since immobility can be fatal [see also 8].

6. Monitoring health status, to respond in a timely manner to physiological needs and to avoid health crises [see 7, 8 and 9].
7. Maintaining personal hygiene and cleanliness, to protect the integrity of the skin and prevent and treat infections.
8. Physical manipulation: turning, lifting, facilitating stretches and massages essential for to maintain/improve the function of body organs and systems in cases of immobility [see 9].
9. Maintenance of physiological function: involves timely response to metabolic, respiratory, gastrointestinal, circulatory, urinary, etc. dysfunctions; It includes physical handling, temperature control, diet, and hydration.
10. Specific interventions/technologies: includes invasive or non-invasive surgical actions, including orthopedics, trepanation, amputation, hemorrhage control… as well as the application of medicinal products and practical aids, such as prostheses.

ICV05 - Adaptation based on duration of care. It takes a value from 1 to 3 depending on the following ranges of estimated duration of care:

1. Less than one month.
2. Between one and six months.
3. More than six months.

ICV06 - Collective action based on the number of episodes or cycles. It takes a value from 1 to 3 in function of the number of repetitions or episodes that the individual experienced in which the group decided to intervene to provide care:

1. A single episode.
2. Two episodes.
3. Three or more episodes.

ICV07 - Individual identity. Takes a value from 0 to 3 depending on identity traits individual reflected in terms of.

0. Not applicable (for example, in the case of babies).

1. Cooperation with specific care actions.
2. Adaptability and social commitment to the group.
3. Resilience, tenacity, self-esteem, social commitment and desire for survival.

ICV08 - Multiple care cases. Takes a value of 0 or 1 depending on:

0. The subject receiving care is a unique case documented in his group.
1. There are several documented subjects in the same group with possible evidence of reception of care.

ICV09 - Paleolithic or differential burial. It takes a value of 0 or 1 depending on:

0. Not documented.
1. Paleolithic burial, or one from a later period than the Paleolithic but which expresses some unique type of recognition for that individual.

Additionally, six other variables with a classifying effect are defined:

- ICV10 - Period: Lower Paleolithic, Middle Paleolithic, Upper Paleolithic, Prehistory Late (Mesolithic, Neolithic, Chalcolithic, Bronze Age), Late pre-colonial prehistory, Middle Ages and Modern Age.
- ICV11 - Human species: *Homo erectus,* pre-Neanderthal, *Homo neanderthalensis, Homo sapiens.*
- ICV12 - Membership in a hunter-gatherer group (yes / no).
- ICV13 - Child Individual (yes / no).
- ICV14 - Elderly individual (yes / no).
- ICV15 - Presence of therapeutic or pharmacological treatments that reflect care specialized (yes / no).

The term pre-Neanderthal or early Neanderthal, corresponding to the variable ICV11, and with significant relevance in the results, it is used to classify the hominins of the population from the Sima de los Huesos, Atapuerca (Spain). So far, the following have been found at this site: approximately 7,000 human fossils belonging to at least 29 individuals. Their fossil record includes:

Among them were 17 skulls, a complete pelvis, and all the bones of the body represented. Individuals in this group are considered contemporaries. After their discovery, they were classified initially as *Homo heidelbergensis* (Arsuaga et al., 1997). Subsequently, its elimination of the hypodigm of this species, being considered as belonging to the lineage Neanderthal, given the abundant number of Neanderthal traits in all components of This group (Arsuaga et al., 2014).

RESULTS

For each of the cases (N) described in the Reference Framework, Table 4 details the values of the nine variables (ICV01 to ICV09) that establish a quantitative Care Indicator (IC), as defined in the section Definition of variables; Table 5 below details the values of the variables with classifying effect, and the minimum number of individuals (NMI) contained in each case.

N	IC	ICV01	ICV02	ICV03	ICV04	ICV05	ICV06	ICV07	ICV08	ICV09				
1	12	0	1	0	1	3	1	1		
2	32	3	3	4	3	2	1	2		
3	14	1	1	2	1	2	1	1		
4	39	2	0	4	1	3	3	1	1	1
5	27	2	1	1	1	3	1	1	1	1
6	14	2	1	2	4	1	2	1	1	1
7	30	1	1	3	2	3	2	1		
8	15	1	1	0	1	3	1	1		
9	33	2	2	1	2	3	2	2		
10	34	3	3	3	2	2	3	2	1	
11	63	3	3	5	3	3	3	2	1	1
12	42	2	2	3	3	3	2	0	1	1
13	20	2	1	1	1	2	2	2		1
14	22	2	1	2	1	2	2	2		1
15	12	0	1	1	1	2	2	1		
16	16	1	1	2	1	2	2	1		
17										
18	10	0	1	1	1	2	1	1		
19	36	1	2	2	2	3	3	1		1
20	51	3	1	3	2	3	3	3	1	1
21	20	2	1	1	1	2	2	1	1	1

N IC	ICV01	ICV02	ICV03	ICV04	ICV05	ICV06	ICV07	ICV08	ICV09				
22	28	2	2	2	3	2	2	1	1	1			
23	10	2	1	1	1	1	2	1	1	1			
24	10	2	1	1	1	1	2	1	1	1			
25	44	3	2	4	6	2	3	2	1	1			
26	11	1	2	2	2	1	1	1	1	1			
27	42	3	1	2	3	3	3	2					
28	16	3	0	1	2	2	1	1					
29	40	2	3	3	7	2	2	3					
30	39	3	0	1	2	3	3	3		1			
31	30	2	0	1	1	3	2	2	1	1			
32													
33													
34	24	2	2	2	2	2	1	1	1	1			
35	26	2	2	2	2	2	1	2	1	1			
36	39	2	0	3	1	3	3	3		1			
37													
38													
39	39	2	2	2	3	3	2	1	1				
40	66	1	6	4	7	3	1	3					
41													
42	51	2	2	4	5	3	2	2					
43	24	2	1	1	1	3	1	2					
44													
45													
46													
47	9	2	1	2	1	1	2	1					
48	30	2	2	2	3	2	3	2		1			

N IC	ICV01	ICV02	ICV03	ICV04	ICV05	ICV06	ICV07	ICV08	ICV09				
49	42	3	3	4	7	2	3	0		1			
50	24	1	1	2	2	3	1	1					
51	15	1	0	0	1	3	1	1	1				
52	36	2	5	2	6	2	2	1					
53	24	2	0	2	1	3	1	1	1				
54	28	2	1	2	6	2	3	0					
55													
56	27	2	1	1	1	3	1	2		1			
57	46	3	3	6	6	2	2	3					
58	72	1	6	4	7	3	1	3	1	1			
59	60	4	0	6	6	3	2	1	1				
60	66	1	6	4	7	3	1	3					
61	36	1	1	2	2	3	3	3					
62	39	2	1	2	1	3	3	3		1			
63	18	2	1	1	3	2	1	1					
64	22	2	2	2	2	2	1	1		1			
65	32	2	1	2	4	2	3	3	1				
66	39	2	2	2	3	3	2	1	1				
67	57	4	3	3	5	3	2	2					
68													
69	26	3	1	2	2	2	3	1	1				
70	28	2	2	2	4	2	2	1	1				
71	36	2	3	4	3	2	3	2	1				
72	75	3	5	4	6	3	3	3	1				
73	34	2	5	3	3	2	2	1	1				
74	21	1	1	1	2	3	1	1					
75	66	4	4	6	2	3	3	2		1			

N	IC	ICV01	ICV02	ICV03	ICV04	ICV05	ICV06	ICV07	ICV08	ICV09				
76	26	3	1	2	2	2	3	1	1					
77	45	2	1	2	6	3	2	2						
78	28	2	2	3	4	2	2	1						
79	48	3	4	3	3	3	1	1		1				
80	40	3	3	4	5	2	3	2						
81	26	2	2	3	3	2	1	2						
82	20	1	2	3	1	2	2	1						
83	63	3	3	3	5	3	3	3		1				
84	21	1	1	1	1	3	1	2						
85	36	2	1	3	1	3	1	3		1				
86	30	2	1	2	4	2	2	2	1	1				
87	48	2	2	3	4	3	2	2	1					
88	26	2	2	2	2	2	2	3						
89	57	3	1	3	5	3	3	3	1					
90	63	4	3	2	6	3	3	3						
91	81	7	5	3	5	3	3	3	1					
92	45	4	1	3	1	3	3	3						
93	63	3	3	3	5	3	3	3		1				
94	63	2	3	4	5	3	3	3	1					
95	30	2	3	3	4	2	1	2						
96	42	2	2	2	4	3	3	1						
97	69	2	5	3	7	3	3	3						
98	54	3	3	3	3	3	3	3						
99	22	2	2	2	2	2	1	1	1					
100	57	3	3	2	4	3	3	2	1	1				
101	30	1	1	3	2	3	2	1						

Table 4. Quantification of the IC for each case study, based on the variables ICV01 to ICV09.

N	ICV10	ICV11	NMI	ICV12	ICV13	ICV14	ICV15	
1	Lower Paleolithic	*Homo erectus*	1	S		S		
2	Lower Paleolithic	*Homo erectus*	1	S				
3	Lower Paleolithic	*Homo erectus*	1	S	S			
4	Lower Paleolithic	Pre-Neanderthal	1	S	S			
5	Lower Paleolithic	Pre-Neanderthal	1	S		S		
6	Lower Paleolithic	Pre-Neanderthal	1	S				
7	Lower Paleolithic	*Homo erectus*	1	S				
8	Middle Paleolithic	*Homo neanderthalensis*	1	S				
9	Middle Paleolithic	*Homo sapiens*	1	S				
10	Middle Paleolithic	*Homo neanderthalensis* 10		S				
11	Middle Paleolithic	*Homo sapiens*	1	S	S			
12	Middle Paleolithic	*Homo sapiens*	1	S	S			
13	Middle Paleolithic	*Homo neanderthalensis*	1	S				
14	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		
15	Middle Paleolithic	*Homo neanderthalensis*	1	S				
16	Middle Paleolithic	*Homo neanderthalensis*	1	S	S			
17	Middle Paleolithic	*Homo neanderthalensis*	2	S				
18	Middle Paleolithic	*Homo neanderthalensis*	1	S				
19	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		
20	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		
21	Middle Paleolithic	*Homo neanderthalensis*	1	S				
22	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		
23	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		
24	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		

N	ICV10	ICV11	NMI	ICV12	ICV13	ICV14	ICV15	
25	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		
26	Middle Paleolithic	*Homo neanderthalensis*	1	S				
27	Middle Paleolithic	*Homo neanderthalensis*	1	S		S		
28	Middle Paleolithic	*Homo neanderthalensis*	1	S				
29	Upper Paleolithic	*Homo sapiens*	1	S				S
30	Upper Paleolithic	*Homo sapiens*	1	S	S			
31	Upper Paleolithic	*Homo sapiens*	2	S	S			
32	Upper Paleolithic	*Homo sapiens*	1	S				S
33	Upper Paleolithic	*Homo sapiens*	1	S				S
34	Upper Paleolithic	*Homo sapiens*	1	S				
35	Upper Paleolithic	*Homo sapiens*	1	S				
36	Upper Paleolithic	*Homo sapiens*	1	S				
37	Mesolithic	*Homo sapiens*	1	S				S
38	Mesolithic	*Homo sapiens*	1	S				S
39	Mesolithic	*Homo sapiens*	2	S				
40	Mesolithic	*Homo sapiens*	1	S	S			
41	Neolithic	*Homo sapiens*	9 N					
42	Neolithic	*Homo sapiens*	1 N		S			
43	Neolithic	*Homo sapiens*	1	S				
44	Neolithic	*Homo sapiens*	8 N					S
45	Neolithic	*Homo sapiens*	1 N					S
46	Neolithic	*Homo sapiens*	2 N					S
47	Neolithic	*Homo sapiens*	1 N					S
48	Neolithic	*Homo sapiens*	1 N				S	S
49	Neolithic	*Homo sapiens*	1	S	S			

N	ICV10	ICV11	NMI	ICV12	ICV13	ICV14	ICV15	
50	Neolithic	*Homo sapiens*	1	S				
51	Neolithic	*Homo sapiens*	1 N					
52	Neolithic	*Homo sapiens*	1 N					
53	Neolithic	*Homo sapiens*	1 N				S	
54	Neolithic	*Homo sapiens*	1	S	S			
55	Neolithic	*Homo sapiens*	1 N					
56	Neolithic	*Homo sapiens*	1 N					
57	Neolithic	*Homo sapiens*	1	S			S	
58	Neolithic	*Homo sapiens*	1	S	S			
59	Neolithic	*Homo sapiens*	15	S	S			
60	Neolithic	*Homo sapiens*	1 N					
61	Neolithic	*Homo sapiens*	1 N					
62	Neolithic	*Homo sapiens*	1 N		S			
63	Chalcolithic	*Homo sapiens*	1 N				S	S
64	Bronze Age	*Homo sapiens*	1	S				
65	Bronze Age	*Homo sapiens*	4 N					S
66	Bronze Age	*Homo sapiens*	2 N					S
67	Bronze Age	*Homo sapiens*	1 N					S
68	Bronze Age	*Homo sapiens*	1 N					S
69	Late pre-colonial prehistory	*Homo sapiens*	27	S				
70	Late pre-colonial prehistory	*Homo sapiens*	16	S				S
71	Late pre-colonial prehistory	*Homo sapiens*	8	S				
72	Late pre-colonial prehistory	*Homo sapiens*	62	S				
73	Late pre-colonial prehistory	*Homo sapiens*	1 N					
74	Late pre-colonial prehistory	*Homo sapiens*	1 N					

N	ICV10	ICV11	NMI	ICV12	ICV13	ICV14	ICV15	
75	Late pre-colonial prehistory	*Homo sapiens*	1 N		S			
76	Late pre-colonial prehistory	*Homo sapiens*	15 N					S
77	Late pre-colonial prehistory	*Homo sapiens*	1 N				S	S
78	Late pre-colonial prehistory	*Homo sapiens*	1 N					
79	Late pre-colonial prehistory	*Homo sapiens*	1 N					
80	Late pre-colonial prehistory	*Homo sapiens*	1	S				
81	Late pre-colonial prehistory	*Homo sapiens*	1 N					
82	Late pre-colonial prehistory	*Homo sapiens*	1	S				
83	Late pre-colonial prehistory	*Homo sapiens*	1 N					
84	Late pre-colonial prehistory	*Homo sapiens*	1 N					
85	Late pre-colonial prehistory	*Homo sapiens*	1 N					
86	Late pre-colonial prehistory	*Homo sapiens*	2 N					
87	Late pre-colonial prehistory	*Homo sapiens*	1	S	S			
88	Middle Ages	*Homo sapiens*	1 N					
89	Middle Ages	*Homo sapiens*	3 N					
90	Middle Ages	*Homo sapiens*	1 N					
91	Middle Ages	*Homo sapiens*	1 N					
92	Middle Ages	*Homo sapiens*	1 N					
93	Middle Ages	*Homo sapiens*	1 N					
94	Middle Ages	*Homo sapiens*	3 N				S	
95	Modern Age	*Homo sapiens*	1 N					
96	Modern Age	*Homo sapiens*	1 N					
97	Modern Age	*Homo sapiens*	1 N					
98	Modern Age	*Homo sapiens*	1 N					
99	Modern Age	*Homo sapiens*	1 N					

N	ICV10	ICV11	NMI	ICV12	ICV13	ICV14	ICV15	
100	Modern Age	*Homo sapiens*	1 N					
101	Modern Age	*Homo sapiens*	1 N					

Table 5. Segmentation of each case study (N) according to the variables ICV12 to ICV15.

For the entire sample studied, the resulting CI has an average value of 36. Without
However, the 14 cases corresponding to the Middle Ages and the Modern Age are considered a
control reference to check the magnitude of the indicator in contexts that are difficult
comparable with earlier periods, given that, in these recent historical times, the
Medical and surgical knowledge was widespread and systematic throughout
all human populations, as well as the availability of formal structures and roles
oriented towards nursing and medical care.

Therefore, for comparative purposes, the Middle Ages and the Modern Age are excluded, resulting in an IC average of 33 for the entire sample. Segmenting the analysis among the seven periods
Once defined, the following results are observed.

Lower Paleolithic

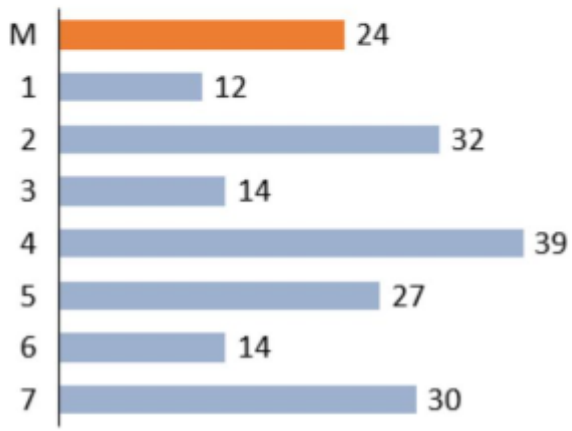
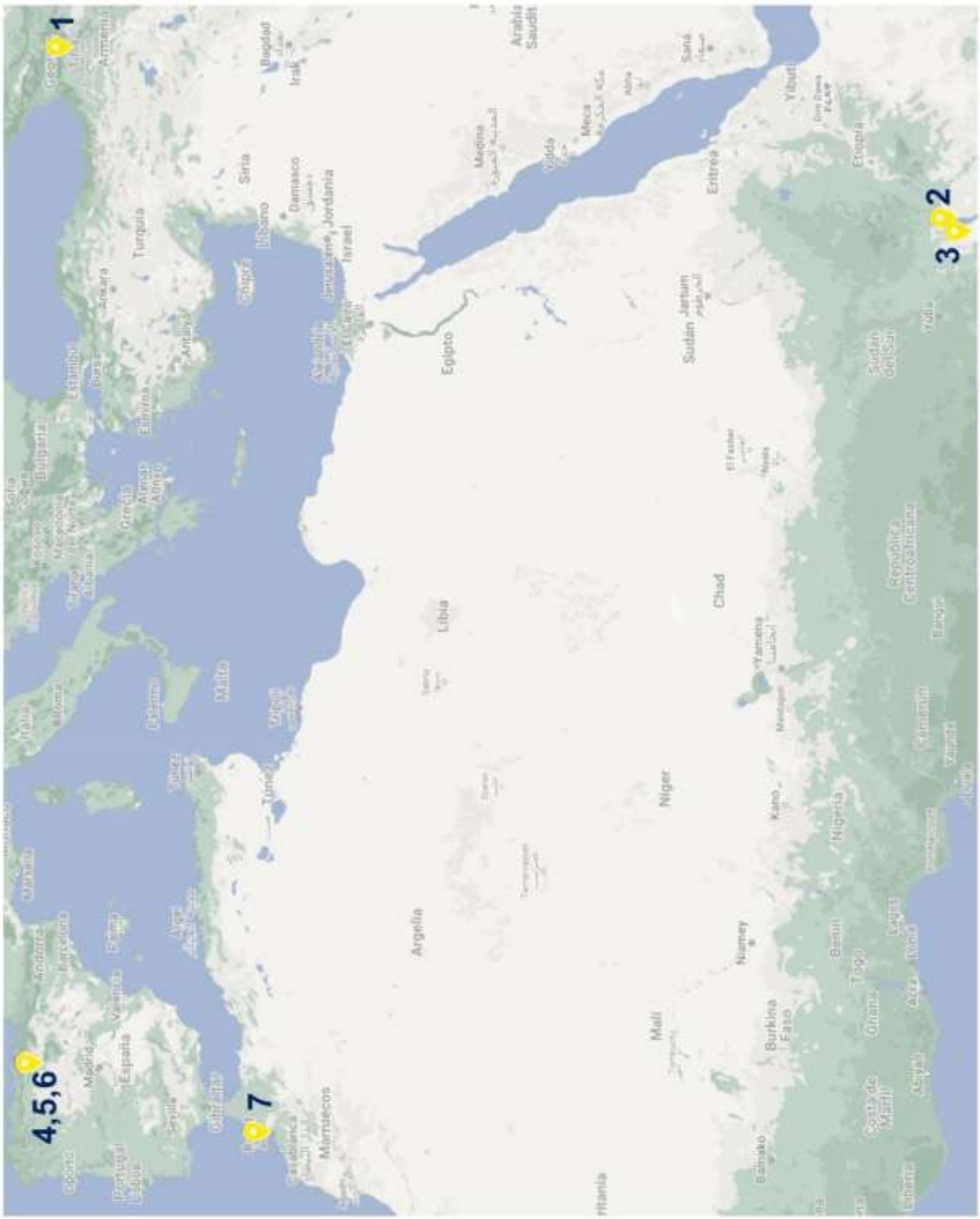


Figure 15. IC results in the Lower Paleolithic (+1.5 Ma-140 ka)

With a mean CI of 24, the two cases of care for heavily affected individuals stand out.
disabled for a long time in their lives, the pre-Neanderthal SH 14 (case #4) and Salé 1 (#7),

initially attributed to *Homo erectus.* Two individuals with problems also stand out.
important mobility features, *H. erectus* ER 1808 (#2) and the pre-Neanderthal SH Pelvis 1 (#5).

The remaining specimens have a lower IC, which is explained by the short duration of care.
that the pre-Neanderthal SH 5 (#6) received, for a few days or weeks after an infection, the pains
and occasional mobility difficulties of *H. erectus* WT 15000 (#3) and, in the case of *H. erectus*
Dmanisi 4 (#1), reflects the help to feed him for a long time, but without
markers that express other possible care.



1 1.77 Ma	Dmanisi, Georgia	*Homo erectus*	Dmanisi hominid 4
2 1.5-1.7 Ma	Koobi Fora, Kenya	*Homo erectus*	KNM ER-1808
3 1.5-1.7 Ma 4	West Turkana, Kenya	*Homo erectus*	KNM WT-15000
430 ka 5	Sima de los Huesos, Spain	Pre-Neanderthal	SH Cr-14
430 ka 6	Sima de los Huesos, Spain	Pre-Neanderthal	SH Pelvis-1
430 ka 7	Sima de los Huesos, Spain	Pre-Neanderthal	SH Cr-5
400 ka	Salé, Morocco	*Homo erectus*	Salé-1

Figure 16. Location of the 7 Lower Paleolithic cases in the sample.

Middle Paleolithic

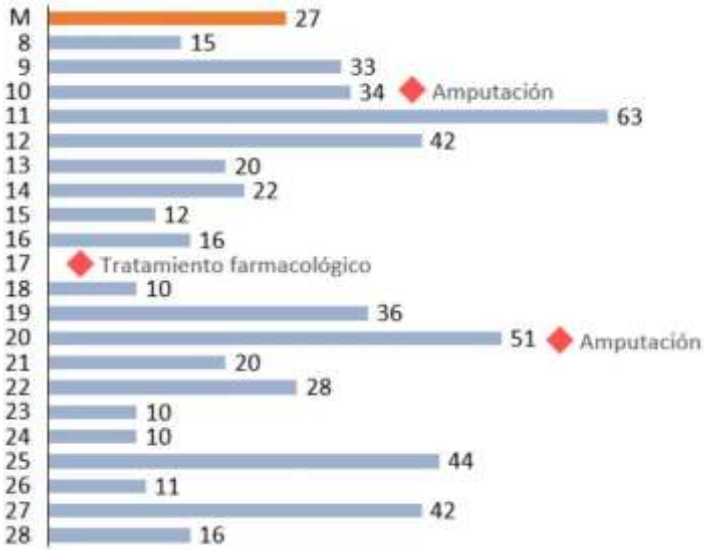
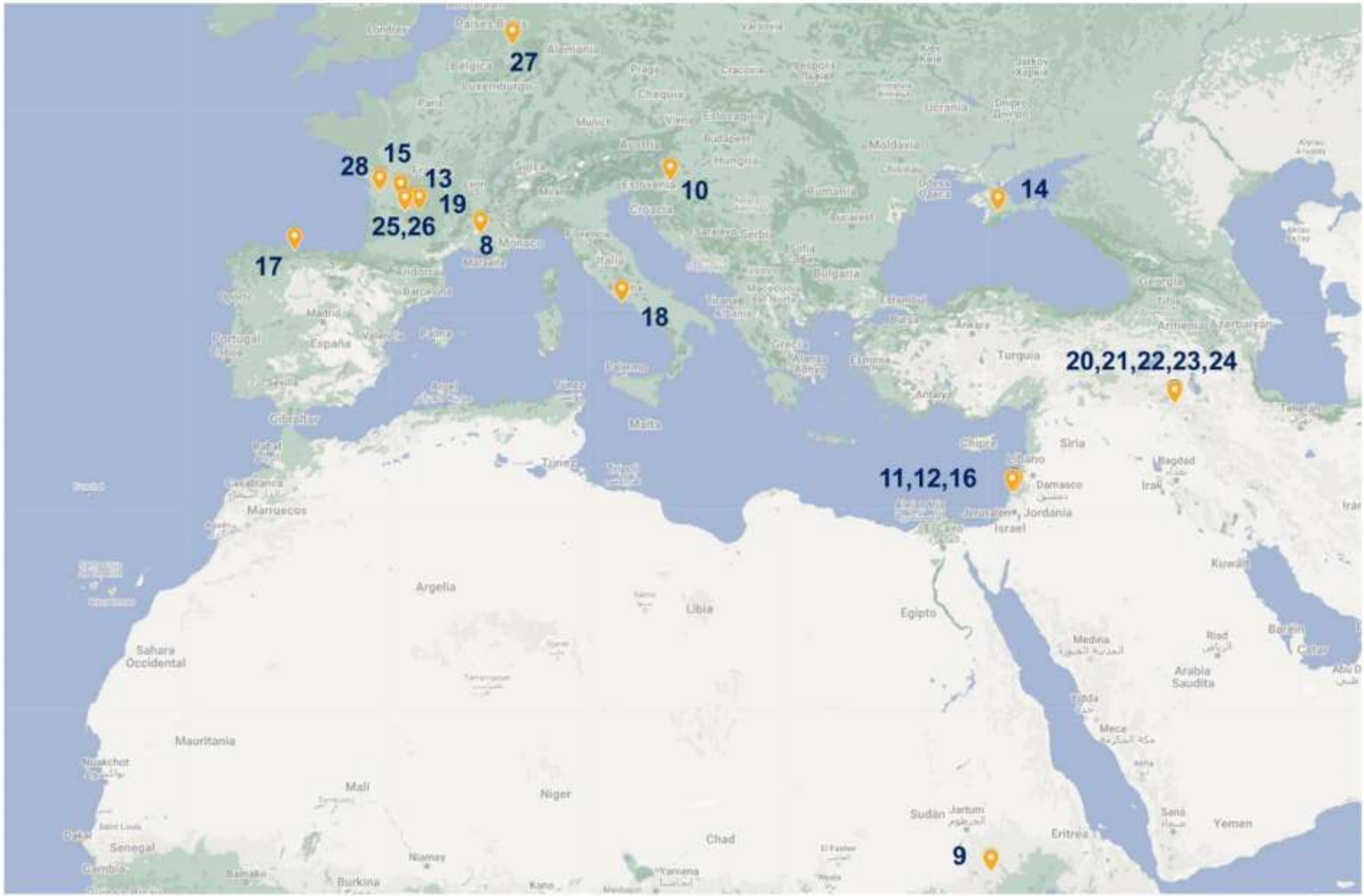


Figure 17. IC results in the Middle Paleolithic (200-40 ka).

During this period, the average IC increased to 27, with a notable geographical dispersion of the Evidence of care. The Qafzeh 11 individuals stand out (case #11, healed head injury) and Qafzeh 12 (#12, congenital hydrocephalus and related postcranial morbidity), both from *Homo sapiens,* as well as the Neanderthal Shanidar 1 (#20, multiple pathologies, the most serious being a head trauma with probable brain damage and consequences on the right side of his body, including the amputation of an arm). The number of *Homo neanderthalensis* individuals with evidence of need for care is 26.

During this period, the first examples of burials of individuals with Pathologies treated: *Homo sapiens* individuals 11 and 12 from Qafzeh and Neanderthals from La Chapelle-aux-Saints (#19), La Ferrassie (#25 and #26), and Shanidar (#20 to #24). Furthermore, in Africa, the child *sapiens* Mtoto, dated to 78 ka, constitutes the oldest known burial in this continent, but it has not been included in the sample due to a lack of evidence of specific care health.

The first cases of amputations are also documented in the Middle Paleolithic, both of the Homo neanderthalensis species : Krapina 180 (#10) and Shanidar 1 (#20). Additionally, in this The oldest documented evidence of the use of drug treatment has been found in this species. in El Sidrón (#17), without being able to verify its nature as a contribution of care or of self-medication, as will be discussed in the Conclusions section.


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8	180 ka	Bau de l'Aubesier, France	*Homo neanderthalensis*	Bau de l'Aubesier 11
9	133 ka	10 Singa, Sudan	*Homo sapiens*	Singa
130	ka	11 Krapina, Croatia	*Homo neanderthalensis*	10 individuals
95	ka	12 Qafzeh, Israel	*Homo sapiens*	Qafzeh 11
95	ka	Qafzeh, Israel	*Homo sapiens*	Qafzeh 12
13	80-130 ka	Rebourdou, France	*Homo neanderthalensis*	Rebourdou 1
14	60-130 ka	Kiik-Koba, Crimea	*Homo neanderthalensis*	Kiik-Koba 1
15	65 ka	La Quina, France	*Homo neanderthalensis*	La Quina 5
16	60-70 ka	Ein Qashish, Israel	*Homo neanderthalensis*	EQH3
17	57-51 ka	El Sidrón (Spain)	*Homo neanderthalensis*	Adults 1 and 4
18	50-60 ka	Grotta Guattari, Circeo, Italy	*Homo neanderthalensis*	Guattari 1
19	47-56 ka	La Chapelle-aux-Saints, France	*Homo neanderthalensis*	La Chapelle-aux-Saints 1
20	45-60 ka	Shanidar, Iraq	*Homo neanderthalensis*	Shanidar 1
21	45-60 ka	Shanidar, Iraq	*Homo neanderthalensis*	Shanidar 2
22	45-60 ka	Shanidar, Iraq	*Homo neanderthalensis*	Shanidar 3
23	45-60 ka	Shanidar, Iraq	*Homo neanderthalensis*	Shanidar 4
24	45-60 ka	Shanidar, Iraq	*Homo neanderthalensis*	Shanidar 5
25	43-45 ka	La Ferrassie, France	*Homo neanderthalensis*	La Ferrassie 1
26	43-45 ka	La Ferrassie, France	*Homo neanderthalensis*	La Ferrassie 2
27	40 ka	Feldhofer, Germany	*Homo neanderthalensis*	Neanderthal 1
28	36 ka	Saint-Césaire, France	*Homo neanderthalensis*	Saint-Césaire 1

Figure 18. Location of the 21 Middle Paleolithic cases in the sample.

Upper Paleolithic

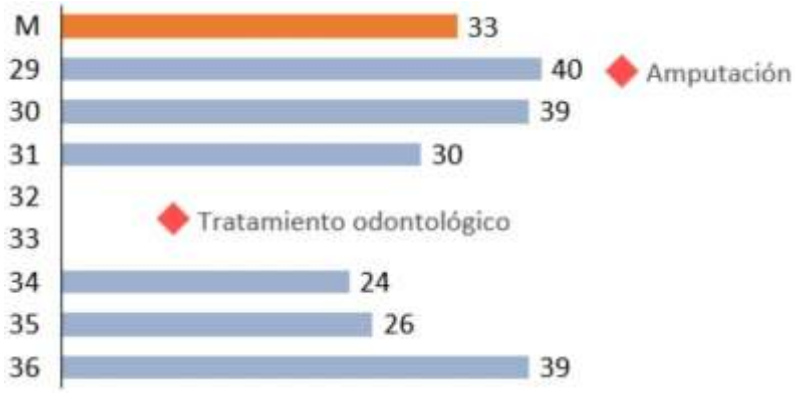
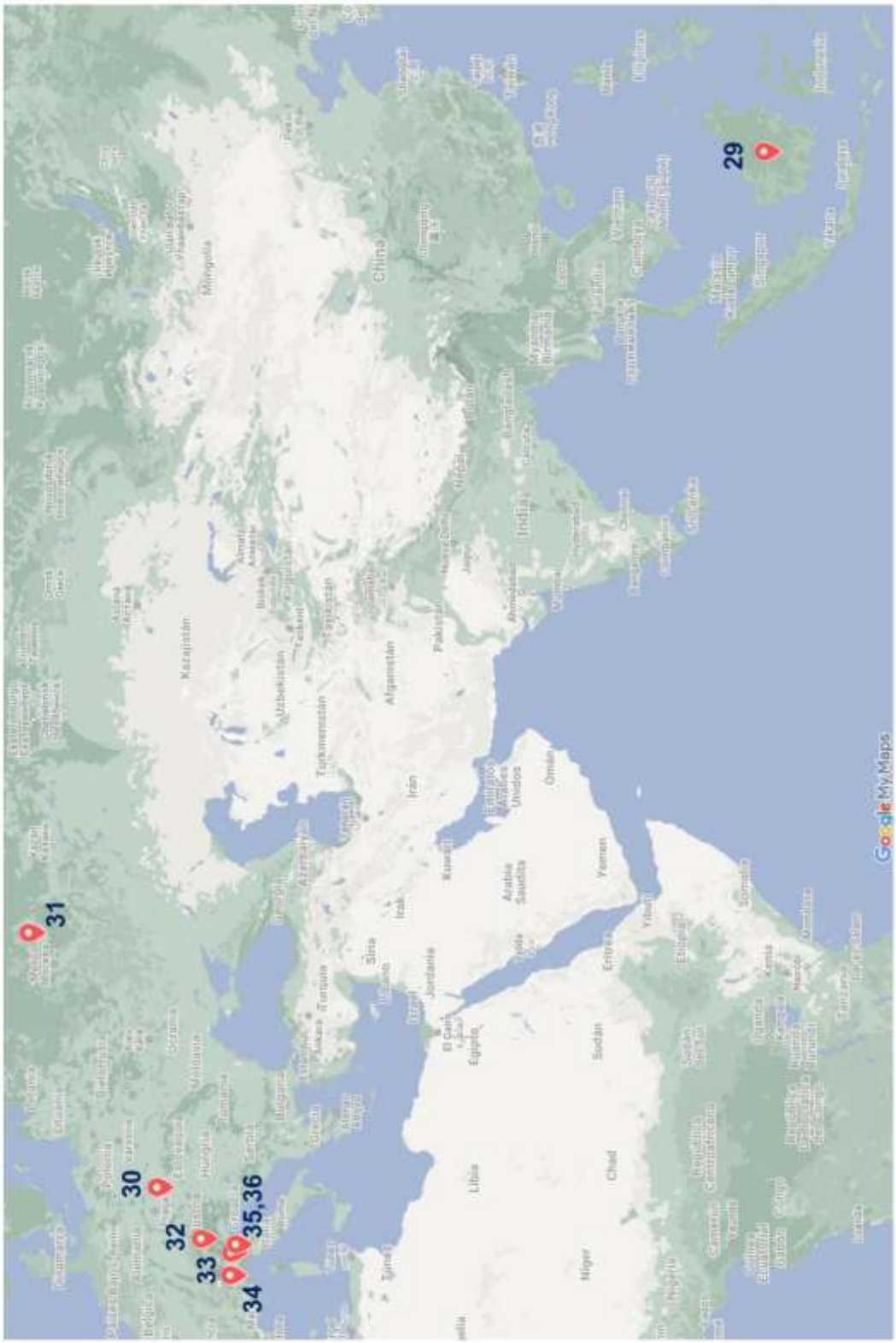


Figure 19. IC results in the Upper Paleolithic (42-11 ka)

With a mean IC of 33, the individual from Liang Tebo (#29) who underwent amputation stands out. assisted by her right leg. Three other cases reflect disability and developmental problems: Dolní Vÿstonice (#30), Sunghir (#31) and Romito (#36), and two other individuals from Arene Candide (#34 and #35) had mobility and pain conditions with relatively more impacts limited.

During this period, the first dental interventions to treat caries, from the Italian sites of Riparo Villabruna (#32) and Riparo Fredian (#33).



29 31 ka 30	Liang Tebo, Borneo	*Homo sapiens*	TB1
26.6 ka 31 24	Dolní Výstonice, Czech Republic *Homo sapiens*		DV 15
ka 32 14 ka	Sunghir, Russia	*Homo sapiens*	Sunghir 2 and 3
	Riparo Villabruna, Italy	*Homo sapiens*	Villabruna 1
33 13 ka	Riparo Fredian, Italy	*Homo sapiens*	Fredian 5
34 11 ka	Arene Candide, Italy	*Homo sapiens*	Arene Candide 2
35 11 ka 36	Arene Candide, Italy	*Homo sapiens*	Arene Candide 3
11 ka	Romito, Italy	*Homo sapiens*	Romito 2

Figure 20. Location of the 8 Upper Paleolithic cases in the sample.

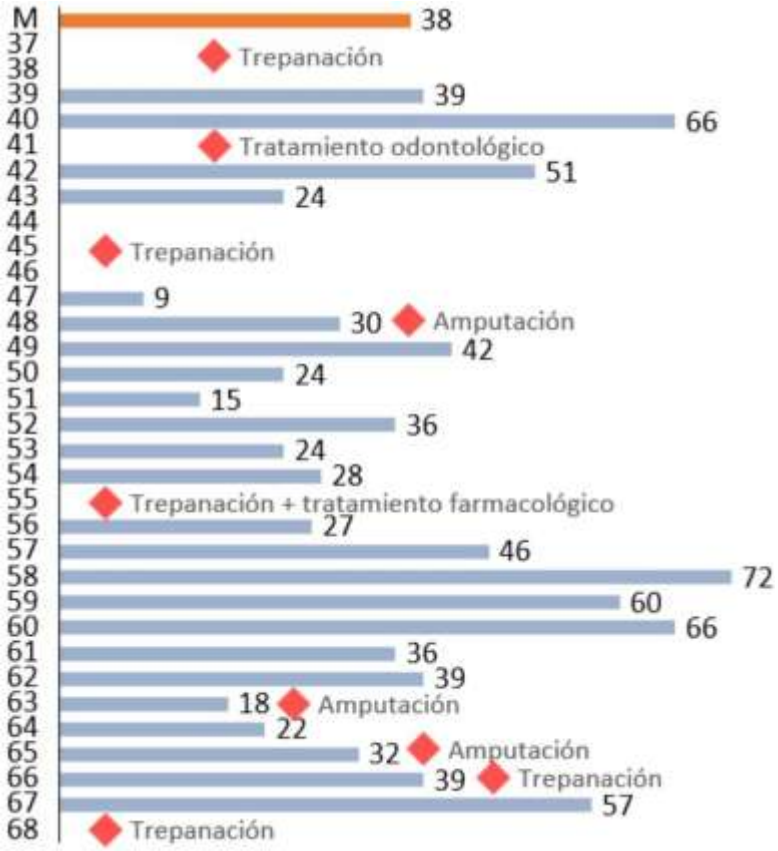


Figure 21. IC results in the Mesolithic, Neolithic, Chalcolithic and Bronze Age (11-1 ka).

From the Upper Paleolithic onwards, an increase in the average IC is observed, reaching a value of 38. between the Mesolithic and the end of the Bronze Age, and a geographical expansion of the sample.

There are four cases in which the IC stands out, the common reason being spinal ailments disabling vertebral mobility: Man Bac 9 (#58), a quadriplegic man for a long part of his life, buried differently in the cemetery of his Neolithic population than the present day northern Vietnam; a woman with lower limb paralysis in Tell Abraq, United Arab Emirates (#60); and two children: Irie 9, from Hokkaido, Japan (#40), with paralysis spinal, and Windover Boy, from Florida, USA (#42), with spina bifida. The population study Man Bac's children's book (#45) is also a unique case, which will be analyzed in detail in the section The childcare for children with illnesses.

In this time frame, the case studies reflect more complex caregiving skills and medical knowledge.

On the one hand, trepanation emerges as a surgical technique, applied to Mesolithic individuals from Vasiliyevka, Ukraine (#38) and Taforalt, Morocco (#37), and in the Neolithic period of Petit Morin, France (#44) and Can Tintorer, Spain (#55). In the Metals section, two other samples are documented. trepanation for sanitary purposes: Castello Del Tartaro, Italy (#68) and Tel Megiddo, Israel (#66), The last case involved two siblings with infections and mobility problems (the trepanation was performed on one).

In addition, three other subjects show evidence of surgical amputations: the Europeans from Buthiers-Boulancourt, France (#48) and Tell Yunatsite, Bulgaria (#63), and the African from Dayr al-Barsha, Egypt (#65).


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37 9-10 ka 38	Taforalt, Morocco	*Homo sapiens*	TF 1
9-10 ka	Vasiliyevka III, Ukraine	*Homo sapiens*	No. 6462-20
39 7 ka	Samouqueira, Portugal	*Homo sapiens*	Samouqueira 1
40 3-3.5 ka 41	Hokkaido, Japan	*Homo sapiens*	Irie 9
7.5-9 ka 42	Site MR3, Mehrgarh, Pakistan	*Homo sapiens*	9 individuals
7.5 ka 43	Windover, Florida, USA	*Homo sapiens*	Windover Boy
7-9 ka 44 7	Shamanka, Siberia, Russia	*Homo sapiens*	Shamanka 29.1
ka	Petit Morin, France	*Homo sapiens*	8 skulls
45 8 ka	Ensisheim, Alsace, France	*Homo sapiens*	Burial 44
46 9 ka	Schletz, Austria	*Homo sapiens*	Ind. Skulls 61 and 1996/3
47.7 ka	Herxheim, Germany	*Homo sapiens*	E 96/ 102 282-14-8
48.7 ka	Buthiers-Boulancourt, France	*Homo sapiens*	Buthiers-Boulancourt (no id)
49 6.2-6.61 ka Toca do Enoque, Brazil		*Homo sapiens*	Individual 9 Burial 2
50 6 ka	Arene Candide, Italy	*Homo sapiens*	Arene Candide 5
51 5.5-6 ka 52	Guanjia, China	*Homo sapiens*	M53
5.5 ka 53	Ascott-under-Wychwood, United Kingdom *Homo sapiens*		Deposit B (mixed adult material)
5.4-5.8 ka 54	Lanhill Long Barrow, United Kingdom	*Homo sapiens*	LB7
4.82 ka 55	Byneskranskop, South Africa	*Homo sapiens*	SAM-AP 6060
4.6-4.8 ka 56	Can Tintorer, Spain	*Homo sapiens*	Mine 28, Burial 10
4-5 ka 57	Mashiki-Azamabaru, Okinawa, Japan *Homo sapiens* Östra Torp 4,		Mashiki 15
4.5 ka 58 4	Sweden	*Homo sapiens*	Östra Torp 4 (no id)
ka	Man Bac, Vietnam	*Homo sapiens*	M9
59 4 ka	Man Bac, Vietnam	*Homo sapiens*	41 subadult individuals
60 4 ka	Tell Abraq, United Arab Emirates	*Homo sapiens*	Burial 1
61 3.5 ka 62	Maltravieso, Spain	*Homo sapiens*	Individual 1 (Mountain)
3-4 ka 63 6	Tumulus B-5, Bahrain	*Homo sapiens*	Individual 12-10146
ka (Calco) Tell Yunatsite, Bulgaria 64 4-5 ka		*Homo sapiens*	Skeleton 105
	Buckinghamshire, United Kingdom	*Homo sapiens*	Individual 5605
65 4 ka	Dayr al-Barsha, Egypt	*Homo sapiens*	4 cases
66 3.5ka 67	Tel Megiddo, Israel	*Homo sapiens*	Tomb 45, individuals 1 and 2
2.5ka 68	Napa, Philippines	*Homo sapiens*	B243
1.2-1.4ka	Castello Del Tartaro, Verona, Italy	*Homo sapiens*	Burial 396

Figure 22. Location of the 4 Mesolithic cases (dark gray), 22 Neolithic cases (brown) and 6 of The Metal Ages (light gray) in the sample.

Late pre-colonial prehistory

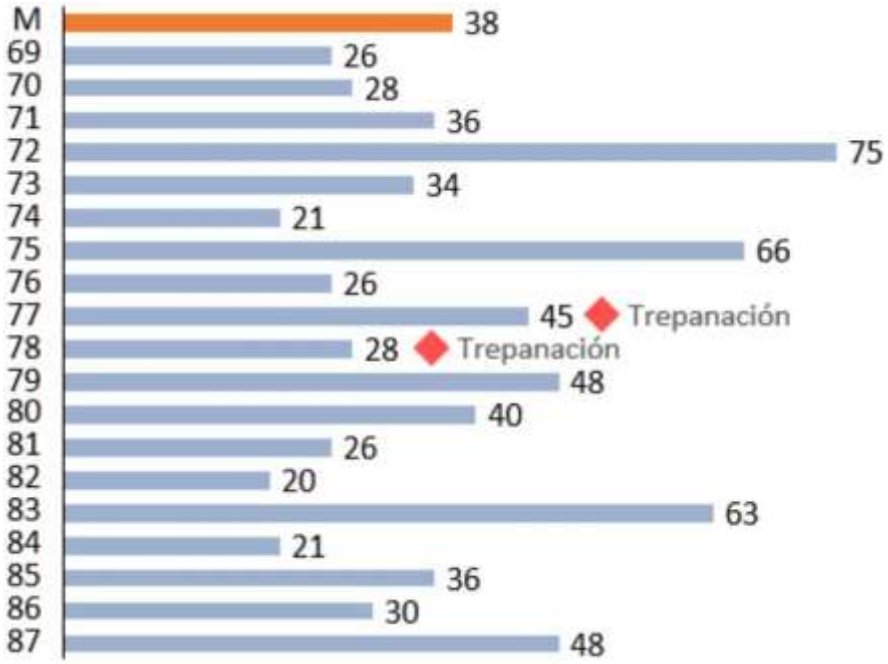


Figure 23. IC results in the late precolonial Prehistory.

This group contains 19 cases, of which 10 come from North American sites, 8 from sites South Americans, and 1 from Australia. These are mostly individuals with different problems that affect mobility, in the context of societies with tensions caused by scarcity of resources and violence.

The average IC value continues its slight upward trend over time, at 38, although very similar to the previous subset of the sample, which corresponded to late Eurasian prehistory. This This fact can be framed within the proximity of economic models to social groups of these two subsets, which would include the management and practices of care in both care direct as in group adaptation.

The most notable example is that of the Carrier Mills community (#72) during the Archaic period Middle (6000-3000 BC) and the Silvicola or Woodland period (1000-200 BC), with different cases of cranial and postcranial injuries, nutritional stress, infections and chronic diseases, which They indicate a heavy socioeconomic burden due to the disease. Despite these difficulties, those Communities were able to assist the sick and injured members, and to compensate for the burdens of ill health adapting to the differences of disabled members.

As individual cases, the Nazca Boy (#75) stands out, who suffered from Pott's disease and acute miliary tuberculosis, whose first symptoms would begin at the age of 1-2 years, and lived up to approximately 8 years old. The case of the young woman from La Plaza, USA, is also noteworthy. (#83) who lived for more than a decade with a systemic infection, scoliosis, and disease premature bone degeneration, and was buried with a rich grave goods collection. This last case It establishes an important reference point for analyzing the unique aspects of the social identity of the subjects who received care.

Despite the significant number of trepanations documented during this period, most of They are interpreted as ritual actions (see the Discussion section), but in this work they They include two individuals from pre-colonial Peru with trepanations possibly associated with management of health, coming from Cuadrángulo Tello (#77) and Achanchi (#78).

In general, the acceptance and support of individuals with disabilities and deformities, including the application of trepanations for health purposes, express egalitarian values and inclusive societies in this period.


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69	2-7 ka	Coastal populations of southern and southeastern Brazil *H. sapiens* 119 adult individuals	
70	3-8 ka	Mulberry Creek, Alabama, USA *H. sapiens* 16 individuals (15 adults and 1 subadult)	
71	4.5-5.6 ka	Barrett site, Middle Green River Valley, USA *H. sapiens* 8 adult individuals	
72	1-10 ka	Carrier Mills, Illinois, USA 73 465-1265	*H. sapiens* 441 adult and subadult individuals
Averbuch, Tennessee, USA 74 500-1000 Grider Site, Pike			*H. sapiens* B271A
County, Indiana, USA 75 700 Hacienda Agua Salada, Nazca, Peru			*H. sapiens* (not id)
			H. sapiens Nazca Child
76	800-1100	Libben, Ohio, USA 77	*H. sapiens* Approx. 15 individuals
900-1100 Tello Quadrangle, Pachacamac Valley, Peru *H. sapiens* Indivivuo H3-CF3			
78	1000–1250	Achanchi, Peru	*H. sapiens* ACH 3
79	1000–1534	Rinconada la Molina, Peru	*H. sapiens* FA 54
80	1030-370	Chenque I, La Pampa, Argentina 81 1100-1290	*H. sapiens* Burial 12
Aztec Ruins, New Mexico, USA 82 1117-1022 Negro Muerto 3,			*H. sapiens* Burial 88
Patagonia, Argentina 83 1150-1300 La Plaza, Arizona, USA 84			*H. sapiens* NM3_4
1200-1400 Moundville, Alabama, USA 85 1300-1500			*H. sapiens* Burial 167
DeArmond, Tennessee, USA 86 1100-1535 Huaca Las			*H. sapiens* #228400
Balsas and Huaca Las Abejas, Peru 87 1788 Bourke, New			*H. sapiens* Burial 50
South Wales, Australia			*H. sapiens* One individual from each site
			H. sapiens (not id)

Figure 24. Location of the 19 cases of the late precolonial Prehistory in the sample.

Middle Ages and Modern Age

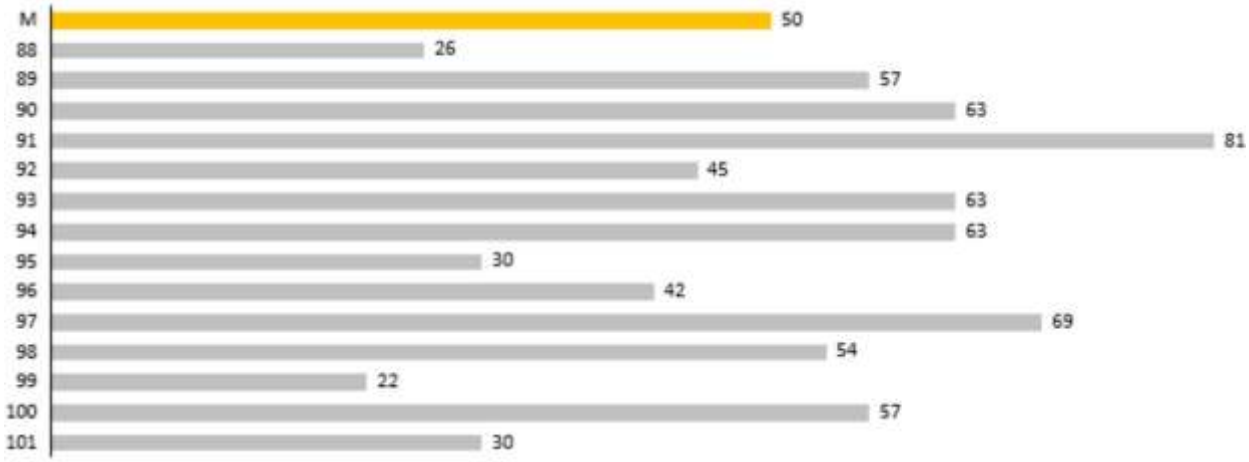


Figure 25. IC results in the Middle Ages and the Modern Age.

Seven cases from the Middle Ages (six European and one African) and another seven from the Middle Ages are taken Moderna (three North Americans, two Europeans and two New Zealanders) as a control subsample with the aim of comparing the support measures for individuals in need of care, taking into account that the adaptation of communities already occurs in a stable manner through the enabling social structures that have medical and technical infrastructures and nursing. This is clearly reflected in the IC, with a mean value of 50 in this group.


95
88
91
94
89
93
98
92
101
96
97
90
99
100

88	400-600	West Heslerton, United Kingdom
89	450-650	Worthy Park cemetery, Kingsworthy, United Kingdom
90	550-800	91 Kulubnarti, Sudan
1050	Kaÿdus, Poland	
92	1100-1300	Ostrów Lednicki Island, Poland
93	1100-1700	St James and St Mary Magdalene Cemetery, Chichester, Sussex, United Kingdom
		Cemeteries All Saints by the Castle and hospital of St John the Evangelist, Kingdom 94 940-1454 United
95	1200-1600	Ballyhanna, Donegal, Ireland
96	1348-1535	Holliston Mills, Tennessee, USA
97	1550-1672	Gran Quivira Pueblo, New Mexico, USA
98	1703-1852	St Bride's Church, London, United Kingdom
99	1800-1900	Cromwell Gorge, Central Otago, New Zealand
100	1850-1875	St. John's burial ground, Milton, New Zealand
101	1888–1890	Philippi, West Virginia, USA

Figure 26. Location of the 7 cases from the Middle Ages (purple) and 7 from the Modern Age (blue) in the sample.

10. CONCLUSIONS

This section details the conclusions that can be drawn about the behavior of Care Indicator (CI) based on the relationships between the variables used in the sample of cases investigated. For this, the ICV10 to ICV15 segmentation variables are taken (see Table 1) and the size of the sample subset and the average CI value are represented.

For periods

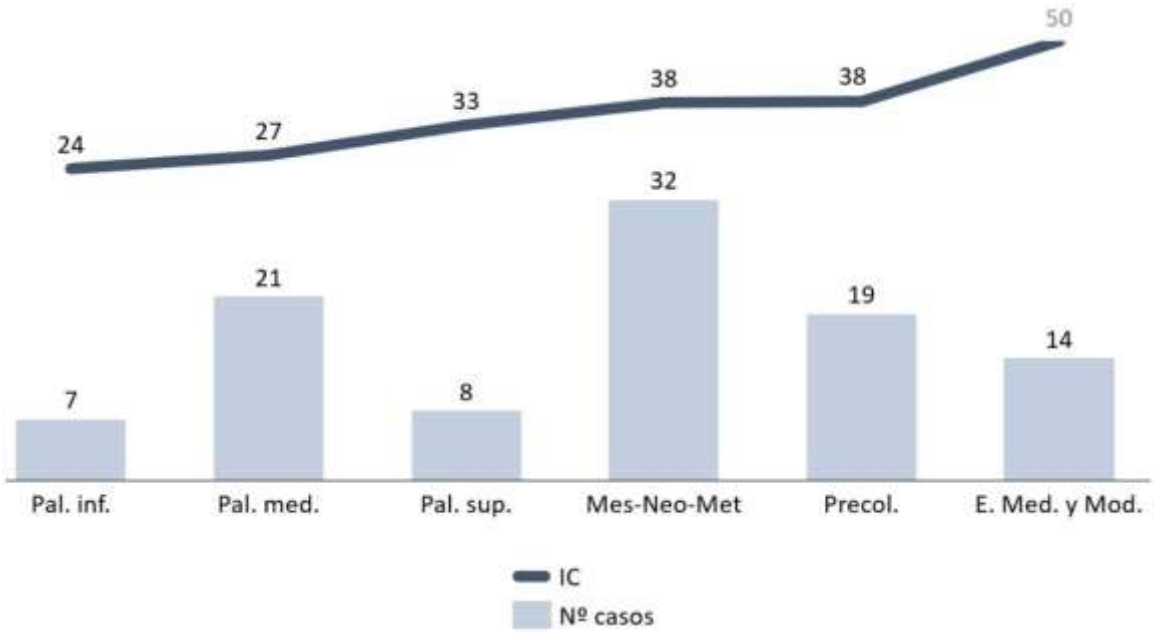


Figure 27. Segmentation of IC according to periods (ICV10): number of cases and average IC of each period.

There is a continued growth over time, with relatively larger increases accused in the Middle Paleolithic, the Upper Paleolithic, and the beginning of the Holocene, who are relevant due to the temporal breadth of the samples from these periods (approximately 1.3 Ma in the Lower Paleolithic, 140 ka in the Middle Paleolithic, 20 ka in the Upper Paleolithic), in comparison with the shorter time span of the following periods (6 ka since the Mesolithic to the Bronze Age and 8 ka in the precolonial sample) which would explain the lower variation of the IC. Subsequently, there is a certain stabilization in the groups of late prehistory in both Eurasia as in America, with similar values in these two subsets, as has been pointed out previously.

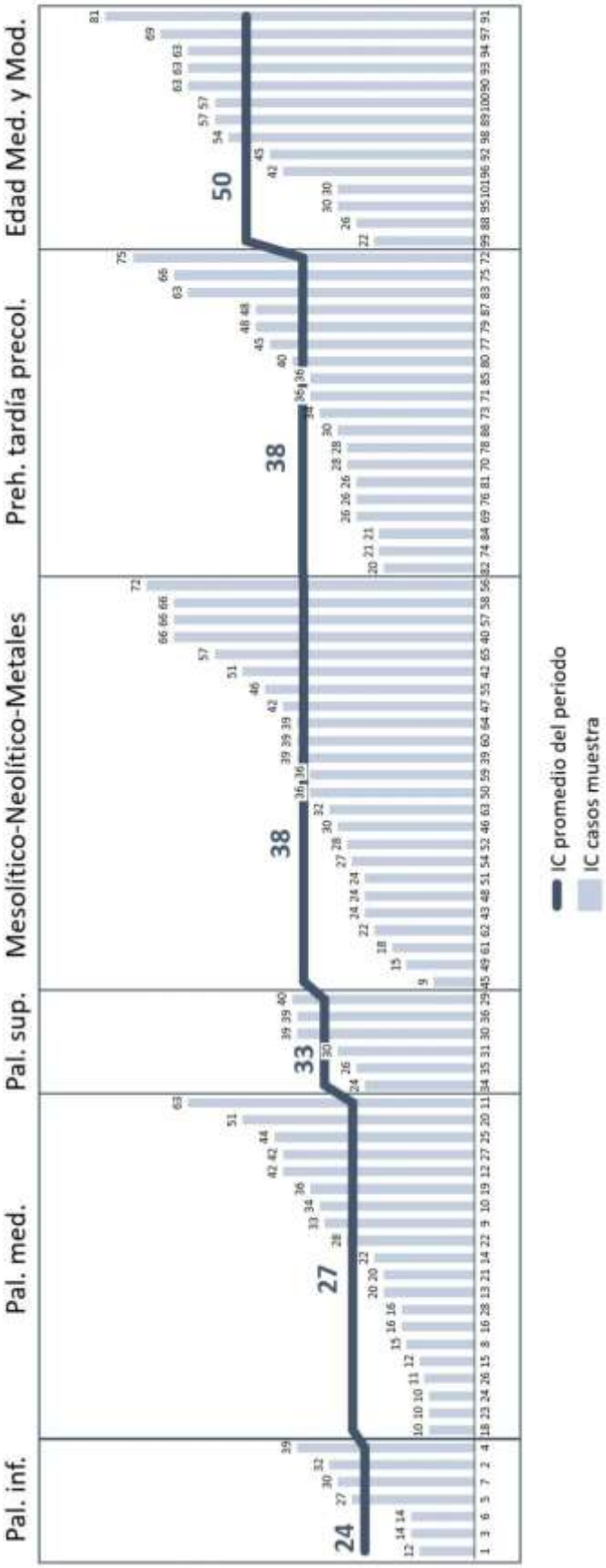


Figure 28. Segmentation of IC according to periods (ICV10): detail of the IC in the cases of the sample, ordered from lowest to highest IC within each period, and average IC for each period.

By human species

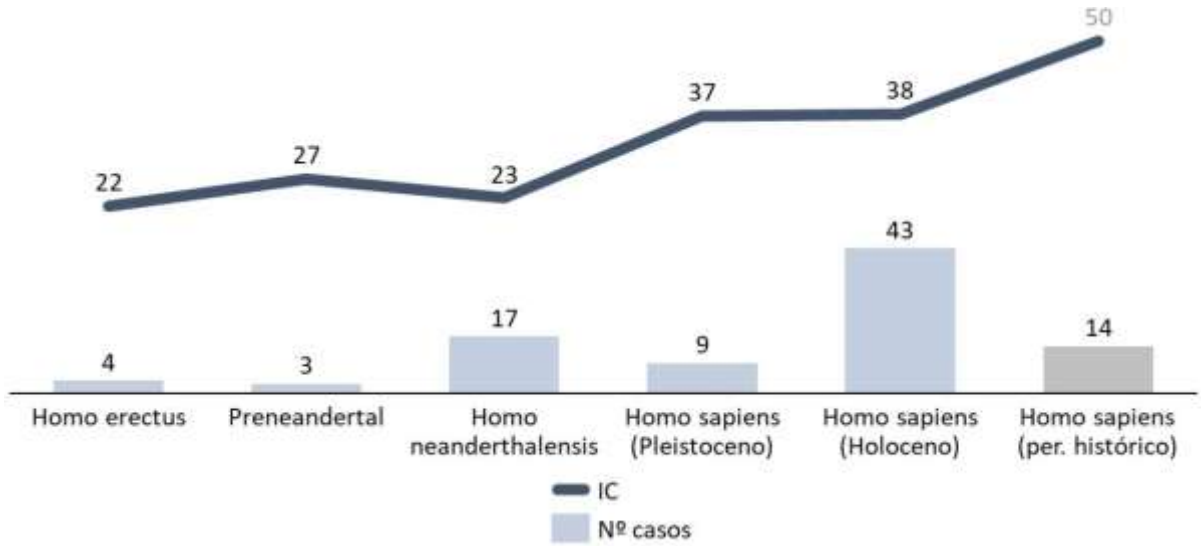


Figure 29. Segmentation of the IC according to human species (ICV11).

In *Homo erectus,* precursor behaviors of care among others begin to be documented.
Humans for 1.5-2 Ma (million years). The increase in IC of the three individuals is noteworthy.
(cases #4, #5 and #6) from the Sima de los Huesos (Atapuerca), which are part of the same population and
They indicate the presence of this behavior half a million years ago in this group of
pre-Neanderthals *(Homo heidelbergensis,* until 2014).

In *Homo neanderthalensis,* this behavior was reinforced during the Middle Paleolithic, with a
A relatively significant sample of cases compared to that of previous human species.
It shows a lower IC score due to the large proportion of specimens where signs of care are present.
They are restricted to a single pathology, typically severe healed traumas (6 cases) and
edentulism (3 cases).

Finally, the body of evidence from our species *Homo sapiens,* which is the majority in the sample
This study reflects a higher IC (38) than in the rest of the human species, indicative of a
complexity of combining care actions. Cases of the
Middle Ages and Modern Age. Separating the sample of modern humans into two
subsets, those composed of Pleistocene *sapiens* groups on one side, and *sapiens* on the other
Holocene, on the other hand, shows no relevant variation, resulting in the IC of *Homo* being 37
Homo sapiens of the Pleistocene. This effect is influenced by complex care cases in 5 of the 9
Pleistocene *sapiens* individuals : Qafzeh (11 and 12), Liang Tebo, Dolní Vÿstonice and Romito.

Children

Child age profile	Number of cases	IC medium
Children's	16	45
Not for children	60	30

Table 6. Segmentation of the IC according to child or non-child individuals (ICV13).

There is a clear shift in the IC towards children. Man Bac 9 (#58) and Irie stand out.
9 (#40), Qafzeh 11 (#11) and the Nazca Child (#75), which represent four distinct periods
(Neolithic, Mesolithic, Paleolithic and pre-colonial period, respectively). These are individuals
who reached young adulthood and suffered from debilitating illnesses since childhood. It also stands out
the IC of the subadult group of the Man Bac population (#59), with strong needs of
care, as will be discussed in the Discussion section.

Elderly individuals

Profile of elderly age / senior adult	Number of cases	IC medium
Advanced age	15	30
Not elderly	61	34

Table 7. IC segmentation according to elderly or non-elderly individuals (ICV14).

No significant shift in the IC towards older individuals is observed.
Medieval and modern societies are taken into account in this calculation.

Type of economy

Type of economy	Number of cases	IC medium
Predominant or exclusive hunter-gatherers	50	32
Predominant or exclusive agricultural-livestock	26	36

Table 8. Segmentation of IC by type of economy (ICV12).

No relevant difference in IC is observed between hunter-gatherer populations and
Populations with agricultural and livestock economies. Medieval societies are not taken into account and modern.

Evidence of application of treatment or medical technique

Application of therapeutic technique or treatment Number	**of cases**	**IC medium**
Evidence	9	32
Without evidence	67	33

Table 9. IC segmentation according to possible evidence of any therapeutic technique or treatment specialized (ICV13).

Application of therapeutic technique or treatment Number	**of cases**	**IC medium**
Amputation	5	30
Clambering	3 without IC: 6	37
Assisted death	1	28
Dental	without IC: 3	N/A
Pharmacological treatment	without IC: 2	N/A

Table 10. IC Segmentation by each specialized therapeutic technique or treatment.

There is no relevant difference in the CI obtained for the subset of cases that have evidence of surgical techniques, therapeutic treatments, or pharmacological products used. The value The slightly lower mean IC value is due to the lack of other pathologies observed in the individuals. Apart from the inference itself regarding possible techniques applied, with the exception of some cases of clambering.

The identification of certain techniques and treatments that hominins used to help themselves from The Paleolithic era, in order to pay attention to others with health problems, can be considered as precursor skills of specialized procedures that will begin to spread from From the Neolithic period, they were already part of human structures and cultures at the beginning of the era. historical. These are complex actions that require a high level of skill, as well as a anatomical knowledge and knowledge of the maneuvers to follow, both in the intervention itself and in the

aftercare. Nor should we forget the necessary transmission of this knowledge.
between members of the group and from one generation to another, forming part of the cultural heritage of the populations.

These observations should be understood by considering all the documented techniques together.
In this work, including amputation, trepanation, dental treatment, pharmacological treatment,
the indications of the use of orthopedic device objects, and the case of assisted death, if so
We consider it an exceptional *treatment .* Taken together, these practices begin to
mainly observed from 5000 years ago onwards, but evidence has been found in the Paleolithic
Examples interspersed with specific actions that anticipate its application.

DISCUSSION

Link between care and human evolution

From the results obtained, we can infer that the behavior of care or attention of the
Healthcare for disabled individuals has very ancient origins dating back to the Paleolithic era.
lower, with seven documented cases. Among them, these actions are more clearly described.
in *Homo erectus* ER 1808 (case #2) from 1.5-1.7 Ma ago, and in the pre-Neanderthals of Sima de
the Bones (cases #4, #5 and #6) from 430 ka ago.

The provision of health care assistance to other individuals must be placed in the context of different
collaborative strategies such as hunting, specialization in the procurement of materials
raw materials, the creation of production chains, the organization and distribution of spaces
activities, food distribution, and co-parenting. Within this framework, we must understand
that different distinctly human abilities have common roots, and that their combination
It allowed for addressing greater risks. Culture, technology, and cooperation were factors.
decisive in human development, and these were joined by others that were more difficult to measure, such as
Empathy and solidarity did not emerge suddenly. For over 1.5 million years, strategies have been in place.
The aforementioned collaborative approaches begin to develop and are identified in multiple works (by
(e.g., Domínguez-Rodrigo et al., 2023). Human care is expressing components
of all those skills, and the first instances of healthcare among *Homo erectus* begin
to become evident at that same time.

In fact, from then on, an evolution of the human brain can also be observed with an emphasis particularly in certain areas related to socialization and empathy, described in different works (Sáez, 2019), which suggests a link with the first observations of behaviors in This field. However, we consider the traditional view that correlates a brain size growth in hominins with the increase in cognitive abilities (Table 11). On the one hand, there are two anomalies that break this correspondence: *Homo naledi,* due to its very recent dating (241-335 ka) and its possible association with activities of burial, parietal engravings and hearths (Berger et al., 2023, in discussion), and *Homo floresiensis,* due to its association with lithic tools.

Species	**Average cranial capacity (cc)**	**Cranial capacity (cc) range**
Australopithecus afarensis	446	387-550
Australopithecus africanus	462	400-560
Homo habilis	610	510-687
Homo rudolfensis	789	752-825
Homo ergaster	801	750-848
Homo erectus	941	727-1220
Homo floresiensis	426	426
Homo heidelbergensis	1266	1150-1450
Homo naledi	500	466-560
Homo neanderthalensis	1488	1200-1700
Homo sapiens	1330	1250-1730
Pan troglodytes	405	350-450
Gorilla gorilla	500	400-685

Table 11. Cranial capacity range of each species within the hominin lineage. Based on Holloway R.L. et al. (2009). Added: common chimpanzee, gorilla, *H. naledi* and *H. floresiensis* (own elaboration).

Furthermore, the growth of the human brain is differential in certain parts, including:

- The bulging of the parietal lobe and the significant and complex flowering of the entire parietal vascular set (arteries and veins) in *Homo sapiens.*

- The growth of the temporal lobes is greater than expected in relation to development of brain size in early *Homo.*

- The larger size of the frontal lobe on the right side and the occipital lobe on the left, producing a rotation of the brain axis that can be seen from *Homo habilis* and, in a way widespread, since *Homo erectus.*

The study of possible correlations between the evolution of brain morphology and abilities Cognitive issues continue to be addressed in different lines of research (for example: Bruner, 2004; Bruner, 2007; Brunel and Beaudet, 2023; Neubauer et al., 2018; Neubauer et al., 2020).

Moving forward in time, the IC trajectory shows a spike in the Middle Paleolithic that is primarily associated with the Neanderthal lineage, and another in the Upper Paleolithic. The development of This behavior, without an obvious adaptive function, must be understood in its context paleoecological.

Beginning in the Middle Paleolithic, Neanderthals formed small clans of about 15-25 individuals who occupied spaces of around 200 m2 and were very isolated from one another. Based on different models obtained from genetic and archaeological studies, it has been estimated a total population of perhaps less than 10,000 Neanderthals at its peak in Eurasia (Sáez, 2016). For more than 200,000 years the net growth of its world population It was virtually zero. As the ice expanded, humans and all the wildlife of the north were They became extinct, while those of the southern peninsulas (Iberian, Italian, and Balkan) endured, called by These *shelters.* In the next climate fluctuation, the Neanderthals expanded again. northward, mixing with groups from other peninsulas. They lived in areas They were accident-prone and always on the move, depending on the seasons. It's unclear if they felt much. They had a need to fraternize with other groups, or rather, they avoided them. But we do know from various sources that... Studies have shown that genetic diversity among Neanderthals was poor, only a quarter of the observed in modern African populations, and a third of that of European populations and present-day Asians. It is very illustrative of this fact that the mitochondrial DNA sequences of Neanderthals from Vindija (Croatia) and Feldhofer (Germany) are very similar, which is unusual given the geographical distance and the geological time that separates them.

All of this tells us about the emotional and social context in which those humans lived, and indicates that their emotions would be focused inward, within their own groups. The life of the Neanderthals It was tough, because they lived in difficult natural environments with high activity demands and frequent periods of scarcity. A large proportion of the fossilized bones of Neanderthals and of the Modern humans present injuries, many of them serious. In fact, cranial injuries

The observed proportions were similar in both species (Beier et al., 2018). Some of them
They could have corresponded to some form of interpersonal violence, both within and outside the group,
This is a phenomenon that occurs in many mammal species, and in primates in particular.

In 17 records of *Homo neanderthalensis,* we observed that these incidents were the subject of
actions of care by others to facilitate their healing, including help with food,
Water, hygiene, and transportation; providing medical care and security. They would also use means to
treat their ailments, such as medicinal plants with analgesic, anti-inflammatory or
antibiotics, with a wide variety that suggests expert knowledge of them and their
around.

In addition to the cases analyzed in the sample of this thesis, Spikins et al. (2018) document
six other Neanderthal specimens with traumatic injuries that, if symptomatic,
They would have required short-term care to manage the wound in the initial stages
after they occur, and in the long term in some situations. These individuals are:

- Sal'a 1 (Slovakia), with a healed injury to the right supraorbital torus.

- Zeeland Ridges (North Sea), with an orbital injury and possible epidermoid cyst.

- Les Pradelles (France) with internal frontal hyperostosis in individual 3, and with myositis ossifying bone in the femur LP.

- Cova Negra 1 (Spain), with a traumatic injury to the parietal bone.

- Arcy-Sur-Cure 9 in Renne (France) with broken teeth and a dental abscess.

- Forbes' Quarry in Gibraltar (United Kingdom) with endocranial hyperostosis (Antón, 1997) and dental abscess.



Figure 30. Gibraltar 1 skull. It presents endocranial hyperostosis and dental abscess.

One of the fundamental premises for reaching conclusions in this work is to avoid the extrapolation from exceptional cases. The scope of bioarchaeological studies must encompass sufficiently representative samples and not restrict oneself to the most anecdotal or the study of unique cases where care would be more intensive and costly.

In a limited set of human groups from the Lower Paleolithic we find the first signs that mark the origin of caring behavior among humans, but we cannot to determine its extent. It is in the Middle Paleolithic that we can begin to infer patterns of broader behavior. The most represented human remains from this period are the belonging to the Neanderthal lineage and, from the very beginning of this lineage, we recognize in the Pre-Neanderthals likely developed care for individuals with problems or disabilities. A little later in time, most elderly Neanderthals show evidence of cured pathologies (Trinkaus, 1978; Trinkaus, 1983; Trinkaus and Zimmerman, 1982). This It suggests a level of social development in which disabled individuals would be well cared for by Others from the group. Several of them, particularly La Ferrassie 1 (#25 in the sample), Shanidar 1 (#20), La Chapelle-aux-Saints 1 (#19) and the same holotype of the species, Neanderthal 1 (#27),

They lived for many years in conditions of severe disability, which would have prevented them
actively contribute to the subsistence of the local group.



Figure 31. Skull of La Ferrassie 1, individual with an estimated age at death of between 40 and 55 years.
He received care at least twice in his life: when he fractured his right femur, and when
She suffered from a pulmonary pathology.

These individuals are sometimes referred to or depicted as *elderly.* However, it is not
It's strange to read the nickname of the Old Man of La Chapelle-aux-Saints. But this is due to a misinterpretation.
of human longevity and life expectancy. When we explain that Neanderthals lived
about 40 or 50 years, this data mainly refers to their average age of death, but
It does not explain the maximum age this human species could reach. The Neanderthals who reached
Adults lived longer than 40 years, but many children died along the way;
The result is that the average age of the Neanderthal remains we know of may be between 30 and
40 years, similar, for example, to life expectancy in the Roman Empire. Whereas the
The life expectancy at birth of a Paleolithic baby could be 35 years, that of an adult 35
It could be around 25 years, so it would reach up to 60 years. The fossil record corroborates that, in
In the Middle Paleolithic, from the age of 50 onwards, pathologies were so numerous and severe that many
Individuals died, and that's why they are called elderly, regardless of whether they had an appearance
old woman from the cultural perspective of modern humans.

From the Upper Paleolithic onwards, a change begins to be observed in which the frequency increases
in the fossil record of individuals with an age at death reaching 50 years. However,
Both in this period and in previous Paleolithic periods, the proportion of older individuals
Age in those populations was so low that statistically it is very difficult to find their remains

may even be included in the preserved fossil record. In any case, the biological characteristics
The *Homo sapiens* that began to evolve in the Middle Paleolithic were fundamentally
the same as those of present-day humans, and therefore they had the same biological capacity to
reaching old age. From this perspective, the possibility of a
Greater care is needed among older individuals. But these elderly people do tend to excel in
studies (Trinkaus and Zimmerman, 1982) that postulate its contribution in a more indirect way to
well-being of their social groups. Regarding Shanidar 1, Solecki (1971) argues that, although it would be in
clear disadvantage in a "wild and brutal" environment where all humans had difficulties,
This individual is proof that his group was not lacking in compassion: he could barely feed and fend for himself.
by himself, and we must assume that he was accepted and helped until his death, when his burial
Intentionality also indicated the group's esteem. Referring to Shanidar 1 and 3, Solecki (1971)
It also notes that the very fact that "the lame and wounded individuals" were cared for
in the cave is an excellent testament to community life and cooperation, challenging the
characterization of prehistoric life as "unpleasant, brutal and short".

Traditionally, the assessment of Neanderthals' cognitive potential has been based on
in the extrapolation of the morphology of modern humans and in the inference of manufacturing
of tools, economic activity, and funeral services. Fortunately, in the last
Over the past decade, multiple studies have succeeded in blurring the lines between the two.
species under the aforementioned axes. On the one hand, both species had identical patterns and
subsistence strategies in their respective occupations of the same territory. With the same
conditions, species available for hunting, and raw materials for carving, the responses of
Both human species were the same for 100,000 years or more (Montes and Sanguino)
González, 2021). On the other hand, sites where complete Paleolithic sequences are preserved
The Middle Paleolithic and the transition to the Upper Paleolithic allow us to understand the evolution of the industries of
Neanderthals. These groups demonstrate a great adaptive capacity with which they continually improve.
and perfecting their technologies, using both lithic and bone raw materials, although they
They differ from the first European *Homo sapiens* groups in the operational chains they employed. Also
The possibility of certain cultural influences, even bidirectional ones, has been observed.
mainly in the Châtelperronian.

We cannot forget the third perspective mentioned above, that of funeral arrangements.
In 10 of the 17 *Homo neanderthalensis* records in the sample, it has been documented
characteristics of the site that point to an intentional deposit of the body or burial.
The earliest individuals buried in this species could be over 100,000 years old, an antiquity

Similar to that of the earliest known *Homo sapiens* burials, such as those at Qafzeh and Skhul, both in Israel. In Africa, the oldest known burial is that of a 2.5-3 year old *Homo sapiens* child from Panga Saidi (Kenya), nicknamed Mtoto. This child was placed 78 ka ago with his body in position flexed, knees towards chest, lying on his right side, head possibly covered by a shroud or burial cloth, and a grave having been previously dug to carry out the deposit (Martinón-Torres et al., 2021). Rotation of the head and the first three vertebrae It suggests that he rested his head on some kind of support made of perishable material.

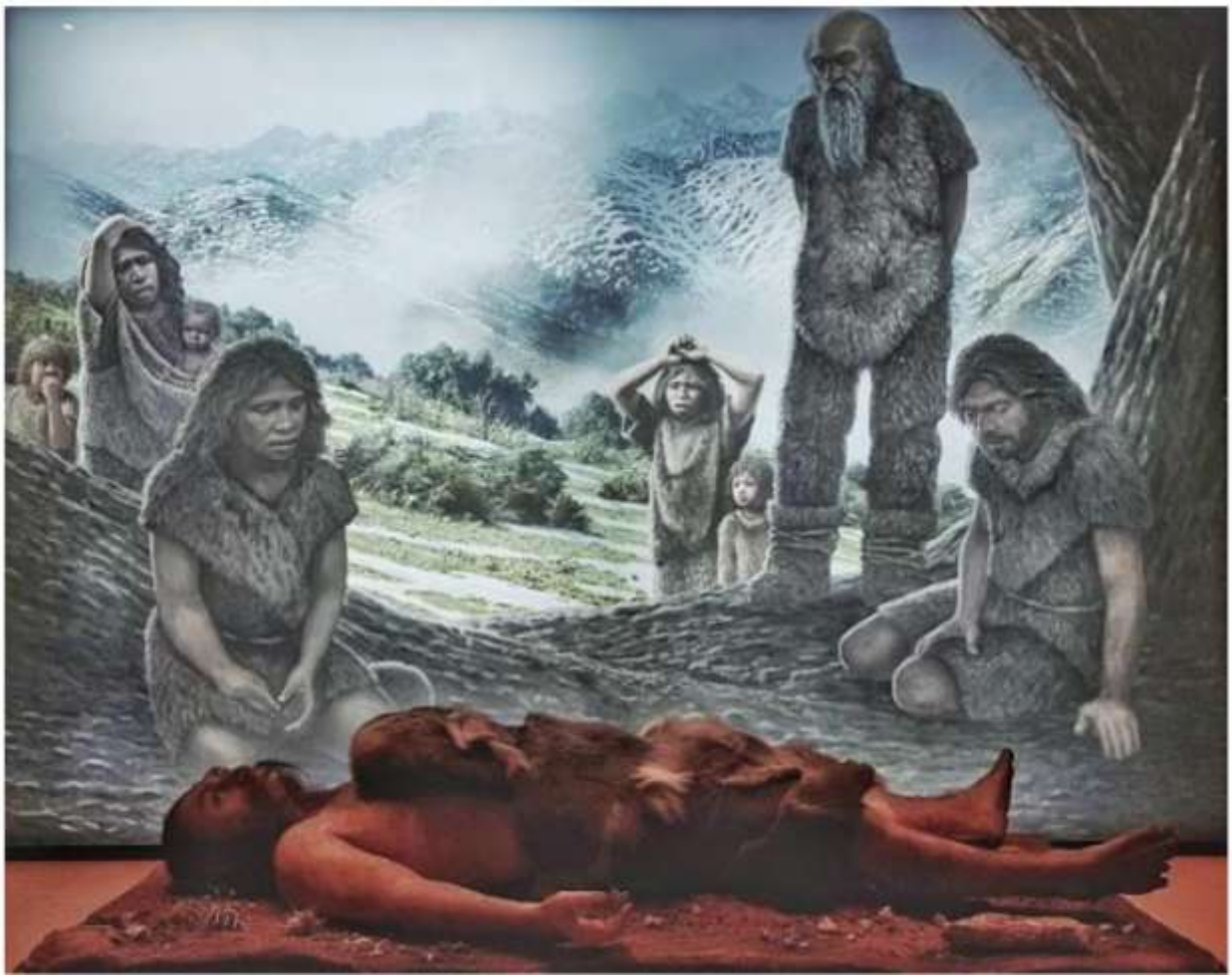


Figure 32. Paleoartistic representation of a Neanderthal group before a deceased individual. Diorama in The National Museum of Natural Sciences, Madrid.

Therefore, the analysis of care practices in subjects found in different Paleolithic human groups throughout all geographies, both of Neanderthals and *sapiens,* as well as in the transition stages towards the Neolithic period, it offers very important data on the social organization of these populations. In the case of Neanderthals, the recognition of caregiving allows for the addition of information

fundamental and change the view of this species. Care among Neanderthals should not be not seen as an isolated element of their behavior, but as part of intraspecies development which is already evident in the technological, economic and funerary study axes, generating together a better appreciation of the cognition of this species and its daily practices.

Focusing on ancestral populations of *Homo sapiens,* among the 15 records of In the Paleolithic, Epipaleolithic, and Mesolithic periods, we find an increase in IC up to 40, and two factors distinctive features that we can point out in care behaviors with respect to Neanderthals: the introduction of trepanation and dental drilling treatments for cavities.

The smallest sample size of modern humans in the Middle Paleolithic (3 individuals) in Comparison with that of *Homo neanderthalensis* (17) is not an anomaly but a reflection of the problematic in the fossil record of this period. The number of known incursions of *Homo* *Homo sapiens* in territories occupied by Neanderthals are scarce. In Europe, it has been proposed three migratory waves of *Homo* sapiens (Slimak, 2023) from the Levant to Western Europe, Although only the third of these phases led to its definitive expansion across the continent. The first phase This would occur in the early Upper Paleolithic (50 to 60 ka), the second phase would correspond to the culture Chatelperronian developed about 45 ka ago on the Atlantic coast of France and on the peninsula Iberian Peninsula, the Cantabrian coast and the northern Mediterranean area, and the third phase would correspond to the Proto-Aurignacian industry from about 42,000 years ago. Cultural unification would have taken place during this stage. of the different populations of *Homo sapiens* across Western Eurasia.

In Asia, there is less clarity regarding possible migration patterns of *Homo sapiens* from Africa. Some of these movements of modern humans are evidenced through the the Misliya jawbone (Israel) from 180,000 years ago, the Al Wusta phalanx (Saudi Arabia) from 90,000 years ago, the Fragments of frontal bone and tibia from Tam Pà Ling (Laos) from 86-68 ka, and the remains of the sites Chinese from Fuyan Cave (120-80 ka), Huanglongdong (100-80 ka), Lunadong (127-70 ka) and Zhirendong (116-106 ka), although there are doubts about some of the latest datings.

Within the limited representation of *Homo sapiens* in the sample from prehistoric periods, it is They show evidence of care in all the geographical regions that feature the described expansions, including Paleolithic references in Africa (Singa, Sudan), Western Europe (Arene Candide and Romito, Italy), Central Europe (Dolní Vÿstonice, Czech Republic), Levant (Qafzeh, Israel), Central Asia (Sunghir, Russia) and East Asia (Liang Tebo, Borneo); in the Epipaleolithic and In the Mesolithic period, new African evidence (Taforalt, Morocco) and European evidence (Samouqueira, Portugal and Vasiliyevka, Ukraine) and Asian countries (Hokkaido, Japan).

Therefore, there are two moments in which there is an apparent leap in the care provided, both in quantity and quality, the latter referring to the use of more specialized techniques for to act on the body of the individual with problems. First, in the Middle Paleolithic, with a prolongation and intensification during the Upper Paleolithic. Secondly, during the Late prehistory, occurring in different geographical regions of the planet.

The transformation of the social organization of human groups in the Neolithic period, with the settlement and increasing size as key characteristics, facilitated the task of becoming involved in the care and develop specialized and more intensive activities around this behavior. This period can be considered the beginning of the structuring of forms of mutual aid and solidarity towards disabled people, as a consequence of a level greater social progress and medical skills to maintain the health of societies. This This fact does not necessarily correspond to moral development, but rather its possible The cause may be associated, at least partially, with the triggering of a rate of higher spread of infectious diseases (León Cristóbal, 2022).

In any case, the deployment process we observe in this behavior feeds the discussion about a more biological or more cultural origin of the ability to care for others, and about the balance between both components that can vary throughout the development of the human societies.

The biological origin of care among adults is usually supported by behaviors typically linked to upbringing, which are similar to mechanisms used in recognized responses in certain highly social mammals, as diverse as chimpanzees, lions, wolves or dolphins (Decety et al., 2012; Decety et al., 2016), as well as in the selective advantage of reducing the risk of mortality of other members of the group when the groups are highly independent (Frank and Linsenmair, 2017), whether or not they are close relatives.

The cultural component of care becomes stronger as the level of collaboration in hominins. We cannot ignore that this phenomenon also occurs in other populations of non-human primates, such as the chimpanzees of Tai National Park (Coast of Ivory). Among them, it is common to treat wounds inflicted by predators on other companions, cleaning areas of the body where the injured person cannot reach (Boesch, 1991; Boesch and Boesch-Ackerman, 2000; Boesch et al., 2010). The fact that other chimpanzee groups do not show this in such a way This behavior is not common, but rather observations of it occur more sporadically. and/or in captive individuals, suggests that Tai's chimpanzees have developed this

behavior through a local learning process. In humans, this cultural process transforms into
Care is essential, primarily within the group, and generates selective social pressure that
This behavior, along with other collaborative strategies, is encouraged, as detailed.
previously, including the transmission of knowledge. This makes the cultural component of
Care will gradually take on a more prominent role in its balance with the biological component.
We must understand that an important milestone in this process was the normalization of that
behavior, even to the point of normalization, in such a way that choosing not to care had
a negative consequence in the social link scheme of the communities.

The archaeological evidence for all these skills is becoming increasingly complex, and the
Care among humans is one more of them, without overlooking in any case that the deployment of these
These processes took place at different times and paces depending on the geography and culture, such as
as observed in the sample of this work, within a framework of increasing development.

Link between care and burials

With the evidence available in the fossil record, it is not possible to determine when humans
They did not attain knowledge of the inevitability of death, nor who the first ones were.
hominins who became aware of it, nor what they were seeking by performing certain ritual actions.
As possible starting points, we have two.

First, the 29 individuals from the Sima de los Huesos. Cueva Mayor is one of the caves.
from the Atapuerca mountain range in northern Spain, and has been occupied by hominins since the
Middle Pleistocene to the Middle Ages. At the end of a side gallery of the cave, there is a shaft
A 14-meter vertical drop that ends in a 14-meter chamber on an inclined ramp. In this
In that place, 430,000 years ago, there was a possible burial site associated with a ritual act that also
This would lead to throwing a biface nicknamed Excalibur into the chasm (Carbonell et al., 2003), the only tool
lithics of the site, masterfully carved from a red quartzite very rare in the Sierra de Atapuerca.
However, the very high proportion of young individuals (24 out of 29) also supports a reason
catastrophic deposition (Bermúdez de Castro et al., 2020).

Secondly, the remains of *Homo naledi* found in several chambers of the Rising Star system
(South Africa), which have been argued as possible burial sites (Berger et al., 2023, in discussion).
This human species lived 241-335 ka ago and is surprising because of the small size of its body

(150 cm and 45 kg) as well as its brain (466-560 cc). It had a brain of similar size to that of *Homo floresiensis* (426 cc), but much lower than that of other human species: *Homo erectus* (between 727-1220 cc), *Homo sapiens* (1350 cc on average), *Homo neanderthalensis* (1450 cc as average). As an additional reference, the pre-Neanderthal skulls from Sima de los Huesos have between 1050-1400 cc.

The first traces of symbolic capacity also appear at the end of the Middle Pleistocene, and also a growing number of healthcare samples. During this period, the following occurs: Pettitt (2011) calls it a "modernization phase" in hominin mortuary activity, and it is related to early modern humans and Neanderthals.

We start from the complexity involved in identifying and interpreting a human burial in that period, including the discovery of bones in anatomical connection, of a prepared pit, and of associated objects that can be interpreted as a funerary offering. Sometimes this is prevented not only by the lack of conservation, but the removal of sediments by the action of animals or displacements of the terrain. Therefore, the number of burials identified in the Middle and early Paleolithic The data from the Upper Paleolithic is scarce, and a reference number could be 134 (Zilhão, 2015; Trinkaus and Buzhilova, 2018). Pettitt (2011) distinguishes 60 Neanderthal burials, and lists the types of burials that occurred at the end of the Middle Pleistocene:

- Deposition of bodies in unmodified natural places: for example, Pontnewydd in Wales, Quinine in France.

- Simple burial in a dug pit, without grave goods: Kebara KHM2 in Israel, Spy in Belgium and, with more doubt, Roc de Marsal in France, Tabun and Amud in Israel and Others. This type would also include the oldest human burials. Modern ones: for example, Mtoto in Kenya, Taramsa in Egypt, Skhul and Qafzeh in Israel, Lake Mungo 3 in Australia.

- Primary treatment of the corpse, with body parts flexed and funerary goods additions; and secondary treatment, in which the skeletons are disassembled after a time, And sometimes they change location: for example, Dederiyeh 2 in Syria or Krapina in Croatia (in this case, it seems to be due to cannibalism).

- Ritual burial, which adds more formal elements to the previous type, such as ornaments bodily remains, burial signage, unique placements of funerary goods,

deposition of later individuals in the same pit, etc. Two examples are La Ferrassie 1 and La Chapelle-aux-Saints 1 in France.



Figure 33. Reconstruction of the burial at La Chapelle-aux-Saints 1, in the National Museum of Natural Sciences, Madrid.

To correlate health care behaviors in the sample of this thesis with burials, we must look at their Paleolithic dating or mortuary characteristics unique features in burials from later periods, referring to a different position of the body than that of the other bodies in the necropolis, or a special grave good associated with the deposit. In this way, Among the 17 Neanderthal individuals in the sample, we found 10 of them with characteristics of Intentional burial. Among the 11 cases of modern humans from the Middle Paleolithic and the Upper Paleolithic, 7 of them correspond to burials (Qafzeh 11 and 12, Dolní Vÿstonice 15, Sunghir 2 and 3, Arene Candide 2 and 3, Romito 2). In the following prehistoric periods, in the

While burial practices have become widespread, unique characteristics are observed in the Burials of 5 Neolithic cases and one Bronze Age case, distributed throughout the region. It is interesting to highlight the distinctive characteristics in the grave goods of children's burials of the Man Bac community (Vietnam), linked to patterns of age at which they died due to health problems that they had been suffering from for a long time in their lives (case #59). Finally, in the pre-colonial period, another 5 burials with aspects are documented singular.

Based on these observations, we propose that the burial may have been used to highlight or to honor the difference of an individual who received special care, sometimes considering also their social status, regardless of awareness of a transcendental meaning of death.

Amputation for surgical purposes

For a long time, the oldest known example of a partial surgical amputation was that of a elderly Neolithic farmer (case #48) who was missing part of his arm, from Buthiers-Boulancourt, France (Buquet-Marcon et al., 2007). This individual survived during months, possibly years, after the surgical amputation of the lower forearm Left. There is no evidence of associated infection, and his skeleton indicates medical skills. advanced techniques related to surgery and post-surgical treatment, in particular, to stop the blood flow and treat disinfection and healing in this individual.

Of similar age, this thesis has identified five more individuals: three with amputations of upper limbs (described in cases #63 and #65) and two of lower limbs (#65); likewise, two other pre-colonial individuals with foot amputations have been recorded (#86).

The publication of a case of surgical amputation in a young hunter-gatherer from The Indonesian cave of Liang Tebo, in Borneo (Maloney et al., 2022) is surprising because of its age Much older, 31,000 years. This young man (#29) would have been about 19 or 20 years old when he died, and it hasn't been possible to determine its sex. Its skeleton shows evidence in the lower part of the left leg of a surgical amputation of the tibia and fibula, ruling out an accidental amputation or an action exterior. The difference in size and thickness of the remaining parts of the tibia and fibula on the side

left, with respect to the bones of the right leg, leads to the conclusion that that episode
It happened during childhood, and he survived for between 6 and 9 years afterward. During the surgery, the treatment
of the surrounding tissue, including veins, vessels, and nerves, reveals a
High competence to perform this action successfully. The actions of care (nursing) and
Intensive postoperative care would have been important and also successful, as the
Temperature regulation, regular feeding, bathing, and movement to prevent
pressure ulcers developed while the individual was immobile. The wound was cleaned, bandaged, and
disinfected regularly, perhaps using locally available botanical resources with
medicinal properties to prevent infections and provide anesthetics to relieve pain.
Furthermore, the individual's right knee joint had begun to degenerate,
possibly as a result of the different walking pattern he would adopt. Finally, after his
Upon his death, he was intentionally buried, reinforcing the degree of integration of this individual into
your group.

The young man from Borneo belonged to a group of hunter-gatherers with a nomadic way of life.
in a complicated environment, the Sangkulirang–Mangkalihat karst, a mountainous area inland
of a rainforest. This implies that the level of care she experienced, through both
Direct care actions, as well as community adaptation, would possibly be more
a complex that we later began to observe in Neolithic settlements. In all
In this case, we are talking about knowledge that today we frame within different disciplines such as
Anatomy, physiotherapy, and medicine. These are areas of knowledge that needed to be acquired through
previous experiences, both in acting on human bodies and other animals, as well as
competition in the use of plants with medicinal properties.

There are two possible cases of amputation older than the one in Borneo, both of the species
Homo neanderthalensis.

With an estimated age of 120 ka, the Krapina 180 ulna (case #10) has a distal end
rounded with bone growth forming a callus: he suffered an amputation during his lifetime a long time ago
before the individual's death (Estabrook and Frayer, 2014). Perhaps the individual may have had
a non-union fracture, so that the proximal end of the ulna would have healed separately
of the distal end. In such cases, the broken ends can heal in a manner that resembles
a post-traumatic pseudoarthrosis (Trinkaus, 1978). However, comparing Krapina 180 with
Other documented cases of non-union fractures, in most of these there are aspects that are missing in
The Neanderthal ulna, with a dense polishing of the bone surface called eburnation, points

that Krapina is representing a likely case of amputation (Eddie, 2013). Comparing the
The case of Krapina 180, compared with other hominin cases where no additional context is recorded, results
impossible to determine the causes of the injury (natural, accidental, medical treatment, ritual,
violence…), so it can only be understood that this individual suffered a temporary limitation
of economic activities, typically foraging, given that it seems clear that it continued
using his arm for a long time after the trauma, as well as possible health monitoring,
since no infection is observed in the bone (Estabrook and Frayer, 2014).

The other case is that of Shanidar 1 (#20), dated to about 45-60 ka, whose right humerus is
truncated, with a callus of bone on the remaining stump. Shanidar 1 is a skeleton with many others
Problems: His amputated arm was compounded by healed fractures in his left orbit, injuries to the
cranial vault, exostosis of the right lateral femoral condyle and abnormal shape of the distal tibia
right and the talus. In particular, the right humerus has an angle that may be due to
healed fractures or crushing injuries (Trinkaus, 1978 and 1983), it being unclear how it happened
trauma that removed the distal end at once, or if it remained for some time
after the initial fracture before subsequent amputation. To verify the possibility of amputation,
Experimental imitation practices were carried out with lithic tools, verifying that the
The duration of the amputation would be 25-30 minutes, with between 3 and 5 tool changes, and that
The key factors in it would not be so much the tools, but the skills to perform it
intervention (Lietava, 1988).

The earliest medical texts in Greece, Rome, and China describe surgical amputation.
civilizations used metal scalpels, saws, and other specialized surgical instruments, and
They shared an emphasis on separating healthy tissue from necrotic tissue and on treating the wound properly.
However, it is very difficult to be clear about whether some of the first amputations
Prehistoric treatments were surgical. For the same case of Liang Tebo, a group of surgeons
Practicing orthopedic surgeons (Murphy et al., 2023) propose an open fracture as an alternative
distal tibia/fibula with involvement of the growth plate, and the development of osteomyelitis
This chronicle would have meant a long period of suffering and confinement for the young man of
Borneo. In this alternative scenario, necrosis of the bone and surrounding soft tissues
Due to an infection, this would have led to cutting away the remaining soft tissue. In fact, this option
would have involved antisepsis and debridement (removal of necrotic tissue and the burden)
bacterial), and would have required a complex understanding of the anatomical basis of the infection to
specifically remove the infected tissue, and a much higher level of care than performing
of a complete amputation. But a dead foot would likely be a critical impediment to

moving through the rugged, mountainous terrain where he lived was much more painful than a stump. and there are no clear signs of the proposed osteomyelitis, so amputation seems more plausible. complete (Vlok et al., 2023).

What we can be clear about, in either of the two Borneo scenarios, is the
The care that young man clearly needed to survive was evident. But, if there are any doubts...
Determining the type of intervention in a case where the preservation of the remains is good is easy to infer the complexity to study and interpret other more fragmentary cases, where a fracture
This condition, accompanied by an arterial lesion that produced distal ischemia, can produce a dry gangrenous process (tissue death) and end in self-amputation of the limb without assistance. There are multiple cases of this type described in modern medical texts, even with a specialized treatment for gangrene.

These cases of self-amputation with survival occur in non-human primates, with numerous observations that originate from violent actions between peers or human traps, with Survival without medical attention (Bramblett, 1968; Kano, 1983; Waller and Reynolds, 2001). Before The lack of attention, individual resilience is the main survival factor, and individuals They continue their lives by limiting their movement and eating more slowly. In the most severe cases of In cases of limb amputations, abandonment by their group has been observed, or at the very least, the distancing of that individual by others.

Clambering

Trepanation, as a maneuver to open the skull of a living or dead individual, has a very ancient origin, dispersed in space and time. Within the framework of this thesis, the first Documented cases date from the Epipaleolithic and Mesolithic periods (#37 from Taforalt, Morocco, and #38 from Vasiliyevka III, Ukraine) and from the Neolithic (#44 from Petit Morin, France). The adoption of this The maneuver by human groups from different geographies and cultures must have been due to other causes as well. heterogeneous. Various forms and techniques have been identified in their execution; there are also single and multiple trepanations. Thus, trepanations can be studied from several perspectives: their morphology, which is usually directly related to the technique used (by drilling, by curettage or abrasion, and incising) and the instrument used (initially flint and later metals), its location in the skull, and the degree of total or partial perforation of the bone. In addition, other Important parameters for the study of the Bioarchaeology of Care are the signs of

bone regeneration or healing, its possible link with pathologies that justify its practice, and whether it is a primary action or secondary to a traumatic process.



Figure 34. Trepanned skull from Taforalt, Morocco.

In general, medical reasons and ritual are usually the two main explanations proposed for These practices. A more detailed classification is that of Laín Entralgo (1990), which adds four the various possible motivations for this activity:

- Spontaneous method, which is performed on another person without any prior conception.

- Empirical method, which is carried out in a given situation similar to a previous one in which The action had a favorable outcome.

- Technical method, which is carried out based on previously assessed criteria, considering a a set of factors that lead to understanding the causes of the problem, and that allow us to predict the results of the action through the application of certain means also acquaintances.

- A magical method, resulting from supernatural beliefs. Focusing on the last point, It should be noted that magic, religion, and medicine have almost certainly been linked. in many ancient cultures, so it may not be mutually exclusive with the other three points.

In the context of this thesis, the focus is on trepanation performed on living subjects.
certain individuals where the likely explanation is some type of healthcare. In
In this sense, the first trepanations are observed in the interior of Europe and, above all, in the
Mediterranean area, with an initial expansion probably associated with the Neolithic process and
to the social and cultural changes it entailed, which brought about new interpretations of
the facts (including those related to health) and the structures of coexistence. Without
However, the number of known cases of trepanation during this period is small.
The dynastic system in Egypt was not a common practice (Ghalioungui, 1983), and it is also very small.
number of trepanations found in the Greco-Roman dynasties (Pahl, 1993).

There are no known cases of trepanation in the Paleolithic, and we can only speculate on two possible cases.
Reasoning for this. On the one hand, the Paleolithic culture (or cultures) were linked to
a different interpretation of the facts and behavioral practices different from those of the
later periods. On the other hand, from some initial attempts, they might already be aware
that the available technology would not be the most suitable for this type of action.

An additional question is the mechanism for transmitting this complex practice. Campillo
(2007) proposes an asynchronous start in various places and, only occasionally due to proximity,
transmission between nearby population centers; in fact, we can extend this hypothesis
also to the realm of pre-colonial America. It also establishes a possible association between the
trepanation and cranial traumas that occurred during economic activities
human in prehistory, as demonstrated by the high proportion of skulls with this type of
incidences identified in both *Homo sapiens* and *Homo neanderthalensis individuals,*
with a similar relationship in both species (Beier et al., 2018). In open trauma, a
Once the bleeding had stopped, the post-traumatic holes and the detachment could be observed.
of bone. The scars could be depressed or raised, and in the latter, there was often
I could feel and appreciate the heartbeat. Experience with cases of individual recovery could
leading to downplaying the bone loss, and attempting to puncture the swelling and remove the
loose bone fragments, both cases leading to the improvement of the injured person, due to the reduction of
hematoma and the facilitation of cicatricial synostosis. This experience, in turn, provided feedback to the
loss of fear that the skull is perforated and, as a next step, to consider the possibility
to drill it. For this, they needed stone tools, which they possessed, and a good knowledge
anatomical. Campillo (2007) observes that the predominant location is above the plane
glabella-inion, probably to avoid the temporal fossa, heavy bleeding of the muscle
temporal and deep temporal artery injury.

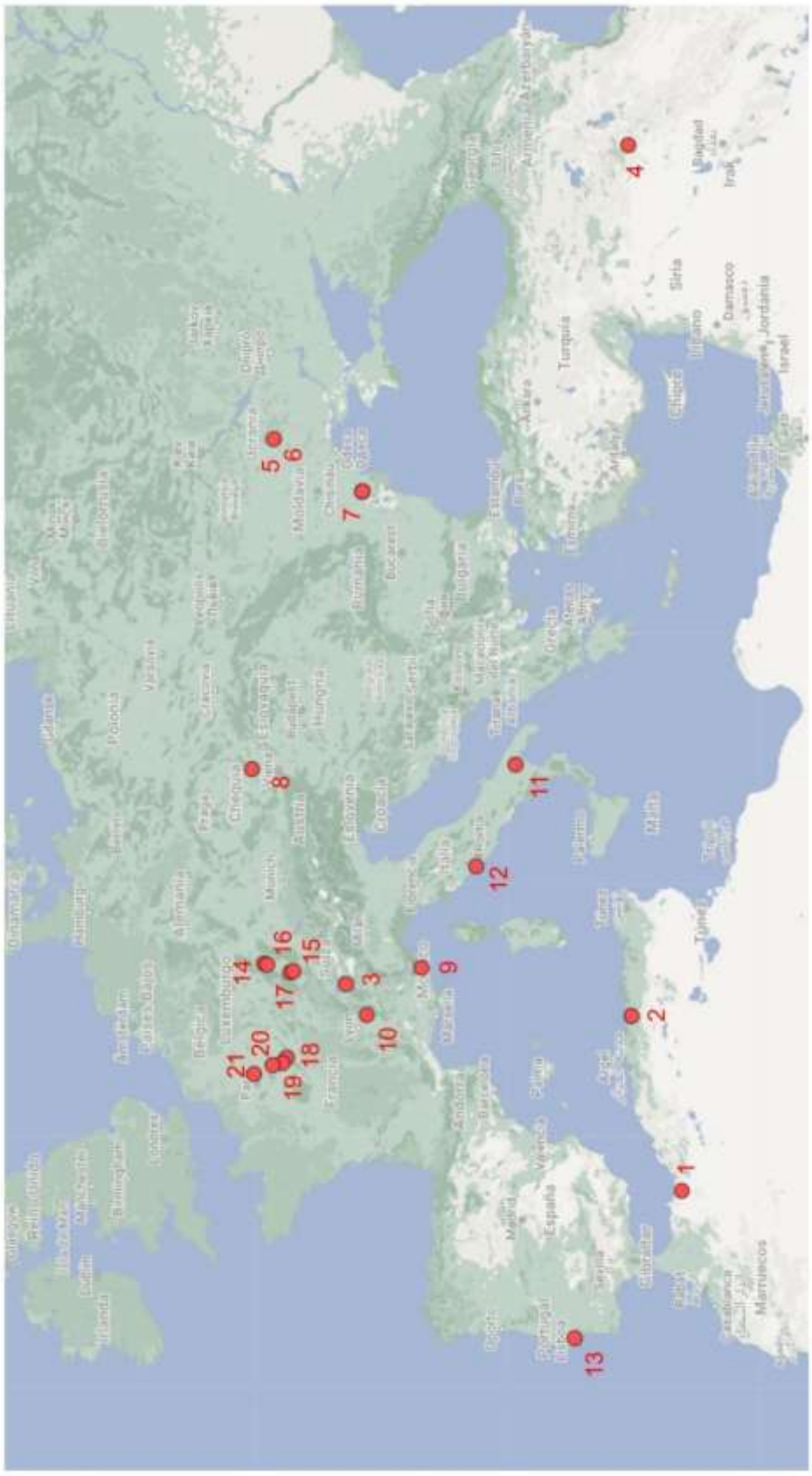
Without ruling out therapeutic use for certain cases such as the relief of hematomas or abscesses (Tejerina, 1972), Campillo proposes that in prehistory the predominant motivation for trepanation It was the ritual, seeing that the frequency of this practice was much higher than in modern times. In contrast, other authors (Weber and Czarnetzki, 2001; Andrushko and Verano, 2008; Erdal and Erdal, 2011) argue that the survival of trepanation treatment in prehistory is due to Expert knowledge that seems logical to link to a decision to care. In part, Pahl's (1993) meticulous study of trepanation in Egypt suggests that the cases The earliest Egyptians had a more refined technique (probably associated with a specific purpose). therapeutic) than the later, more advanced trepanations (which would have a ritual purpose).

Taking into account previous studies and the evidence examined, this thesis proposes that In some human groups, the origin of trepanation would have an intermediate scenario that combines Both motives (medical and ritual). In them, the idea of the disease and its solution initially It would have magical connotations, and not so much the basis of anatomical knowledge with ideas clear cause-and-effect relationships, beyond the mere symptom of pain. Understanding anatomy and its treatment would increase in a manner analogous to the development of other cultural processes and technological advancements, leading to a specialization that would clarify the true scope of therapeutic use of this practice.

In any case, within the framework of care, the sample in this thesis explores specific trepanations that indicate a probable purpose such as health treatment, and the uses of are not considered This practice was widespread in certain Mesoamerican and South American populations, as well such as European (Talayotic, Canarian), which seem closer to a ritual interpretation, and They sometimes even include the extraction of fragments that are collected as amulets. In America, trepanation also coexists with other ritual practices such as body deformation cranial and dental mutilation (Lastres and Cabieses, 1960).

However, the analysis of individual 3 from Achanchi (Peru) is intriguing (#78). It belonged to a a society where war and violence played a major role in daily life. Despite the lack of resources, and the likely precautions that would exist to anticipate attacks, the The care taken with the trepanations of this individual (and the injuries of many others) shows a surprising investment in care among the Chanka, and a social organization designed to responding to frequent intensive care needs (Tilley, 2017). This example denotes the importance of moving from the individual level to understanding certain behaviors of a community, including the exploration of its values.

In conjunction with the 9 cases of trepanation included in the sample, of which 7 come from the Epipaleolithic/Mesolithic, Neolithic and Bronze Age periods, Cruzéby et al. (2001) and Escolà (2022) increased the number of trepanations for surgical purposes to 21 during those periods:



1	Taforalt, Morocco
2	Afalou-bou-Rhummel, Algeria
3	Barmaz, Switzerland
4	Zawi Chemi, Iraq
5	Vasilyevka III, Ukraine
6	Vasilyevka II, Ukraine
7	Vovnigi II, Ukraine
8	Vedrovice, Czech Republic
9	Abri de Pendimoun, France
10	Grotte de Souhait, France
11	Trasano, Italy
12	Grotta Patrizi, Italy
13	Concheiro da Moita do Sebastiao, Portugal
14	Hoenheim-Souffelweyersheim, France
15	Ensisheim, France
16	Lingolsheim, France
17	Riedisheim, France
18	Cheny, France
19	Passy-Richebourg, France
20	Balloy-Réaudins, France
21	Vignely, France

Figure 35. Cases of trepanation for surgical purposes in the Epipaleolithic, Mesolithic, and Neolithic and Bronze collected by Cruzéby et al. (2001) and Escolà (2022).

Therefore, given the difficulties in identifying certain actions as healthcare,
We must bear in mind that some of the interventions that may surprise us by expressing a
Remarkable anatomical knowledge, in reality, would correspond to a symbolic meaning. Again,
This should remind us that there was a link between certain precursor forms of care
physicians and certain skills that had a ritual or magical meaning. An ancient example of this
We found this application in an artificial eye made of tar and animal fat placed on a woman
Buried in Burnt City (Iran) about 4800 years ago. An aesthetic motivation for its use has been suggested.
of this ocular prosthesis during life, compensating for the missing eye (Moghadasi, 2014). Many
Detailed features give this appendage a very similar anatomy and appearance
to that of a natural eye, including the convex surface, the spherical shape, a smaller circle
In the center, mimicking the cornea, white spots on the conjunctiva, and golden wires inside the
The eye represents capillaries. But it has other characteristics that go beyond simple imitation.
such as the eight regular radial lines drawn from the center of the smallest circle
(cornea), which resemble the sun's rays, completing the artificial eye by linking it to
light and brightness.

Finally, prehistoric evidence of trepanation and amputation procedures
rudimentary methods discussed in this thesis, as well as the observation of fractured bones joined in
alignment suggests that other techniques for the treatment of

Injuries that would include the early use of non-operative orthotics, splints, and practices of rehabilitation. The difficult preservation of organic materials prevents us from having evidence of objects. related for the moment. These primary orthopedic methods began to be observed some time ago about 3000 years ago in Egyptian and Chinese cultures, and more widely about 2500 years ago in Greece and Rome (Swarup and O'Donnell, 2016).

Dental treatments

The cases of Villabruna 1 (#32) and Fredian 5 (#33) suggest that in certain groups of Hunter-gatherers of the Late Pleistocene already possessed fundamental medical knowledge for to perform dental caries treatments, long before the associated socioeconomic changes to the Neolithic transition towards food production.

This practice may have had a very ancient origin, as an evolution of the use of small tools, like toothpicks, to pry and scrape the teeth. This activity of Human hygiene was used to remove food debris, or also to relieve pain due to to a dental pathology, and is evident in numerous subjects of the hominin fossil record since 2 Ma. Your observation is very interesting when studying the implications for dexterity manual of these hominins, and their behaviors related to feeding and with Oral hygiene. The materials used to make these objects could be varied, such as such as bone, plant remains (twigs, grass), fish bones and tendons.

Generally, the grooves that result from the use of toothpicks are located on the teeth. posterior, around the cervical line, and are equally frequent on the distal and mesial surfaces. They are usually oriented buccolingually and have a semicircular or tubular cross-section, frequently exhibiting fine striations parallel to the direction of the furrow. It has also It has been observed that captive chimpanzees scratch their teeth with small twigs. Humans, its formal and regular use began with the Sumerians and especially with Roman civilization, but there is evidence in individuals of other human species, for example:

- *Homo habilis:* specimens L 894-1, from the Shungura Formation in Omo (Ethiopia), 1.84 Ma; OH 62, from Olduvai Gorge (Tanzania), 1.8 Ma.

- *Homo* erectus: OH 60 specimens, from Olduvai Gorge (Tanzania), 1.8 Ma; D2735 from Dmanisi (Georgia), 1.77 Ma; Yiyuan (China), 420-320 ka.

- From *Homo sp.* (not assigned to a species): a 1.2 Ma tooth from the Sima del Elephant in Atapuerca (Spain).

- A pre-Neanderthal tooth from the Sima de los Huesos in Atapuerca (Spain), dating back 430 ka.

- *Homo neanderthalensis:* several specimens from Krapina (Croatia), 130 ka; Hortus (France), 57 ka; El Sidrón (Spain), 49 ka; Stajnia Cave (Poland), 46 ka; Cova Foradà (Spain), from 38-41 ka.

From the use of those tools as toothpicks, the development of a
The shift in dental health care behavior from one individual to another must have required a more nuanced context
extensive care, and basic knowledge of certain parts of the human body and of the
therapeutic effects of your treatment.

Among the Neolithic burials of Mehrgarh (Pakistan), case #41 corresponds to 9 individuals
in which 11 molars have perforations made with lithic tools, and of these there are caries in 4,
This indicates therapeutic or palliative treatment. At this site, the flint lithic assemblages
They appeared associated with beads of bone, steatite, shell, calcite, turquoise, lapis lazuli and
carnelian. Using experimental archaeology based on ethnographic literature, Coppa et al. (2006)
They find that with a flint point it takes less than a minute to produce perforations in
The enamel is similar to that of Neolithic specimens. This suggests that the technical knowledge
Originally developed by artisans for bead making, these techniques could be transferred to the
Tooth drilling, in a precursor form of dental techniques.

Pharmacological intervention

The transition of hominins to a more carnivorous diet more than 2 million years ago probably
The pressure from zoonotic pathogens increased, based on observations of infections in
in modern hunter-gatherers and in hunters of wild animals, in the stomach pH
exceptionally low in humans compared to other primates, and in the divergence in genes
related to immunity also in comparison with other primates. Hagen et al. (2023)

They argue that the combination of increased pressure from zoonotic pathogens and the need to
Maintaining a brain and body in a mammal as long-lived as humans made it possible for them to
They will intensify self-medication strategies through the use of plant-based resources.
The challenge is to find evidence in the fossil record that supports this hypothesis.

The remains of plants with medicinal properties found in skeletons, typically in the
Tartar on teeth or in coprolites are usually associated with herbal remedies, but not
We have no certainty that its application in the living individual was indeed that, or that its
use was either intentional or accidental (Bryant, 1974). However, different studies
Ethnographic studies have shown that hunter-gatherer communities use resources
pharmacological factors in their environment extensively influence their daily lives (Kala, 2009). Even
They have observed possible specific spaces from about 3000 years ago, which possibly
They combined the use of medicinal resources with women's activities such as childbirth,
menstruation or child-rearing (Classen, 2011). The use of these resources is usually situated within the framework
of certain therapeutic techniques and preventive measures, although observations of their ineffectiveness
They might not be reflecting employment as an effective protection of the population, but rather social purposes.
such as love potions, contraceptives, good luck charms, specific ones against the
witchcraft and poisons (Taylor, 1977). On the other hand, ethnographic sources also demonstrate a
expert knowledge when applying or ingesting these products, either as an external application,
mixed or soaked in hot water to produce an infusion that is drunk, or roasted with
fire to chew and swallow (Taylor, 1977).

In prehistory, we find remains of medicinal plants in dental plaque, even in
other human species. For this discussion, the case of El has been included in the sample for this thesis.
Sidrón (#17). At this site, 2500 bone remains have been found so far, representing
to all regions of the skeleton of at least 13 Neanderthals. This is the set of remains
The most complete Neanderthal remains on the Iberian Peninsula. This group has contributed a wealth of data.
to the knowledge base of this species, such as the marks of cannibalism on the bones,
Neanderthal DNA and genetic links with other European individuals, inbreeding and low
Genetic diversity in this species, and its expression in congenital anomalies, hypoplasia due to
nutritional deficiencies, and the possible division of tasks by sex based on the distinction of stretch marks
as a consequence of using the mouth as a third hand. In the tartar particles on the tooth
In Adult 4, SD1604, remains of two non-nutrient plants have been found: yarrow (Aquilea),
which has anti-inflammatory properties, and chamomile, which facilitates digestion (Hardy, 2012).

Genetic traces of poplar, a natural source of [something], have also been found in the tartar of Adult 1. salicylic acid analgesic, as well as *Penicillium rubens,* a fungus with antibiotic properties (Weyrich, 2017).

Although it is difficult to say with certainty that the presence of these remains corresponds to a intentional ingestion of products for their medicinal properties, the multitude of documents ethnographic and the reinforcement provided by toothpick marks on the teeth of the community of El Sidrón, allow us to explore a very ancient origin of this behavior. However, the lack of The information makes it impossible to determine whether this treatment is self-medication or not. contribution of care by other colleagues. In addition, the difference between feeding and Medicine is not always entirely labeled.



Figure 36. Selection of Neanderthal fossils from El Sidrón.

The self-medication activity that has been documented among non-human primates is not entirely comparable, given that most studies in this field relate the Ingestion of plants or non-food products to combat or control intestinal parasites (Huffman, 2003; de Roode et al., 2013), although they may also be related to the relief of intestinal discomfort. In this regard, it is important to highlight the selection observations of the

same plants by humans and chimpanzees in response to similar symptoms of illness (Huffman et al., 1996). It is significant to highlight the existence of other health behaviors unique behaviors among chimpanzees, such as applying insects to the wounds of another individual (Mascaró et al., 2022). In any case, the use of plants with bitter flavors, warnings of potential toxicity indicates that hominins like the Neanderthals of El Sidrón would have a knowledge at least equal to that of present-day primates, but this should not be understood behavior in isolation, but rather in the context of their linguistic abilities and technological, it would probably be more complex and elaborate (Hardy et al., 2015).

Meanwhile, the human exploitation of medicinal plants in prehistory acquired a
The use of plants containing hallucinogenic substances played a notable role. In Pleistocene groups of
The use of hallucinogens and stimulants in the activity of hunter-gatherers has been documented.
hunting (for example, Rudgley, 1999), and there are several studies that explain certain reasons
artistic expressions of the Upper Paleolithic as a product of altered states of consciousness (for example,
Clottes and Lewis-Williams, 2001). Some authors even defend the role of these plants in the
Human evolution, as a trigger for brain changes resulting from a mutation
produced by the psychoactive components of certain species 2 Ma ago (McKenna, 1993,
mentioned by Guerra Doce, 2006).

The presence of ephedra in the Neanderthal burial at Shanidar 4 (#23) is intriguing, along with
with other plant species in their flowering season found next to the body, which has led to
It can be interpreted as a floral offering or the burial of a shaman (Solecki, 1975). It is necessary to
to pause and understand the details of this burial. On the one hand, the flowers depicted in the
Shanidar 4 pollen cannot be collected at the same time, at least under the conditions
modern. This contradicts the possibility that the flowers were collected to be deposited.
with the body; it seems more likely that animals like solitary bees gathered and nested,
depositing pollen in taxonomically mixed groups (Hunt et al., 2023). But Leroi-
Gourhan (1975) identified some of the pollen groups as immature grains, which opens the
need to explore more complex scenarios where, due to some motivation and/or mechanism,
They introduced immature flowers. There are several possibilities, such as the action of rodents.
(Sommer, 1999), that were in the intestinal contents of the animals consumed by the
individual, that he fed on those plants, or that other Neanderthals placed them underneath or
on top of the buried body.

The case of Can Tintorer (Spain) is also very interesting. It has been detected in the tartar of
Individual 10 from burial 28 consumed a medicinal plant, specifically...
opium poppy *(Papaver somniferum).* This subject is dated to the Neolithic period and has two
trepanations. It cannot be concluded whether poppy consumption occurred exclusively for one use.
therapeutic related to surgical practices, taking advantage of its sedative properties,
analgesics and narcotics, or as support for work-related occupational stress
intensive mining activity that it carried out. This continued mining activity has also been observed in
Another individual from the same group, number 4, also shows signs of consumption in his tartar.
of poppy. Since there were no pathologies in their bodies, Campillo (1986) initially ruled out the
therapeutic use and considers that the trepanations of individual 10 were ritualistic, but the works
later studies that identified the signs of intensive work (Villalba, 1999; Juan-Tresserras, 1999)
They raise the possibility of using plants for medicinal purposes.

However, the documentation to support the consumption of products with medicinal substances or
Psychoactive substances in Paleolithic populations are still very scarce, but there is no reason to
It is not reasonable to rule it out, as it seems logical that different human groups would have known its properties since
very ancient, and they began to exploit them for various uses, including therapeutic ones, the
social and magical. This knowledge would be reproduced by imitation (as in the case of the
non-human primates) and through cultural transmission. Later, the Neolithic period brought the cultivation of
cereals, but also the domestication of plants with other properties: fibers, spices,
Oils, hallucinogens, and medicines. In fact, certain forms emerged in some groups.
precursors of agriculture oriented towards experimenting with other types of vegetables (including some
with psychoactive properties such as poppy and hemp) rather than with cereals, since
They lived in favorable environments without problems meeting their subsistence needs through
hunting and gathering (Sherratt, 1997: 288).

Caring for children with illnesses

It is very difficult to distinguish between childcare and health care.
dedicated to infants with illnesses or disabilities. Several of the skills and techniques
employed to raise human children, who are highly dependent in themselves, overlap with the
used to care for children with health problems.

Additionally, some cases are unclear. For example, the child individual PN07 of the
The Neolithic community of Poulnabrone (Ireland) has a trisomy of chromosome 21 and constitutes the
The oldest evidence of a case of Down syndrome (Cassidy, 2020). It is assumed that it was an infant due
to its breast-based diet identified in the 15N isotopic signal. Although its features
Morphological features may have been distinctive, but it is not at all clear that this child was treated in a way that...
unique apart from the normal care of its upbringing.

Even within this difficulty, certain differences in the forms of care can be observed.
In parenting, childcare tends to follow certain predictable patterns, and its actions
They are usually associated with expectations of positive outcomes. In contrast, in healthcare,
The needs and condition of the care recipient are often variable and unpredictable, thus
such as the results of the support provided to the child. This also often leads to more situations
stress, even harm to the health of caregivers, and conditions affecting the community,
particularly when diseases spread among several individuals. Paradoxically,
It has been observed that communities that register high levels of infant mortality have
also a high fertility rate (Oxenham et al., 2008). These high rates of new births,
combined with their short lifespan, they add pressure on the community and impact the
actions and organization of the same in relation to health care.

The high dependency mentioned above is, in turn, an important point of discussion.
The perception of that dependence that we have in modern Western societies may differ
in two aspects regarding the reality that would exist in prehistory: firstly, problems or
injuries that do not significantly alter a child's normal modern life, but do
would condition their movements in situations demanding mobility; secondly,
The consideration of the status of *a child* is also linked to culture and, for the purposes of the
Regarding healthcare actions, we must discuss whether these can be differentiated across the broad spectrum
that period is childhood.

The first specific health care provided to infants is observed in the
Middle Paleolithic. In the difficult paleoecological context described in the section *Link between*
Care and human evolution of this thesis, it is explained that Neanderthal infants would grow up together
to the group through strong emotional bonds, feeling integrated and protected (Spikins, 2018). According to
As they developed, the children acquired certain roles to help the small group that, as
Any human being would alternate with games that develop skills. On the other hand,
The transmission of knowledge between generations became increasingly complex as they progressed

developing cognitive abilities, and this behavior was key to survival. All
This puzzle of emotions and behaviors that conditioned survival has its own meaning today.
reflection in the fossil record through certain very illustrative cases of care between adults
Neanderthals, and from burials rich in detail to infant individuals, which are not the subject of this
thesis, due to the lack of pathologies that can be interpreted as triggers for receiving care
specific. In contrast, *sapiens* children do show serious pathologies and signs of needing care.
Qafzeh 11 (case #11) and Qahzeh 12 (#12), from the Middle Paleolithic.

Man Bac Individual 9 (#58) lived about 4000 years ago in northern present-day Vietnam. M9
He was a man who died at 20-25 years old, and belonged to a small, sedentary group that lived
a riverine and coastal environment. Its economy was predominantly based on hunting and gathering.
combined with horticulture. Among the remains of food resources found, there are both aquatic and
as terrestrial, but there is no trace of rice consumption, although it has been found in other
sites in the Red River Delta. The body of M9 showed fusion of the C1-T3 vertebrae, fusion
of the sacroiliac joint, extreme bone atrophy, but no evidence of trauma or
infections. He suffered from acquired tetraplegia between the ages of 12 and 14, due to a complication
A congenital condition called Klippel-Feil syndrome. This case illustrates the strong impact on a community.
of a problem that a child suddenly suffers.

He was buried differently from the rest of the group members, in a flexed NS position.
while the normal position in the group was supine EO. Two vessels associated with the
burial. As identified clinical characteristics, M9 certainly had partial paralysis
of the upper trunk and complete paralysis of the lower trunk, torticollis and osteoporosis, very
He would probably suffer other symptoms related to his illness, such as a weakened immune system.
weakened, cardiovascular, gastrointestinal and respiratory dysfunctions, kidney failure and ulcers from
pressure, and possibly episodes of pain and depression. The functional impacts of their
Immobility was notable, due to the absolute inability to perform essential activities; likewise
In instrumental activities, he would be unable to perform any activity with
Physical demands. Survival for about 10 years with these problems stemming from his tetraplegia
This signifies a clear case of need for care.

The M9 care model would consist, on the one hand, of direct care actions
continuous and intensive (nursing), regular observation of their health status, care of their
hygiene (cleaning of waste, bathing, protection of the skin, etc.), their diet (perhaps
including the preparation of a special diet, occasionally or frequently), the maintenance of

their hydration and regulation of their body temperature, massage and postural positioning for to stimulate organic functions and prevent pressure ulcers, and the specific treatment of these when they appeared. On the other hand, the group would have to make an effort to involve the individual in social activity, and overcome the important psychological requirement of their care.

The interpretation of this case, with its long survival and the absence of infections and fractures, It reflects a skilled and intensive dedication to M9 by its group since the end of her childhood. M9 would need cooperation and flexibility to manage the *cost* of care and organize themselves around its provision. This adaptation and care towards M9 takes more relevance considering the health and nutrition stress indicators that the population suffered. The frequencies of cribra orbitalia and linear enamel hypoplasia are among the highest identified in the Neolithic of Southeast Asia (Oxenham and Domett, 2011). It is also high frequency of nonspecific periostitis in the upper and lower extremities of subadults (#59). Likewise, the oral health of the population was generally poor. These are manifestations of hematological pathological conditions and immune responses to infections, alterations of metabolic system and poor nutrition.

It is interesting that the M9 case is expressing a non-fatalistic philosophy in the community before an impossible cure, but with sustained care over many years, despite the The group experienced tensions regarding the health and nutrition of its members. Although there remains doubt as to whether these positive values would exist in all members, or in a part of them.

Finally, their burial maintains their inclusion in the group, but the unique characteristics They also suggest a certain recognition or respect for difference. On an individual level, it This can be interpreted as a strong desire to live and self-esteem on the part of M9, as well as their adaptability. and social commitment to cooperate with the care and integration actions that were receiving.

The case of Man Bac 9 demonstrates the validity of using Bioarchaeology of Care, and in particular stages 3 and 4 of their methodology, to obtain inferences related to health care in children. M9 began receiving care from late childhood, but these These actions are especially relevant for perinatal and infant children, stages in which rates of Morbidity and mortality were high, so the impact on the community would obviously be The situation was serious, and therefore a community-level response was to be expected. The case of Benjamina This is also clearly attested to. This girl lived between 9 and 14 years old during the Middle Pleistocene. in the Sima de los Huesos (Atapuerca, Spain). 430,000 years ago, Benjamina was born with a pathology

congenital condition called left unilateral lambdoid craniosynostosis, which is the least common of all variants of this disease: currently there is one case for every 200,000 births, and the surgery is performed before the third month to avoid developmental disorders. Her condition had probably a traumatic origin, due to a difficult twin pregnancy, lack of fluid amniotic sac, malposition of the fetus, a fall by the pregnant mother, or congenital torticollis. The parietal bone began to fuse with the occipital bone during the final stage of gestation, so that the The brain grew abnormally, causing skull deformation and the accumulation of Fluids in the brain, as indicated by the presence of irregular granules in the bone. The pressure The elevated intracranial pressure he suffered undoubtedly caused him significant psychomotor disorders. However, the group did not discard this disabled girl, but instead chose to protect and care for her.

Returning to Man Bac 9, in that case we looked not only at the clearly marked evidence in not only the preserved skeleton, but also the funerary context. It is crucial to look for signs demographic factors in bone samples that may be associated with certain behaviors or treatments given to children during their lifetime. Among these signs, we can also find some that clarify the distinction between health care and morbidity and normal child-rearing, such as the weaning and the introduction of other foods. But the preservation of the fossil remains of individuals Creating prehistoric children's books is very difficult, which makes it necessary to also resort to other materials archaeological evidence that may provide possible clues about the care of children with health problems.

The aim is to identify specific objects that would help the child to carry out a function. The child Tebo 1 (#29), with the amputated leg, could have been helped by some a device that would help him walk or move around on certain occasions. In other cases, the Caregivers could have used utensils to feed disabled children, or as primary orthopedic methods. An example of this latter use can be found in the Nazca Child. (#75), whose mummy preserved a stool-like device on which his body was sitting in a squatting position. It was likely the same device he used in life, such as part of the care motivated by Pott's disease and acute miliary tuberculosis that He suffered from it, and that he would be immobilized from the age of 1-2 years until he died at about 8 years old.

Finally, in interpreting community behaviors we cannot disregard certain motivations that might lead the community to decide to distribute its finite resources to prioritize care for some individuals over others, for example, to care for women pregnant women or newborns as a way to mitigate high infant mortality. At the extreme Conversely, we find it difficult to determine whether a premature death can be a consequence

of infanticide. Scrimshaw (1984) distinguishes a more active form of infanticide, which usually occurring at the time of birth or shortly thereafter, and another more passive one, which include different strategies of neglect, difficult to detect in the archaeological record.
Paradoxically, the high infant mortality rate among the 41 subadults of Man Bac (40 of (they died before the age of 8) has been associated with possible passive infanticide (Oxenham et al. al., 2008), ruling out epidemics that have not been observed in the bodies. Let us not forget that, In the care actions identified throughout the Bioarchaeology of Care method, there are an important and ongoing decision factor. Caring for sick children adds physical burdens and psychological support for caregivers regarding the already high demands of normal care associated with Therefore, in certain cases, the probabilities of obtaining results would be assessed against situations of maximum pressure with a well-known high infant mortality, assuming the burden emotional involvement in decisions to prioritize care towards certain individuals.

LIMITATIONS

In addition to the limitations that have been discussed in each of the cases and discussions In particular, a basic limitation for the study of the Bioarchaeology of Care is the information available from the past that is preserved to this day in order to carry out this analysis, materialized through a number of problems that are shared with the rest of the archaeological discipline:

The sample of skeletons that reaches the archaeological record is minimal, and has biases of conservation depending on the climate and environment of the geographical area.

Skeletons are never fully preserved, sometimes losing elements. skeletal key features to identify indicators of disease or injury.

- Bones are subject to alterations from scavenging activity, as well as from modern human activity (construction, agriculture…) and possible errors in tasks recovery of materials in archaeological work.

- There is a significant random component in the choice of sites to excavate, as well as in the of the effective excavation area at any given time.

- Not all skeletons that are recovered are adequately preserved for study osteological.

Given all of the above, it is difficult to reach a reasonable certainty that the data represents the population to which the subjects studied belong. Furthermore, only a portion of those who can They study present pathological lesions and, although each disease has clinical characteristics basic, it can present with different symptoms and signs in different people, in different rates of progression, and requiring different types of care over time. The experience Each individual's life cycle is unique, so two contemporary individuals who suffered the same The problem could have manifested different care experiences.

On the other hand, it is difficult to detect those cases of subjects who may have received care before their death during a certain period, but too short for the bones not to have an identifiable or conclusive healing/remodeling.

Additionally, there are cases of groups where the need to receive care is being analyzed. that a certain proportion of individuals would experience, but that alone does not prove that actually received them, but it is necessary to establish this assumption based on having of a sufficient sample size to reflect the cultural and social context of that group can explain the assumption of such behavior. As examples, we have the cases of the communities of Man Bac (#59), coastal communities of southern Brazil (#69), Carrier Mills (#72) and Libben (#76).

In any case, skeletal remains are not enough to understand pathologies and their treatment. received, but the soft tissues, which are the ones that mostly suffer, are not usually preserved. the effects of the disease. Although it is necessary to rely on ethnographic references from various To understand how a particular disease is managed in each culture, one must study different cultures. to document and acknowledge the limitations of its projection onto past societies.

An example that illustrates this limitation is the medical care that had to be provided in response to incidents during group adventure activities at the National Outdoor Leadership School among 2002 and 2005 (McIntosh et al., 2007). These experiences took place in natural settings wild people of Wyoming, Alaska, Arizona, Washington, Idaho, Mexico, Chile and the Territory of Yukon. The sample consists of 1,051 people with an average age of 22 years. Only 2% of The incidents would correspond to health problems that would have archaeological visibility in the fossil record. The appreciation of this type of injury in the Paleolithic is complemented by its

severity, given that severe fractures and cranial trauma predominate in the fossil record (Wu et al., 2011) while, frequently, more common and less serious pathologies pass unnoticed and, in these cases, are detected in subsequent re-studies of the same fossils, or either remain unidentified or they are left unidentified.

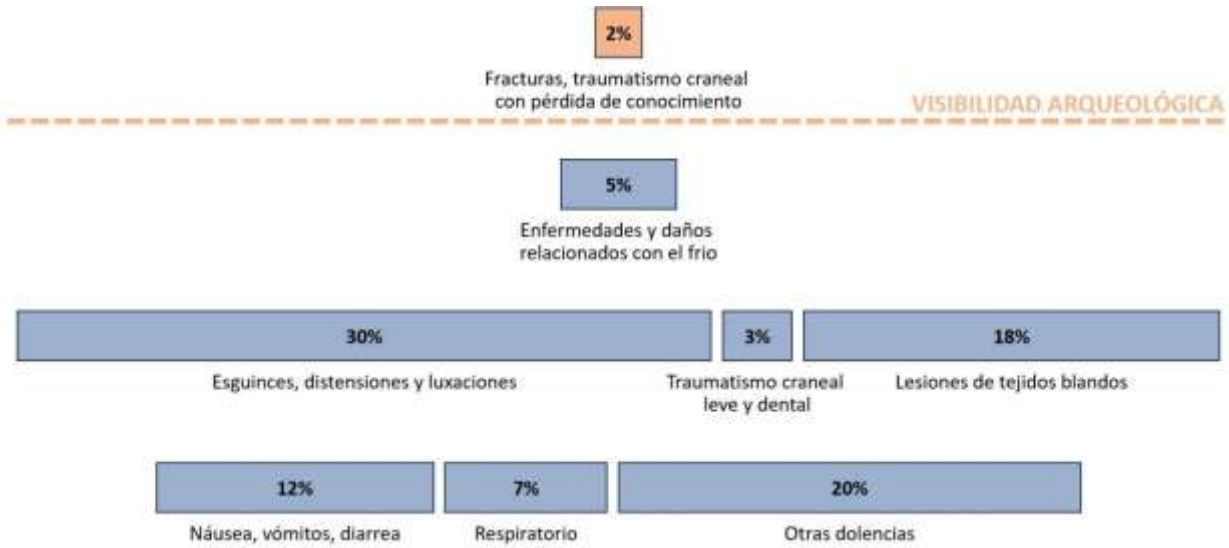


Figure 37. Types of health problems in wild natural environments and archaeological visibility that would correspond. Translated from Spikins et al. (2018) with data from (McIntosh et al., 2007)

In addition to the factors explained above, there are methodological and administrative difficulties: The analysis processes may vary between different lines and/or research teams. osteological, recording and reporting, or that there are problems or restrictions when it comes to the sharing and/or communication of results.

Finally, primary sources sometimes fail to analyze the potential clinical impacts or functional aspects of the signs of care found in the skeleton. This makes it difficult to be able to To standardize the application of criteria across different cases. Support from secondary sources. It limits the detail and potential accuracy of the interpretations.

11. RECOMMENDATIONS

Development of the Bioarchaeology of Care at the population level

In recent years, there has been an attempt to extend the Bioarchaeology of Care to a level
population, to try to understand the continuous flow of care to individuals who in any
society suffers from a variety of pathologies with varying degrees of severity and cure in a
at any given moment, as well as the social identities that these actions may suggest.

Population-level analysis is crucial to understanding the complexity of care delivery
in the past, and the experience and daily lives of the people who received them. In any case, there are
It should be noted that, with the limitations listed in the previous section, it is not clear that
Measuring the number of individuals who received care in a population is a decisive indicator.
From a high proportion of observations of possible care in a sample of skeletons not
It must be inferred that people in that population *took great care of themselves.* And, conversely, a lack of
Observations may conceal a provision of care to individuals before it occurred
skeletal changes.

Just as the study of care provision acquires its greatest value contribution when the
The focus extends from the "disease" level to the "person" level experiencing it, in a
The value of a group approach comes from scaling up the analysis from a specific management level of
The problem lies in the group's everyday adaptation to difference. Therefore, a discussion
The fundamental issue concerns the applicability of the Bioarchaeology of Care method for
populations and on the need to adjust it.

An example that we can again use for this reflection is the analysis of the population of Man
Bac (Oxenham and Willis, 2017) from the point of view of the care of the 41 subadult individuals
that are preserved (case #59). This group has a high incidence of dental hypoplasia, which
It suggests problematic maternal and neonatal health, and skeletal and dental problems.
nonspecific among almost all individuals under 8 years of age. Infant mortality had
Peak levels were observed in newborns, at 18 months, and at 4 years of age. The children received treatment.
special funerary, with unique objects according to age, as described in the Framework
reference to this document. Clearly, the subadults of Man Bac needed attention
healthcare, in many cases intensive, on the part of the community, whose adaptation is evident

due to the high infant morbidity, which would be particularly hard on the group's psychological health, and for their positive response to special funeral treatments.

Also of note is case #71 from the Barrett site community of the Late Archaic period American. In a group of 125 bodies, 8 show problems that would restrict their essential activities, and six of them would also have their instrumental tasks limited. This is evident. the need for community adaptation and the care provided for walking, carrying weight, facilitate recovery and rest, help with nutrition and manage the pain of those 8 individuals. However, there is no evidence that their reduced mobility created an identity or influenced extraordinary characteristics of their burials, which have no factors differences compared to others, which suggests an inclusive connotation in behavior of the community.

Simpson (2022) analyzes the communities of the Mulberry Creek site (#70), which existed in Alabama (USA) in the Middle Archaic (8-5 ka) and Late Archaic (5-3 ka) periods. Considering the nomadic nature of the communities that occupied the place, applying the Bioarchaeology of Care identifies 16 possible cases of care in the form of adaptation, manifested by problems (fractures, osteoarthritis, osteomas, infections, etc.) that They impaired the mobility of those people of both sexes, and 7 of them also required support. Direct. All were adults, except for one teenager. Three individuals stand out due to the severity of their cases. Injuries that demonstrate the need for care, while also showing episodes of violence close to their death. In 2 of them (burials 8 and 135), the violence would be explained by the a possible incursion by an outside group that would take advantage of these individuals' weakness. But in The third (burial 12), the manifestations of an infection (acute osteomyelitis or perhaps treponemal infection) spread through different postcranial regions, and the multiple damages by Fractures, possibly associated with a large fall, express the care this individual received. She would receive this care for a long time until her death. However, at the end of her life, this care was no longer available. would not relieve their pain or slow the progression of their systemic infection, so, considering Ethnographic sources of Native Americans suggest that *perimortem* violence in this The individual would have been an assisted death.

Another case analyzed in this thesis (#78) is that of the individuals from Achanchi (Peru), belonging to The Chanka society, which had a notable warlike component in its daily life. However, the The treatment of numerous injuries and survival after trepanations indicates that care They were also uniquely present in the social organization of this community.

These recent cases raise a debate about an interesting point of connection between care and
Violence. On the one hand, evidence of violence in a community should not preclude analysis
of the potentially existing care behaviors within it. They are not
mutually exclusive behaviors, and in fact, both are likely to be present.
Another is the assistance or participation in the death of another individual with a benevolent intention (death
pious, assisted death by one's own will, euthanasia), indicates that direct violence is not always
It must be associated with a belligerent intention; rather, there may be cases where it represents a
care action. Consequently, the communities that have reported violent episodes must
to be a particular focus of study for the identification and characterization of care that
existed within them. The relationship between war, violence, and care requires a
a more in-depth analysis that exceeds the scope of this thesis, but it is necessary to note that the approach of
An approach to this study cannot ignore a key component that, however, in the
This research has indeed defined the concepts of care and compassion: the motivation of
The agent who performs the action. Often there is insufficient data to pursue this approach.
of analysis; however, the periodic review of cases studied decades ago, and their comparison
With the findings from more recently published work, you can enrich the database of
knowledge on which this argument is based.

A clear example is the Neanderthal population of Krapina (Croatia) and its hundreds of remains found
in a fragmentary manner, corresponding to at least 25 individuals. This collection was initially
interpreted as possible examples of interpersonal violence. Subsequent studies (Estabrook and
Frayer, 2014) compare the proportion of traumatic injury marks with that observed in the
Pleistocene hominin record, but we still don't understand how such a large number accumulated
large number of specimens and the reasons for their fragmentary state. New approaches are needed.
groups with other hominin groups, such as those from the Sima de los Huesos in Atapuerca
(Spain) and El Sidrón (Spain). These three groups can contribute with donations.
interesting to the study of care, as has been pointed out throughout this work.



Figure 38. Pelvis-1 from Sima de los Huesos (Atapuerca, Spain), one of the three specimens with evidence of care by his contemporary group from Sima de los Huesos. In this case, It belonged to a subject who lived more than 45 years and for a considerable time suffered from spondylolisthesis and lumbar kyphosis, with postural problems, pain and restrictions in their daily physical activities.

In conclusion, from the study of care cases in populations in this thesis, no observation is made no need for relevant adjustments to the Bioarchaeology of Care method to use it at the population level (nor for the study of children). Rather, it proposes future Approaches should delve deeper into the correlation of different individual cases within the same group or a close sociocultural context.

In this sense, the database on which this thesis is based includes three types of case studies for population-based analysis:

1) Record of an individual who, belonging to a group where there are different cases of health care is unique in terms of the characteristics of the care received (for example, the M9 of the Man Bac community).

2) Record of a collective case where a majority number of
common characteristics in the care that several members of the group would receive
(for example, the Man Bac subadult group).

3) Several individual records of independent cases that, despite belonging to a
contemporary community, no common factors in the characteristics have been documented
of the care received that demonstrates, by itself, a group behavior (by
for example, Sima de los Huesos or Shanidar).

Therefore, I believe it is necessary to continue the development of the Bioarchaeology of Care with a population-based and individual approach, without it making sense to separate both perspectives of methodological form. However, the extension of this method to both individual and collective cases Population-based research would have the benefit of, on the one hand, continuing to test and refine it and, on the other hand, Enrich a global database with quantitative and qualitative care indicators such as foundations for generating broader comparisons and discussions, both about new fossils and based on previous studies.

As an example, at the level of individual analysis, the skeleton of Tebo 1 is a clear candidate for a more comprehensive examination of the care needs of this Borneo subject with an amputated leg, as a continuation of the initial report published (Maloney et al., 2022).

A new subject would be the one recently announced (Tomé, 2023, in press) in relation to the skeleton of a pre-colonial adolescent in Toca do Olho d'Água das Andorinhas, in the central-eastern region of Brazil. That individual had a severe form of spina bifida, a birth defect Congenital condition that arises during early fetal development. Despite their disability, which perhaps It would prevent her from walking; the girl survived into adolescence, which would necessarily indicate the provision of care by their community. In addition, two objects appear to be associated with His burial: a tapir skull and a bracelet made with about 1000 beads, possibly from seeds. This individual is another obvious candidate to be explained under the prism of the Bioarchaeology of Care.

At the population level, it is suggested to evaluate the groups where more than one case has been documented with care received, such as the Sima de los Huesos, with the cases of skull 14, Benjamina, the pelvis 1, Elvis, and skull 5, Miguelón; additionally, Neanderthal groups such as those of Krapina and El Sidrón could make essential contributions to research in the Bioarchaeology of Care with a population focus.

For all of this, prior work is needed to standardize the evaluation criteria of each of the fossils and the adaptations that their communities carried out to perform care actions. In this thesis, the foundations for the construction of a catalog of care in prehistory with homogeneous criteria based on nine variables (ICV01… ICV09) that generate a Care Indicator (CI) and six more variables (ICV10…ICV15) that allow the results to be segmented according to different axes. These will be able to to serve to delve deeper into approaches regarding equality of access to care by sex, age ranges, social classes, type or size of settlement, etc. For example, in this thesis The distinction found by age stands out, with a significantly higher CI in the case of the 16 cases of subadult individuals in the sample.

The database resulting from this thesis is made available to the scientific community, for enrich it with new records and as a reference for reviewing other published cases, whether or not they are described under the methodology of Bioarchaeology of Care.

Following the discussions established in this thesis, each element does not necessarily have to correspond to not an individual subject, but a group of subjects, when they meet certain characteristics common care needs (e.g., an epidemic, a catastrophic event, a single mortality event) motivated by a war episode, etc.) that must be sought in their archaeological contexts (remains bone and cultural) and environmental.

Awareness and social utility of the Bioarchaeology of Care

The origin and evolution of care among humans in prehistory is a topic that sparks an enormous curiosity, due to the universality of these experiences and the nuances they bring social and cultural context of each community. Therefore, there is a need to disseminate these discoveries among the scientific community and the general public, and to promote a debate enriching. However, it is possible that from the bubble of paleoanthropology and the In archaeology, we may not be fully aware of several misconceptions held by the general public, sometimes even from other colleagues, whom we must eradicate through our research work, but also by dedicating sufficient time to outreach. Along these lines, I summarize below. the results of a series of 42 initiatives carried out over 4 years, between 2019 and 2023.

Book *Human Evolution: Prehistory and Origin of Compassion* (Almuzara, 2019)	1
Lectures in public forums (3 at the National Museum of Natural Sciences, 1 at the National School of Anthropology and History of Mexico, 1 at the Demos Forum, 3 at local corporations)	8
Interview on Spanish public television	1
Interview on Spanish public radio	4
Interview on private Spanish radio stations	3
Press interviews	3
Podcast collaborations: Spain, USA, Argentina, Ecuador, Venezuela	14
Blog posts about the Bioarchaeology of Care	5
Compassionate Leadership training sessions for private companies	3

Table 12: 42 outreach and training initiatives in the Bioarchaeology of Care between 2019-2023.

These initiatives are based on evolutionary, bioarchaeological, and anthropological research that They delve into the deep roots of care in prehistory. Their main objective is to put these findings accessible to the general public. Their impacts can be articulated around five key lessons learned, which I presented at the *European Association* Annual Meeting *of Archaeologists* (Belfast, September 2023).

1) What is care? Let's define the concept:

To begin with, a recurring topic of discussion is clearly defining the concept of care. But does it have Does it make sense to limit it, or rather, not to limit it too much? That is, is the limiting the same for all the Does this mean that societies around the world, or the nuances of each society, necessitate a specific way of defining boundaries?

We are always striving to learn more about the peoples who came before us, to better understand their lives, their history, and how that history affects and shapes the lives that Those of us who live today. The provision of care is an inherent part of all cultures.

But the processes and experience related to the provision of care vary today depending on the time, geography, and culture, and this also happened in the past.

Care begins with the understanding that a population and its individuals have about the health problems they experience, including their beliefs about the causes of their illness. We don't need to go back to prehistory to see how a disease like COVID-19, which has affected without exception all human communities on the planet, is understood, assumed, and even treated in such different ways even among societies with similar cultures.

If this has happened (and is happening) with a global understanding of science, we can imagine that in In the past, the diversity of understanding and methods of attempting to heal would be vast. diseases and injuries, within the universality of the concept of care that all possess human societies.

If in the recent past, in some societies certain disorders were still associated with supernatural events, as we delve deeper into prehistory, with a knowledge extremely limited in medicine, indistinguishable from other fields such as magic, and in some economies With far more limited resources, it is a great challenge to try to understand the motivations and the decision factors that motivated those human groups to care for disabled individuals.

2) Care and human evolution:

The origins of human care are closely linked to the development of behaviors that we consider emblematically human: in particular, our willingness to cooperate for a greater good and our social organizing skills. The capacity (and the will) to lend Health-related care likely played a crucial role in the success of the species that preceded us. However, among the general public, the image of relationships Among humans in past periods, it frequently succumbed to prejudices about behaviors primitive or gender-dependent and with violence, which overshadow the meaning of the health care and compassion in prehistory.

To take a closer look, more than a century after Marcellin Boule's misinterpretation of the The Neanderthal of La Chapelle-aux-Saints-1, in reality many people still see that species as much more archaic than the geological age of its remains indicates, when in

In reality, the evolution of *Homo neanderthalensis* in Eurasia occurred practically in parallel with that of our species *Homo sapiens* in Africa, and they hybridized on numerous occasions.
Some even still dismiss the use of the term "human" when referring to
Neanderthals; however, since we crossed paths with them and, as a consequence, all the
Modern humans have a Neanderthal trace in our genome; it would be hard to believe that *Homo*
Homo sapiens may have hybridized with another animal considered "non-human". In any case, in the
The concept of "caveman man" implicitly implies less distance from the group of apes.
than with modern humans, as Boule also argued. Unfortunately, this image reinforces
Furthermore, another very common misconception is that evolution is perceived as a progression.
linear towards the *improvement* of a species.

Therefore, understanding past experiences of disability and care calls into question
such perceptions and can help inform the values and behaviors of today's society.
And we find evidence of care in all stages of prehistory, from the Paleolithic period onwards.
Lower, middle, and upper Neolithic periods, the Mesolithic period, and up to the appearance of metals. And we must
It is worth noting that this behavior is found in at least four human species, including
Homo erectus, pre-Neanderthals (or sometimes understood as *Homo heidelbergensis), Homo*
neanderthalensis and *Homo sapiens.*

From the perspective of dissemination, we must continue working to eliminate the interpretation of man.
caveman. Paradoxically, one of the subjects who most helped to create that image (the Neanderthal)
La Chapelle-aux-Saints-1) was actually a great example of a prehistoric human with
significant health problems that would lead his group to take care of him.

3) Care and violence:

A recurring question I often receive combines acts of compassion and...
of violence, trying to understand why such antagonistic behaviors often come together in the
fossil record. This is what the popular perception of the past as a place of nature is all about.
relentless in the fight for survival, full of "fangs and claws in red" *(nature red in*
tooth and claw, expression quoted by Alfred Lord Tennyson, *In Memoriam AHH,* 1850).

The answer we need to explore is not as simple and immediate as linking the origin of the
Violence in our nature as extremely social primates, or in social and cultural change

of the Neolithic. Such a radical distinction can sometimes be obscuring a gray area where both behaviors become mixed.

A very illustrative case of both behaviors combined occurred between 5-3 ka ago in the Mulberry Creek community in Alabama (USA). This document has already described a individual from that group (#70) who showed signs of *perimortem violence,* who These would correspond to assisted dying. This is an example of how assistance or participation The death of another individual with a benevolent intention challenges the conventional association of the direct violence purely with a belligerent intent. In contrast, this record underlines the the possibility that such actions could represent expressions of care. Furthermore, care It becomes an expression of compassion when one considers the underlying motivation of care agent, a factor whose importance is also shared by the concept of violence.

Therefore, the care did not *end* at a certain point, as is often suggested to me in various debate forums, a moment when the light of humanity seemed to go out and the of the war. No phenomenon in the development of the behaviors that characterize the Human evolution happens in this way, and caregiving is no exception. Instead, We must understand them in the context of the emergence of new behaviors derived from the profound transformations in the foundations of the economic and social model. On the surface, these These changes obscured the importance of care as a contribution to the development of societies. However, paradoxically, the emergence of violence and war with a Extensive emphasized the need for such care (see, for example, cases #47, #70, #73, #78). In fact, the Sima de los Huesos pre-Neanderthal group, which has three individuals in the sample (#4, #5, #6), also includes the first documented case of a murder in prehistory, occurring 430 ka ago (Sala et al., 2015). Skull 17 belonged to an individual between 15 and 20 years old, who suffered two fractures in the frontal bone above the left orbit. The blows were made with the same object in two different impacts and with different trajectories. The fractures did not heal and were the cause of his death. This incident has the characteristics of interpersonal violence frequently recorded in the field of forensic anthropology. That The fact that both fractures are identical rules out an accident, since in a fall it is unlikely that one would cause an accident. Traumatic injury caused by the same object twice at two different angles. The study of this subject It indicates that another hominin, probably right-handed, struck him twice on the side with a hard object. left side of the face with the intention of assaulting him. Consequently, this subject exemplifies the context of aggression that characterizes certain behaviors of social mammals, where Humans are no exception.

This shows that the attitude (the ability) to care remained at the root of the package *of human* that began to take shape more than 1.5 million years ago, and re-emerges (is employed) in response to need motivated by a belligerent context due to territorial or economic conflicts, as well as in the face of Natural disasters. These events are merely the cause of a consequence that generates a problem. for health. In some individuals, the decision path followed by their group (see Theoretical Framework) It concluded with a lack of help for her health problem. This is the kind of behavior we see from notably among present-day non-human primates, who also do not follow a decision path as defined, and would occur in a multitude of human subjects that have not been preserved in the fossil record. What this work highlights is the list of cases of humans who did receive care, which are becoming increasingly abundant, with more complex actions as time goes on. These actions initially have an occasional character and subsequently become structural, when the Human societies began to have stable technical means at their disposal. At this point, Lists of humans cared for obviously become countless, towards the end of time prehistoric.

4) Inspiration for a more compassionate society:

How can we leverage the past debate on care to shape values? and behaviors in today's society? Let's explore the reflections that arose during two I gave public lectures on this topic.

In December 2021 I was invited to the Demos Forum, the convention where all the Spanish foundations to promote the development of civil society. In my presentation and in the In subsequent discussion we concluded that care in the past has a strong link with the origin of philanthropy, understood as the tendency to seek the good of people in a selfless, even at the expense of self-interest. Undoubtedly, this is a driving force we recognize. its benefit both for the other people who receive its effect, and for the caring agent.

In May 2023 I introduced the main lines of this thesis at the National Museum of Natural Sciences. Here, I was thanked for my efforts in spreading the understanding that the Care is just one more behavior in the complex cognitive network that different human groups share. Human behaviors in these areas developed in different geographical locations and at different paces. Evolution is neither linear nor simple. We must focus not on trying to explain the evolution in a simple way, but to explain the complexity of evolution in a simple way.

ıis is best understood by telling the story of those who starred in it.

Past caregiving experiences. One of my outreach tools is the blog.

Nutcracker Man (https://nutcrackerman.com). I published the article *"Romito"* there in May 2023.

2: a case of dwarfism in the Upper Paleolithic studied with the Bioarchaeology of Care, and

Their results far exceeded the average interactions I receive on the rest of *my posts.*

Views	13,637 3.6 times the average number of visits in June-23
I like	139
Shared 28	
Comments 7	
Selection of comments	*The other day, while reading this article by Nutcrackerman, I almost started to cry.* *Evidence of empathy in the Upper Paleolithic, the group's ability to accept and include difference; despite all that this entailed in a subsistence economy*
	It is difficult to imagine what it must have been like to share life with a "neighbor" like the one described in the context of the Paleolithic.
	It's fascinating what you can infer from bones and all the secrets that are revealed despite happening in such ancient times. *remote*
	Interesting extended standard nurturing practices in children
	Care within family groups has always been important.

Table 13: Results (as of July 30, 2023) of the blog post *Romito 2: a case of dwarfism in the Upper Paleolithic studied with the Bioarchaeology of Care*

In July 2023 I published a new article explaining the high levels of morbidity and mortality among children in a Neolithic community located in northern Vietnam about 4000 years (Oxenham and Willis, 2017). The article focuses particularly on individual 9, who She lived with quadriplegia from age 12-14 until her death at age 20-25 (Tilley, 2015). Once again, The results exceeded the average interactions of other *posts.*

Views	8,301 total 2.2 times the average number of visits in June 2023
I like	105
Shared 33	
Comments 2	
	Wonderful post, it reaffirms my belief that we are capable of both the best and the worst. It's impressive, and I'm saving it, as always, for my students. It's great for breaking down the stereotypes they still have about men and women from Prehistory.
	As a nurse, I have always been struck by the evidence of complex care in prehistory as a phenomenon that differentiates us as humans from other species.

Table 14: Results (as of July 30, 2023) of the blog post *Childcare in prehistory: the Man Bac population*

Finally, other results from my oral presentations abound in similar reflections.
In particular, they all share a deeper appreciation of the universality of this type of experiences, supported by documented cases spanning all eras and diverse geographies, and which accompany human development. The interest of teachers in integrating is noteworthy. this topic in their teaching materials and study plans.

We can conclude that, in the context of the rise in popularity of archaeology and paleoanthropology in recent years, thanks to digital media and globalization Knowledge, bioarchaeological studies revealing evidence of care have attracted the media attention and public interest, indicating a strong desire to Learn more.

5) A transdisciplinary approach to comprehensive knowledge

Essentially, evidence of care between humans is found in bones, in a way that that we are tempted to think that the study of bones and their cultural context is the

responsibility of anthropologists and archaeologists. However, delving into the complexities of the Human care in the past reveals a multifaceted process. For care between humans If it had taken place in the past, there had to have been a perception of a need, the caregivers Potentials had to be willing and able to provide direct help and/or adapt, and the The individual in need of care had to accept and allow the intervention of the various actions.

These factors allowed care experiences to be initiated and maintained throughout the time, which makes each case unique, and requires a collaborative effort with the early involvement of various scientific fields, such as archaeology, biology, and osteology, paleopathology, cognitive, forensic, social and cultural anthropology, among others. Furthermore, knowledge of disciplines that go beyond archaeology and paleontology, such as clinical medicine, the Nursing, philosophy, sociology, and psychology. Adapting to the demands and limitations Within the field of archaeology, these diverse disciplines contribute crucially to developing a comprehensive view of the intricacies of past care experiences.

In 2022 I proposed to Lorna Tilley the idea of creating a research group on Bioarchaeology about Care in Spanish. The idea arose from the recognition of a large gap in discussion within the Spanish-speaking scientific community. Several challenges explain this gap, including the the reluctance of some scientists to include this line of analysis in the research archaeological, and the difficulties of discussing such a complex topic in English in certain forums Spanish-language local businesses, which are key to quickly and efficiently launching the first steps in the investigation.

With Tilley's support, I took the initiative to announce the creation of this group in *Nutcracker Man* and its objectives:

1.	To raise awareness and disseminate information among the Spanish-speaking scientific community about the methodology of Bioarchaeology of Care and about the subjects studied with it
2.	Promote the identification of new case studies, and their review under this method of previous cases
3.	To help define what care requires, including its approach as a moral attitude and conduct, as well as its proto-moral precedents

4.	Organize conferences and discussion forums on the subject
5.	Disseminate and facilitate materials, presentations and bibliography
6.	To help spread the Bioarchaeology of Care among the general Spanish-speaking public

Table 15: Objectives of the Bioarchaeology of Care Research Group in Spanish.

The response was immediate and positive, with six more people immediately offering their services. Join him. Halfway through the course, we published a blog post on *Nutcracker Man* summarizing our activity, as a result of which a new member joined the group.

As of the date of this document, the eight members of the group have contributed eleven related works with the Bioarchaeology of Care from four different domains, including anthropology, archaeology, philosophy and education, providing the group with the necessary transdisciplinary vision. In addition, three other experts in specific subjects have collaborated with the group.

During the first year of existence, we have consistently held monthly meetings monographs on different topics:

1	Definition of concepts (care, help, compassion…) and scope of study
2	Individual case studies that mark the clearest origins of the provision of care between humans
3.	Discussion on types of pathologies that express potential care needs, and degree of real need for care involved in them
4	Possible causes of the origin of this behavior: recurrence, habit, social pressure, regulations…
5	Reflection on care needs and/or displays of attachment; bonding with the decision-making capacity
6	The health care of children; differential aspects compared to other practices more ordinary parenting
7.	Association of social relationships with the development of cognition and language

8	Relationship with empathy; evolution of different types of empathy
9	Precursor forms of this type of behavior in other animals
10	First publishing project as a group

Table 16: Topics discussed in the Bioarchaeology of Care Research Group in [language] Spanish (as of July 2023).

In conclusion, to help manage the uncertainty that exists in all regions of the planet, There is a need to strengthen trust in people. Learn the lessons of the past about Caring between humans is a process that undoubtedly generates trust, bonds, and cooperation. Since the *Homo* genus evolved, cooperation has always been and continues to be essential for solving the complex problems that humans face.
Careful, cooperation and compassionate action can be the mortar, so needed today, to help revitalize the collective and the focus on the good of communities and individuals, which are not different, but rather feed off each other.

As scientists, we have a dual responsibility: to communicate scientific knowledge, and to recount the lessons we learn from it, ensuring that they are correctly understood and that become integrated into the core of general knowledge and into the training of individuals.

Furthermore, care and compassion are increasingly valuable and appreciated skills in the communities and their social structures, extending their influence to activities business, as demonstrated by the growing presence of the concept of "compassionate leadership" in business literature and in the training programs that companies offer to their managers and employees.

12. GLOSSARY OF TERMS

Bioarchaeology

A discipline that provides information about the lifestyles of human populations based on
From the study of bone and dental remains, tissues that record lived experiences.
Bioarchaeological study provides key evidence for understanding problems of
Knowledge of the past such as work and subsistence, health and disease, diet
and nutrition, sedentary lifestyle, intergroup contact, social conflict, and the adoption of cultivated plants
and the domestication of animals, etc. (Fabra, 2020).

Osteobiography

Originally, it referred to the compilation of all available information from the
Analysis of a skeleton that makes it possible to narrate the life of an individual (Saul, 1972). Currently, it is
has consolidated itself as a specific framework for analysis within a humanistic bioarchaeology, which
It promotes the study of biography as a cultural narrative based on human remains.
(Robb, 2002).

Paleoanthropology

Study of the origins and evolution of the human lineage and its fossil record, and of the relationships
phylogenetic relationships between different species, from the first bipedal hominins to humans
modern organisms, spanning a period of approximately seven million years of evolution. The research
Paleoanthropology addresses physical, behavioral, and cultural perspectives, and has close links
with other disciplines such as archaeology, paleontology, geology, paleoecology, the
biology, genomics, and primatology. It is also known as human paleontology.

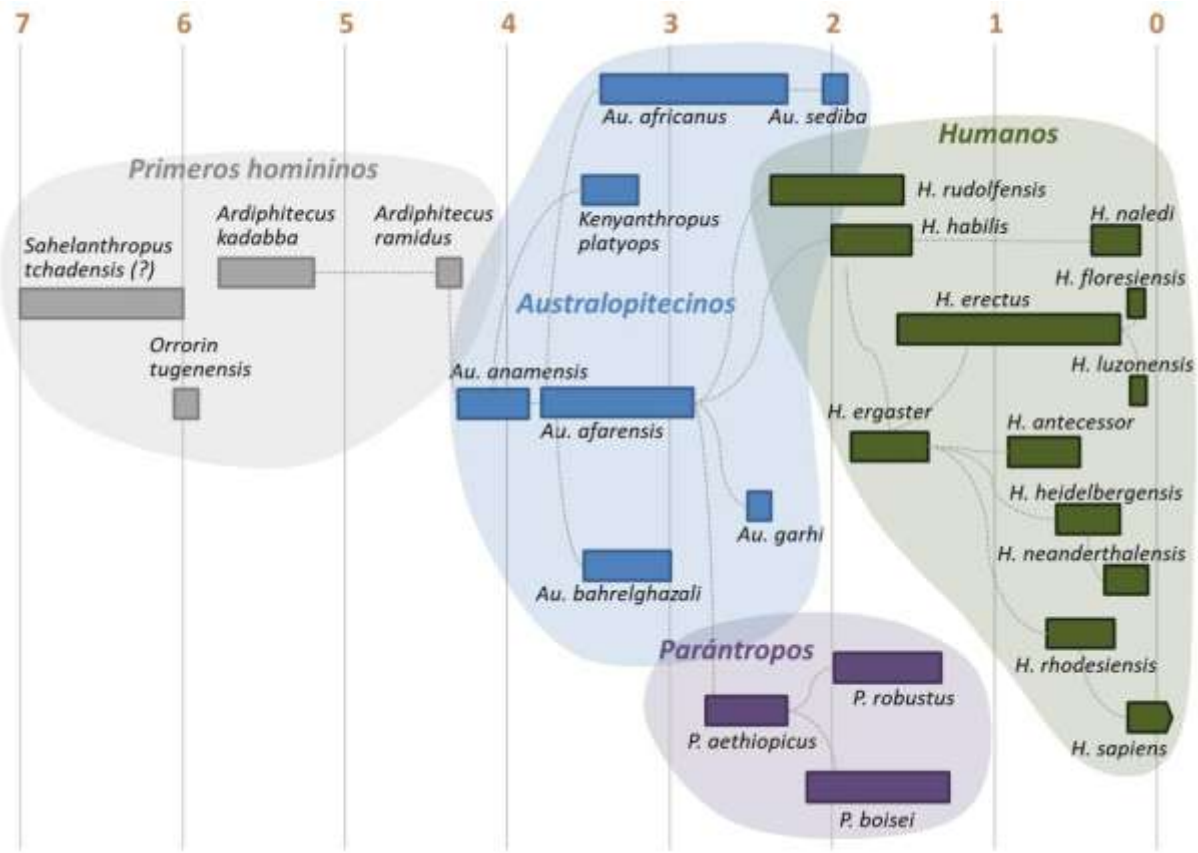


Figure 39. Human phylogenetic tree.

Paleopathology

Science that studies the traces left by disease in living beings, known through the study of their fossilized or mummified remains (RAE). These diseases are analyzed through from the analysis of the traces found in the bones, organic remains and surrounding areas where they are located These remains. Paleopathological investigations are interdisciplinary, articulating contributions from medicine, biology, archaeology and anthropology, among others.

Health

State in which the organic being normally performs all its functions (RAE). For its part, the WHO defines health as a state of complete physical, mental and social well-being, and not merely the Absence of ailments or diseases. However, this definition is questioned because, taken Strictly speaking, it could be interpreted that almost no one has been truly healthy in

at some point (as well as those with a chronic disability, the elderly...). Nor
It addresses the cultural nature of health; for example, Australian Aborigines define
Traditionally, health has been understood in terms of the social, emotional, spiritual, and cultural well-being of all the community, a holistic vision that includes a cyclical concept of life-death-life (National Health and Medical Research Council of Australia, 1996).

Disease

Alteration or deviation from the physiological state in one or more parts of the body, due to causes in generally known, manifested by characteristic symptoms and signs, and whose evolution is more or less predictable (WHO).

State produced in a living being by the alteration (slight or severe) of the normal functioning of a organism or some of its parts due to an internal or external cause (adapted from the RAE).

Disability

Situation of a person who, due to their physical, sensory, intellectual or mental conditions lasting, encounters difficulties for their participation and social inclusion (RAE).

A temporary or long-term condition resulting from a deficiency in body function or structure associated with activity limitations or participation restrictions. Both the individual and The community gives meaning to this state in relation to the ways of life in which it is experienced (Tilley, 2015).

Disability differs from physical impairment, the latter referring to a medical condition. direct and its resulting physical limitations, while disability implies a condition complex social that results from the interaction between an individual and a specific cultural context.

Emotion

Regulatory response to external stimuli. In short, much of the scientific literature It considers emotion as a unique response to a discrete stimulus. In the context of the

Bioarchaeology of Care: Many emotional situations are complex, and the initial response in them it can be a succession of emotions (love, compassion, anguish, despair, sadness, panic, tenderness, etc.). Additionally, emotions regulate the individual's relationship with their context, and they represent a motivational system that influences perception, cognition, and Creativity. In this sense, emotions influence the way an individual provides care.

Empathy

Ability to know, feel or identify with a particular emotional experience of another. In certain situations, there is explicit communication of emotion (for example, through the speech or touch) as an empathic response (Omdahl, 1995); in them, empathy would be not only in the capacity to know, but also to respond and, therefore, the product of the evaluation cognitive processing of emotional signals.

Emotional empathy and cognitive empathy

Emotional empathy is a behavior selected in evolution to function in conditions in which empathy is required for the circumstances of close relatives, the Reciprocal loyalists and group members; cognitive empathy is a strategy that is part of of negotiating one's own path in the complex social world of humans (Smith, 2006).

Both types of empathy are complementary, and their integration produces a healthy mental state. that allows for the most adaptive and least costly responses to situations that require action.

Altruism

Concern for alleviating another's distress or contributing to their well-being, which is triggered (at least partially) by the capacity to empathize, which allows one to recognize the need to intervene.

Compassion

A feeling that arises when witnessing the suffering of another and motivates the subsequent desire to help. to alleviate it. It is often related to other concepts such as moral decency, correctness, and kindness. and sympathy (understood as affective inclination).

(Health) care

Assistance to an individual experiencing a short, medium, or long-term disability such as resulting from a pathology (Tilley, 2015). This disability does not need to be severe or prolonged for care to occur.

This definition disconnects care from the caregiver's motivation, thus separating it from the concept of compassion.

Care provision

A set of actions provided to a person who has survived or recovered from a pathology, which has probably caused a disability that significantly affects aspects of their physical, psychological and/or behavioral functioning capacity (Tilley, 2015).

Types of care provision

Direct help or support: carrying out actions related to hygiene maintenance, nursing, physiotherapy, supply, mobility, etc.

Accommodation or adaptation: adoption of strategies that allow or facilitate a level of participation in cultural, social or economic activities that would not otherwise have occurred reached.

Agent in the provision of care

Agency is not the action that is observed, nor the result of this action, but the quality socially significant action (Moore, 2000). Applied to the context of Bioarchaeology

In the context of care, the agency is neither the care provided nor the evidence of the outcomes of care. but rather refers to the conscious intention that drives the decision to start and maintain the care and determines what type of care was provided. In addition, the agency is conceptualized as a continuous and flexible flow of behavior. The nature of any healthcare susceptible to archaeological inference is rarely limited to a single act or comprises a course of predictable action. It is often observed that caregivers' practices are reconfigured to respond to changes in health status (Tilley, 2015).

Care model

Model of health care provided, based on requirements related to the health associated with the clinical and functional outcomes of the individual's disease, in the probability that the individual needed and received care, based on what is known about context of lifestyles, and estimation of the duration of care and costs involved that they would have.

Care Index

Online tool created by Tilley and Cameron (2014) to help researchers to to reflect through the Bioarchaeology of Care. It provides tools to have in It takes into account the relevant biological and archaeological variables, articulating key concepts such as disability, care and agents, facilitate the organization and analysis of evidence, and help to to achieve rigor and transparency throughout the research process. It contains four steps that These correspond to the stages of the Bioarchaeology of Care. It is not prescriptive: most of its components are open, most of the information sought is qualitative, most The incoming data is in text format, and reflection is encouraged. It is a flexible mechanism. in which different steps or tools can be applied according to the needs of the study of each individual case.

Individual identity

It is defined in terms of the internally and socially constructed self-image, as a result from their unique experience with their environment. It includes biological, behavioral and social factors whose combination is different in each person.

Personality

It refers to the condition or state of being a person, as understood in a specific context, with special significance regarding the agents who are related to it (Fowler and Kam, 2007).

Moral conscience

The ability of an individual to analyze their own actions, to dissect an action and judge it as right or wrong in a prescriptive sense; moral conscience presupposes conscience psychological tendency to revisit one's own actions or anticipate them (Romero, 2022).

Human

In paleoanthropology, all species of the genus *Homo* (which means "Man") are considered human: *Homo habilis, Homo erectus, Homo neanderthalensis, Homo sapiens,* etc., although some authors They usually reserve the term "human" exclusively for modern humans *(Homo sapiens).*

Homo erectus

A hominin species that lived between 2 million and 140,000 years ago, and is considered the first representative of the genus *Homo* to leave Africa and spread across Eurasia.
It was characterized by having an elongated and low skull, with a cranial capacity between 700 and 1200 cc, A sloping forehead, prominent eyebrows, a jaw without a chin, and small teeth.
The body was tall, with long, proportionate limbs, adapted to efficient bipedalism.
He was already capable of long-distance walking. His body was muscular and robust, with a broad chest. He had a complex behavior, which included the use of stone tools, the control of fire, the cooperative hunting and the care of the sick.

Homo erectus originated in Africa from a common ancestral population with *Homo habilis.*
The oldest *Homo erectus* fossil was found in Drimolen (South Africa), and is 100,000 years old. between 1.95 and 2.04 million years ago. African *Homo erectus* evolved for more than one million years, giving rise to diverse forms that cannot be explained solely by the

sexual dimorphism. The oldest known hominin fossils outside of Africa were found in Dmanisi (Georgia), dated to about 1.8 million years ago.

Some groups of *Homo* erectus also expanded into Asia, where they adapted to different environments and climates, reaching as far as Southeast Asia. This species became extinct about 108,000 years ago. 117,000 years ago, leaving its last trace in Ngandong (Java Island, Indonesia).

Homo neanderthalensis

Homo neanderthalensis is an extinct species of hominin that inhabited Europe and western Asia. From about 400,000 years ago to about 40,000 years ago. It was characterized by having a skull long and robust, between 1200-1700 cc, a low and rounded forehead, prominent eyebrows, a It had a wide, large nose, a jaw without a chin, and large teeth. Its chest was broad and the Their bodies were strong and muscular, adapted to the cold and to hunting large animals. They had a brain similar to or greater than that of modern humans, and evidence has been found that they used tools, fire, they made symbolic expressions in cave paintings and engravings, and They buried their dead.

Neanderthals originated from a common ancestral population with humans modern humans around 800,000 years ago. The DNA and morphology of the hominins from Sima de los Bones (Atapuerca), dated to 430,000 years ago, place them in the Neanderthal lineage, as well as others Fossils from the European Middle Pleistocene. Neanderthals spread across Europe and Asia. western during the Late Pleistocene, adapting to different environments and climates.

Neanderthals became extinct about 40,000 years ago, possibly due to competition with the Modern humans, climate change, or disease. However, before disappearing, Interbreeding occurred between the two species, leaving a genetic footprint of between 1% and 4% in the DNA of present-day humans, this proportion decreasing to 0.5% approximately in African aborigines.

Homo sapiens

The hominin species to which modern humans belong. It is characterized by having a rounded and high skull, with a cranial capacity between 1200 and 1700 cc, a broad forehead and

vertical, with barely defined eyebrows, a narrow and projecting nose, a jaw with a chin and
It has small teeth. Its body is slender and graceful, with short limbs and
provided, adapted to bipedalism and dispersal across diverse environments and climates. It has
a highly advanced symbolic behavior, which includes the use of complex tools, the
language, art, religion, and culture.

Homo sapiens originated in Africa more than 300,000 years ago, from an ancestral population
common with *Homo neanderthalensis.* The oldest known fossils of *Homo sapiens* are
He believes they are those of Jebel Irhoud (Morocco), with an age of between 315,000 and 286,000.
years, although its archaic features could indicate that it corresponds to a basal population of the lineage
sapiens.

For hundreds of thousands of years, distinct African basal groups of the *sapiens* lineage
They evolved, giving rise to groups with great morphological and genetic variability that went
mixing with each other. Some of the most important sites where remains of modern humans have been
found in Africa are Omo Kibish (Ethiopia), at least 212,000 years old; and Herto
(Ethiopia), about 160,000 years old.

Different populations of *Homo sapiens* left Africa in several waves across Eurasia more than
of 100,000 years, with a more extensive expansion starting 40,000 years ago. Along its path, it
They encountered other hominin species, the Neanderthals and the Denisovans, with whom they
They crossed paths occasionally.

Homo sapiens is the only hominin species that survives today. They have adapted
to different environmental and cultural conditions, developing a great genetic diversity and
phenotypic. However, all present-day humans share a common origin and history
evolutionary.

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