Disability & Care in Bioanthropology

(theories of disability, disablement & malformation, trauma, anthropology of war & violence)

Dr Arwa Kharobi

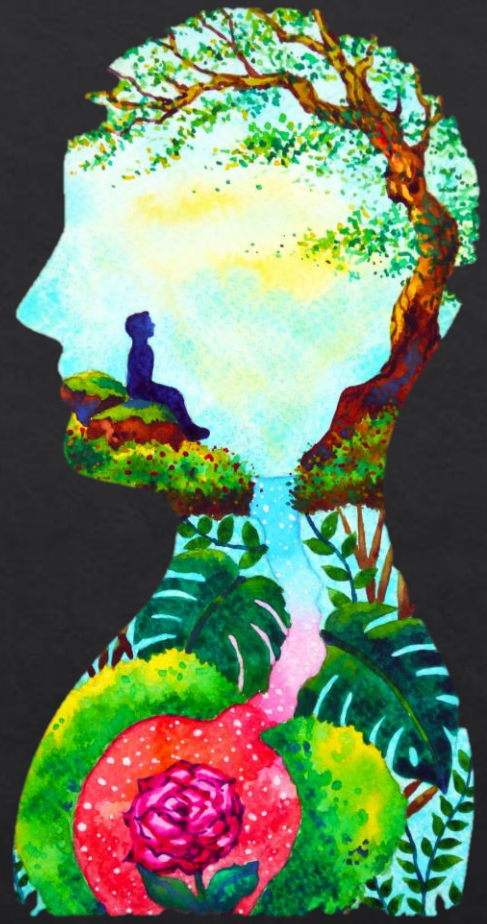

Margaret Mead, What is the earliest sign of civilization? Stone tools? A clay pot? Agriculture? Cave paintings? Religious icons?
The first sign of civilization is a 100,000 yr old fossil of a femur.
In the animal kingdom, if you break your leg, you die. A broken femur that has healed is evidence that another person has carried the person to safety and has tended to them through recovery. It indicates that
someone has helped a fellow human, rather than abandoning him
GUIDO RAFELLA 2021

wounded animals in the wild would be hunted and eaten before their broken bones could heal.

Thus, a healed femur is a sign that a wounded person must have received help from others …….

"Helping someone else through difficulty is where civilization starts."

Margaret Mead conducts an interview on United Nations Radio in 1952.
Hulton Archive/Getty Images



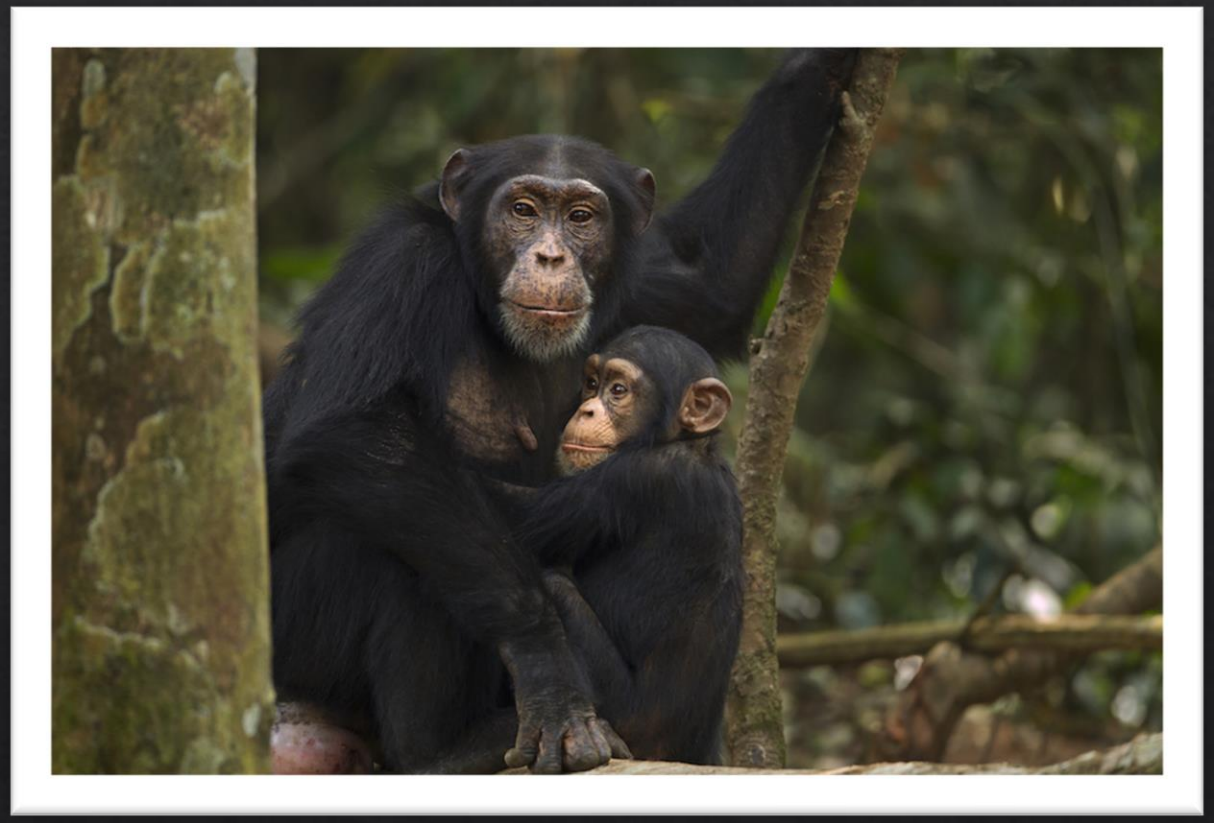
- IS "MEDICINE," BROADLY CONSTRUED, UNIQUE TO HUMANS?

- IS HEALING & HELPING OTHERS EXCLUSIVE TO HOMO SAPIENS?




Recent evidence points to the fact that medical behavior once ascribed to humans may be found in other species.

Chimpanzees: been observed treating the wounds of other community members by applying insects



Chimpanzees, Fiona Rogers/Getty Images

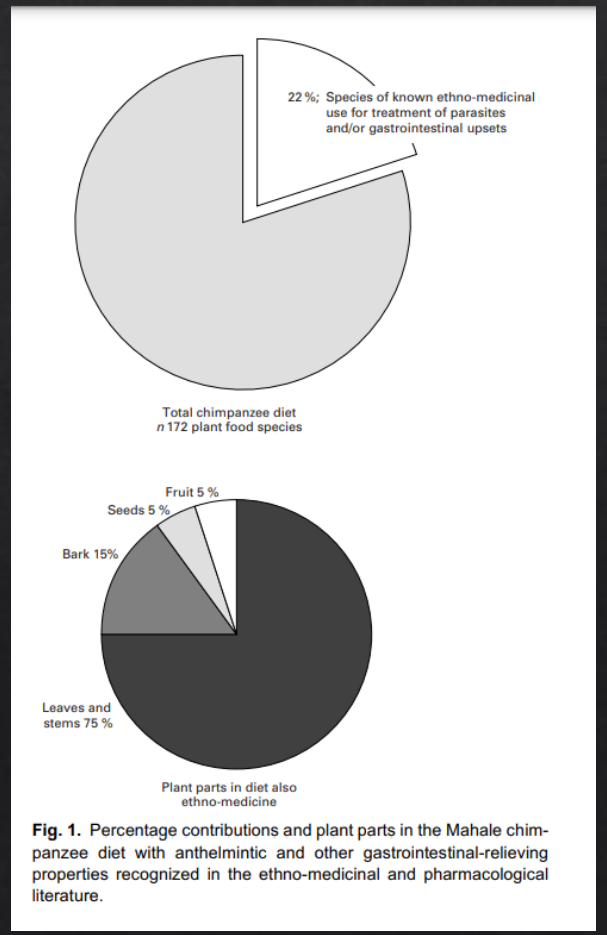


Fig. 1. Percentage contributions and plant parts in the Mahale chimpanzee diet with anthelmintic and other gastrointestinal-relieving properties recognized in the ethno-medicinal and pharmacological literature.

Defining Disability

"physical or mental impairment, which substantially limits one or more … major life activities" (ADA 1990).

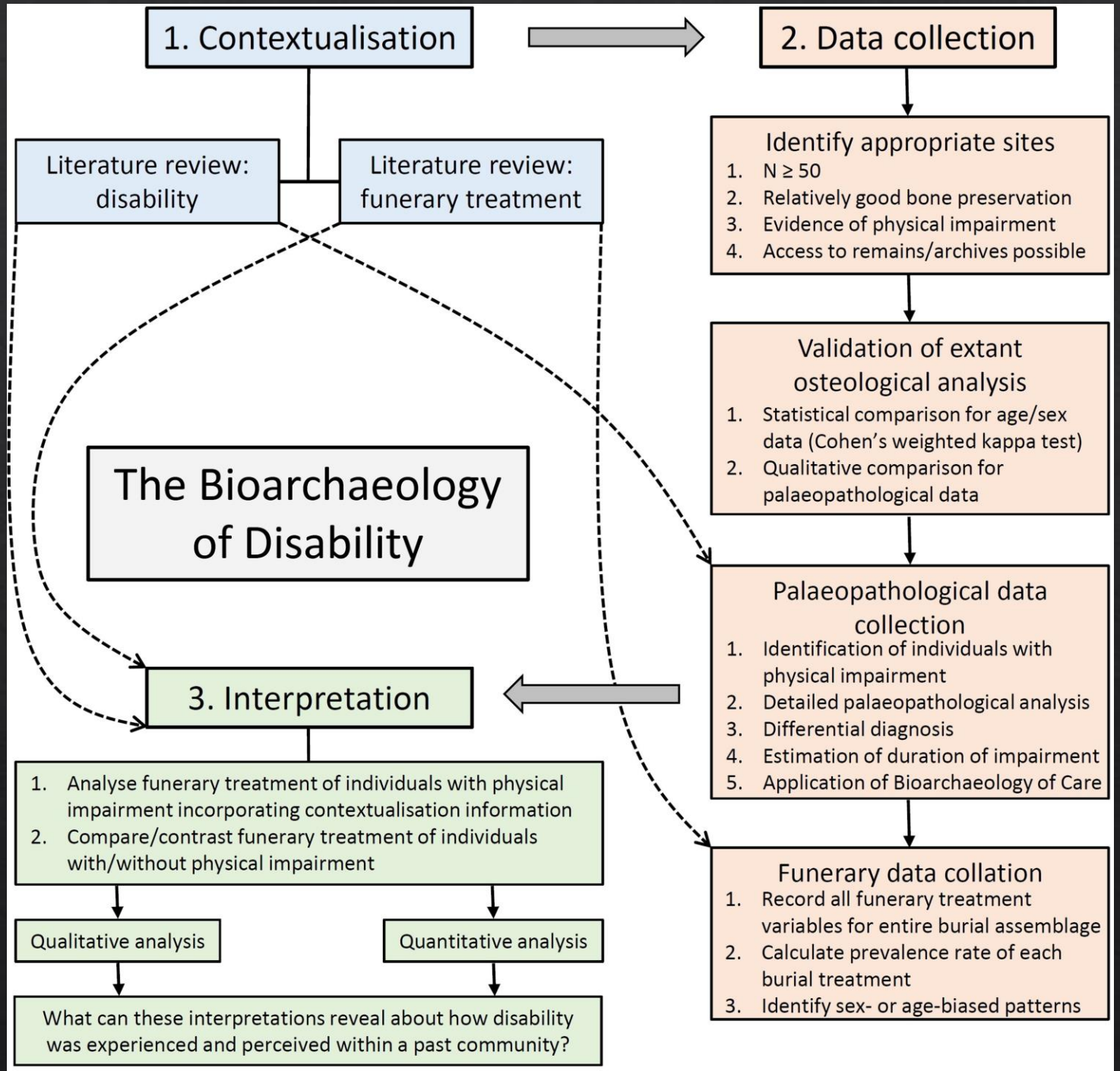
"loss or abnormality of psychological, physiological, or anatomical structure or function" (Susman, 1994, p. 15).

DEFINING DISABILITY

Some researchers are careful to distinguish the differences between impairment and disability:

Individuals are impaired if they experience (or are perceived by others to experience) physiological or behavioral statuses or processes which are socially identified as problems, illnesses, conditions, disorders syndromes, or other similarly negatively valued differences, distinctions, or characteristics which might have an ethnomedical diagnostic category or label

Disability exists when people experience discrimination on the basis of perceived functional limitations. (Kasnitz & Shuttleworth 2001, p. 2)


1. Contextualisation
2. Data collection
Literature review: disability
Literature review: funerary treatment
Identify appropriate sites
1. N ≥ 50
2. Relatively good bone preservation
3. Evidence of physical impairment
4. Access to remains/archives possible
Validation of extant osteological analysis
1. Statistical comparison for age/sex data (Cohen's weighted kappa test)
2. Qualitative comparison for palaeopathological data
The Bioarchaeology of Disability
Palaeopathological data collection
1. Identification of individuals with physical impairment
2. Detailed palaeopathological analysis
3. Differential diagnosis
4. Estimation of duration of impairment
5. Application of Bioarchaeology of Care
3. Interpretation
1. Analyse funerary treatment of individuals with physical impairment incorporating contextualisation information
2. Compare/contrast funerary treatment of individuals with/without physical impairment
Qualitative analysis
Quantitative analysis
Funerary data collation
1. Record all funerary treatment variables for entire burial assemblage
2. Calculate prevalence rate of each burial treatment
3. Identify sex- or age-biased patterns
What can these interpretations reveal about how disability was experienced and perceived within a past community?

Understanding Disability and Physical Impairment in Early Medieval England: an Integration of Osteoarchaeological and Funerary Evidence

Solange Bohling, Karina Croucher & Jo Buckberry

Pages 73-114 | Published online: 26 Jun 2023

Butler's Field

Pseudarthroses on the posterior surfaces of the right and left scapulae of BF-6 as a result of bilateral posterior dislocation of both shoulders.

Photograph by S Bohling with permission of the Corinium Museum.

Norton East Mill 91.

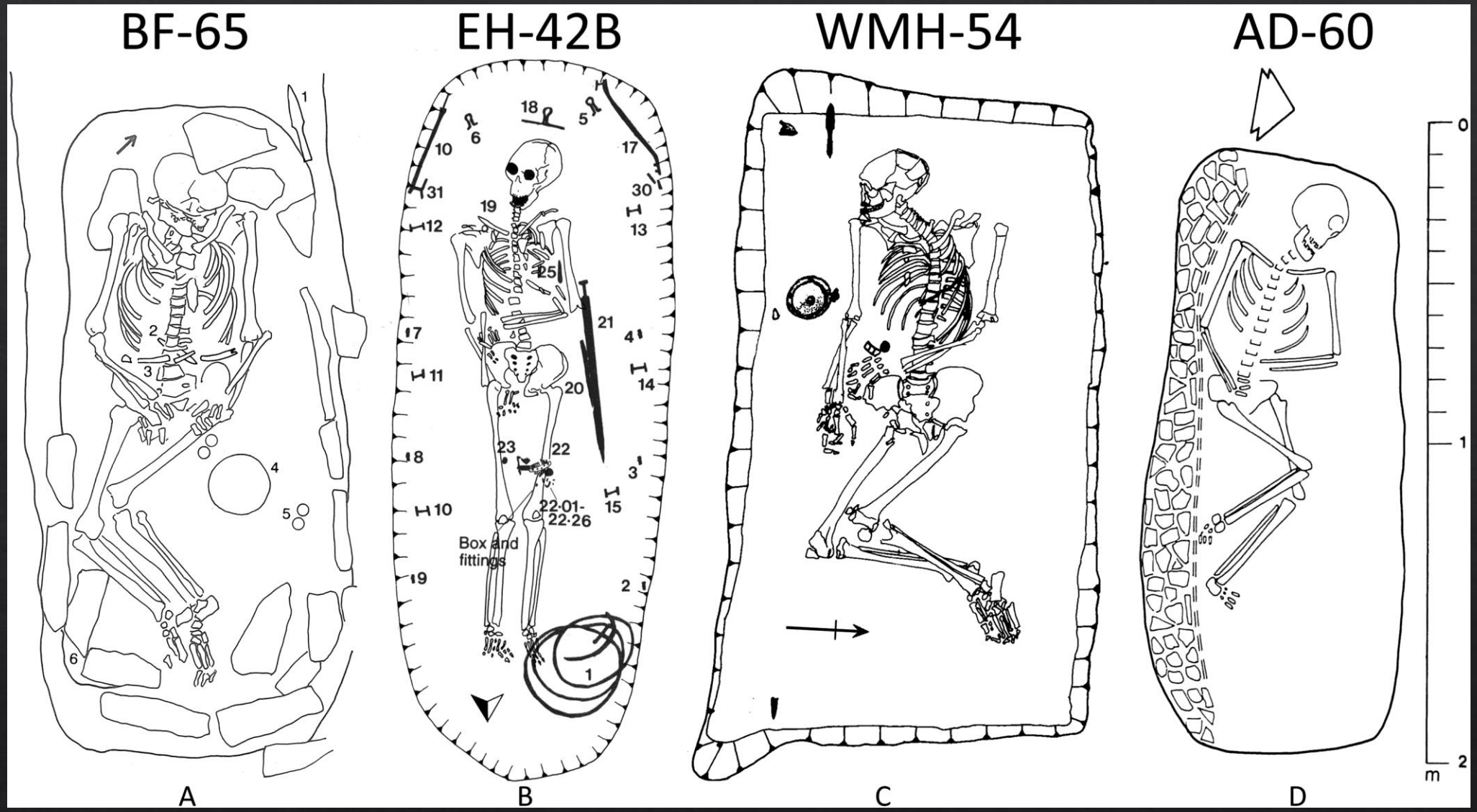
Fracture and consequent shortening of the right femur of NEM-91 (in comparison to left) which probably resulted in an abnormal gait.

Photograph by S Bohling with permission of Tees Archaeology.

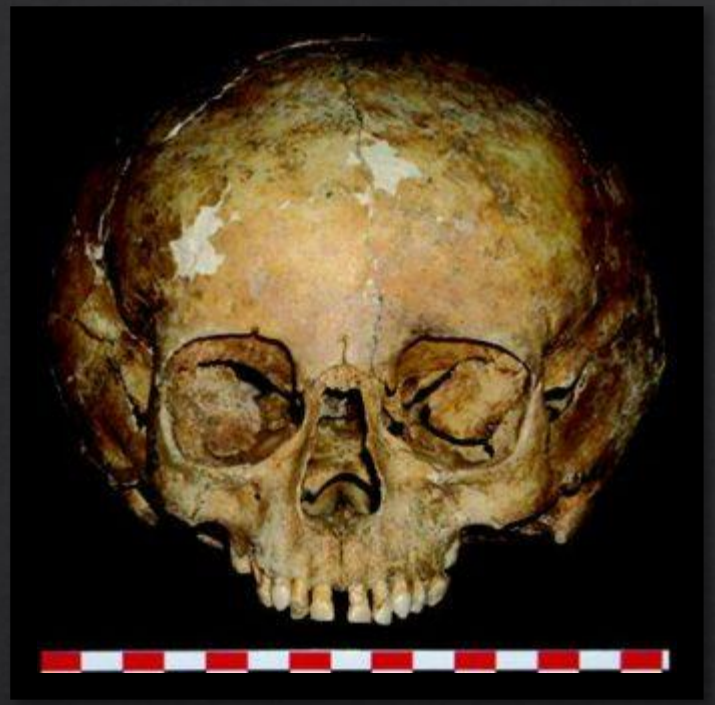
Butler's Field 65.

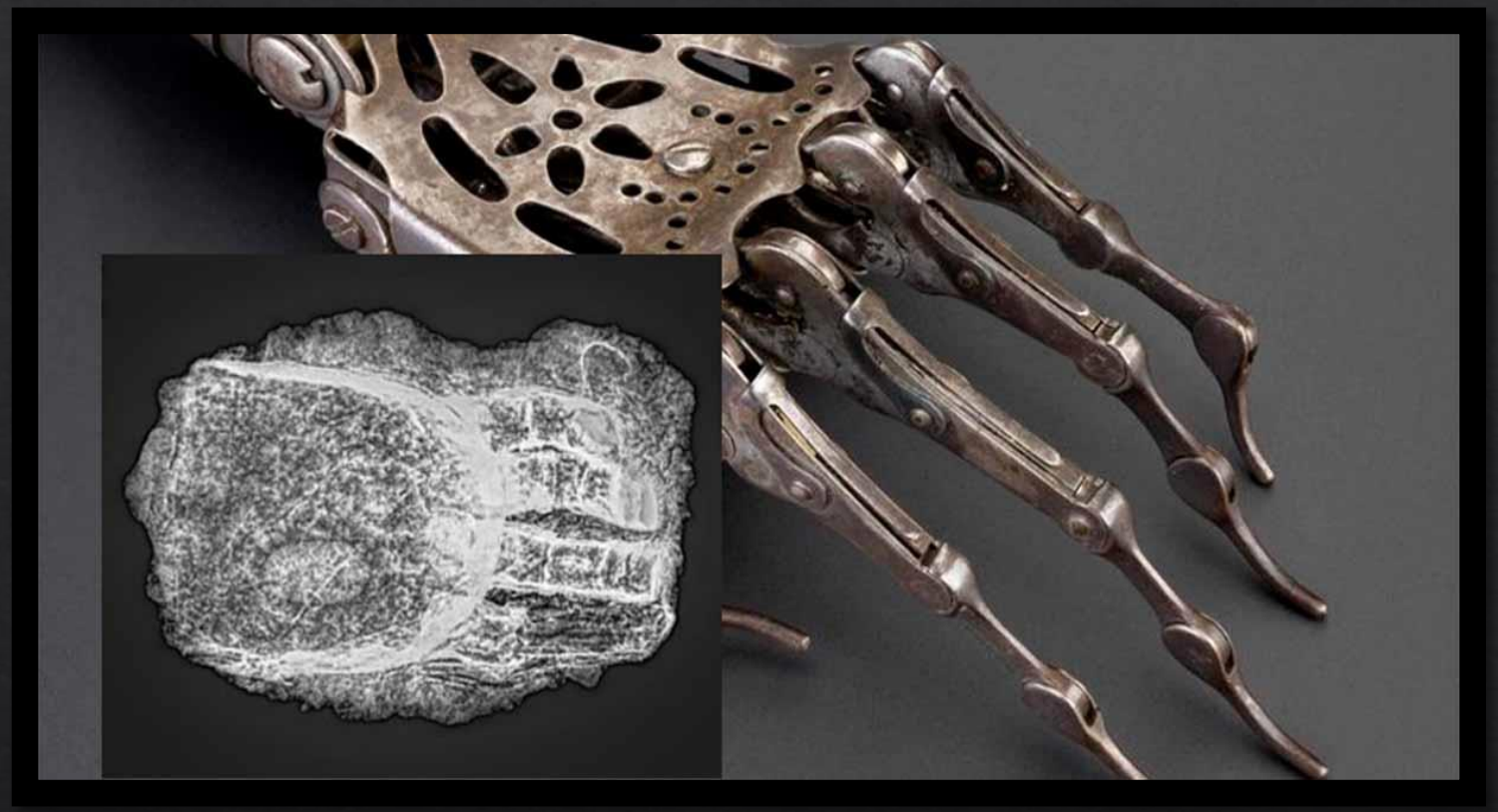
Well-healed trauma to the right side of the viscerocranium of BF-65 resulting in asymmetrical eye orbits and possible soft tissue abnormalities that would have been noticeable in many social interactions. Scale in centimeters.

Photograph by S Bohling with permission of the Corinium Museum.

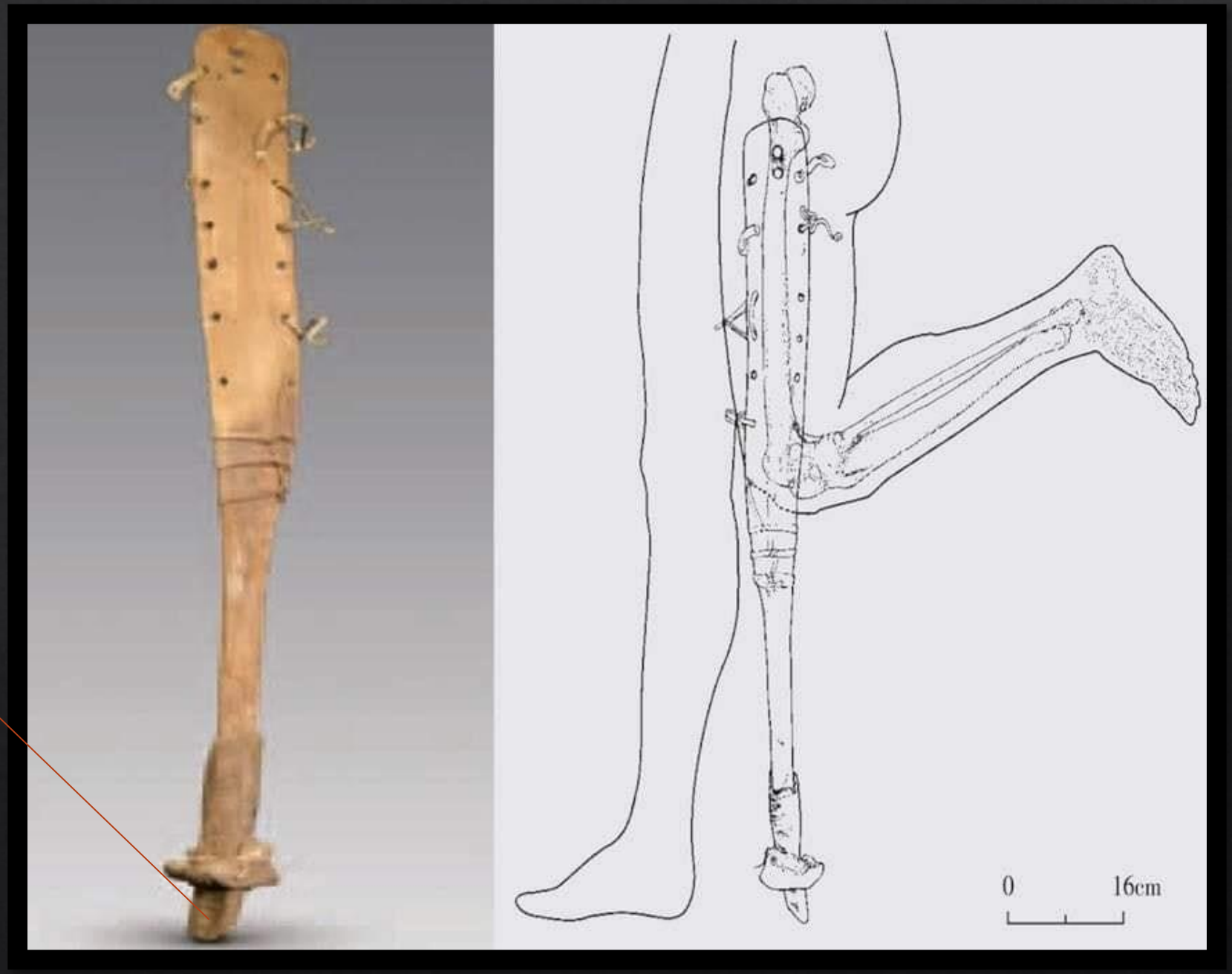


Grave for individuals with physical impairment with evidence of increased burial effort.

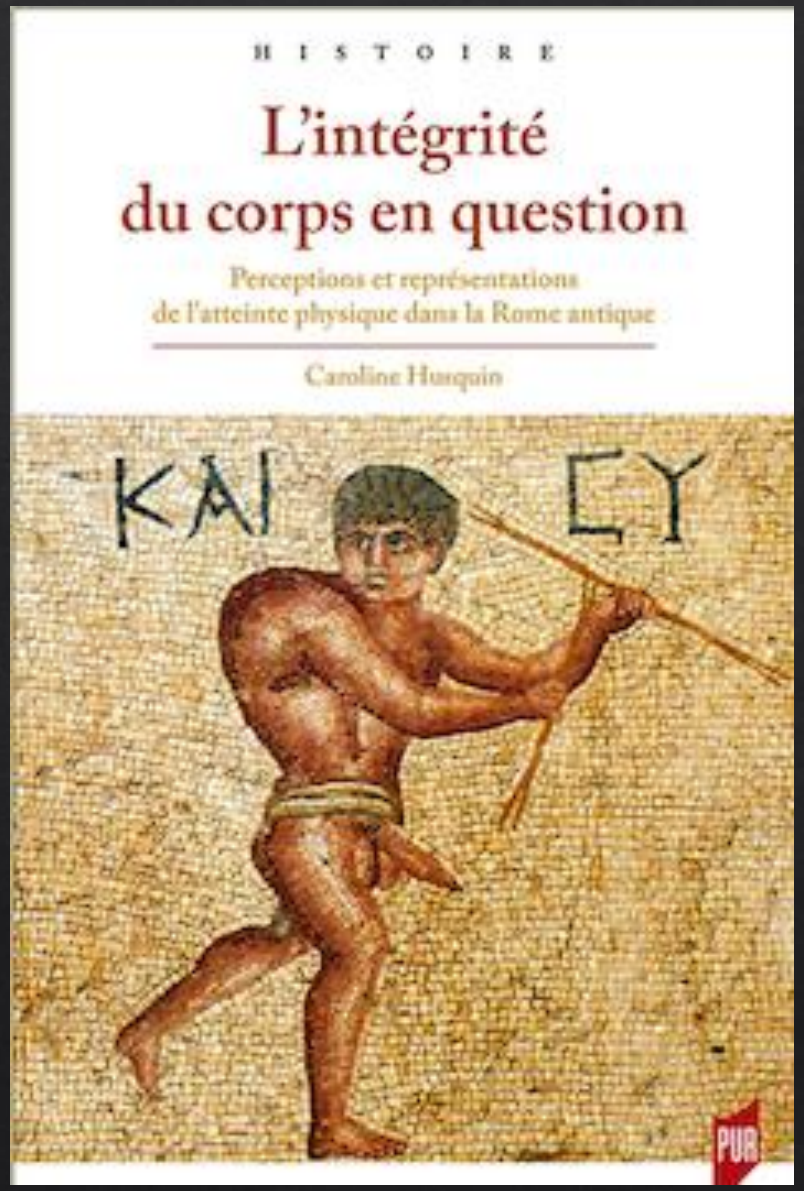




2,200-year-old tomb in Turpan, China, revealing the remains of a man with a unique prosthetic leg



Wear on the prosthetic
→ used extensively


HISTOIRE
L'intégrité
du corps en question
Perceptions et représentations
de l'atteinte physique dans la Rome antique
Caroline Humpin
KAI
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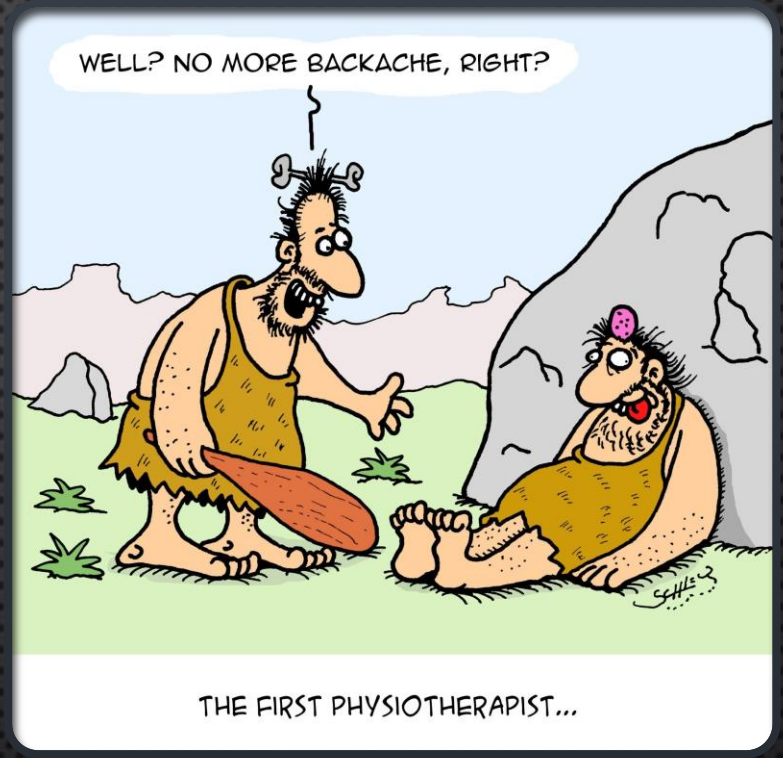
Trauma

TRAUMA

1. WHAT IS IT?
2. RECORDING TRAUMA
3. TYPES OF TRAUMA
4. THROUGH CULTURAL MODIFICATION

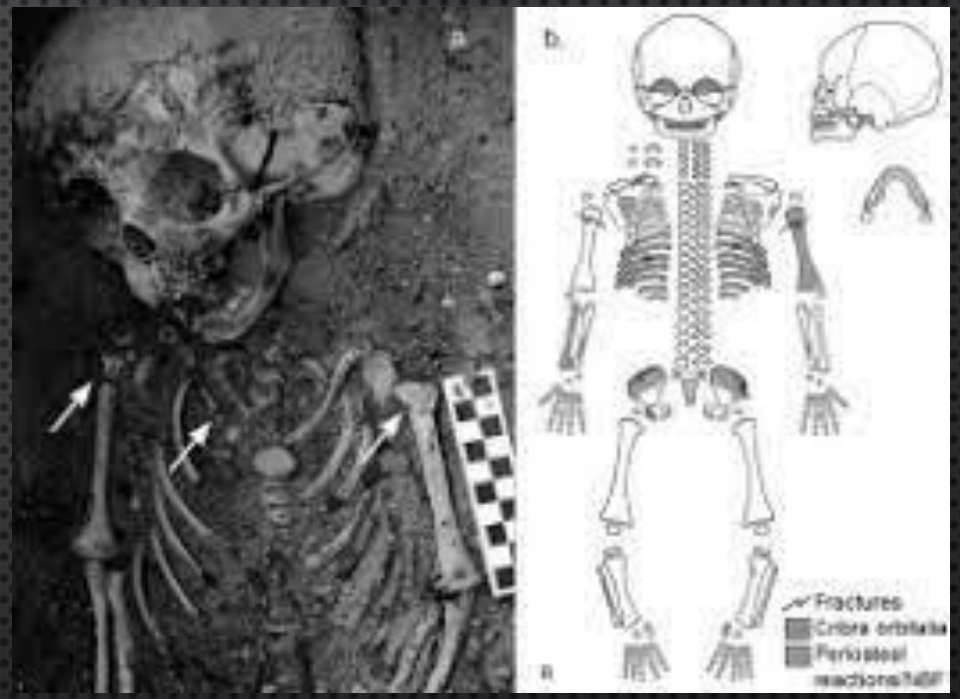


Refers to an injury to living tissue that is caused by a force or mechanism extrinsic to the body

'any bodily injury or wound'

III. TRAUMA

- ~~What is it?~~
- Recording trauma
- Types of trauma
- Through cultural modification



1. When did the trauma happen?
2. What caused the trauma?

79 yrs old Female

Right humerus
Complete fracture

When did the trauma happen?

Antemortem
Before death

Perimortem
Around death

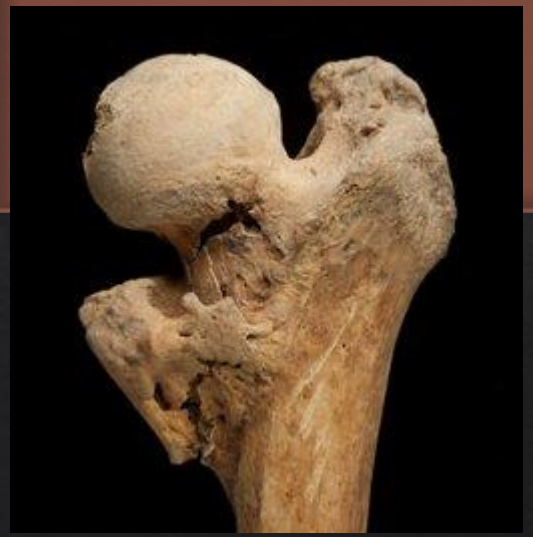
Postmortem
After death

Lovell, 1997

When did the trauma happen?

Antemortem

Before death



Signs of healing

Lovell, 1997

When did the trauma happen?

Perimortem

Around death

- ✓ No healing
- ✓ Similar coloration to rest of bone
- ✓ Oblique angle of breakage
- ✓ Well-defined, clean or smooth, ‘polished’ edges

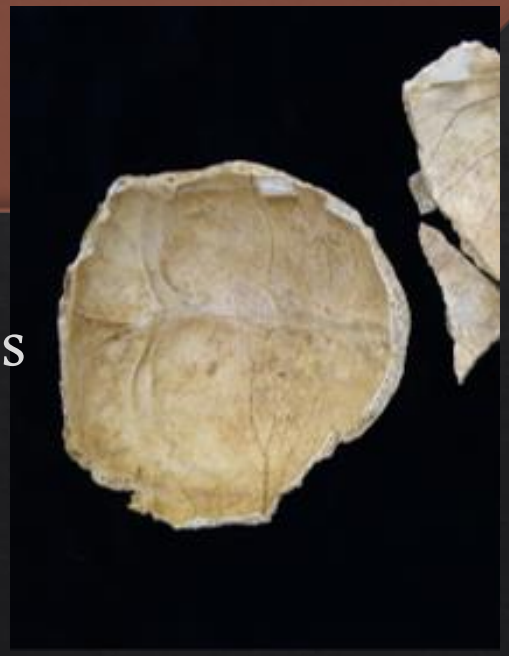
Lovell, 1997

When did the trauma happen?

Postmortem

After death

- ✓ Many small broken pieces (shatters)
- ✓ white or lightly colored fracture lines
- ✓ 90-degree angle of breakage



Lovell, 1997

What causes trauma?

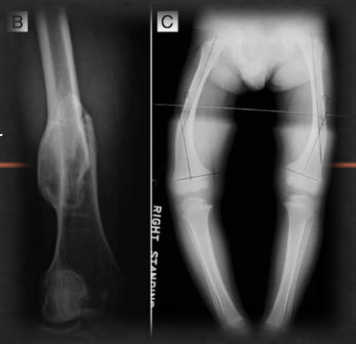
Acute Causes

the major cause

1. accidents
2. intentional- Interpersonal violence (individual or collective)
3. amputation

Pathology

bone weakened or deformed



1. osteoporosis
2. rickets
3. metastases

Stress

repeated use

- usually caused by a strenuous, repetitive activity

42 yrs old Female

Abnormal bone size resulting from bilateral amputation of the lower limbs approximately at the midpoint in the tibia and fibula associated with clinically documented chronic syphilis

TRAUMA

1. ~~What is it?~~
2. ~~Recording trauma~~
3. Types of trauma
4. Through cultural modification

1. Dislocation
2. Fracture
3. Blunt Force
4. Sharp Force
5. Projectile

1. Dislocation

Traumatic injury to joints: loss of normal contact between the components of the joint

can be:

- partial (subluxation): articular surfaces partially displaced, but retain some degree of contact
- complete (luxation): articular surfaces of the joint totally displaced from one another

Clarke & Goodship, 2010

1. Dislocation

Can be congenital or even spontaneous, but **traumatic origins are the most common**

Often associated with fracture

Clarke & Goodship, 2010

1. Dislocation

- Most commonly involved : shoulder & hip
- Common result of dislocations : Osteoarthritis of the affected joint surface
    - formation of a secondary joint = long term contact

<u>Keys to recognize dislocation</u>:

1. Present before death (generally for a significant amount of time)
2. Remain unreduced (unset, not tractioned) long enough to generate bony changes

1. Dislocation

An incomplete or complete break in the continuity of a bone

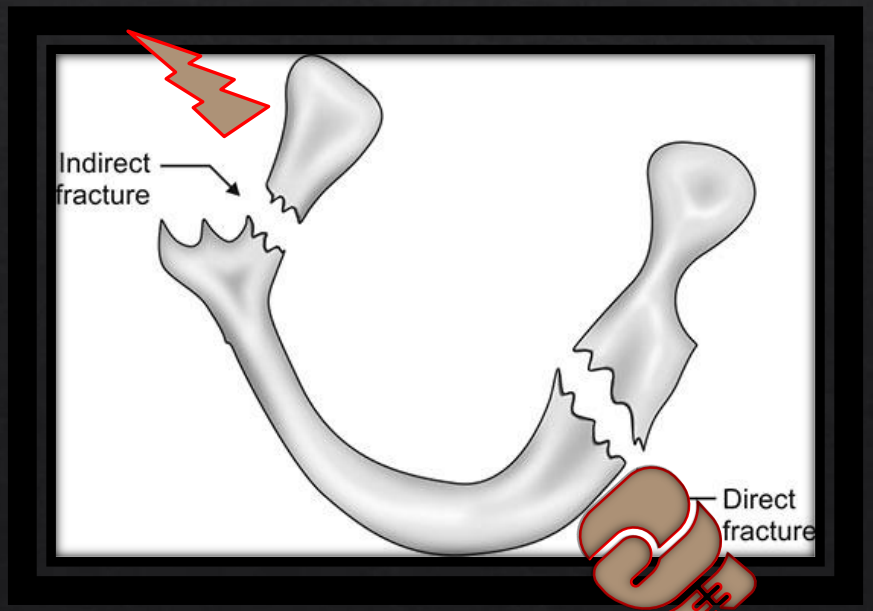
can be the result of :
- traumatic event
- twisting due to muscle spasm
- indirect loss of leverage
- disease that results in osteopenia

48 yrs old Female

Femoral diaphyseal fracture
large and relatively well-organized and extensively remodeled bony callous that originated as a hematoma surrounding the traumatic injury

2. Fractures

Complete	involving the entire cross section of the bone
Incomplete	does not involve the complete cross section of the bone
Fissure	crack extending from a surface into, but not through, a long bone
Impacted	in which one fragment is firmly driven into the other
Indirect	distant from the site of injury



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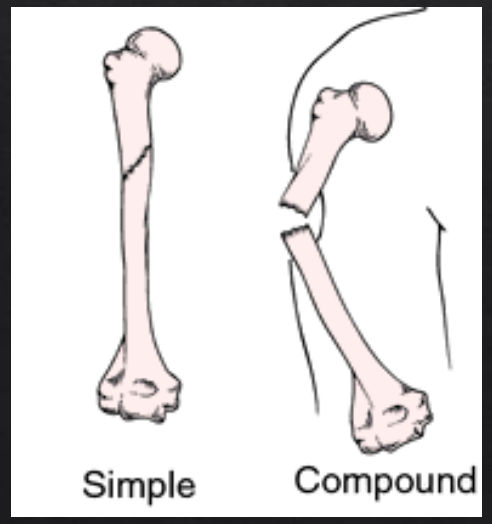
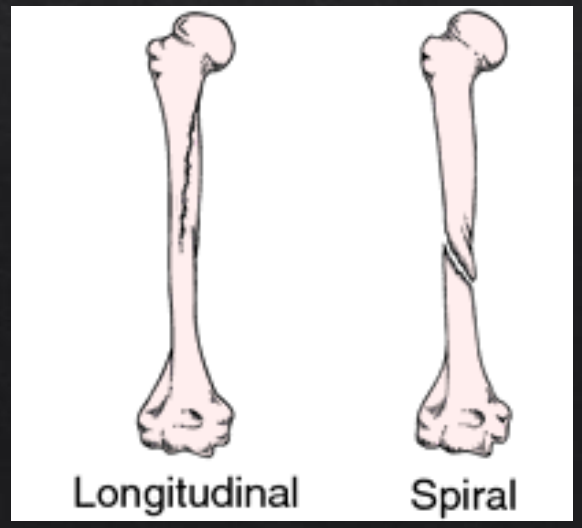
2. Fractures

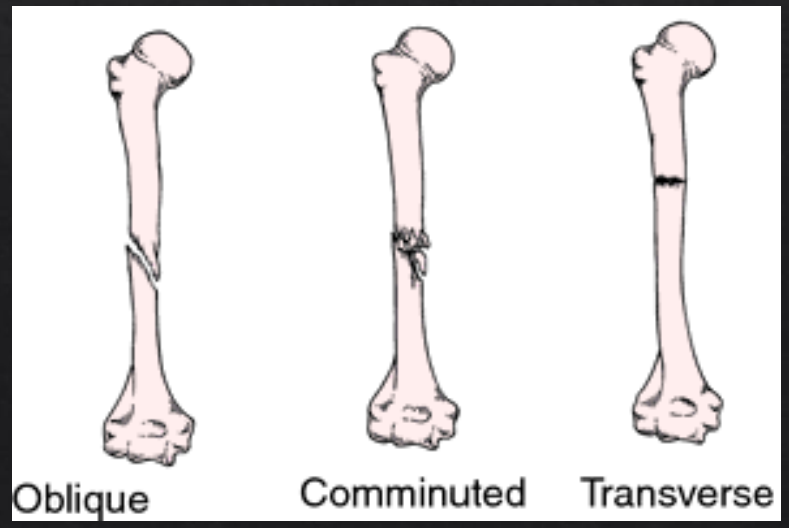
Adult Female

Crush fracture affecting the left lateral aspect of the L-5 vertebral body; subsequent remodeling and fusion to the bony sacrum can be observed

Closed or Simple	does not produce an open wound
Open or Compound	one in which a wound through the adjacent or overlying soft tissue communicates with the outside of the body
Longitudinal	one extending along the length of the bone.
Spiral	in which the bone has been twisted and the fracture line resembles a spiral.
Oblique	one in which the break extends in an oblique direction.
Comminuted	one in which the bone is splintered or crushed, with three or more fragments.
Transverse	at right angles to the axis of the bone.

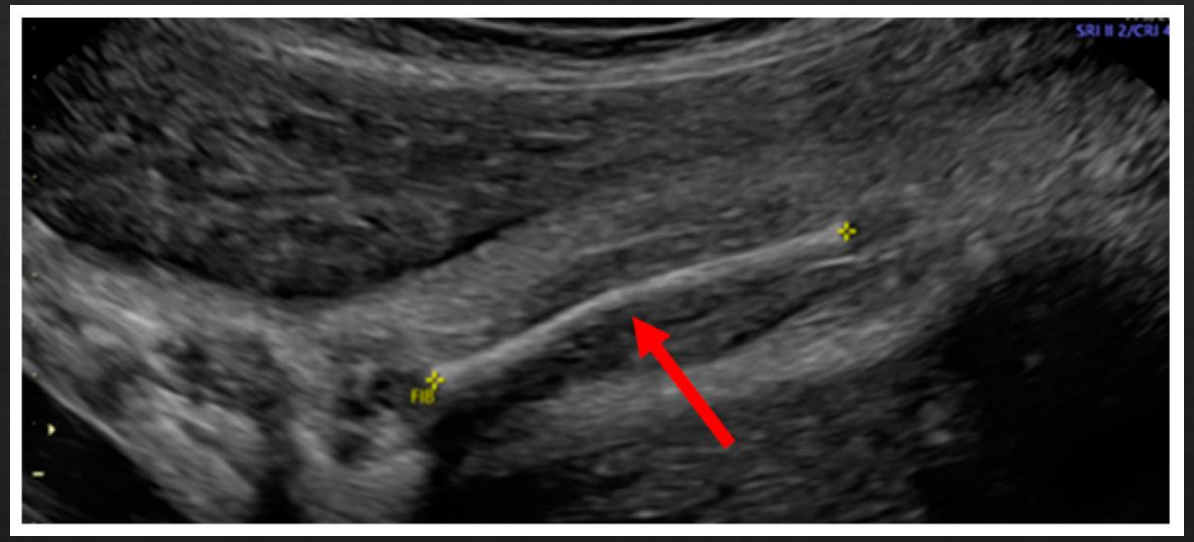






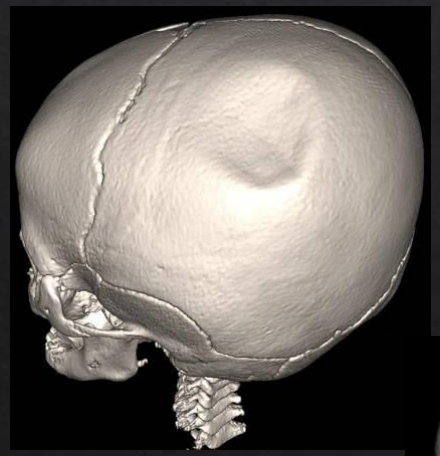
2. Fractures

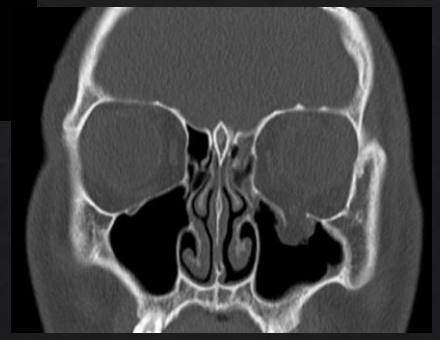
Intrauterine	of a fetal bone incurred in utero
Greenstick or interperiosteal	in which one side of a bone is broken and the other is bent, most commonly seen in children

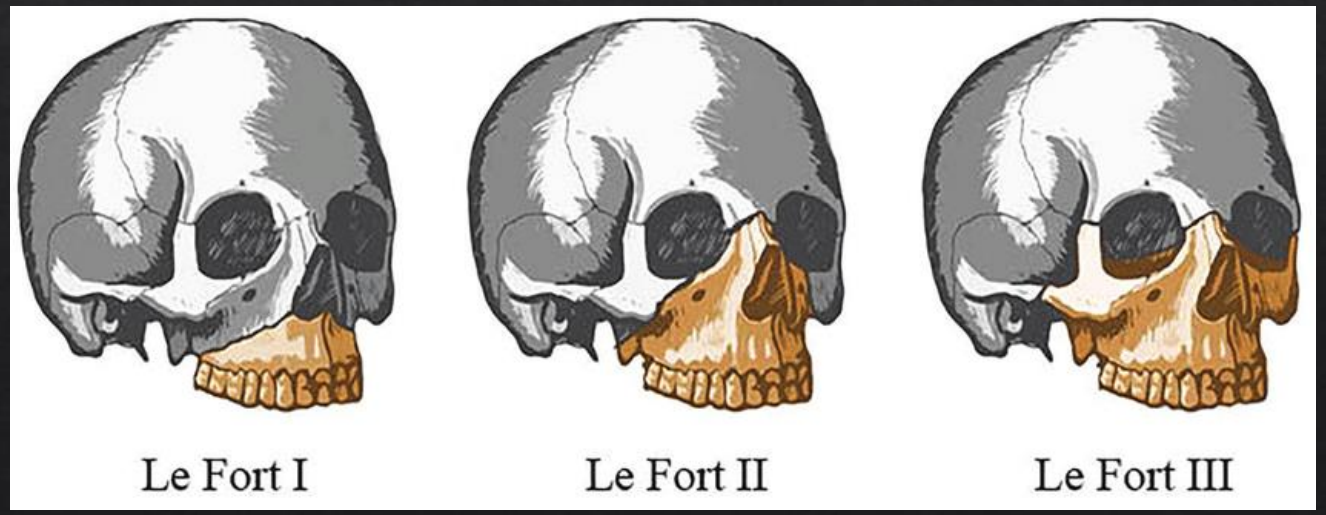


2. Fractures

Ping-pong	of the skull, resembling the indentation that can be produced with the finger in a ping-pong ball
Blow-out	of the orbital floor caused by a sudden increase of intraorbital pressure due to traumatic force
Le Fort fracture	of the maxilla







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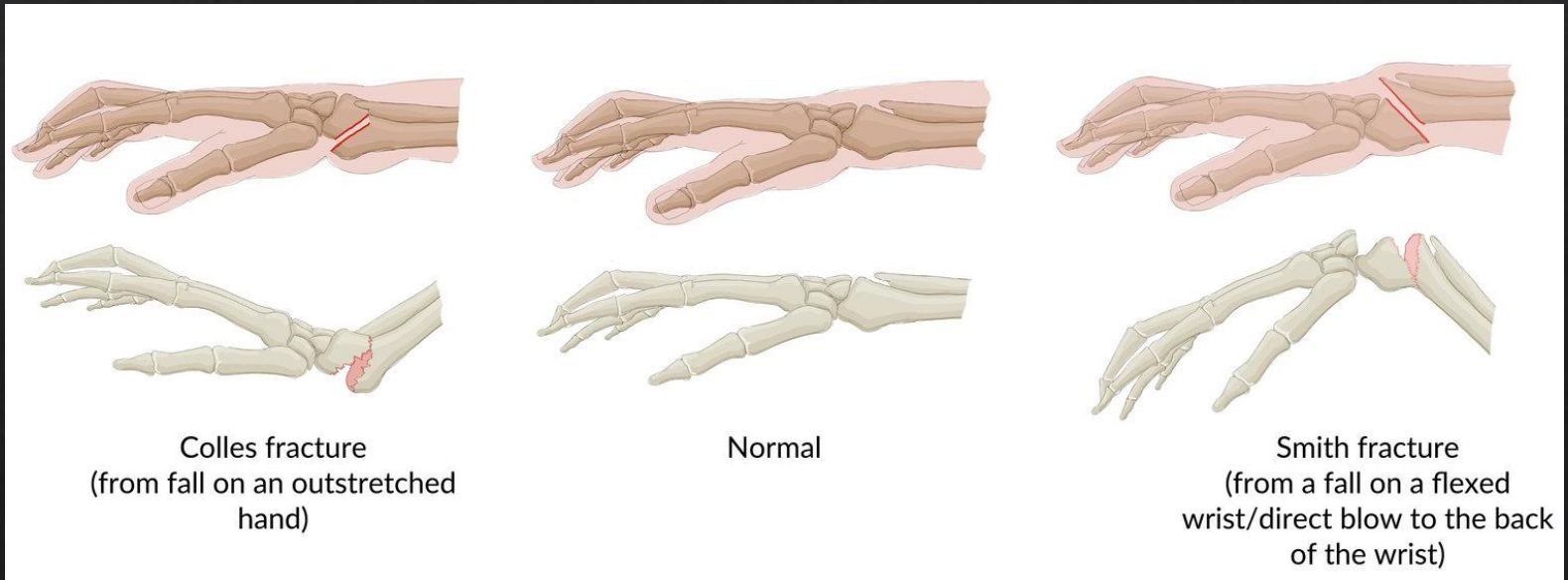
2. Fractures

Monteggia's	the proximal half of the shaft of the ulna, with dislocation of the head of the radius
Smith's	the end of the radius, fragment displaced in the direction of the palm of the hand
Colles'	the lower end of the radius, the distal fragment being displaced backward



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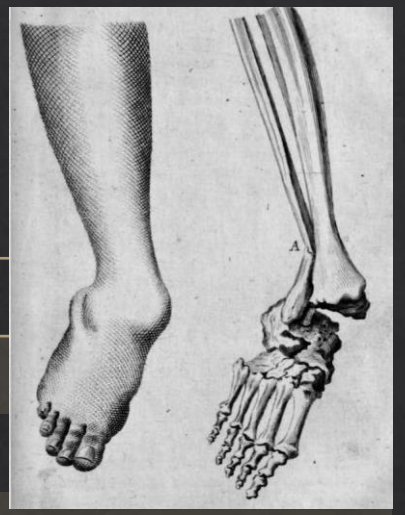
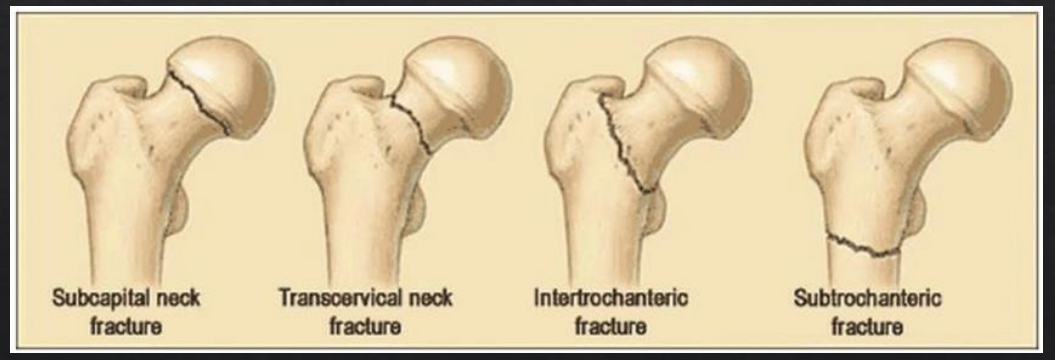
2. Fractures



Pertrochanteric	of the femur passing through the greater trochanter
Stieda's	of the internal condyle of the femur
transcervical	through the neck of the femur
Dupuytren's/Pott's	of lower part of the fibula with serious injury of the lower tibial articulation



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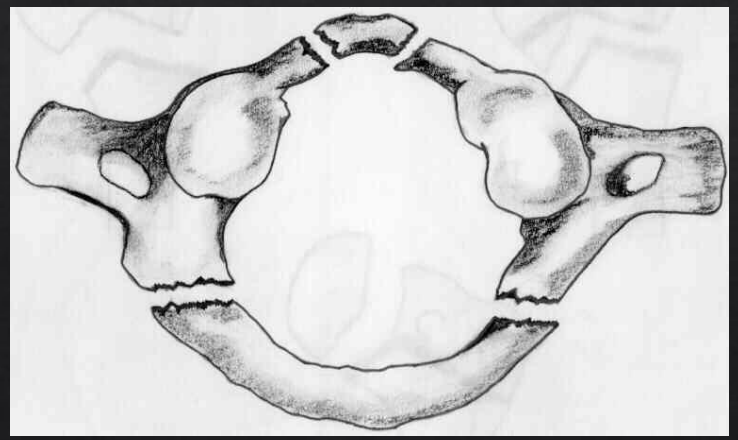
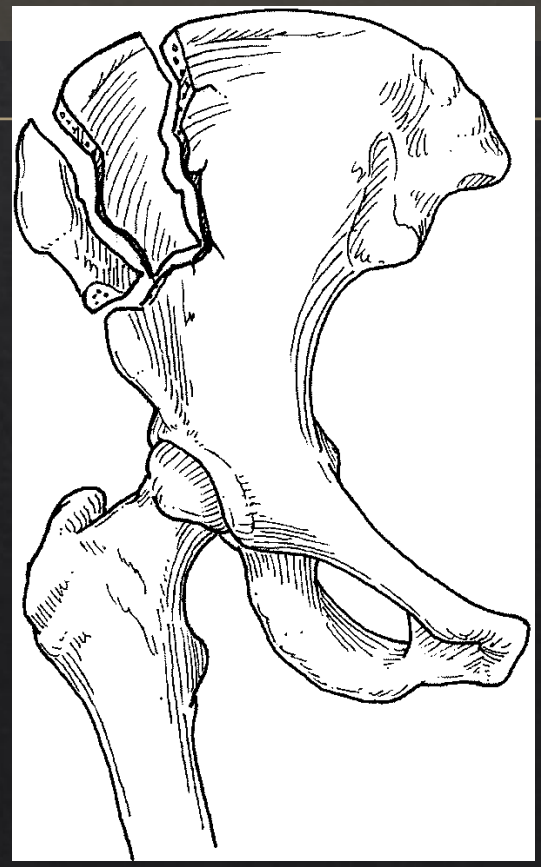
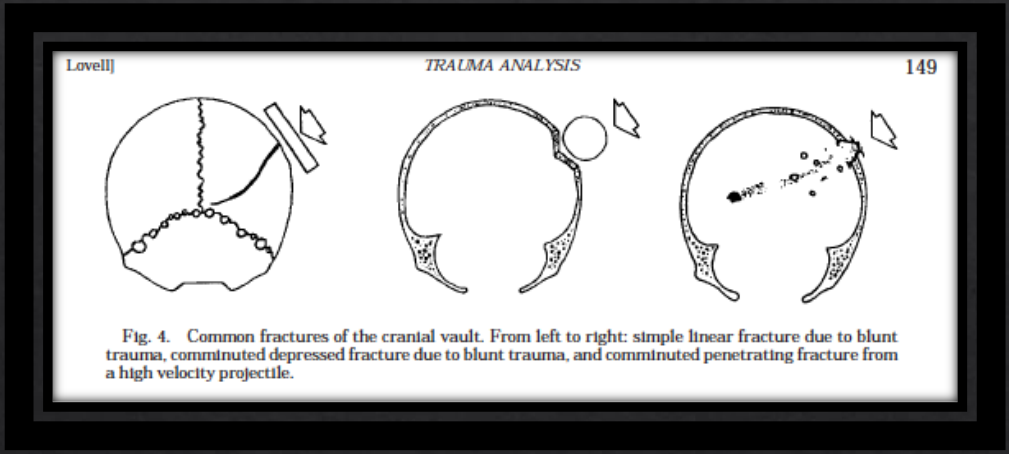
2. Fractures

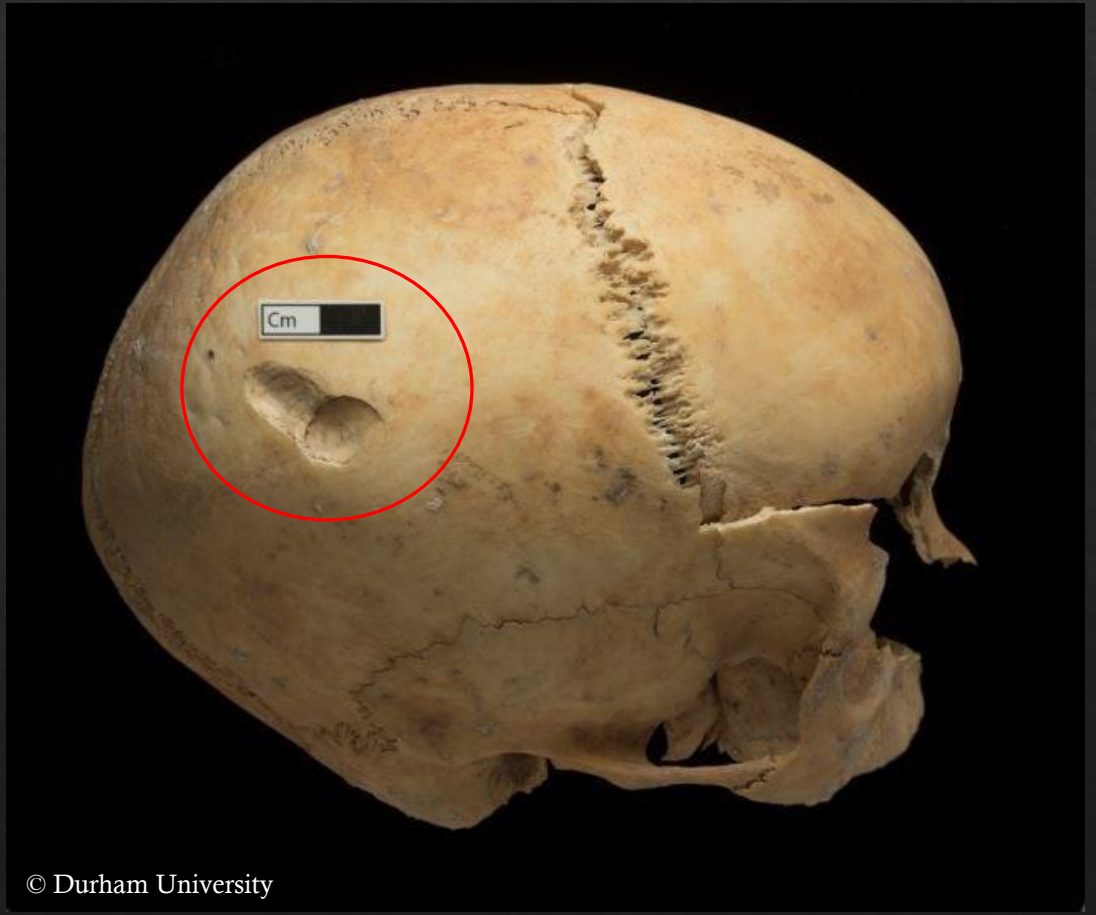
Jefferson's	atlas
Bennett's	of the base of the 1st MTC, running into the carpometacarpal joint, complicated by subluxation
Duverney's	of the ilium just below the anterior inferior spine





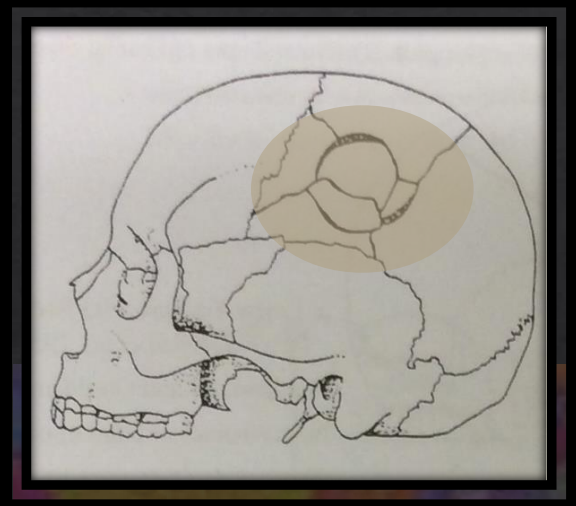
2. Fractures



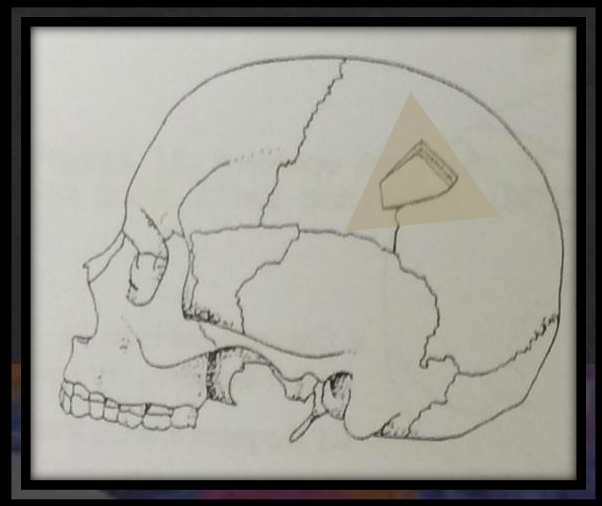


2. Fractures

1. Simple linear
e.g., sharp-edged weapon



2. Circular
e.g., Circular object



3. Depressed
e.g., by axe butt

4. Stellate
Localized blow

Define the fracture

Healed or not?

three stages of bone healing:

1. inflammatory
2. Reparative (production)
3. remodeling

immediately after the bone is fractured
lasts for several days

- ✓ fractured
- ✓ bleeding into the area -
- ✓ inflammation
- ✓ clotting of blood at the fracture site

HEALED OR NOT?

1. Inflammation

provides the initial structural stability & framework for producing new bone

begins when the clotted blood formed by inflammation is replaced with fibrous tissue and cartilage

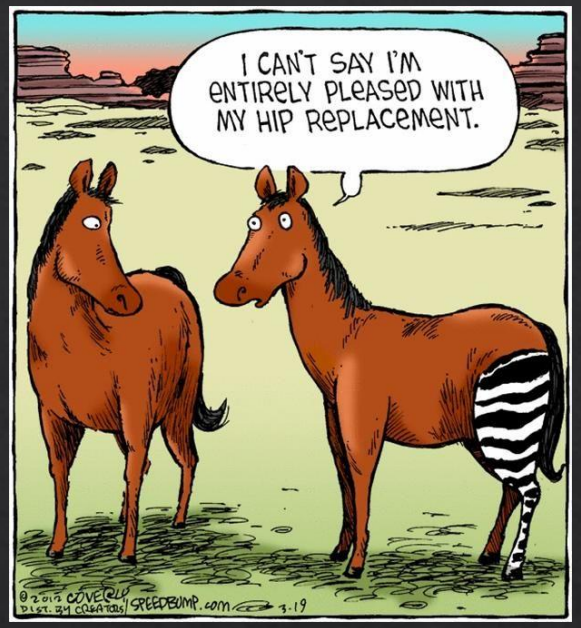
as healing progresses, the soft callus is replaced with hard bone

visible on x-rays several weeks after the fracture

HEALED OR NOT?

2. **Bone production**

final phase of bone healing
goes on for several months



HEALED OR NOT?

3. **Bone remodeling**

In remodeling, bone

continues to form
becomes compact
returns to its original shape

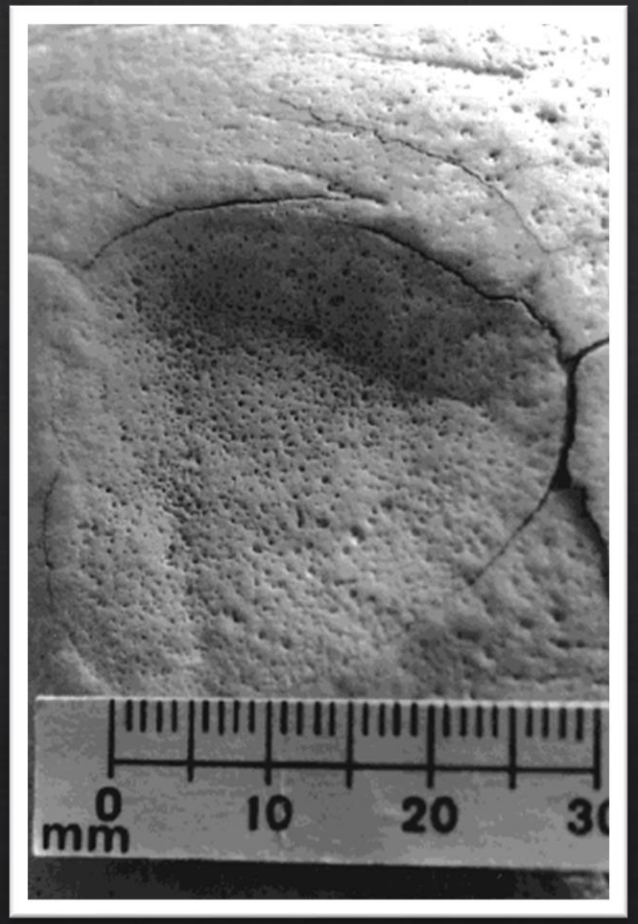
+ blood circulation in the area improves

weightbearing (standing or walking) encourages bone remodeling

3. Blunt Force Trauma

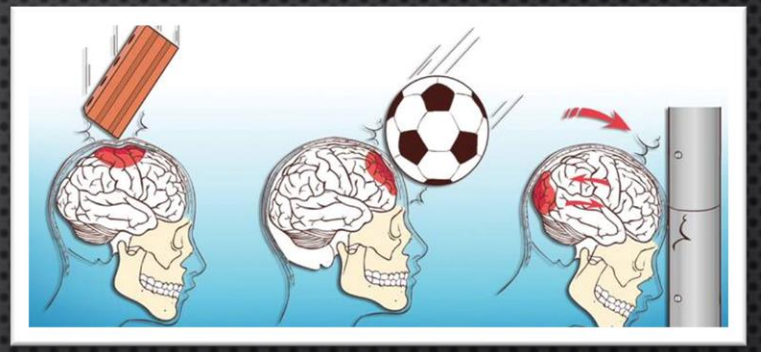
defined as a slow-loading impact to a focal area of bone, resulting in a degree of damage which directly correlates to the amount of kinetic energy transferred from the impacting object to the bone

Often discussed in regard to cranial trauma



Depression fracture of the cranial vault, showing radiating and concentric fracture lines. Probably due to low velocity blunt trauma (Lovell, 1997)

3. Blunt Force Trauma



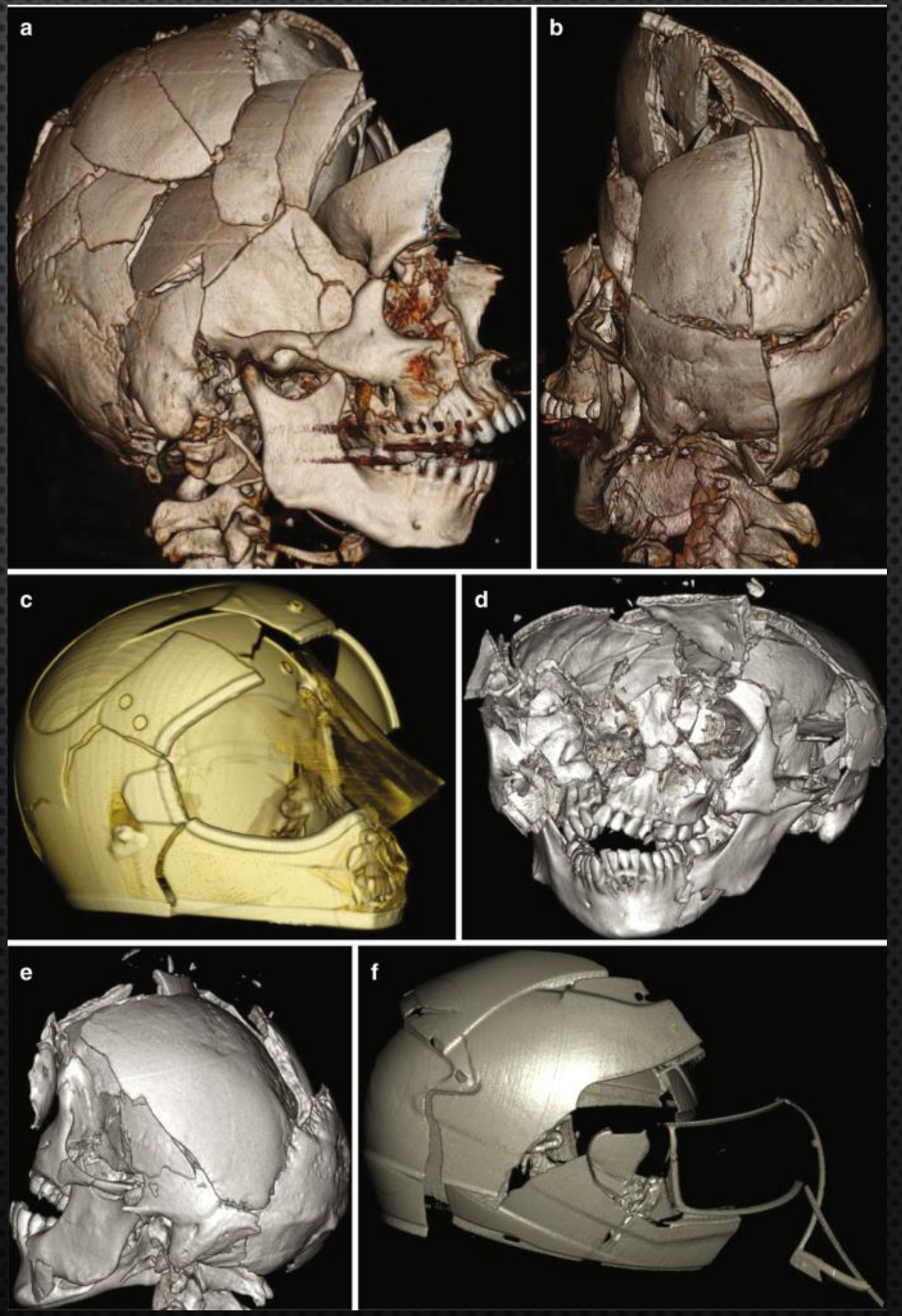
the biomechanics of the skull affect the way in which it responds to injury with a blunt weapon

- **outer table** comes under compression
- **inner table** comes under tension

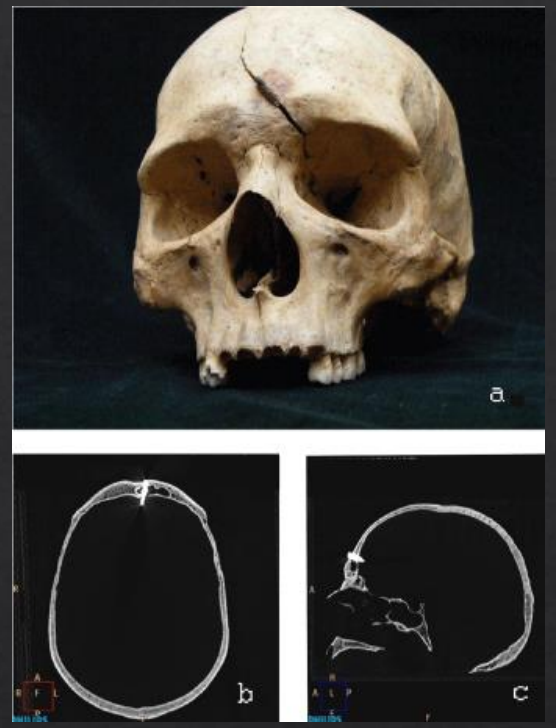
3. Blunt Force Trauma

If the force of the blow exceeds the elastic limit of the bone

- **inner table** fractures in the immediate area of the blow forcing a cone of bone to break away from around the entrance wound.
- **outer table** is more likely to separate in a concentric fashion around the affected region



4. Sharp Force Trauma



Sharp -edged weapon

Multiple possibilities:

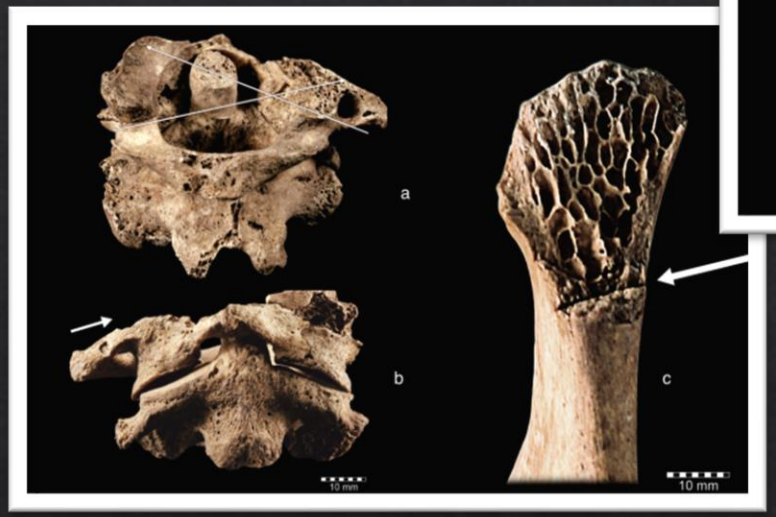
1. Blade passed cleanly through the bone

→a wound with straight, clean-cut edges which may be almost perpendicular with the bone surface

2. Blade came in contact with bone and glanced off

→a gutter fracture where the sword has grazed the bone

4. Sharp Force Trauma



Multiple possibilities:

3. Blade made contact and produced a deeper wound

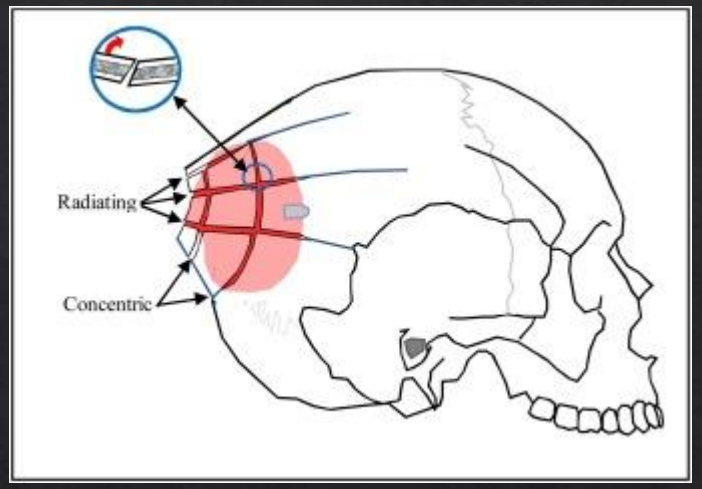
→a linear wound with a well-defined clean edge and the possibility of terminal fractures

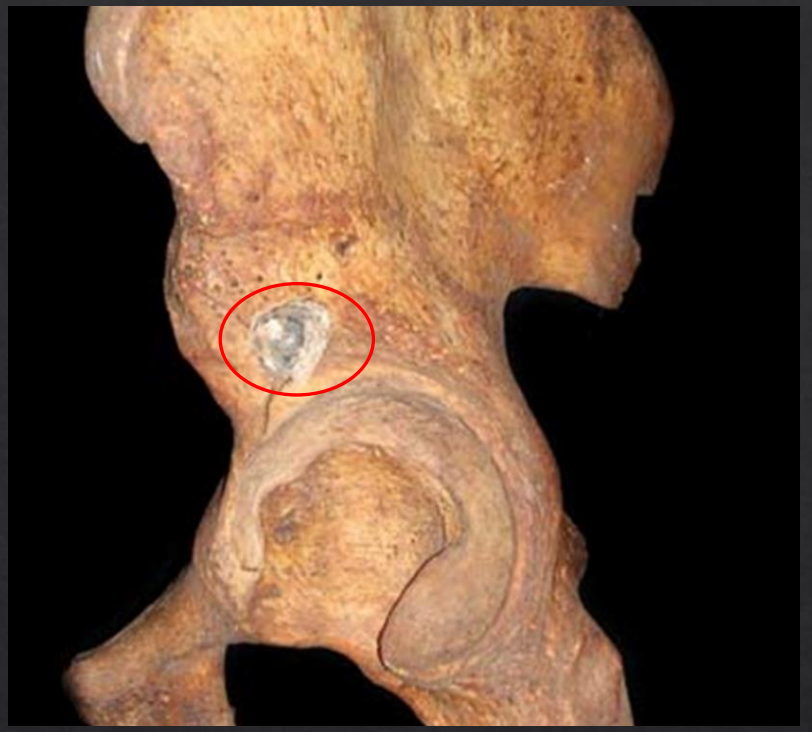
4. Incised wound, sometimes known as a **skip lesion-** wounds → a linear cut which may have small flakes of bone chipped off its edges

5. Projectile Trauma

- Projectile-obvious entry/exit wounds (characterised by velocity of weapon contacting body) – rare
- Both slow and high velocity weapons (arrows, bullets, rocks)
- Differences in velocity of the projectile → different patterns on the bone

5. Projectile Trauma

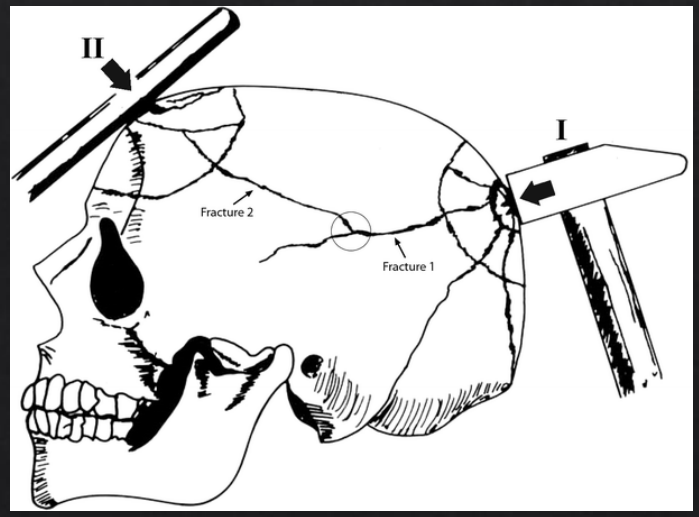




Also possible to have the projectile embedded within the bone

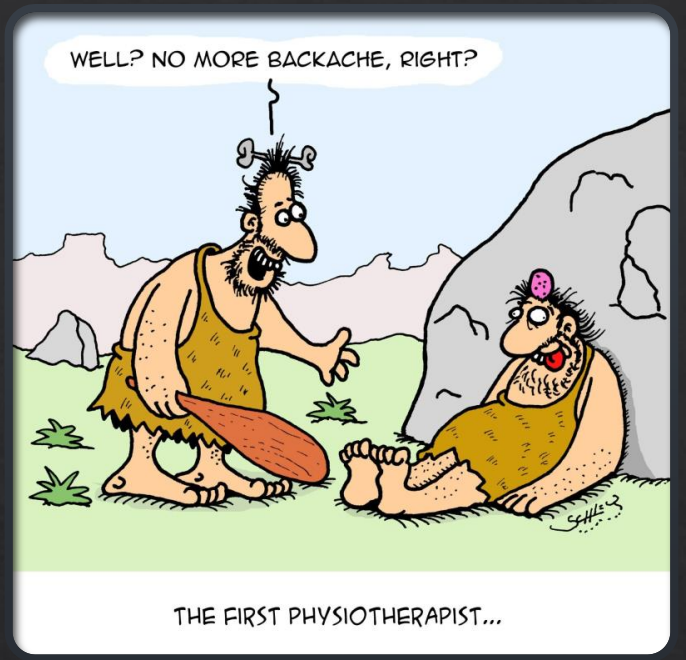
<u>It is important to record:</u>

1. size and shape of the hole
2. Internal or external beveling
3. Radiating fractures? their degree



TRAUMA

1. ~~What is it?~~
2. ~~Recording trauma~~
3. ~~Types of trauma~~
4. Through cultural modification



1. Cranial modification
2. Dental modification
3. Foot binding
4. Waist training

1. Cranial Modification

Where and when?

- Back to 45.000 BC, Iraq
- Most ubiquitous cultural practices in antiquity
- Every continent except Australia

How?

applying pressure to various areas of the skull at a young age

- Occipital/Frontal/Both frontal & occipital /Along a transverse axes

Why?

Cosmetic & social status and ethnic/cultural identity

Risks: death: e.g., late Inca period mummified infant, Peru

1. Dental Modification

Where and when?
Diverse contexts in the Old & New Worlds

How?
Intentional, traumatic process
- Chipping
- Avulsion
- Inlay

Why?
Social identity, e.g., warriors (filed teeth) from the Viking Age, Scandinavia & England

Risks: infection & death

3. Foot Binding

Where and when?

- More recent times
- Upper class Chinese women from the 10th to early 20th cent AD
- Many soft-tissue examples in medical collections around the world

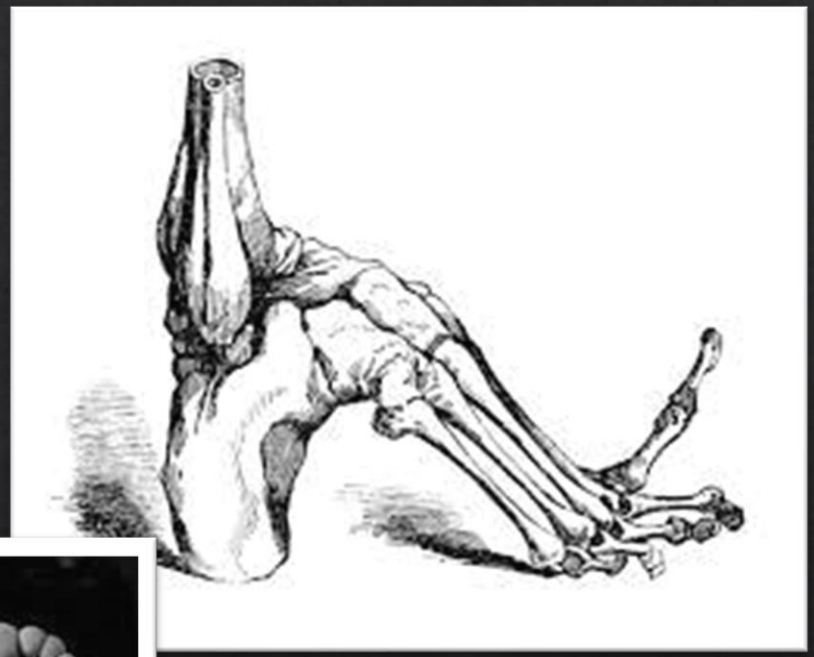
How?

- Feet of female children (4-7yrs old) bound in such a way that the MTT bent downwards & forced toward the heel of the foot.
- Tarsals & MTT fractured multiple times to create ‘lotus foot’

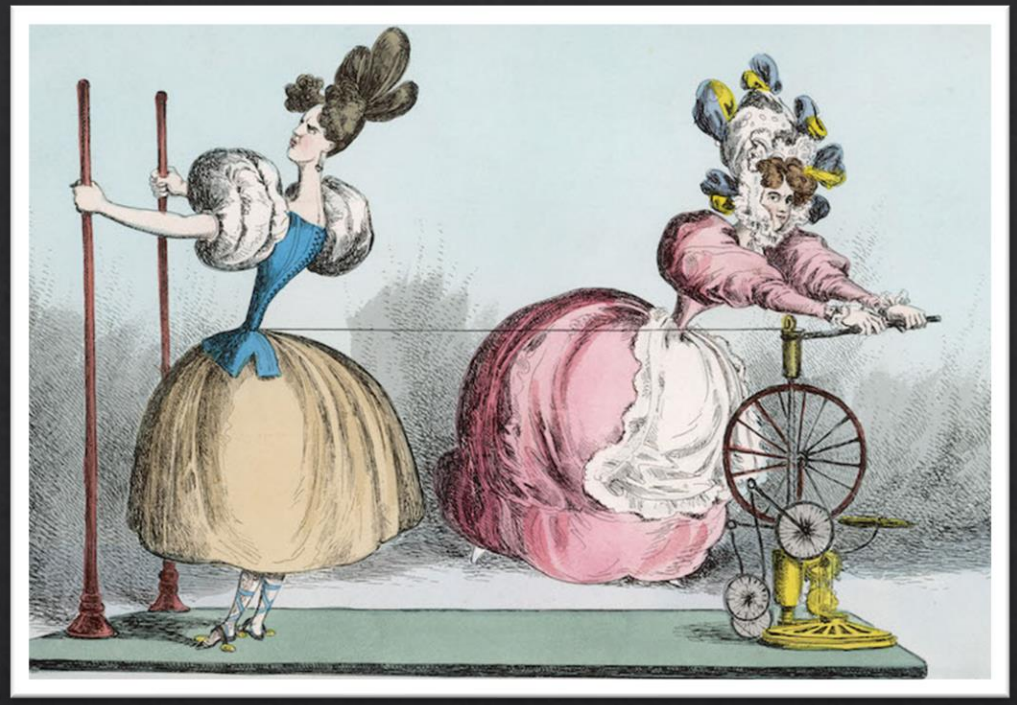
3. Foot Binding

Why?
Cosmetic & Associated with social status and ethnic/cultural identity

Risks: abnormal amgulation of the tarsal bones, secondary complications (necrosis of the toes, sepsis), less activities, falling



4. Waist Training



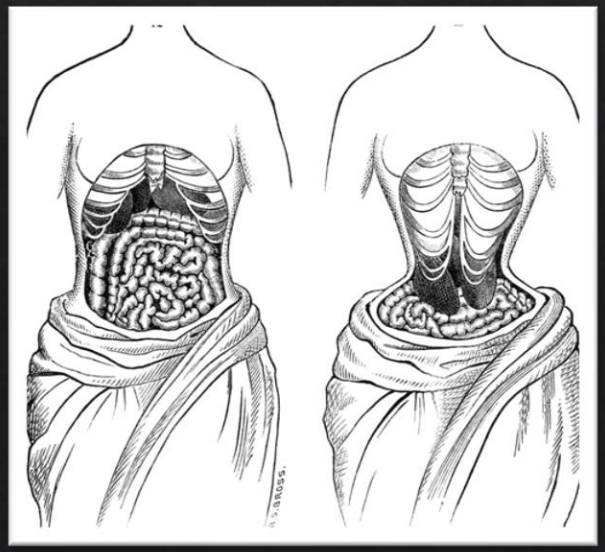
Where and when?

- European post-Medieval pop
- Popular from the 16th cent AD
- Reaching a peak in the mid 19th cent AD

How?

Change the torso:

- Inferiorly & laterally directed deformations of the spinous processes in the TH. V
- Deformation of the 4th – 10th ribs
- S shape
- Sternal ends directed inferiorly



4. Waist Training

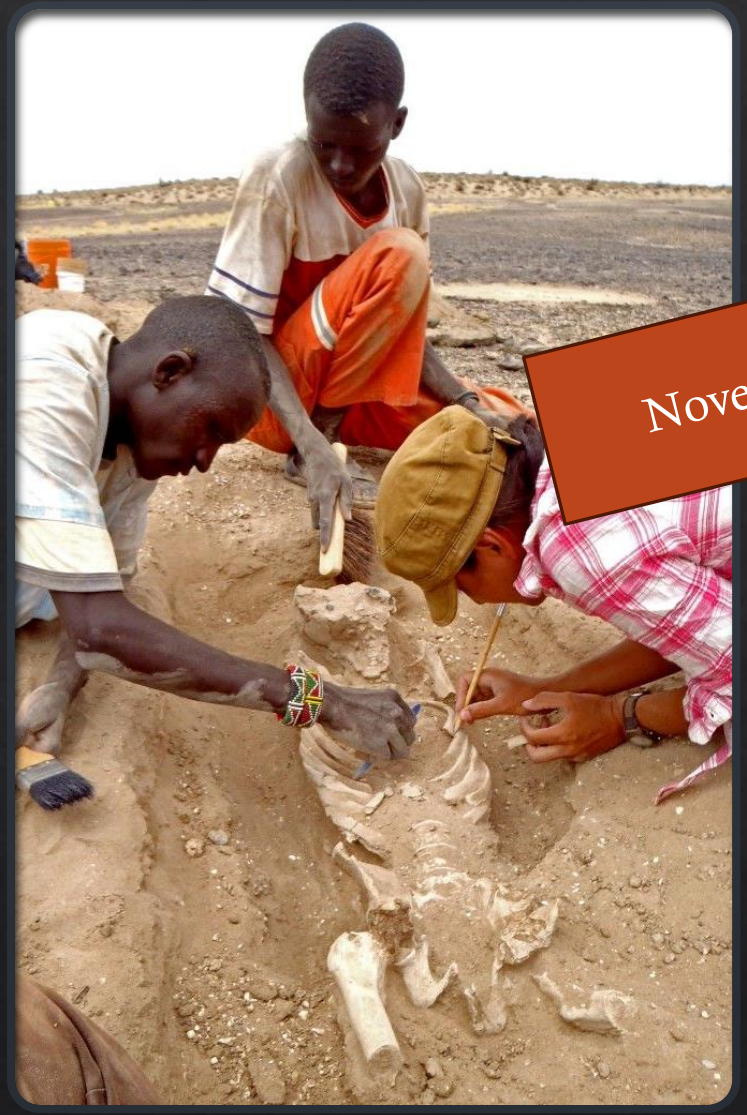
Why?
Cosmetic
Medical (rare)

Risks: multiples fractures at the neck amd bodies, ribs having a tapered appearance

Part IV: anthropology of war and violence

Violence as a social strategy

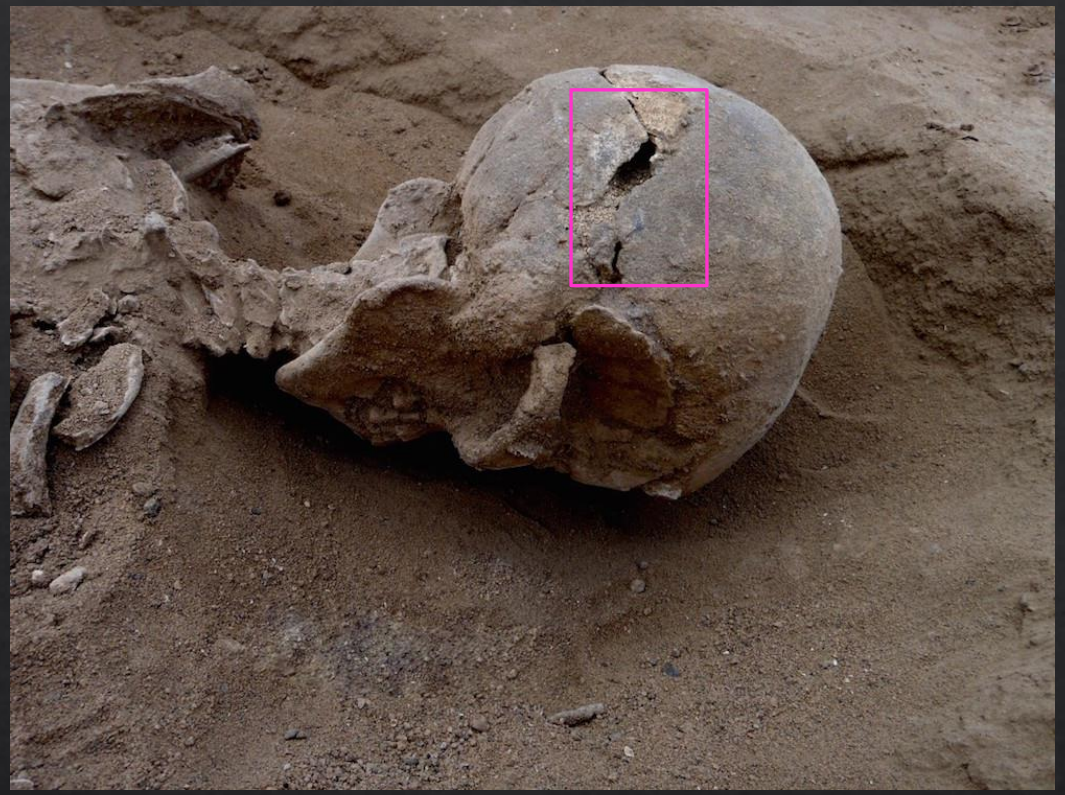
- war is a social strategy that comes into play under certain types of circumstance once a particular level of social group size and organization has been reached
- violence increases with group size and social complexity
- war only became common as larger, sedentary civilizations emerged around **12,000 years ago**



The Oldest Known Evidence of Warfare Unearthed

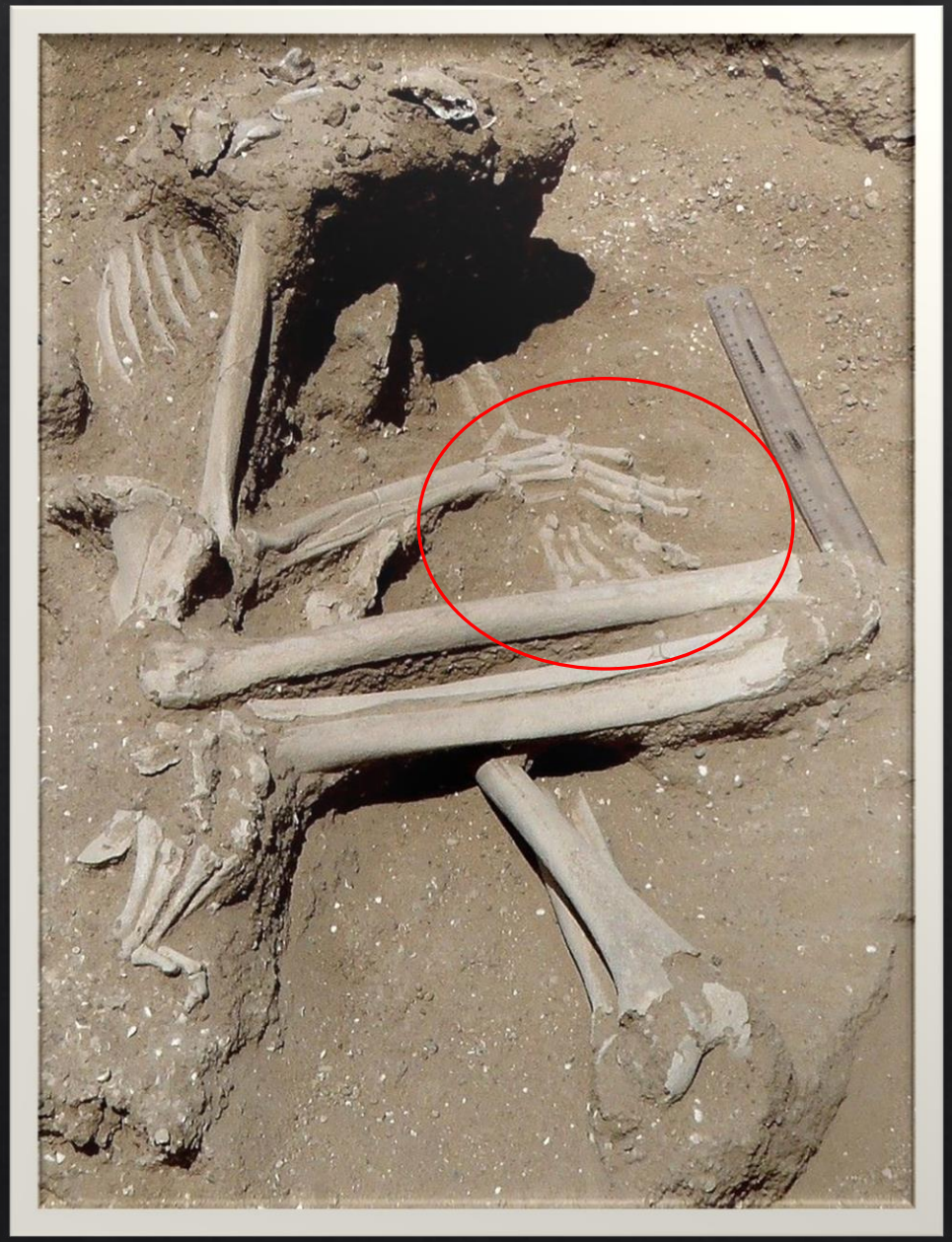
November 2016

- Near lake turkana (kenya)
- Around 10,000 years ago
- At least 27 individuals
- About 10: wounds consistent with violence



blunt force wounds suggesting clubbed to death

tiny obsidian blade lodged in a skull + another cut from a projectile on the other side

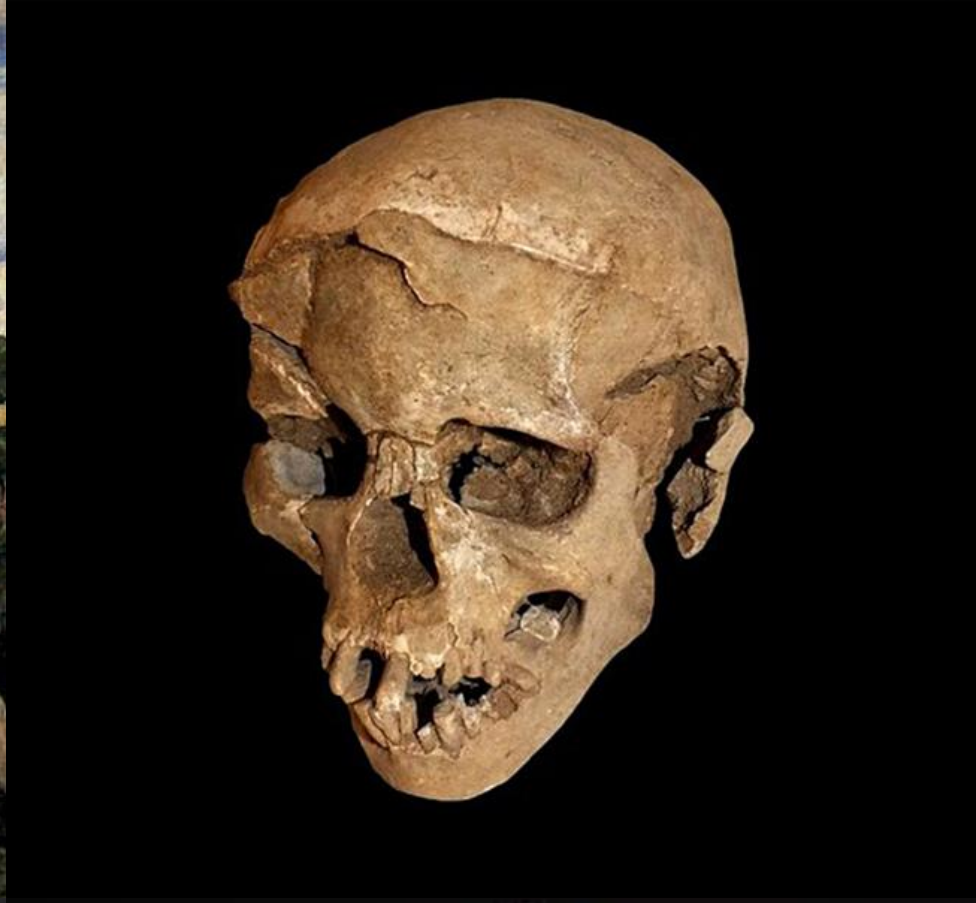


CHILDREN & WOMEN WERE NOT EXCLUDED

fractures on

1. the knees
2. possibly on the left foot

Position of the hands → her wrists may have been bound



Several injuries to the skull → clubbed with a wooden implement

Published: 23 November 2016

Contesting the massacre at Nataruk

Christopher M. Stojanowski, Andrew C. Seidel, Laura C. Fulginiti, Kent M.

Nature **539**, E8–E10 (2016) | Cite this article

3766 Accesses | **20** Citations | **39** Altmetric | Metrics

ARISING FROM M. Mirazón Lahr *et al. Nature* **529**, 394–398 (2016); doi:10.1038/nature16477

Mirazón Lahr *et al.*[1] present the earliest evidence of inter-group warfare at the East African site of Nataruk. Their evidence of warfare is based on three inferences: that the skeletons were all contemporaneous, that the bodies were left unburied, and that most individuals exhibited perimortem trauma consistent with interpersonal violence. We believe the data suggest that the burials are not contemporaneous and that most of the observed cranial damage is inconsistent with blunt force trauma. Therefore, the inference of inter-group warfare is premature. There is a Reply to this Comment by Mirazón Lahr, M. *et al. Nature* **539**, http://dx.doi.org/10.1038/nature19779 (2016).

November 2016

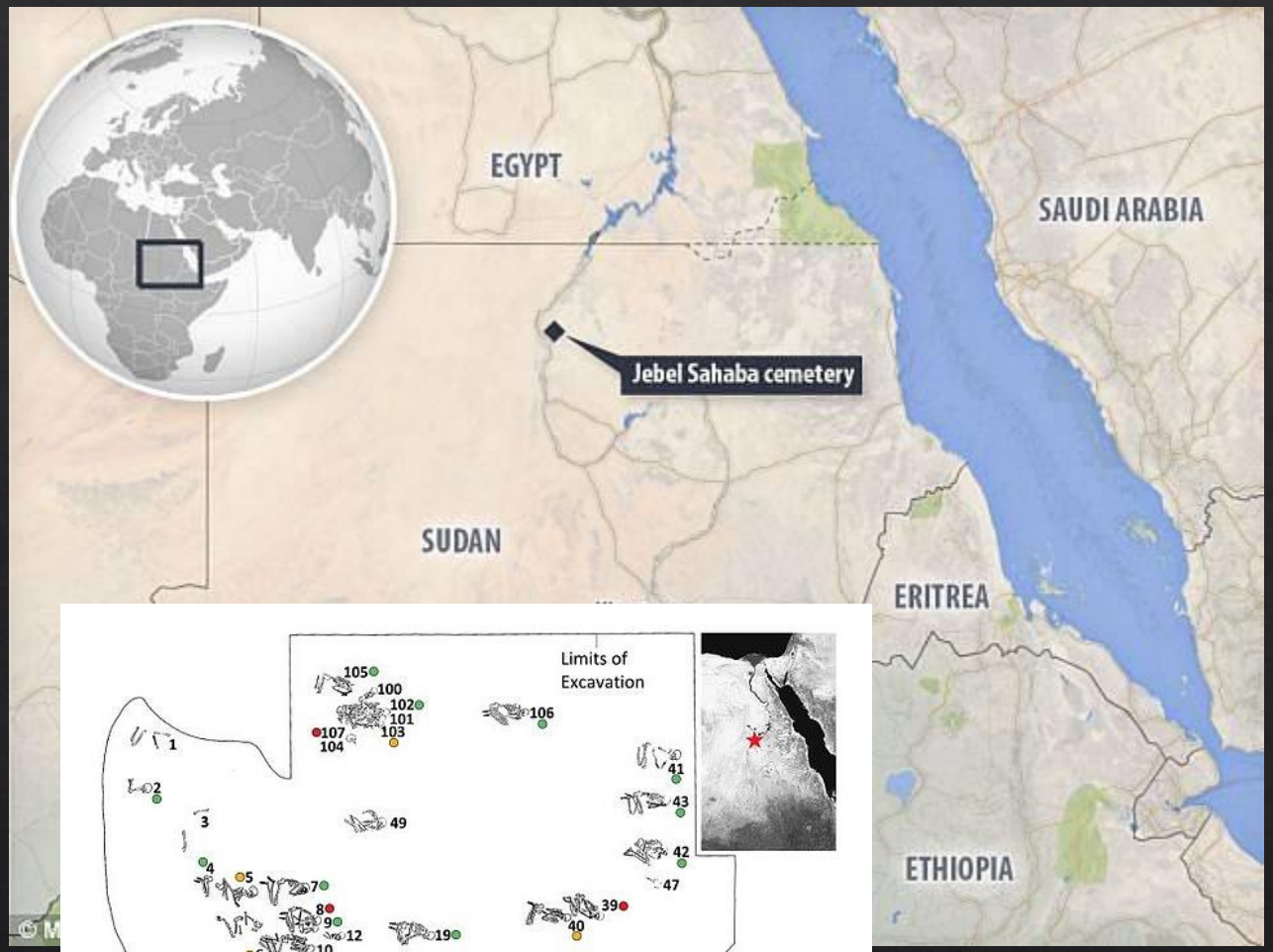
BUT! Site may not represent intragroup violence, as claimed!

- questioned this analysis
- Blunt-force cranial trauma may have been misidentified
- All individuals may not have been buried at the same time

Early 2020

Earliest known war was a repeated conflict 13,400 years ago

hunter-fisher-gatherers



- cemetery discovered in 1965
- dating back to 11,000BC
- on the east bank of the Nile
- at least 61 individuals
- 45% died from inflicted wounds

106 previously undocumented lesions and traumas

1. projectile injuries (from arrows or spears)

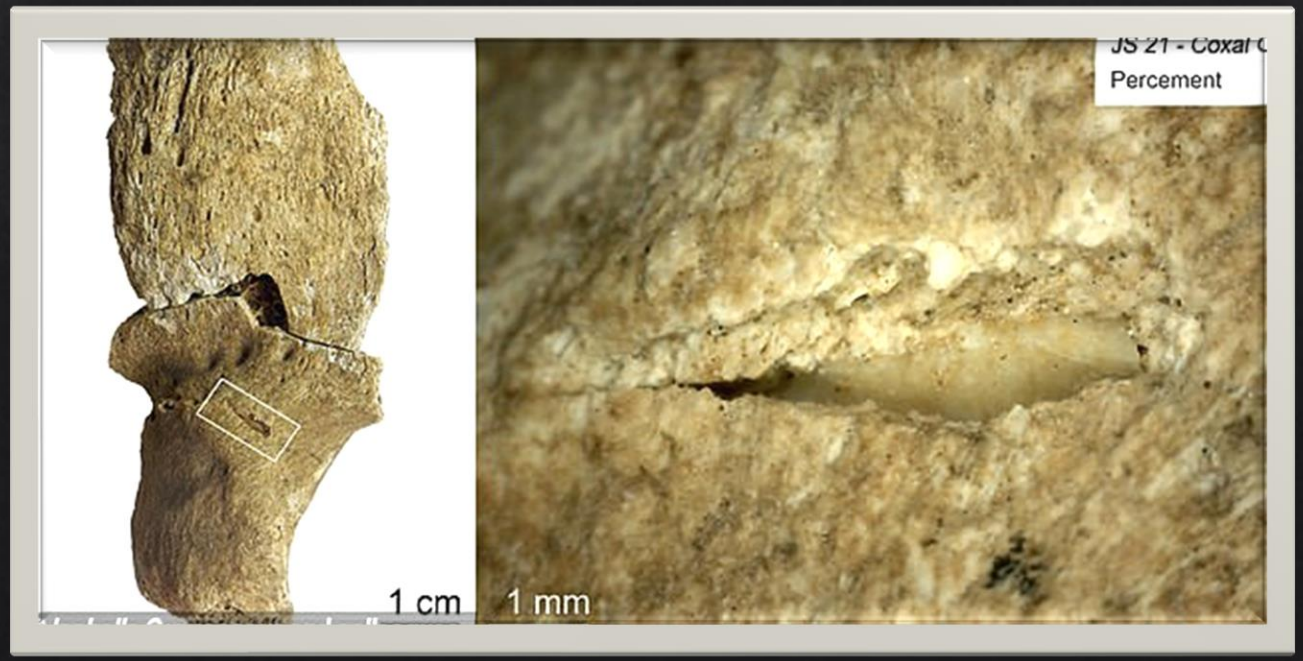
2. trauma (from close combat)

3. traces associated to natural decay

50% injuries identified as puncture wounds

caused by projectiles like spears & arrows,

= supports the theory of being attacked from a distance, rather than during domestic conflicts.



new data supporting sporadic & recurrent episodes of inter-personal violence

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nature > scientific reports > articles > article

Article | Open Access | Published: 27 May 2021

New insights on interpersonal violence in the Late Pleistocene based on the Nile valley cemetery of Jebel Sahaba

Isabelle Crevecoeur ✉, Marie-Hélène Dias-Meirinho, Antoine Zazzo, Daniel Antoine & François Bon

Scientific Reports **11**, Article number: 9991 (2021) | Cite this article

16k Accesses | **8** Citations | **1672** Altmetric | Metrics

Abstract

The remains of 61 individuals buried in the cemetery of Jebel Sahaba (site 117) offer unique and substantial evidence to the emergence of violence in the Nile Valley at the end of the Late Pleistocene. Excavated and assessed in the 1960s, some of the original findings and interpretations are disputed. A full reanalysis of the timing, nature and extent of the violence was conducted through the microscopic characterization of the nature of each osseous lesion, and the reassessment of the archaeological data. Over 100 previously undocumented healed



- Territorial and environmental pressures
Climate changes
Environmental disaster of the ice age
Live together in a smaller area
Competition for food

TENSIONS FLARE

TOILET PAPER HOARDING LEADS TO FIGHT

Are Humans Inherently Violent?