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Osteobiography of an Adolescent from Bronze Age (3146-3130 BP) Non Nok Tha, Thailand

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Introduction

- Osteobiography is suited to investigating the individual experiences of the Agricultural Transition
- Non Nok Tha is an early agricultural site in Southeast Asia
- Previous research argued that domestication of rice led to better health outcomes; however, this may not have been the case for all individuals



Figure 1

Background

- Non Nok Tha is an archaeological site located in northeast Thailand's Phu Wiang section of the Khorat Plateau (Figure 1)
- The site is a small mound initially used as a cemetery^{1,2}
 - First millennium BCE⁴
 - 75 generations
 - 2 separate affiliative social groups living in the local area, likely in different villages
- One of Thailand's first large mounds to be extensively excavated
 - First discovered via a survey on May 3, 1964
- Domestication of cattle, water buffalo, & pigs
- Rice domestication & cultivation
- Early Thai metalworking of bronze & iron

Material and Methods

- Standard osteological methods for macroscopic analysis were used to estimate age, sex, and pathological changes to the bone³
- Age at death was estimated using dental eruption, skeletal development, and long bone fusion

Individual 33

- 15-18 years old
- Probable male (subadult estimation of sex challenging)
- Severe localized periosteal reaction on distal end of left tibia
 - Ongoing infection
 - No signs of healing
 - Sharp striations on the cortical bone
 - Large callus (Figure 2)
- Generalized moderate periosteal reaction along the entire shaft on right tibia
- Some signs of healing

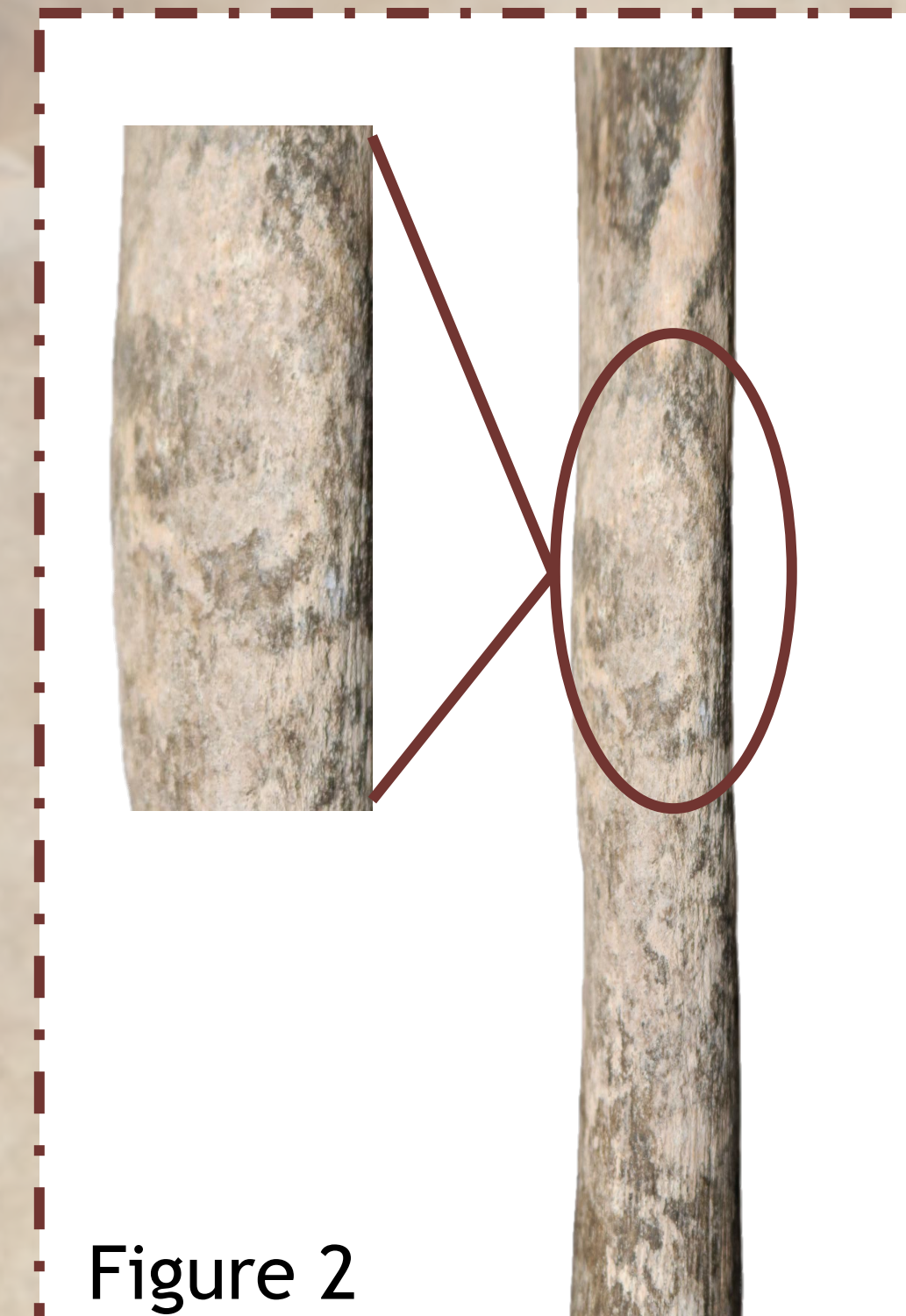


Figure 2



Figure 4

- Generalized moderate periosteal reaction along whole shafts of the right & left femur
 - Active & healing
- Healed porotic hyperostosis on left & right parietal bones
- Porotic Hyperostosis on parietal & occipital bones
 - Frequently linked with iron deficiency anemia⁸



Figure 3



Figure 5

- Linear enamel hypoplasia present on incisor
 - Genetic abnormalities or trauma
 - Mainly occur as a response to non-specific systemic stress during early childhood⁶
- Schmorl's Node & Osteoarthritis present on thoracic vertebrae (Figure 3,4)
 - Resulting from agriculture, metalworking, or salt harvesting
 - Strenuous labor
- Moderate dental wear on both mandible & maxillary incisors (Figure 5)
 - Possible tool use or repetitive activity

Discussion

- Dietary sodium affects immune system⁷
 - Proinflammatory cytokines are primarily generated by activated macrophages and play a role in controlling inflammatory responses⁸
- High levels of salt consumption in day-to-day life might have exacerbated active periosteal present in Individual 33
 - Salt fermentation & other social/cultural practices
- Perhaps Individual 33 was socially considered an adult & expected to work equivalent to an adult male of this time period

Conclusions

- Individual 33 did not have an easy life
 - Endured trauma & disease
 - Died at a young age
- Further research + studies are needed to better understand stress & its effect on the skeletal
- Further research + studies needed into the diets and day-to-day life of Non Nok Tha
- More information about labor distribution - including age range needs to be examined

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References

