

Kent Academic Repository

Full text document (pdf)

Citation for published version

Dolding-Smith, Jessica and Pitfield, Rosie and Deter, Chris and Mahoney, Patrick (2019) The application of histomorphometry to puberty in the archaeological record. In: American Journal of Physical Anthropology. Program of the 88th Annual Meeting of the American Association of Physical Anthropologists. 168 (S68). p. 60. Wiley

DOI

<https://doi.org/10.1002/ajpa.23802>

Link to record in KAR

<https://kar.kent.ac.uk/76213/>

Document Version

Author's Accepted Manuscript

Copyright & reuse

Content in the Kent Academic Repository is made available for research purposes. Unless otherwise stated all content is protected by copyright and in the absence of an open licence (eg Creative Commons), permissions for further reuse of content should be sought from the publisher, author or other copyright holder.

Versions of research

The version in the Kent Academic Repository may differ from the final published version.

Users are advised to check <http://kar.kent.ac.uk> for the status of the paper. **Users should always cite the published version of record.**

Enquiries

For any further enquiries regarding the licence status of this document, please contact:

researchsupport@kent.ac.uk

If you believe this document infringes copyright then please contact the KAR admin team with the take-down information provided at <http://kar.kent.ac.uk/contact.html>

The application of histomorphometry to puberty in the archaeological record

JESSICA AM. DOLDING-SMITH, ROSIE PITFIELD, CHRIS DETER and
PATRICK MAHONEY.

Human Osteology Lab, Skeletal Biology Research Centre, School of Anthropology
& Conservation, University of Kent

March 30, 2019 ,

Adolescence is marked by the onset of puberty whereby hormonal changes cause the body to mature into its reproductive capacity, adult body size, and behavioural maturity. Specific bony secondary sexual characteristics develop during the six stages of puberty: initiation, acceleration, peak height velocity, deceleration, maturity, and completion. Macroscopic skeletal indicators of puberty provide one way to estimate the stage of puberty attained at the time of death.

This study determines if underlying microscopic changes in bone growth are linked to the macroscopic skeletal stages of puberty. Age-at-death was reconstructed from dental formation for 40 juvenile skeletons from Blackgate, Newcastle ($n=17$), Fishergate Barbican, York ($n=13$), and St Gregory's Priory, Canterbury ($n=10$). Pubertal stage was estimated from the hamate hook, distal hand phalanges, distal radius, proximal ulna, iliac crest, cervical vertebrae, and mandibular canine root. Microscopic features of bone remodelling were measured from previously produced histological thin-sections of the anterior humerus mid-shaft ($n=40$) using CellSens analysis software. Secondary osteon density, size, and shape parameters were measured.

Analyses revealed a curvilinear relationship between puberty stage and bone remodelling. Osteon population density increases during the acceleration phase of puberty and then tapers off throughout subsequent puberty stages. This indicates that pubertal stage relates to bone remodelling, with the fastest remodelling being associated with the most rapid puberty stage. This is the first study to explore the possible link between puberty and microstructural bone growth.

This research was funded by the University of Kent Vice Chancellor's Research Scholarship and the Dora Harvey Memorial Research Scholarship.