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Microscopic markers of an infradian biorhythm in human juvenile ribs

ROSIE PITFIELD¹, JUSTYNA J. MISZKIEWICZ² and PATRICK MAHONEY¹.

¹Anthropology and Conservation, University of Kent, ²Archaeology and Anthropology, Australian National University

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Recent studies have indicated that an infradian systemic biorhythm may coordinate aspects of human hard tissue growth and adult body size. Here we investigate if evidence of this biorhythm retained in human teeth as the periodicity of Retzius lines (RP) corresponds with the microstructural growth of a non-weight bearing bone, the rib. Using static histomorphometric methods, the RP of permanent first molars was calculated and combined with measures of bone remodelling for ribs from 50 human juvenile skeletons. Results provide the first evidence that the infradian biorhythm is linked to bone remodelling in children. Retzius periodicity was negatively correlated with relative osteon area and Haversian canal size in children aged between eight to 12 years. Results imply that a faster biorhythm (fewer days) relates to increased bone deposition during remodelling leading to larger osteons relative to Haversian canal size in ribs from these children. A faster biorhythm was also correlated with the relative cortical area of their ribs. Relationships between bone remodelling and the biorhythm were much more variable in younger children aged between three to seven years of age. Our results provide the first evidence that an infradian biorhythm is linked to bone remodelling in older children.