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Pathological phalanges in a camarasaurid sauropod dinosaur and implications on behaviour

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Several types of pathological bony overgrowth are known from various dinosaur taxa but, except for stress fractures, are rarely reported from appendicular elements. Herein we describe pathological manual and pedal phalanges of a camarasaurid sauropod (SMA 0002), which show features rarely recognised in non-avian dinosaurs. They include lateral osteophytes and smoothing of phalangeal articular surfaces, a deep pit, proximal enthesophytes in pedal unguals, distal overgrowth associated with a fracture, and a knob-like overgrowth lateral to the distal condyles of a pedal phalanx. Their causes were assessed by means of visual examination, CT scans, and bone histology, where possible. The lateral osteophytes are interpreted as symptoms of osteoarthritis. The ossified tendon insertions in the unguals are most probably the result of prolonged, heavy use of the pedal claws, possibly for scratchdigging. The distal overgrowth is interpreted to have developed due to changed stress regimes, and to be the cause for the fracture. The deep pit represents most likely a case of osteochondrosis, whereas the knob-like overgrowth likely represents a post-traumatic phenomenon not previously reported in dinosaurs. The study confirms that a rigorous assessment of pathologies can yield information about behaviour in long-extinct animals.

Key words: Dinosauria, Sauropoda, camarasaurids, paleopathology, osteoarthritis, enthesophytes, osteochondrosis, bone tumour, Jurassic, Morrison Formation, Wyoming, USA.

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