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A re-evaluation of fossil hominin obstetric constraints

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Compared to other primates, humans are claimed to have a more difficult childbirth involving extreme cephalopelvic disproportion and variable birth-canal cross-sections that necessitate fetal rotations. The antecedents of this "obstetric dilemma" in hominins are debated. Because traditional obstetric planes (inlet, midplane, outlet) may not accurately define points of constriction in non-human specimens, a re-evaluation of obstetric constraints in fossil hominins is called for.

Five fossil hominin pelves (A.L. 288-1, Sts-14, Sts-65, MH2, Tabun-1) were reconstructed and the minimum dimensions within each birth canal were determined, using appropriate pelvic elements from other fossil specimens to reconstruct fragmentary specimens. To assess the degree of cephalopelvic disproportion, estimated fetal head dimensions (length and breadth) and shoulder breadth were compared to the minimum AP and ML dimensions of the birth canal. Next, the pattern of shape change (AP/ML) throughout the birth canal was examined.

These analyses demonstrate that human-defined obstetric planes do not represent the true minimum dimensions in fossil hominin birth canals. The pelvic inlet represents the minimum AP dimension in modern humans and MH2, but in no other fossils. The fossil pelves exhibit shape changes throughout the birth canal that differ in each specimen. Inferred birth mechanisms in these fossil hominins differ correspondingly, and do not present a clear, anagenetic trajectory from easy to difficult childbirth. Interspecific differences in birth canal morphology and fetal dimensions suggest that birth was accommodated in different species by differing mechanisms, including altered pelvic morphology, cranial molding, and different fetal rotation patterns.

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