

**When it comes to back care, size really doesn't matter.
In African safari elephants, does carrying a rider - or multiple riders - impact on musculoskeletal integrity?**

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Summary:

This study investigated the effect of weight bearing on joint and limb segment angles in fore and hind limbs of the ridden elephant.

Methods:

Five sound working safari elephants completed walking trials on firm level ground under eight different rider conditions; no rider, one, two and three riders, all with and without saddle. Self-adhesive retro-reflective markers were attached at ten anatomical locations; five on the left forelimb and five on the left hind limb. Digital video cameras recorded and data was analysed using 2D motion-analysis software. Forelimb and hind limb segment angles (relative to vertical) and joint angles (degrees) were measured at mid stance (MS); range of motion (ROM, degrees) from touch down to toe off was calculated for each valid (n=970) stride. Data was analysed by ANOVA and T-Test statistics.

Results:

The presence of rider(s) significantly influenced ($P < 0.01$) a greater number of limb segments and joint angles in MS than the presence of a saddle. Rider(s) or saddle had no significant effect ($P > 0.05$) on MS angles of manus, carpus, pes or femorotibialis/femoropatellaris joint. At MS, humerus angle of retraction increased with rider number; tarsus joint angle reduced as rider number increased with no saddle; with saddle, there was no significant effect. Carpus joint ROM reductions were significant ($p < 0.001$) for 3 riders with and without a saddle.

Conclusions:

The presence of rider(s) influences limb kinematics in elephants indicating compensation for weight bearing and the potential for musculoskeletal compromise. The use of a saddle may modify the potential for musculoskeletal compromise.