

The effects of medullary reaming on the torsional strength of the femur

Abstract:

The authors have investigated the effect on the torsional strength of the bone of reaming the medulla of the femur from 12 to 16 mm in steps of 1 mm. Five groups of femurs, with 10 pairs in each, were tested comparatively in torsional loading and the torque required to cause fracture and the angle through which the bone had twisted at fracture were directly recorded for each pair.

The results of maximum torque at failure (expressed as a proportion of the same parameter for the unreamed femur) plotted against the ratio of bone shaft diameter to reamed diameter showed a good correlation. The proportional maximum torque was found to range from 0.63 (at 12 mm) to 0.36 (at 16 mm) with a sharp transition between 14 and 15 mm. This drastic reduction was felt to be important for both the surgeon and the patient.