Summary

4 annotations on 1 page by Mok Ying Ren

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withstood by the reconstruction was quantified in the failure test.

RESULTS AND CONCLUSIONS

Peak load in the failure test was not found to be statistically different between the two-hole and four-hole designs. In cyclic testing, the two-hole configuration exhibited statistically smaller fragment migration in both shear and distraction than the four-hole design ($p < 0.05$). The strain magnitude in the side plate was not statistically different in the cyclic or failure tests. The femurs with a greater neck angle failed by crushing of the bone in the neck. The femurs with a lesser neck angle failed due to bending of the hardware.

#1 *p.2*

biomechanically as stable as the four-hole DHS in cyclic and failure loads under the conditions tested. These results, in concert with clinical experience, can be used to support the use of the two-hole DHS for the reconstruction of intertrochanteric fractures without a diaphyseal extension.

#2 *p.2*

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Biomechanical evaluation of the dynamic hip screw with two- and four-hole side plates.

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Abstract

OBJECTIVES

To determine the biomechanical strength and stiffness of a dynamic hip screw (DHS; Synthes USA, Paoli, PA, U.S.A.) with a two-hole side-plate as compared with a four-hole side-plate design for the reconstruction of unstable three-part intertrochanteric fractures.

DESIGN

Eight matched pairs of embalmed human femurs were tested in two modes: (a) 2,000 cycles of simulated physiologic loading; (b) test to failure.

SETTING

Laboratory. Simulated single leg stance using a simulated pelvic loading mechanism with abductor loading. Strain and displacement sensors were

used to measure fragment shear and distraction and surface strain in the proximal side plate.

SPECIMENS

Eight pairs of skeletonized embalmed cadaveric specimens were selected on the basis of femoral neck angle and absence of old fracture, anatomic anomaly, or pathology.

INTERVENTION

The specimens were divided into two groups: (a) left femurs received the two-hole side-plate design; (b) right femurs received the four-hole side-plate design. All fractures were reconstructed by the same surgeon using the manufacturer's instructions.

MAIN OUTCOME MEASUREMENTS

Implant placement was verified by radiographic measurement of tip-to-apex distance. In cyclic testing, the amount of femoral neck fragment migration in both distraction and shear was quantified. Strain magnitude in the side plate was measured in both cyclic and failure testing. The peak load withstood by the reconstruction was quantified in the failure test.

RESULTS AND CONCLUSIONS

Peak load in the failure test was not found to be statistically different between the two-hole and four-hole designs. In cyclic testing, the two-hole configuration exhibited statistically smaller fragment migration in both shear and distraction than the four-hole design ($p < 0.05$). The strain magnitude in the side plate was not statistically different in the cyclic or failure tests. The femurs with a greater neck angle failed by crushing of the bone in the neck. The femurs with a lesser neck angle failed due to bending of the hardware. The results of this investigation revealed that the two-hole DHS is biomechanically as stable as the four-hole DHS in cyclic and failure loads under the conditions tested. These results, in concert with clinical experience, can be used to support the use of the two-hole DHS for the reconstruction of intertrochanteric fractures without a diaphyseal extension.

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