✚ Evidence in focus

Smith+Nephew

Unstable pertrochanteric fractures treated with TRIGEN◊ INTERTAN◊ Intertrochanteric Antegrade Nail show significantly improved biomechanical stability compared with Gamma3™ nails in a cadaveric model

✚ Plus points

Significantly higher mean cycles to failure with TRIGEN INTERTAN compared with Gamma3 (p=0.02)
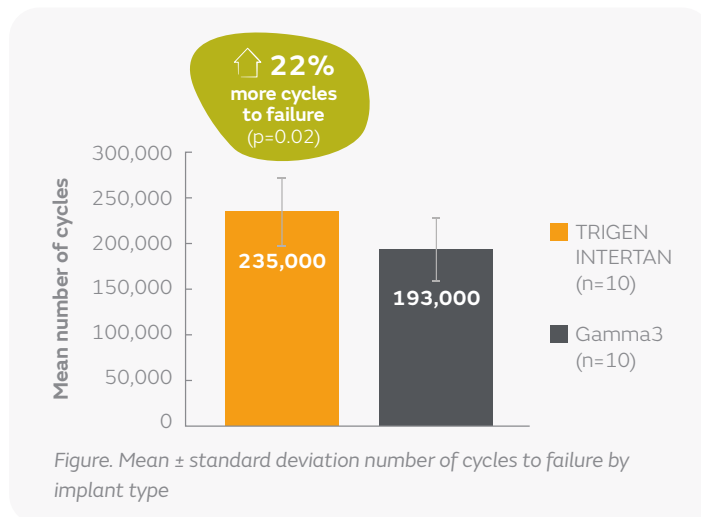
Significantly higher average load to failure for TRIGEN INTERTAN compared with Gamma3 (p=0.02)

Overview

- Biomechanical study evaluating the post-treatment stability of unstable, multifragmentary pertrochanteric fractures in 10 pairs of cadaveric femurs (mean age, 46 years), randomly allocated within each pair to either:
  - TRIGEN INTERTAN (n=10)
  - Gamma3 (n=10; Stryker, Mahwah, NJ, USA)

- Cyclic fatigue testing was conducted, with loads progressively increasing by 100N every 20,000 cycles
- Failure was defined as 15mm of actuator displacement

Results

- Compared with Gamma3, TRIGEN INTERTAN demonstrated:
  - Significantly higher mean number of cycles to failure (p=0.02; Figure)
  - Significantly higher mean load to failure (1640 vs 1430N; p=0.02)
  - Significantly lower mean femoral head rotation at baseline (0.3 vs 1.7°; p=0.01), with significant improvements sustained up to 120,000 cycles (p<0.05)
  - Significantly lower mean varus collapse at baseline (0.3 vs 1.1°; p=0.01) with significant improvements sustained up to 120,000 cycles (p<0.05)
  - 38% higher initial stiffness (1058 vs 652N/mm; p=0.005), with significant improvements sustained up to 120,000 cycles (p=0.047)

22% more cycles to failure (p=0.02)

TRIGEN INTERTAN (n=10): 235,000

Gamma3 (n=10): 193,000

Figure. Mean ± standard deviation number of cycles to failure by implant type

Conclusions

In this biomechanical study, TRIGEN INTERTAN was associated with significant improvements in stiffness, femoral head rotation and varus collapse compared with Gamma3. This resulted in TRIGEN INTERTAN constructs having significantly more cycles to failure, demonstrating the potential benefit of optimising lag screw and nail design.

Citation

*Hoffmann S, Paetzold R, Stephan D, Püschel K, Buehren V, Augat P. Biomechanical evaluation of interlocking lag screw design in intramedullary mailing of unstable pertrochanteric fractures. *J Orthop Trauma*. 2013;27(9):483–490.

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