TRIGEN INTERTAN vs Stryker Gamma3 summary

- Initial stiffness of INTERTAN construct almost 40% greater than Gamma3™
- INTERTAN femoral head rotation and varus collapse initially up to 84% lower than Gamma3
- After 140,000 cycles, interfragmentary movement on average 33% less on INTERTAN when compared to Gamma3
- Implant toggle/medial translation in proximal femur significantly lower in INTERTAN vs Gamma3 providing higher survival rate
- Average failure load was over 200N higher on INTERTAN than Gamma3
Problems in hip fractures

Complication rates in proximal femur fractures as high as 16% in highly unstable fractures
- Malalignment and malrotation of femur
- Delayed healing causing implant failure

Micromotion caused by
- Collapse of proximal fragment
- Movement between fracture fragments
- Lack of interfragmentary compression
- Instability of device – medial translation of the construct due to nail toggle in proximal femur

Conclusions

Integrated screws
- Reduced varus collapse of femoral head
- Reduced rotation of femoral head and neck
- Reduced movement between fracture fragments
- Interfragmentary compression in a linear fashion

Trapezoidal shape
- Reduced toggling of the nail in the proximal femur
- Enhanced nail stability helping to prevent medial translation and implant failure
Mechanical testing

• 10° angle adduction/10° angle extension out-of-plane configuration used to simulate the resulting hip force at heel strike during gait
• Cyclical fatigue testing performed under increasing axial load until failure
• Each Femora specimen cut using proximal femoral osteotomies to replicate AO/OTA Type 31A2.2 unstable pertrochanteric fracture

Results

• Mean value of the failure load for the TRIGEN™ INTERTAN™ device was 1640 ± 56N compared to 1430 ± 60N for Gamma3™
• In 9 out of 10 comparisons, the TRIGEN INTERTAN device survived on average 51,000 ± 4,000 additional cycles more than Gamma3
Results: Femoral head rotation

Absolute value of rotation of the femoral head around the axis of the lag screw measured every 20,000 cycles

![Graph showing femoral head rotation over cycles for Gamma3 and INTERTAN devices.]

Highlights

- Rotation of femoral head higher for Gamma3 (1.7 ± 1.5° angle) compared to the TRIGEN® INTERTAN device (0.3 ± 0.3° angle) for up to 120,000 cycles.
- Less femoral head rotation around the lag screw may result in less chance for leg length discrepancy due to femoral neck shortening and potentially better healing rates.
Results: Varus collapse

- Baseline varus collapse of the femoral head was higher for Gamma3 (1.1 ± 0.5°) compared to the TRIGEN® INTERTAN device (0.3 ± 0.2° angle) for up to 120,000 cycles.

- Less varus collapse may result in a more normal gait for the patient making it easier to ambulate and return to pre-fracture status quicker.

Highlights
Results: Implant stiffness

Stiffness of the bone implant construct measured every 20,000 cycles

Highlights

- Initial stiffness of the TRIGEN® INTERTAN device was 38% higher compared to Gamma3 for up to 120,000 cycles
- Stiffer construct may result in quicker healing and return to pre-fracture status quicker
The first failure in the Gamma3 group failed at 142,248 cycles compared to the first failure in the INTERTAN group failed at 191,885 cycles. Survivability of Gamma3 construct (193,000 ± 35,000 cycles) was significantly reduced relative to INTERTAN construct (235,000 ± 38,000 cycles). Stronger nail in fatigue means it can withstand a potentially higher load for a longer period of time allowing a longer time for the bone to heal.

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Reference