



Talon™ Lag Screw



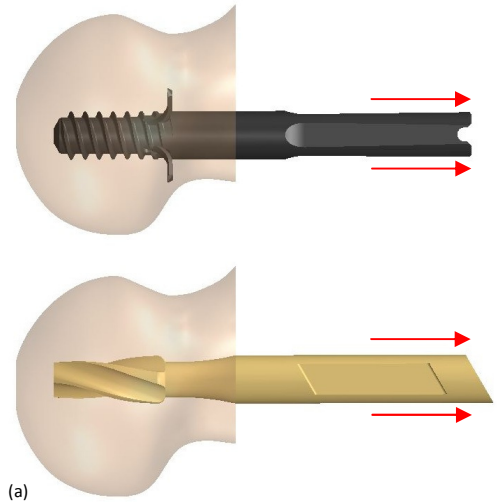
A Biomechanical Comparison with the
DePuy Synthes Helical Blade

Overview

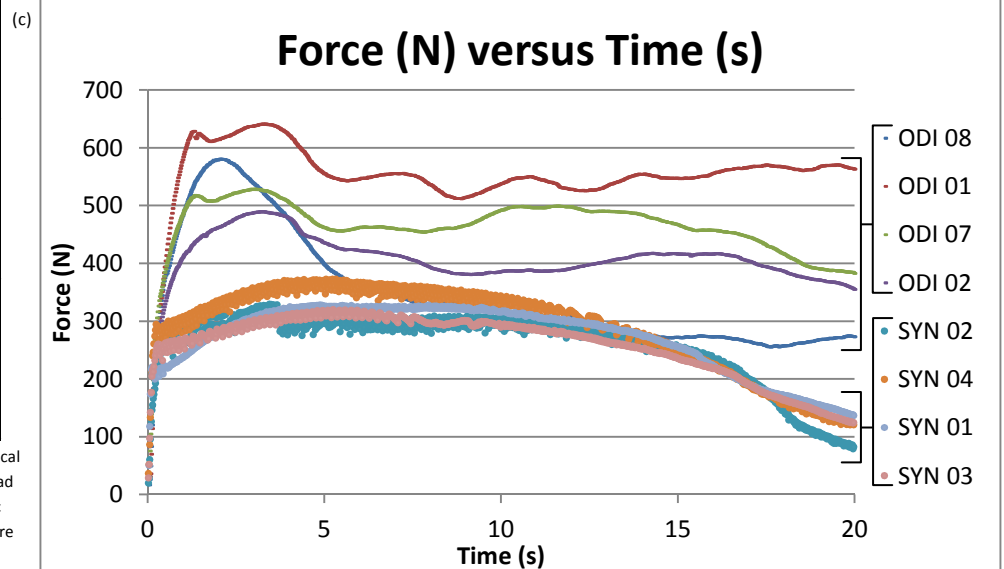
The Talon™ Lag Screw has been in existence in various forms for over a decade. The latest version, made of titanium, is used with the Talon™ DistalFix™ Proximal Femoral Nail for the treatment of hip fractures. The four deployable Talons™ allow it to gain superior purchase in the femoral head, even in osteoporotic bone. The goal of this testing was to evaluate the pullout resistance (N), a surrogate for the compressive force that can be applied via the lag screw, and ultimate torque to failure (N-m) of the Talon™ Lag Screw compared to the DePuy Synthes Helical Blade. Tests were conducted using Fourth-Generation Composite Femurs (Sawbones, Vashon, WA) with a core density of 8pcf to simulate an osteoporotic femur (standard core density of these femurs is 17pcf). All femurs were implanted by an orthopedic surgery resident using custom fixtures to ensure consistent implantation depth and orientation of all lag screws/blades. Implantation of each device was done in accordance with their respective technique guides.

Pullout Resistance

Interfragmentary compression aids fracture healing immensely, but is often difficult to achieve in the hip fracture setting on account of poor trabecular bone quality. The Talon™ Lag Screw, positioned slightly inferior of center in the femoral head when viewed in the AP plane, anchors into the cortex of the bone. **This cortical engagement translates to an ultimate pullout force, a surrogate for compression, 63.6% greater than that of the Helical Blade.**



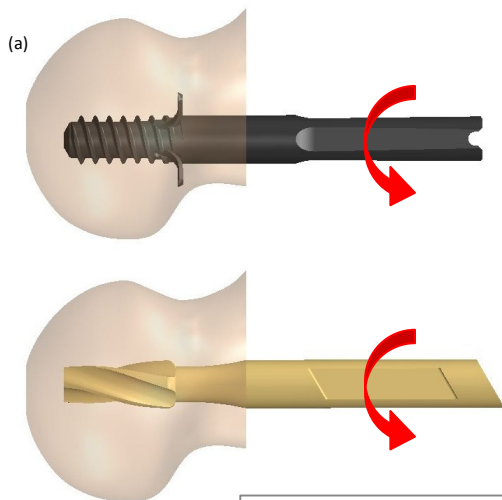
Specimen	Ultimate Pullout Load (N)	Average (SD)
ODI 08	579.83	559.27 (65.70)
ODI 01	640.45	
ODI 02	488.89	
ODI 07	527.92	
SYN 02	329.58	341.92 (23.07)
SYN 03	320.00	
SYN 04	372.77	
SYN 01	345.34	



(a) Schematic representation of Talon™ Lag Screw and Helical Blade implantation position as seen in the AP plane and load applied; (b) results of pullout resistance testing; (c) graphic depiction of pullout resistance testing results. Implants were subjected to a displacement of 1mm/sec.

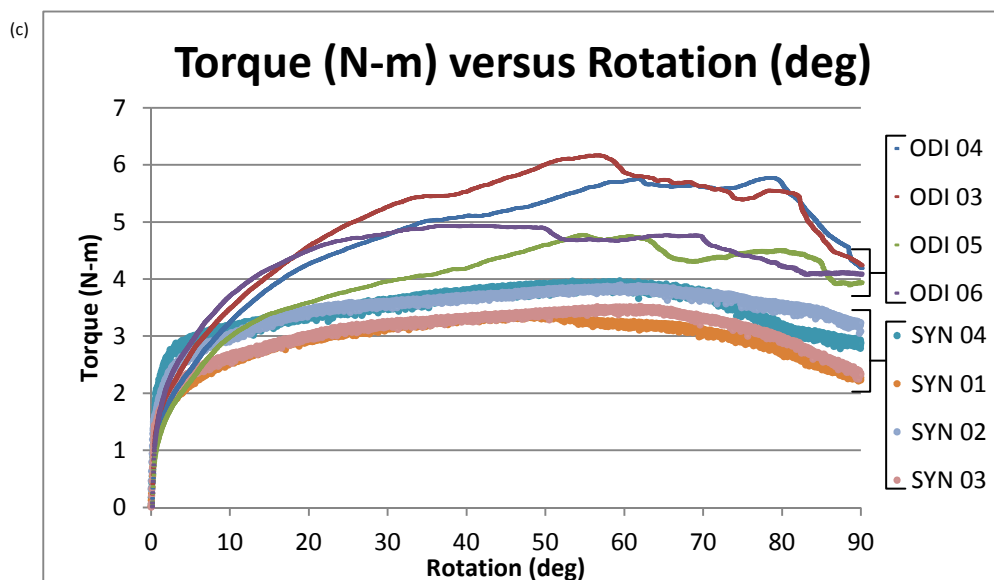
Torque to Failure

The ability to resist rotation about the axis of a lag screw is of critical importance particularly when the fracture line is perpendicular, or nearly perpendicular, to the femoral neck. This pattern is often seen in basicervical and intertrochanteric hip fractures, two types often treated with cephalomedullary devices. The Talon™ Lag Screw controls rotation by way of its deployable Talons™, which engage the cortex and span more than one inch tip-to-tip at full deployment. The DePuy Synthes Helical Blade works by creating an area of compressed bone adjacent to the blade edges. This means of fixation is highly dependent on bone quality, a factor that is often diminished in the osteoporotic population. **On average, the ultimate torque to failure of the Talon™ Lag Screw was found to be 46.5% greater than that of the Helical Blade. Furthermore, over the first 10° of rotation the average torque measured for the Talon™ Lag Screw was 18.8% greater than that of the Helical Blade.**



(b)

Specimen	Ultimate Torque (N-m)	Average (SD)	Torque @ 10deg (N-m)	Average (SD)
ODI 04	5.78	5.41 (0.67)	3.26	3.37 (0.31)
ODI 03	6.17		3.50	
ODI 05	4.78		2.99	
ODI 06	4.94		3.72	
SYN 02	3.90	3.70 (0.28)	3.01	2.84 (0.29)
SYN 03	3.52		2.65	
SYN 04	3.97		3.15	
SYN 01	3.40		2.53	



(a) Schematic representation of Talon™ Lag Screw and Helical Blade implantation position as seen in the AP plane and load applied; (b) results of torque to failure testing; (c) graphic depiction of torque to failure testing results. Implants were subjected to a rotation of 1°/sec.

All implantations and testing were conducted by an independent laboratory, the Phillip Spiegel Orthopaedic Research Laboratory at the Foundation for Orthopaedic Research and Education (F.O.R.E.) in Tampa, FL.



5912-F Breckenridge Parkway
Tampa, FL 33610
Phone: (888) 635-8535 Fax: (888) 632-8047
www.odi-na.com

Caution: Federal law (USA) restricts this device to sale by or on the order of a physician.