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Acutrak 2® Headless Compression Screw System
Upper Extremity

Key Publications

A Comparison of Two Headless Compression Screws for Operative Treatment of Scaphoid Fractures

Publication Excerpt

"Our study demonstrates that the Synthes headless compression screw experienced a greater loss of interfragmentary compressive force from the time of installation to the final steady state compression level. The higher post-installation compression of the Acutrak 2 Standard may be attributable to the greater number of threads throughout the entire length of the screw. The clinical significance of these results, are, at this point uncertain. We do demonstrate that a fully threaded design offers a more reliable compression that may translate to more predictable bony union."

Journal Abstract

Purpose

The purpose of this study was to compare the interfragmentary compression force across a simulated scaphoid fracture by two commonly used compression screw systems: the Acutrak 2 Standard and the 3.0 mm Synthes headless compression screw.

Methods

Sixteen (8 pairs; 6 female, 2 male) cadaver scaphoids were randomly assigned to receive either the Acutrak 2 or Synthes screw with the contralateral scaphoid designated to receive the opposite. Guide wires were inserted under fluoroscopic control. Following transverse osteotomy, the distal and proximal fragments were placed on either side of a custom load cell, to measure interfragmentary compression. Screws were placed under fluoroscopic control using the manufacturer's recommended surgical technique. Compressive forces were measured during screw insertion. Recording continued for an additional 60s in order to measure any loss of compression after installation was complete. The peak and final interfragmentary compression were recorded and paired t-tests performed.

Results

The mean peak compression generated by the Acutrak 2 Standard was greater than that produced by the Synthes compression screw (103.9 ± 33.2 N vs. 88.7 ± 38.6 N respectively, $p = 0.13$). The mean final interfragmentary compression generated by the Acutrak 2 screw (68.6 ± 36.4 N) was significantly greater ($p = 0.04$) than the Synthes screw (37.2 ± 26.8 N). Specimens typically reached a steady state of compression by 120-150s after final tightening.

Conclusion

Peak interfragmentary compression observed during screw installation was similar for both screw systems. However, the mean interfragmentary compression generated by the Acutrak 2 Standard was significantly greater. Our study demonstrates that the Synthes headless compression screw experienced a greater loss of interfragmentary compressive force from the time of installation to the final steady state compression level. The higher post-installation compression of the Acutrak 2 Standard may be attributable to the greater number of threads throughout the entire length of the screw. The clinical significance of these results, are, at this point uncertain. We do demonstrate that a fully threaded design offers a more reliable compression that may translate to more predictable bony union.

Reference

Grewal R, Assini J, Sauder D, Ferreira L, Johnson J, Faber K. A comparison of two headless compression screws for operative treatment of scaphoid fractures. *J Orthop Surg Res*. 2011;6:27.

Acutrak vs Herbert Screw Fixation for Scaphoid Nonunion and Delayed Union

Publication Excerpt

"The Acutrak screw enabled more accurate screw placement and achieved higher union rates and modified Mayo wrist scores than the Herbert screw did."

Journal Abstract

Purpose

To compare the treatment outcome of Acutrak versus Herbert screw fixation for scaphoid non-union and delayed union.

Methods

Records of 132 patients who underwent Herbert screw fixation (n=61) or Acutrak screw fixation (n=71) with or without bone grafting for scaphoid non-union and delayed union by a single surgeon were reviewed. The most common fracture site was the waist of the scaphoid (n=95), followed by the proximal pole (n=31) and the distal pole (n=6). Screw placement was considered accurate (n=120) when the screw was placed in the central one-third (axially) of the scaphoid; otherwise it was eccentric (n=12). Bone union was assessed radiographically and clinically. Functional outcome was assessed using the modified Mayo wrist score.

Results

Respectively in the Herbert and Acutrak screw groups, the mean patient ages were 25.3 and 27.3 years (p=0.28), the mean intervals between injury Acutrak versus Herbert screw fixation for scaphoid non-union and delayed union and screw fixation were 12.2 and 17 months (p=0.38), the mean durations to bone union were 2.1 and 1.8 months (p=0.63), and the union rates were 77% and 93% (p=0.01). The union rate was significantly higher in fractures of the waist of the scaphoid than in the proximal and distal poles (94% vs. 71% vs. 33%, p=0.001). The union rate was significantly higher when the screw was placed accurately (axially) than eccentrically (Herbert screw: 84% vs. 40%, p=0.006; Acutrak screw: 96% vs. 0%, p=0.004). 84% of the Herbert screws were placed axially, compared to 97% for the Acutrak screws. Respectively, 67% and 85% of patients had satisfactory functional outcomes (p=0.03), whereas 23% and 7% of the patients had persistent non-union (p=0.05).

Conclusion

The Acutrak screw enabled more accurate screw placement and achieved higher union rates and modified Mayo wrist scores than the Herbert screw did.

Reference

Oduwole KO, Cichy B, Dillon JP, Wilson J, O'Beirne J. Acutrak versus Herbert screw fixation for scaphoid non-union and delayed union. *J Orthop Surg* (Hong Kong). 2012;20(1):61-65.

Arthrodesis of the Thumb IPJ and Finger DIPJ with a Headless Compression Screw

Publication Excerpt

"Distal digital joint arthrodesis with the AcuTwist resulted in a fusion rate of 94% with a complication rate of 9%. Our rate of fusion compares favorably with prior series using other methods of fixation."

Journal Abstract

Purpose

To study the results of using a small, headless compression screw (AcuTwist) for thumb interphalangeal (IP) joint and finger distal interphalangeal (DIP) joint arthrodeses.

Methods

Between November 2007 and January 2012, 48 primary arthrodeses of the thumb IP joint or DIP joint in the other digits were performed in 29 consecutive patients with AcuTwist devices. Indications for arthrodesis included 19 cases of osteoarthritis in 25 fingers, 3 cases of lupus in 9 fingers, 2 cases of post-traumatic osteoarthritis in 2 fingers, and 1 case and finger each of acute trauma, neuromuscular disorder, postinfectious osteoarthritis, boutonniere deformity, and Dupuytren contracture. Charts were reviewed for clinical data, and radiographs were assessed for alignment and healing.

Results

Age averaged 59 years and follow-up averaged 12 months (range, 2–50 mo). Union occurred in 43 out of 46 fingers (94%). There were no cases of nail deformity, wound complications, tip hypersensitivity, or clinically notable malalignment. Three arthrodesis failed to fuse, including 2 asymptomatic nonunions and 1 fixation loss requiring revision with autograft. The complication rate was 9%.

Conclusions

Distal digital joint arthrodesis with the AcuTwist resulted in a fusion rate of 94% with a complication rate of 9%. Our rate of fusion compares favorably with prior series using other methods of fixation.

Reference

Cox C, Earp BE, Floyd WE, Blazar PE. Arthrodesis of the thumb interphalangeal joint and finger distal interphalangeal joints with a headless compression screw. *J Hand Surg Am*. 2014;39(1):24-28.

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