

Evidence Matters Research Bulletin

Pull-out strength of the 4.75mm and 3.9mm Stryker Omega PEEK Knotless Anchors as compared to similarly-sized Arthrex SwiveLock PEEK Knotless Anchors in bone analogues

Top level summary

The purpose of this test was to determine and compare the pull-out strength of the 3.9mm and 4.75mm Stryker Omega PEEK Knotless Anchors to the 3.5mm and 4.75mm Arthrex SwiveLock PEEK Knotless Anchors in bone analogues.

Methods¹⁻³

Polyurethane foam blocks were used to provide a consistent media for testing. Bone analogues were selected for anchor size by evaluating clinical literature for ranges of bone densities within the targeted indications for use and matching these to available densities of marketed bone analogues.¹ For the 4.75mm anchors a 20/12.5/7.5 pcf bone analogue was used and for the 3.9mm and 3.5mm anchors a 50/20 pcf bone analogue was used.

4.75mm anchors were loaded with two strands of #2 Force Fiber Suture and inserted into the bone analogues according to the manufacturer's instructions. They were then loaded to failure at 4.23mm/sec to record the pull-out strength using an Instron Materials Testing Machine (Model 5944).

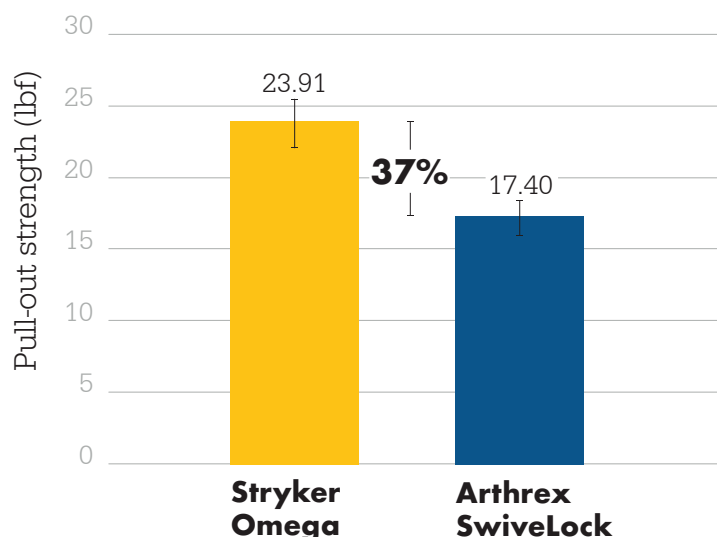
3.9mm and 3.5mm anchors were loaded with one strand of #2 Force Fiber Suture and inserted into the bone analogues according to the manufacturer's instructions. They were then cyclically loaded between 10 and 45 N for 500 cycles at 1 Hz and then loaded to failure at 4.23mm/sec to record the pull-out strength using an Instron Materials Testing Machine (Model 5944).

A two-sample, single-tailed t-test was used to determine statistically significant differences between the anchors' performance in each group (significance was set at $p < 0.05$).

Results

Results from this study show the 4.75mm Stryker Omega PEEK Knotless Anchor's pull-out strength was 37% higher than the Arthrex SwiveLock PEEK Knotless Anchor ($p < 0.05$; see Figure 1).

Figure 1. The Stryker Omega PEEK Knotless Anchor (mean: 23.91 lbf; N = 6) was found to have significantly higher pull-out strength than the Arthrex SwiveLock PEEK Knotless Anchor (mean: 17.40 lbf; N = 7) in a soft bone analogue ($p < 0.05$). Error bars are representative of the standard error of the mean (Stryker: 1.63; Arthrex: 1.23).



Results from this study show the 3.9mm Stryker Omega PEEK Knotless Anchor’s pull-out strength was 72% higher than the 3.5mm Arthrex SwiveLock PEEK Knotless Anchor (p <0.05; see Figure 2).

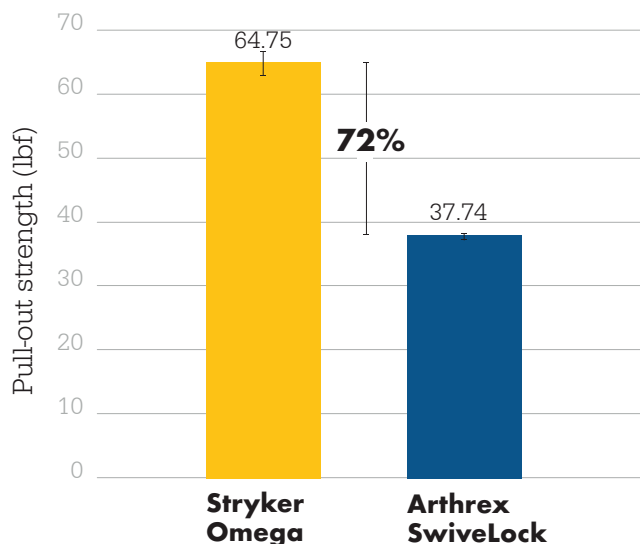


Figure 2. The 3.9mm Stryker Omega PEEK Knotless Anchor (mean: 64.75 lbf; N = 5) was found to have significantly higher pull-out strength after cyclic loading than the 3.5mm Arthrex SwiveLock PEEK Knotless Anchor (mean: 37.74 lbf; N = 5) in a hard bone analogue (p < 0.05). Error bars are representative of the standard error of the mean (Stryker: 1.70; Arthrex: 0.34).

Clinical relevance

This test demonstrates that the 3.9mm Stryker Omega PEEK Knotless Anchor has a greater pull-out strength than the 3.5mm Arthrex SwiveLock PEEK Knotless Anchor in a 50/20 pcf bone analogue. These anchors are commonly applied to indications in the foot and ankle, elbow, and the knee where bone density is often considered “hard bone.”¹ The 4.75mm Stryker Omega PEEK Knotless Anchor has a greater pull-out strength than the 4.75mm Arthrex SwiveLock PEEK Knotless Anchor in a 20/12.5/7.5 pcf bone analogue. The most common application for the 4.75mm Stryker Omega PEEK Knotless Anchor is in lateral row fixation in rotator cuff repair where bone density ranges from soft to medium density.¹

References

1. Stryker DHFD13832 Rev A 2019
2. Stryker DHD13991 Rev A 2019
3. Stryker TR18161 Rev A 2018

Sports Medicine

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