Biomechanical comparison of intramedullary cortical button fixation and interference screw technique for subpectoral biceps tenodesis.

Abstract:

The purpose of this study was to biomechanically evaluate a new technique of intramedullary cortical button fixation for subpectoral biceps tenodesis and to compare it with the interference screw technique. We compared intramedullary unicortical button fixation (BicepsButton; Arthrex, Naples, FL) with interference screw fixation (Bio-Tenodesis screw; Arthrex) for subpectoral biceps tenodesis using 10 pairs of human cadaveric shoulders and ovine superficial digital flexor tendons. After computed tomography analysis, the specimens were mounted in a testing machine. Cyclic loading was performed (preload, 5 N; 5 to 70 N at 1.5 Hz for 500 cycles), recording the displacement of the tendon. Load to failure and stiffness were subsequently evaluated with a load-to-failure test (1 mm/s). Cyclic loading showed a displacement of 11.3 ± 2.8 mm for intramedullary cortical button fixation and 9 ± 1.7 mm for interference screw fixation (P = .112). All specimens within the cortical button group passed the cyclic loading test, whereas 3 of 10 specimens within the interference screw group failed by tendon slippage at the screw-tendon-bone interface after a mean of 252 cycles (P = .221). Load-to-failure testing showed a mean load to failure of 218.8 ± 40 N and stiffness of 27.2 ± 7.2 N/mm for the
intramedullary cortical button technique. For the interference screw, the mean load to failure was 212.1 ± 28.3 N (P = .625) and stiffness was 40.4 ± 13 N/mm (P = .056). We could not find any major differences in load to failure when comparing the tested techniques for subpectoral biceps tenodesis. Intramedullary cortical button fixation showed no failure during cyclic testing. However, we found a 30% failure rate (3 of 10) for the interference screw fixation. Intramedullary cortical button fixation provides an alternative technique for subpectoral biceps tenodesis with comparable and, during cyclic loading, even superior biomechanical properties to interference screw fixation.