Cyclic Loading Biomechanical Analysis of the Pullout Strengths of Rotator Cuff and Glenoid Anchors: 2013 Update


THIS PAPER is the latest in a series that analyzes the biomechanical properties of commercially available rotator cuff and glenoid anchors. A range of anchors composed of PEEK, resorbables, biocomposites, titanium and UHMWPE were tested to determine their pullout strengths, modes of failure and levels of displacement under cyclic loading.

The research shows that the larger rotator cuff anchors can withstand higher loads than the smaller sized glenoid anchors. The typical mode of failure was eyelet breakage for rotator cuff anchors and anchor pullout for glenoid anchors. Knotless anchors and knotted anchors performed similarly in this study. Newer generation anchors had higher failure strengths (in some cases >760 N) due in part to the higher strength sutures used with these devices.

The authors conclude that failure load is dependent on anchor types (rotator cuff or glenoid) but not anchor location (cancellous or cortical bone). Failure mode is dependent on the specific anchor.

Invibio Commentary

This series of articles by Barber provides a direct comparison of the biomechanical behavior of suture anchors across a range of materials and manufacturers. It highlights the number of PEEK devices available in the market and discusses how these devices demonstrate the desired mechanical characteristics for their intended use.

PEEK-OPTIMA® polymers are commonly used in the production of arthroscopic devices due to their high strength, radiolucency and ductility. PEEK-OPTIMA polymers have greatly increased the treatment options available to arthroscopy clinician because it allowed devices to be manufactured with an open core to facilitate bone growth through the anchor. Now a majority of knotless anchor systems are composed of PEEK-OPTIMA polymers due to these advantages.

If you are interested in learning more about the use of PEEK-OPTIMA polymers in rotator cuff and glenoid anchors or other sports medicine devices, please email me or visit our website at www.invibio.com.
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