ISAKOS

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

10th Biennial ISAKOS Congress • June 7-11, 2015 • Lyon, France

Paper #22

Using Nanofracture to Augment Rotator Cuff Repair Does Not Adversely Affect Anchor Pullout Strength

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Summary:
Nanofracture of the footprint is an attractive option to augment rotator cuff repairs in an attempt to stimulate cancellous bleeding at the repair site, and does not decrease the pullout strength of nearby suture anchors.

Abstract:
Purpose
Multiple studies have evaluated methods to enhance rotator cuff healing to the footprint, including techniques to stimulate bleeding and bring biologic factors to the repair site. The purpose of this study was to evaluate the effect of Nanofracture of the rotator cuff footprint on pullout strength (ultimate load to failure) of suture anchors for the purpose of rotator cuff repair.

Methods
Eight fresh frozen cadaveric shoulders (ages 59-64) were divided into two groups of four: one side to the suture anchor with Nanofracture group (Nano), and the contralateral side to the group with no Nanofracture (control). Three 5.5 x 18 -mm suture anchors (Depuy Mitek Healix PEEK anchors) were placed into the greater tuberosity in each specimen. In the Nano specimens, Nanofracture technique was performed to the rotator cuff footprint using a standardized template with 1 mm holes spaced 2.5 mm apart. Each specimen was then mounted onto an Instron machine. Using a 45 degree pull angle, specimens were pre-loaded with 50 N for 10 seconds and then loaded to failure (304 mm/second). Ultimate load to failure was then recorded.

Results
There was no significant difference in the 3 - anchor average pullout strength between the control and Nanofracture groups. Average pullout strength of all anchors was 236.8 N for the Nano group and 234.3 N for the control group.

Conclusions
Using Nanofracture on the footprint to enhance blood flow to the site of rotator cuff repair does not decrease the ultimate load to failure of the surrounding suture anchors.

Clinical Relevance
Nanofracture is a technique similar to microfracture, but creates holes with a smaller diameter and deeper penetration. According to Burns and Snyder (2013), deeper penetration is necessary to access the stem cells and biologic factors needed to augment soft tissue repair. This technique is a potential augment to rotator cuff repairs to enhance healing rates by bringing more biologic healing factors to the site of the repair.