GRYPHON® BR SUTURE ANCHOR TECHNOLOGY: KNOT SIZE COMPARED TO ARTHROSCOPIC KNOTS WITH #2 SUTURE

Jim Spivey, BS, MBA (Sr. Engineer) and Justin Piccirillo, MS (Staff Engineer), Depuy Synthes Mitek Sports Medicine

OBJECTIVE

The GRYPHON Anchor with PROKNOT Technology builds upon the successful GRYPHON Anchor family of anchors by incorporating a pre-tied sliding knot that offers significant advantages over traditional arthroscopic knots. The PROKNOT Technology is tied from a doubled-over length of #1 PERMACORD™ High Strength Suture. This unique configuration delivers previously conflicting benefits of control over tensionability and a very small knot profile.

The size of the PROKNOT Technology was compared to the Duncan Loop, Tennessee Slider, SMC, and Surgeon’s Knot. All knots were tied using ORTHOCORD® High Strength Orthopaedic Suture, #1 for the PROKNOT Technology and #2 for the arthroscopic knots. These arthroscopic knots are some of the most commonly tied arthroscopic knots for labral repairs. (1)

METHODS

- An arthroscopic cannula was fixed to the bench top in an angled clamp, with its distal opening positioned roughly 10mm away from an 8mm-diameter acetal rod.
- Several samples of each knot-type were tied on the rod, using a knot pusher to tighten the knots and apply backing half-hitches.
- Arthroscopic knot tying followed the instructions from multiple published sources. (2) (3)
- Arthroscopic knots were backed up with three half-hitches, tied in Reverse-Hitch-Alternating-Post (RHAP) format. (2) This number of half-hitches is recommended for traditional arthroscopic knots to achieve adequate knot security. (1) PROKNOT Technology knots are backed up with one half-hitch because PROKNOT Technology knots with one half-hitch is equivalent in strength to any of these arthroscopic knots with three half-hitches. (4)
- A digital microscope was used to image the completed knots on the acetal rod. Measurements of knot height and width were produced in photo-viewing software [Adobe Photoshop CS5] by comparing these dimensions against the known diameter of the acetal rod.
- An example of a Duncan Loop in the right plane, showing measurement locations:

Knot Height
Knot Width

RESULTS

- On average, PROKNOT Technology is 64% smaller than a Duncan Loop
- On average, PROKNOT Technology is 59% shorter than a Duncan Loop
- On average, PROKNOT Technology is 58% smaller than a SMC knot
On average, PROKNOT Technology is 50% shorter than a SMC knot
On average, PROKNOT Technology is 57% smaller than a Surgeon’s knot
On average, PROKNOT Technology is 58% shorter than a Surgeon’s knot
On average, PROKNOT Technology is 27% smaller than a Tennessee Slider
On average, PROKNOT Technology is 58% shorter than a Tennessee Slider

CONCLUSION

The knot body of the knot with PROKNOT Technology was statistically smaller in volume (P = 0.012, maximum) and shorter in height P < 0.001, in all comparisons) than the traditional arthroscopic knots.

Due to the lower potential for soft tissue and cartilaginous irritation, the use of a smaller-profile knot may offer advantages to some patients over other arthroscopically-tied knots.

REFERENCES