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

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## OBJECTIVE

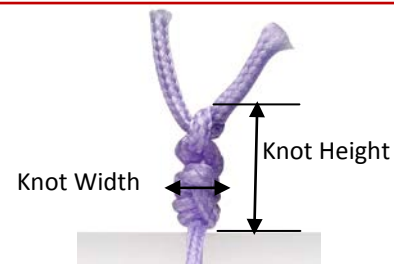
The GRYPHON Anchor with PROKNOT Technology builds upon the successful GRYPHON Anchor family of anchors by incorporating a pre-tied sliding knot that offers significant advantages over traditional arthroscopic knots. The PROKNOT Technology is tied from a doubled-over length of #1 PERMACORD™ High Strength 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:

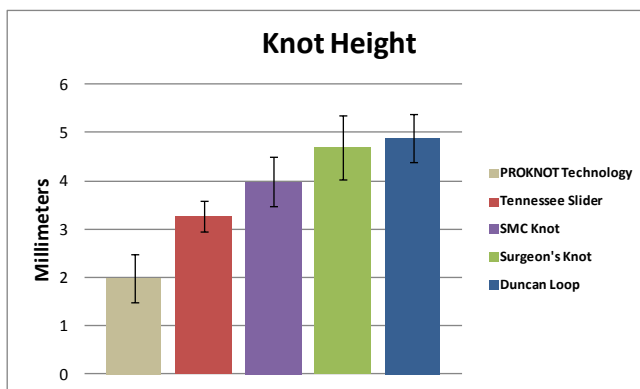
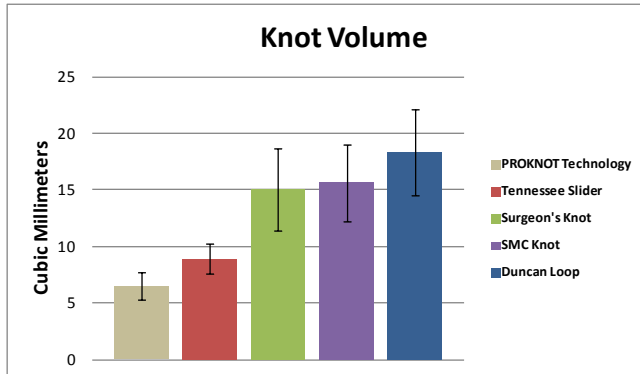


- Knot volume was calculated by approximating the knot mass as a cylinder. This estimated knot diameter was calculated using the formula for a cylinder. (Volume =  $\pi \times r^2 \times h$ )
- Data from all 16 groups were evaluated in pairwise combinations using two-sample t-tests, with any p-value finding less than .05 indicating statistical significance.

## 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

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4. *DePuy Synthes Mitek Sports Medicine. Knot Strength White Paper.*