The “Safe Zone” Technique Improves Suture Placement and Accuracy During Arthroscopic Remplissage: A Cadaveric Validation of A Novel Technique

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OBJECTIVES

1. Evaluate the accuracy of suture passage during remplissage
2. Identify surface landmarks to improve placement of posterior sutures
3. Validate the use of identified landmarks to improve passage through the infraspinatus tendon

METHODS

12 cadaveric shoulders

1st 6 specimens (control group)
- Standard arthroscopic remplissage
- 2 anchors placed with 4 suture limbs per specimen
- Specimens dissected to quantify the location of suture passage
- Based on posterior lateral acromion (PLA)
- Location of posterior cuff penetration
- After analyzing the control group
  - “Safe zone” (SZ) calculated to improve infraspinatus tendon penetration
  - >1 cm lateral and <3 cm distal to PLA

2nd 6 specimens (SZ group)
- Arthroscopic remplissage with the safe zone technique for suture passage
- Safe zone marked before arthroscopy
- Specimens dissected
- Analized accuracy of suture passage
- Location of penetration
- Results compared to control group
- Levine scores calculated for precision comparison

RESULTS

Control Group

- 25% of sutures correctly pass through the infraspinatus tendon
- Standard remplissage suture passage is inaccurate
- 25% of sutures correctly pass through the infraspinatus tendon

SZ Group

- 83.3% (20/24) of the infraspinatus tendons
- Significantly improved from the control group (p < 0.01)
- 3.8% (2/53) in the infraspinatus muscle or MTJ
- Significantly improved from the control group (p < 0.01)
- 3% (2/75) penetrates modified to the MTJ and the tendon
- Compared to 20.8% (15/73) in the control group (p < 0.01)

Further Analysis

- Prevention of over-medialization: significantly improved using the safe zone
- Suture passage in SZ group was significantly more lateral (6–8 cm) on the PLA than the control group (p < 0.01)
- Overall precision (SZ) improved in 75% of passes

CONCLUSIONS

- Standard remplissage suture passage is inaccurate
- 25% of sutures correctly pass through the infraspinatus tendon
- We recommend the “safe zone” technique:
  - >1 cm lateral and <3 cm distal to PLA
- The safe zone technique is also helpful with orientation of suture passage and improved precision of passes
- This technique, significantly improved accuracy of suture passage into the infraspinatus tendon
- The safe zone provides a reproducible method that may prove useful to prevent previously reported complications of remplissage

REFERENCES