Meniscal Repair of Bucket Handle Meniscus Tears at the Time of ACL Reconstruction Improves Patient Outcomes

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Disclosures

Edward S. Chang, MD
- Avanos – Consultant
- Arthrex – Education and research support

Background

- Bucket handle meniscus tears (BHMTs) represent 10-26% of all meniscus tears and often present concurrently with ACL tears
  - BHMTs are present in 13.4% of acute and 32.3% of chronic ACL tears

- Size and displacement present a unique challenge to the surgeon

- Historically these have been treated with meniscectomy; however, there has been a significant shift towards repair of these injuries at the time of ACL reconstruction (ACLR).
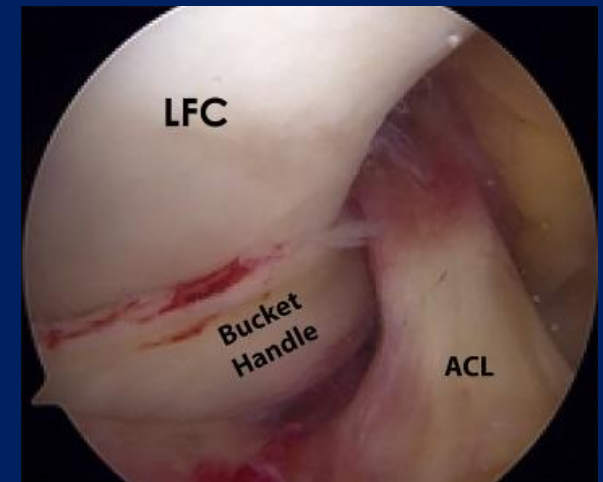
Background

- Shelbourne et al. (2004) found no significant difference in patient-reported outcome scores following repair versus meniscectomy of BHMTs in the setting of ACL reconstruction

- Ding et al. (2022) reported BHMT repair at the time of ACLR was associated with decreased risk of subsequent meniscus surgery when compared to meniscectomy

- Kalifis et al. (2022) found successful BHMT repair led to lower rates of osteoarthritis and better knee function 10 years post-ACLR when compared to meniscectomy

Purpose: To examine demographic and surgical factors that may influence patient-reported outcomes in patients undergoing ACLR with concomitant BHMT surgery.

Hypothesis: BHMT repair at the time of ACLR will be associated with improved patient-reported outcomes when compared to meniscectomy

Methods

Study Design: Retrospective chart review

- All patients who underwent ACLR with concomitant treatment of BHMT
- 5 surgeons at a single center, Dec 2015 through Feb 2020.

Patients were divided based on meniscal treatment at the time of ACLR:

- Partial meniscectomy (N = 30)
- Meniscus repair (N = 39)
- Average follow up of 15.2 months

Methods

Outcomes of Interest:

- Demographic and surgical information were obtained via chart review

- Patients completed the International Knee Documentation Committee (IKDC) Subjective Knee Evaluation form

Plan of Analysis:

- Multivariable regression model was completed to determine association between patient-reported knee function and demographic and surgical factors

Results

Descriptive Statistics (Table 1):

- No significant differences in demographics

- There was significant difference in graft choice between BHMT Repair vs meniscectomy

- Red-Zone tears more likely to undergo repair

Table 1: Demographics and Injury Characteristics between Meniscal Repair and Meniscectomy			
	Meniscus Repair	Meniscectomy	p-value
Biologic Sex (M, F)	14, 8	13, 6	0.75
Age (years)	29.8 ± 10.0	27.2 ± 10.2	0.40
BMI (kg*m^{-2})	27.1 ± 5.9	29.4 ± 5.7	0.21
Time from injury to surgery (years)	2.22 ± 5.32	1.60 ± 2.72	0.50
Time from ACLR to follow-up (years)	1.28 ± 0.95	1.21 ± 0.87	0.67
Graft Source	11 BTB Auto 7 HS Auto 2 QT Auto 2 TA Auto 0 HS Allo 0 PT Allo	2 BTB Auto 11 HS Auto 0 QT Auto 1 TA Auto 4 HS Allo 1 PT Allo	0.003
Bucket Handle Tear Compartment	4 Lateral 17 Medial	2 Lateral 17 Medial	0.67
Bucket Handle Tear Zone	13 Red-Red 6 Red-White 2 White-White	2 Red-Red 4 Red-White 10 White-White	<0.001
IKDC Score (0-100)	78.7 ± 21.2	71.9 ±18.5	0.085

Auto = Autograft; Allo = Allograft; BTB = Bone-Patellar Tendon-Bone; HS = Hamstring; QT = Quadriceps Tendon; TA = Tibialis Anterior; PT = Posterior Tibialis

Results

Multivariable Regression (Table 2):

- The regression model predicted 36.6% of the variance in IKDC scores

- Better IKDC scores were associated with:
  - Shorter time from injury to ACLR (p = 0.028)
  - Longer time to follow-up (p = 0.004)
  - BHMT zone of injury (p = 0.04)
  - Meniscal repair (p = 0.008)

Table 2. Demographic, injury, and surgical predictors of patient-reported knee-related function

Predictor	Estimate	SE	t	P
Intercept	59.64	6.06	9.84	<.001
Graft source				
Allograft – Autograft	6.42	6.45	1.00	.328
Time from injury to ACLR (days)	-.004	.01	-2.32	.028
Time from ACLR to IKDC (days)	.24	.01	3.15	.004
Bucket handle tear zone				
Red:White – Red:Red	3.29	6.24	.53	.602
White:White – Red:Red	16.61	7.71	2.16	.040
Bucket handle tear treatment				
Repair - Meniscectomy	18.87	6.66	2.83	.008

Discussion/Conclusions

- BHMT repair at the time of ACLR, as well as shorter time from injury to ACLR, leads to improved IKDC scores.

- Red-Red Zone BHMTs were more likely to undergo repair.

- Successful BHMT repair has been shown in prior studies to lead to improved functional outcome scores and lower rates of osteoarthritis, supporting our results.

- Our data supports preservation of the meniscus due to its chondroprotective effect as well as its ability to reduce stress on the ACL graft.

References

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