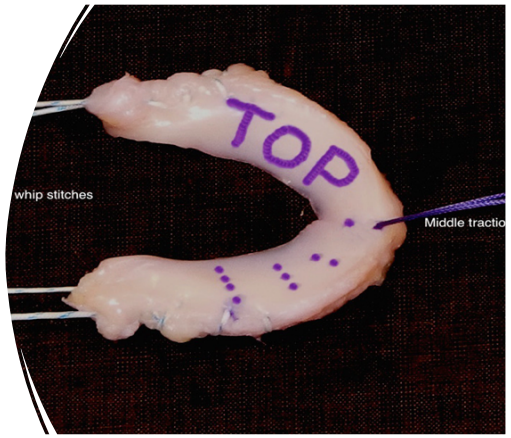
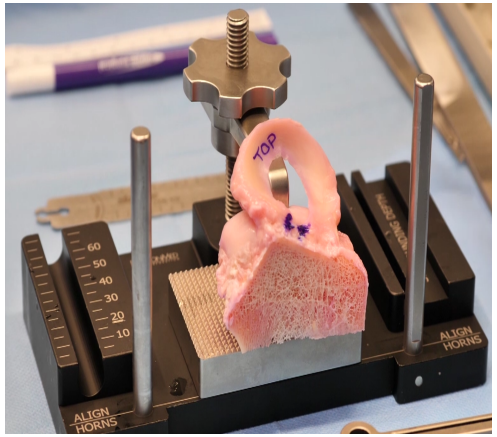


ISAKOS 2023, BOSTON, USA



Bone bridge technique for lateral meniscal allograft transplantation – no difference in clinical outcome compared to the soft tissue technique

BHATTACHARYYA R, KRISHNAN H, BAUSCH N, PILARSKI A, MCGOLDRICK N, THOMPSON P, METCALFE A, SPALDING T

UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE, UK

Disclosures

- T Spalding – Consultant to CONMED USA

- A Metcalfe – Chief Investigator for an RCT funded by NIHR UK on Meniscal Allograft Transplant, Stryker USA provide clinical cost for some research trials – no related conflict of interest

- No other authors have any other relevant disclosures or conflict of interest to declare

Background

- MAT – well established procedure [1-6]
- Considerable debate regarding the best method of fixation of lateral Meniscal Allograft Transplant (MAT)
- Bone Bridge (BB) may have potential benefits over the Soft Tissue (ST) technique [7] but is technically more difficult
- Subsequent systematic review and meta-analysis showed no difference in outcome [8]
- **Aim:** to compare the BB and ST technique for lateral MAT in terms of failure, re-operation rate, complications and patient reported outcomes

Methods

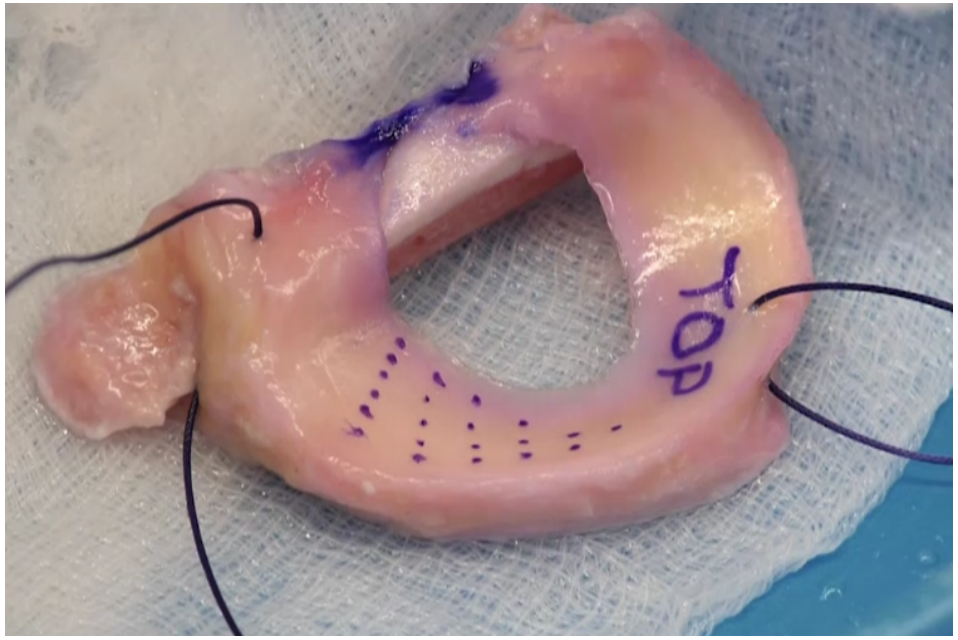
- Retrospective analysis of prospectively collected data for patients with a lateral MAT

- Inclusion criteria: –
  - *BB technique started in our unit in March 2018 – all cases included with min 1 year FU*
  - *Historical control of ST cases from our MAT database from Jan 2017*
  - *Patients after March 2021 excluded – to achieve min 1 year FU*

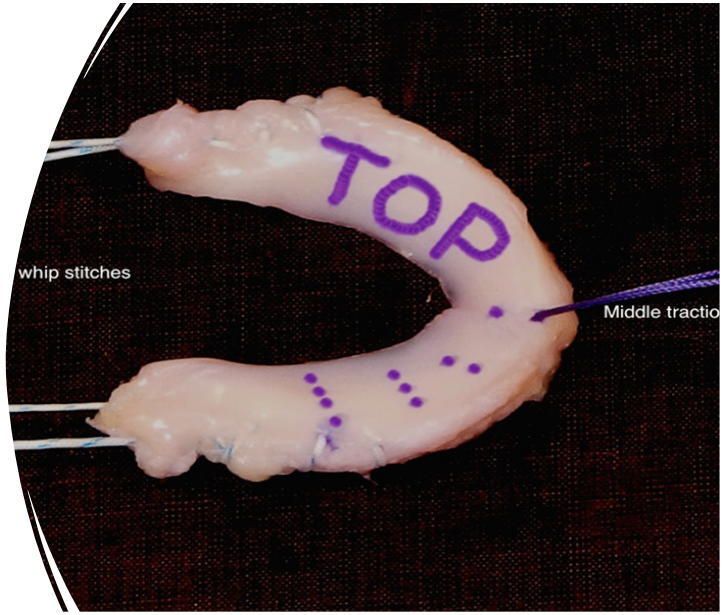
- Exclusion: -
  - *all revision cases were excluded*

Surgical technique

BB: Bone attached to the roots inserted into a pre-prepared slot in the tibia.



ST: graft detached from donor bone – sutures passed through bone tunnels and tied over a button.



Outcomes

- Primary: -
  - failure - removal or revision of the MAT or conversion to arthroplasty

- Secondary:–
  - complications – root tears, graft re-tears, septic arthritis, anterior horn adjustment for extrusion, re-arthroscopy for pain, MUA, neuroma removal
  - Re—operation rate

- PROMS

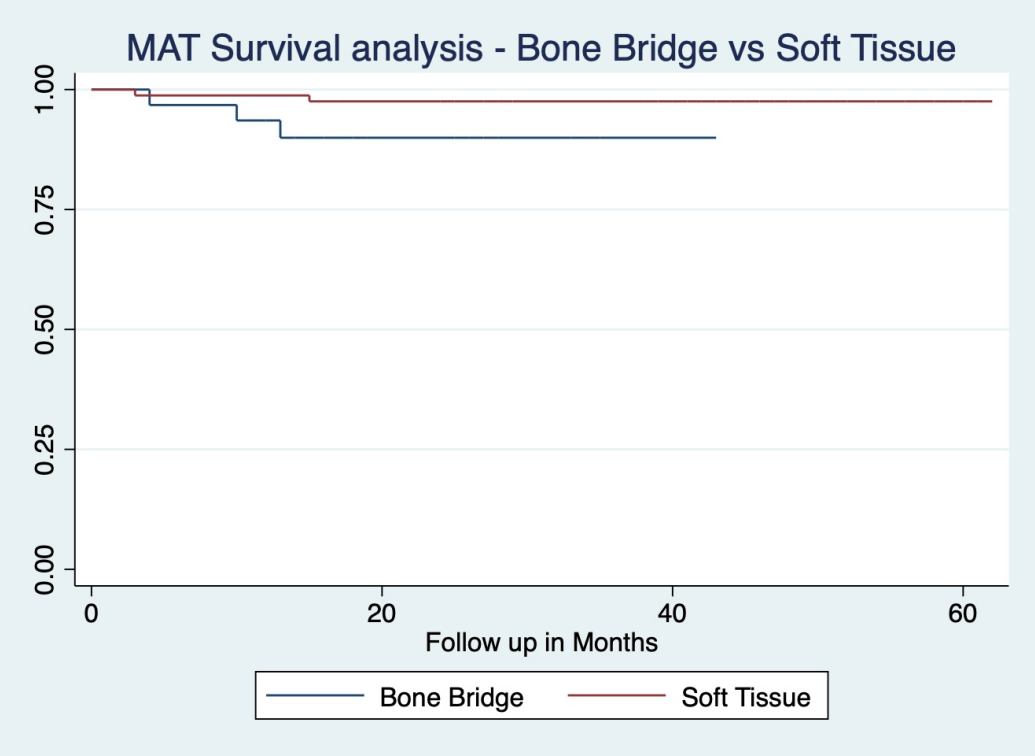
Statistical analysis

- Stata/SE 17.0 for Mac (StataCorp, 4905 Lakeway Dr, College Station, TX 77845, USA) used for analysis
- The data was non-parametric
- Kaplan Meir survivorship analysis was used to compare failure rates between the two groups, using log-rank test of equality
- The Chi squared test was used to compare complications and re-operation rates
- The Wilcoxon matched pairs signed rank test was used to evaluate the PROMs scores within each group
- A p value of 0.05 was deemed to be statistically significant

Results - demographics

Demographic	Bone Bridge group	Soft Tissue group
Number	31	81
Median age (years)	27	27
Age range (years)	13-54	13-50
Sex	20 M; 11 F (M: F -1.8:1)	50 M; 31 F (M: F = 1.6:1)
BMI (kg/m^2- median)	26.2	26.9
Median FU (months)	18	46
FU range (months)	12-43	15-62

Survivorship



Re-operation rate

- BB – 29%
- ST – 29.6%
- p = 0.3

Failure: BB - 9.6%; ST - 2.4%; p=0.08

Complications

Complication	Subsequent re-operation	No of reoperations	Failure
Root tear – 1 posterior root tear	Yes – root repaired	1	No
Graft tears - 5	Partial resection – 1 Repaired – 3; 2 subsequently removed Removed - 1	5	Yes - 3
Septic arthritis - 0	No	0	No
Anterior horn adjustment for extrusion - 1	Yes – re-fixation of anterior root	1	No
Re-arthroscopy for pain - 1	Yes - debridement of scar tissue	1	No
MUA (Manipulation Under Anaesthesia) for stiffness - 1	Yes - 1	1	No
Neuroma removal - 0	No	0	No

Bone Bridge group

Complication	Subsequent re-operation	No of reoperations	Failure
Root tear – 1 posterior root tear; 2 anterior	Yes – root repaired	3	No
Re-tears - 6	repaired– 5 removed – 1	6	Yes - 1
Septic arthritis- 1	Yes - removed	1	Yes
Re-arthroscopy for pain - 4	Yes	4	No
MUA (Manipulation Under Anaesthesia) for stiffness - 4	Yes	4	No
Neuroma removal – 2	Yes	2	No

Soft Tissue group

PROMS	Time frame	Bone Bridge	Soft Tissue
Lysholm	Pre-op	56	52
	2 years' post -op	86	85
	Improvement	30 (p<0.0001)	33 (p<0.0001)
Tegner	Pre-op	3	3
	2 years' post -op	5	5
	Improvement	2 (p<0.0001)	2 (p<0.0001)
KOOS (symptom)	Pre-op	54	54
	2 years' post -op	75	79
	Improvement	21 (p<0.0001)	25 (p<0.0001)
KOOS (pain)	Pre-op	60	58
	2 years' post -op	92	92
	Improvement	32 (p<0.0001)	34 (p<0.0001)
KOOS (ADL)	Pre-op	74	72
	2 years' post -op	99	97
	Improvement	25 (p<0.0001)	25 (p<0.0001)
KOOS (Sport)	Pre-op	31	30
	2 years' post -op	80	75
	Improvement	49 (p<0.0001)	45 (p<0.0001)
KOOS (QOL)	Pre-op	25	19
	2 years' post -op	63	56
	Improvement	38 (p<0.0001)	37 (p<0.0001)
IKDC	Pre-op	41	40
	2 years' post -op	77	72
	Improvement	36 (p<0.0001)	32 (p<0.0001)

PROMS Scores

Conclusions:

- ✓ Both BB and ST technique for lateral MAT show significant objective benefits at 2 years post surgery
- ✓ No advantages of doing the more technically demanding BB technique over the ST fixation method
- ✓ Preferred technique based on surgeon experience and results
- ✓ Radiological MRI based data on meniscal extrusion and long term follow-up objective data are required to further clarify any differences between the techniques

References

1. Grassi A, Macchiarola L, Lucidi GA, Coco V, Romandini I, Filardo G, Neri MP, Marcacci M, Zaffagnini S (2020) Long-term Outcomes and Survivorship of Fresh-Frozen Meniscal Allograft Transplant With Soft Tissue Fixation: Minimum 10-Year Follow-up Study. Am J Sports Med 48:2360–2369.
2. Jauregui JJ, Wu ZD, Meredith S, Griffith C, Packer JD, Henn RF (2018) How Should We Secure Our Transplanted Meniscus? A Meta-analysis. Am J Sports Med 46:2285–2290.
3. Su L, Garcia-Mansilla I, Kelley B, Arshi A, Fabricant PD, Sherman SL, Jones KJ (2022) Clinical Outcomes of Meniscal Allograft Transplantation With Respect to the Minimal Clinically Important Difference. Am J Sports Med 50:3440–3446.
4. Smith NA, Achten J, Parsons N, Wright D, Parkinson B, Thompson P, Hutchinson CE, Spalding T, Costa ML (2015) Meniscal Transplantation and its Effect on Osteoarthritis Risk: an abridged protocol for the MeTEOR study: a comprehensive cohort study incorporating a pilot randomised controlled trial. Bone Joint Res 4:93–98.
5. Smith NA, Costa ML, Spalding T (2015) Meniscal allograft transplantation: rationale for treatment. Bone Joint J 97-B:590–594.
6. Smith NA, MacKay N, Costa M, Spalding T (2015) Meniscal allograft transplantation in a symptomatic meniscal deficient knee: a systematic review. Knee Surg Sports Traumatol Arthrosc 23:270–279.
7. Abat F, Gelber PE, Erquicia JI, Tey M, Gonzalez-Lucena G, Monllau JC (2013) Prospective comparative study between two different fixation techniques in meniscal allograft transplantation. Knee Surg Sports Traumatol Arthrosc 21:1516–1522.
8. Myers P, Tudor F (2015) Meniscal allograft transplantation: how should we be doing it? A systematic review. Arthroscopy 31:911–925.