Fibrin Clot Augmentation of High-Risk Meniscal Repairs Results in Clinical Healing in up to 90% of Cases

Peter Myers
Peter Davies
Michael Goldberg
Jon Anderson

Brisbane Orthopaedic and Sports Medicine Centre

Declaration of Interests

I declare that in the past three years one of the authors has:

- held shares in: Nil
- received royalties from: Nil
- done consulting work for: Nil
- given paid presentations for: Smith and Nephew / Arthrex
- received institutional support from: Nil
- a son who works for Stryker
- developed a meniscus repair needle – MeniPass used in this study
  Portal SportsMed, Brisbane, Australia
  Marketed by Stryker in Australia

Introduction

Meniscus repair can slow the rate of knee degeneration and hopefully reduce the risk of later arthroplasty. [1]

Some meniscus tears have a poor capacity to heal due to

- Complexity
- Zone of injury (e.g. red-white or white-white areas)
- Chronicity

Fibrin clot augmentation has been shown to enhance meniscal healing. [2, 3, 4]

Fibrin clot preparation and placement is technically demanding and is not commonly used

Purpose of Study

1. **To standardise a technique for:-**
   - Preparing a blood clot
   - Passing it into the joint and into a repair site
   - Maintaining it in position
   - Suturing the meniscus tear with the blood clot securely in place

2. a. To follow a retrospective series of patients after augmented meniscus repair to assess rate of healing / failure and satisfaction (Group 1).

2. b. To follow a prospective series of patients with this treatment (Group 2).

Methods - Blood Clot Preparation

30 mls of blood into a glass jar

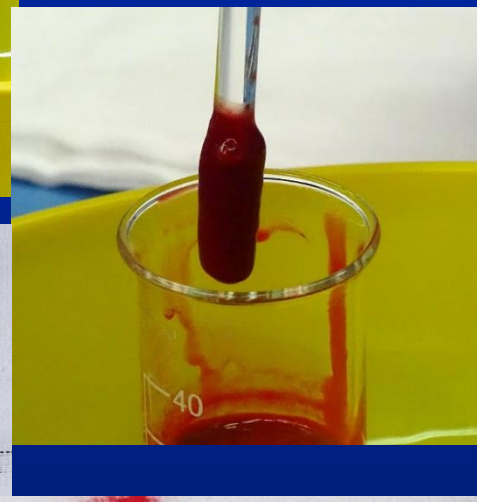
Leave for 7 minutes with a glass rod in jar

Begin to slowly stir for 4-5 minutes

Remove clot from glass rod

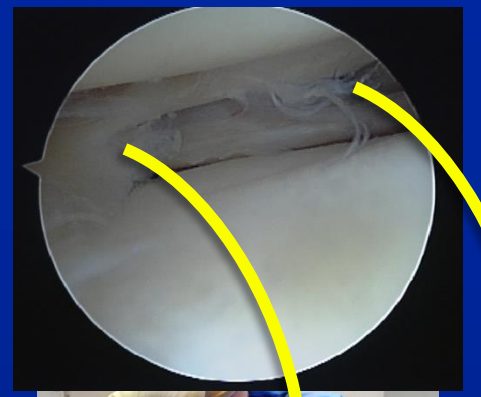
Dry and cut it to size

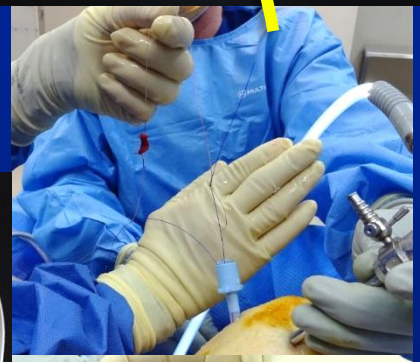
Place sutures at 1 or both ends of the clot

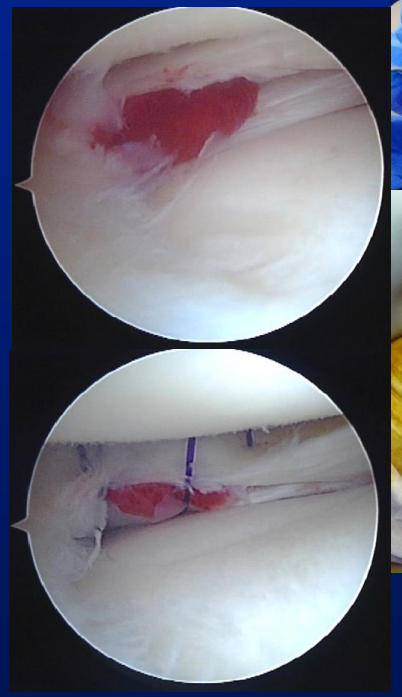


Methods - Passing clot into the tear

- Pass inside–out sutures via a cannula through the apices of the tear
- Tie each suture to one end of the sutures holding the clot
- Pull the sutures through to place the clot into the tear
- Repair the tear
- Author's preference: [4]
- Use inside-out absorbable sutures
- Retrieve the sutures through a postero-medial or postero-lateral incision
- Tie the sutures over the capsule







Methods – Post-Operative Care

Brace for safety and comfort – set at 5° – 10°

Crutches, non-weight-bearing

At 2 weeks

- Wound review
- Remove brace
- Begin gentle flexion and quadriceps setting
- Begin 25% body weight-bearing

At 3 weeks

- Progress to 50% body weight-bearing

At 4 weeks

- Progress to 75% body weight-bearing

At 5 weeks

- Progress to 100% body weight-bearing – 1 or 2 crutches

At 6 weeks

- Full weight-bearing, protected with 1 stick
- 90° flexion

At 12 weeks

- Independent confident weight-bearing
- 120° flexion

Methods - Patients

Group 1 [4].

Retrospective study, Ethics approval, single surgeon, single centre, consecutive series, isolated repairs.

January 2016 and September 2021.

51 augmented repairs in 50 patients

Medial = 63%, Male = 63%

Tear types

- Vertical - 22%
- Radial - 31%
- Complex - 33%
- Revision - 16%

Group 2.

Prospective study, Ethics approval, 6 surgeons, single centre, consecutive series, isolated repairs.

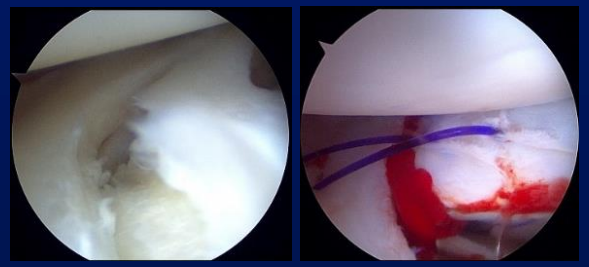
Commenced June 2023.

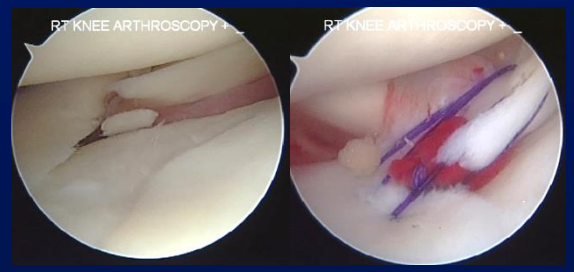
42 augmented repairs

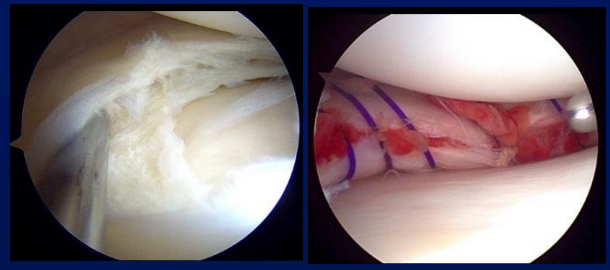
Medial = 52% Male = 45%

Tear types

- Vertical - 28%
- Radial - 24%
- Complex - 38%
- Revision - 24%







Follow up

Group 1 [4].

All patients were followed – median 46 months (22 – 87)

5 patients (5 repairs) had undergone further arthroscopic surgery; i.e. 5 of 51 (10%) repairs had failed.

Group 2.

All patients contacted at 12 months

No case of clinical failure evident at this stage.

Results – Group 1 [4].

All patient reported outcome measures (PROM's) improved significantly except the Tegner score

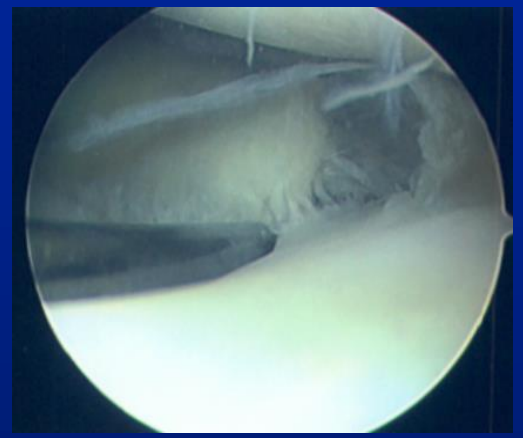
- Lysholm Score 56.5 – 92.4 ($p<0.0001$)
- Oxford Knee Score 30.8 – 45.7 ($p<0.0001$)
- All KOOS Domains improved significantly ($p<0.0001$)
- Tegner score 4.5 – 5.6 ($p=0.08$)

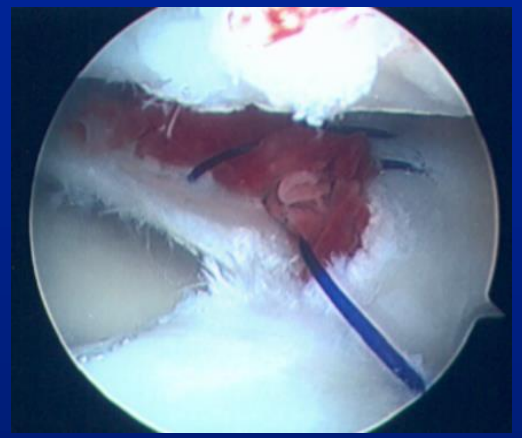
Complications

- 1 patient developed stiffness which settled over 4-6 months
- 2 patients had temporary altered sensation in the lower leg

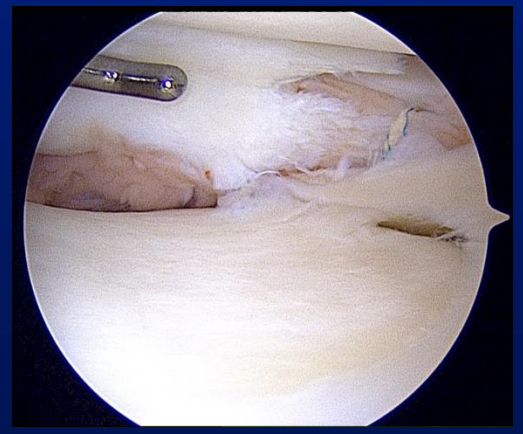
Second Look Arthroscopy

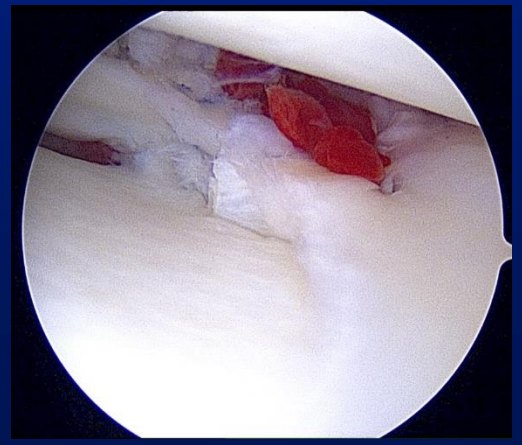
2 patients have had 2nd look arthroscopy for other reasons



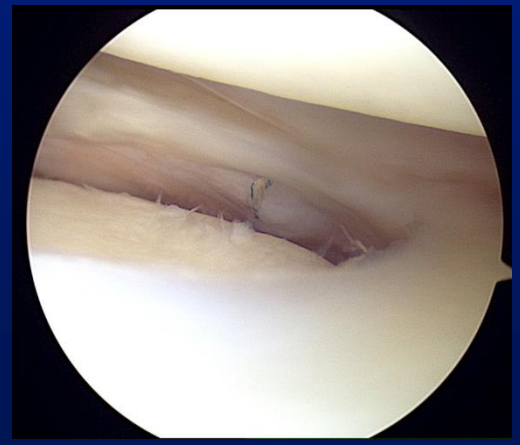


At 5 months





At 8 months



Discussion

Augmenting meniscus repairs allows some tears to heal which otherwise would not

This technique is reliable and reproducible

There is a good success rate with minimal morbidity

This should encourage surgeons to undertake meniscus repairs in some cases which would not routinely be repaired

References

1. Weber J, Koch M, Angele P, et al. The role of meniscal repair for prevention of early onset of osteoarthritis. J Exp Orthop 2018; 5: 10.
2. Nakayama H, Kanto R, Kambara S, et al. Successful treatment of degenerative medial meniscal tears in well-aligned knees with fibrin clot implantation. Knee Surg Sports Traumatol Arthrosc 2020; 28: 3466–3473.
3. Henning CE, Lynch MA, Yearout KM, et al. Arthroscopic meniscal repair using an exogenous fibrin clot. Clin Orthop Relat Res 1990; 64–72.
4. Davis PSE, et al. Fibrin clot augmentation of high-risk meniscal repairs may result in clinical healing in up to 90% of cases. J ISAKOS, 2024, 9,6, 100316

Thank You