

MENISCAL INJURY

Anatomic relations of meniscus from front to back

Anterior to intercondylar eminence

- M Anterior horn of medial meniscus
- C Anterior cruciate ligament
- L Anterior horn of lateral meniscus

Posterior to intercondylar eminence:

- L Posterior horn of Lateral meniscus
- M Posterior horn of medial meniscus
- C Posterior cruciate

Ligament of Humphrey's in front of PCL

Ligament of Wrisberg is behind PCL

Joint capsule attached throughout the meniscus

Coronary ligament: is that part of the capsule from meniscus to tibia.

Popliteus tendon is intra-articular

Medial Meniscus: is less mobile than Lateral meniscus

Histology of meniscus

Cells

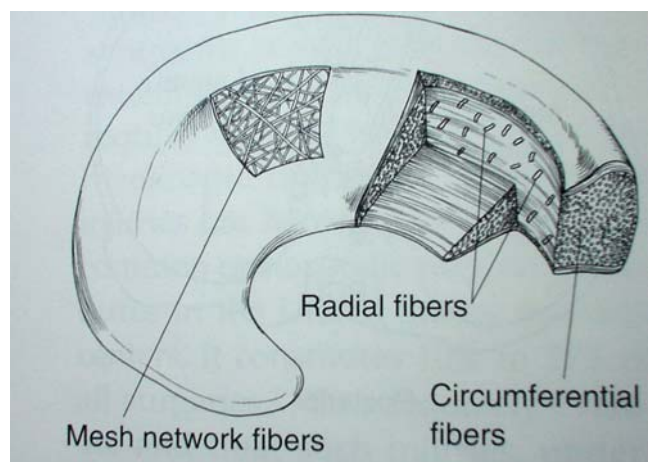
Fusiform (superficial)

Ovoid (Deep): Fibrocartilage cells

Collagen

Type I [60%]

Type II [10%] in the inner layer



3 arrangement of collagen fibres

- I Superficial Radial arrangement
- II Surface Irregular arrangement
- III Deep Circumferential arrangement

Motion

Medial meniscus 5 mm

Lateral meniscus 10 mm with flexion and extension

Anterior Horn is more mobile than Posterior Horn

Less motion with Medial Meniscus due to attachment of deep MCL

Function

Meniscus is highly efficient shock absorber. (greater than articular cartilage) : 20%

It takes 50% of load in extension and 80% in flexion.

Contact area is increased: Contact area decreased after meniscectomy: 50%

Blood supply

All three genicular vessels

Only peripheral 1/3 rd of the meniscus (Medial > Lateral)

Nerve supply

Receptors: Golgi organs, Ruffini, Pacinian

Rich near the Horns and periphery; in the cruciates

Post Horn more than Anterior

Healing occurs: Peripheral tear heals; Radial tear heals

3 types: Red to Red (Peripheral) Heals

Red to White (marginal rim)

White to white (Central) No healing

Epidemiology

Annual incidence of meniscal injury: resulting in meniscectomy of 61 per 100,000

Medial to lateral: 2:1.

The triad of a rupture of the MCL + ACL + Medial meniscus

Clinical

1. Acute history of injury
2. Usually with localised pain
3. With or without locking
4. Block (usually locked in 20° flexion)
5. Repeated episodes
6. Tenderness: Medial Meniscus: In the posterior 1/3
Lateral joint line tenderness: Middle 1/3
7. McMurray's test)
8. Apley's grinding test

MRI

The most useful in intra-articular knee disorders.

Sensitivity and specificity 83% and 95% higher than diagnosis by clinical diagnosis

Note: 60% of people >60yrs have complete meniscal tears.

MRI Classification of the tear

- | | |
|-----------|---|
| Grade I | Small disruption of the homogenous signal |
| Grade II | Disruption is more pronounced but does not extend to the surface |
| Grade III | Extension to either superior or inferior surface - is a clinically significant tear |
| Grade IV | Extends to both side |

Degenerative Tears

The degenerative tears were described as 'horizontal' tears, and occurred in an older age group.

It was observed that this pattern of tear was most frequently seen in the posterior horn of the medial meniscus.

Osteoarthritis knees with a meniscal tear are not more painful than those without a tear.

Meniscal tears do not affect functional status.

Treatment

For Red to Red: Repair

For White to white: Excise or replace

Gray zone: Red to white

What is a stable tear?

Probing: mobility of the torn meniscus is less than 3 mm

Or Size of the full thickness tear less 10 mm

Or Short radial tear less than 3mm

Options

1. Total Meniscectomy

Rarely done

High incidence of OA [more with lateral than medial meniscectomy]

Fairbank: recognised potential effect of meniscectomy on the cartilage

2. Partial Meniscectomy

1. All the mobile fragments that can be pulled past the inner margin of the margin to the center of the joint should be removed
2. The remaining meniscal rim should be smoothed to remove any sudden changes in contour
3. A perfectly smooth rim is not necessary
4. Probe to check rest of the meniscus
5. Remove all debris from the joint
6. More than less intact meniscal rim should be left

Partial meniscectomy 90% good to excellent results Vs 65% with total.

However many long term studies have questioned whether partial meniscectomy a benign procedure. At 8 yr follow up: 50% OA with partial Vs 25% of normal Contralateral knee

3. **Non-fixation healing enhancement**

Abrasion of the synovial fringe

Meniscal trephination

Hardly used in clinical practice

4. **Open repair**

Peripheral tear: (Within 30% of meniscus and >1cm vertical, longitudinal)

Presently: Multiple ligament injury, Plateau fracture

Absorbable or non-absorbable stitches can be used

5. **Arthroscopic repair: 3 techniques**

a) Inside-out

b) Outside-in

c) All inside

Inside-Out: [Henning]

Still Popular

Technique:

Long Flexible needles: positioned through cannula [Contralateral]

Scope from Ipsilateral: Side and location

Medially: between sartorius and capsule with knee in 90° and repair with knee in 20°

Laterally: Between ITB and BF and suture with knee in 60°

2 0 Ethibond

II. Outside in technique:

Less risk to NV

18 gauge needle across the tear from outside to inside Or Mulberry knots can then be tied on the intra-articular free ends of the suture.

Disadvantage: difficulty in reducing the tear and opposing the edges while passing the sutures.

III All inside technique

Vertical tear of the posterior horn

All-inside technique

Suitable for repairs of the far posterior horns implantable anchors, arrows, screws, and staples

Results of meniscal sutures

62% heal, 17% heal incompletely and 21% do not heal

92% are clinically stable

80% return to active sport

20% require further surgery

30-40% failure rate in 5 yrs in ACL

6. Meniscal Allograft

Fresh frozen menisci demonstrated decreased cellularity early on but with progressive remodelling over 6-8 months

The DNA profile of meniscal allograft was 95% identical to that of the human recipient 1 year after transplantation: indicating complete repopulation of the cells from the recipient.

Indication

1. Previously undergone a total or near total meniscectomy and has a joint line pain and early chondral changes
2. When malalignment: Correct alignment and then graft
3. In young with meniscectomy and asymptomatic: controversial
4. White to white zone

Type: Cryo Frozen to -100°

Only 10% cells may remain

Peripheral synovium repopulate these allograft

Less chance of immunological

Develops normal vascular pattern and tensile strength by 6 months

Fresh-frozen allograft preservation

80°C, is a simpler and less expensive method than cryopreservation.

Lacks donor-cell viability, the lack of viability has not affected allograft survival