

Arthroscopic Meniscectomy

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관절경을 사용하는 수술중 부분 반월상 연골 절제술이 가장 흔히 시행되고 있는 수술이다. 반월상 연골 파열은 가능하면 봉합을 하여야 하지만 부득이한 경우 최대한 많이 남겨 두고 절제를 하여야 하며 반월상연골 절제술후 장기 추시 보고에서 퇴행성 변화가 온다는 것은 이미 잘 알려진 사실이다. 파열된 반월상 연골의 치료에 관절경을 이용하는 것이 관절 절개 술로 하는 것을 대치하며 그 수술의 표준이 되었다. 그리고 관절경적 방법이 관절 절개술과 비교하여 결과에서 매우 다르다는 것은 잘 알려진 사실이다. 그래서 저자는 관절 경적 반월상연골 절제술의 수기에 대하여 간략하게 설명한다.

Goals of partial meniscectomy

1. Only the torn portion of the meniscus is removed
2. Careful trimming and contouring of the remaining meniscal rim
3. preservation of the capsular rim
4. normal adjacent articular cartilage is protected

Instruments used in arthroscopic meniscectomy

1. Arthroscopes: 4 mm I.D. of 30 degree arthroscope, 70 degree arthroscope
2. Hand operated instruments
 - 1) Probes, scissors, knives, single jaw cutting forceps, curettes, grasping forceps
 - 2) "The ability to use these hand-operated iustruments is the first and basic skill to be learned in operative arthroscopy"
3. Motorized instrument

Diagnostic examination of the menisci

1. Portal entry
 - 1) Antero-lateral portal
 - 2) Antero-medial portal
 - 3) Postero-medial, postero-lateral portal
 - 4) Mid patellar portal

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- 5) Auxillary lateral portal
 - Auxillary medial portal
 2. Lateral meniscus:
 - figure of 4 position or varus & internal rotation & knee full extension
 3. Medial meniscus
 - ant-lat portal
 - 20° flexion, valgus stress & ext. rotation
 - postero-medial joint compartment not open: only inner 50% possible
 - * **Techniques to solve this dilemma**
 - (1) Change the viewing arthroscope to the medial portal: another 25% possible
 - (2) Use a small diameter arthroscope: 2.7 mm \emptyset arthroscope
 - (3) View the postero medial compartment directly 70° arthroscope is used through the intercondylar notch
 - (4) Probing posteriorly: postero-medial portal through transillumination
 4. Using third portal
 - 1) central patellar tendon
 - 2) along the joint line just anterior to the collateral ligament.
 - 3) at the corners: post-medial portal, post-lateral portal
 5. Using all possible portals

Classifications of Meniscal tear(by O' connor)

1. Longitudinal tears
2. Horizontal tears
3. Oblique tears
4. Radial tears
5. Variations(flap tears, complex tears, degenerative tears)

General Guidelines in Arthroscopic Meniscal Reresection

1. Remove the mobile fragments
2. Do not leave any sudden changes in rim contour
3. Do not try to obtain a perfectly smooth rim
4. Use the probe often : like sculpturing process
5. Let the texture of the meniscus be a guide :
 - ┌ normal-firm, gritty
 - └ degenerative cartilage - soften, mushy

6. Protect the meniscus capsular junction
7. Alternate between hand - operated and motorized instruments.
 - 1) motorized cutter: clean up small, an even strands & tags, smooth
 - 2) hand instrument: desired contour of the meniscus
8. If unsure, leave more meniscal rim rather than less.

Types of meniscal excisions (by O' connor)

- 1 Partial meniscectomy
- 2 Subtotal meniscectomy
- 3 Total meniscectomy

Management of specific meniscal tears

1. Vertical longitudinal tear(Bucket handle)
 - 1) 60% of ACL insufficient knees.
 - 2) repair criteria
 - longitudinal tear greater than 1cm within vascular zone in a young (under age 30) active patient
 - mobile fragment should be relatively intact without secondary tears or deformity
 - 3) 5yr minimal f/u: 90% good and excellent in stable Knees.
 - 4) **Techniques**
 - step1: Probe
 - step2: Partially cut the posterior attachment.
 - step3: Cut the anterior attachment
 - step4: Grasp the anterior horn
 - step5: Avulse the posterior horn
 - step6: Inspect and trim the remaining rim
2. Variation of the vertical longitudinal tears.
 - 1) Short vertical tears.
 - post $\frac{1}{3}$: more difficult
 - "clunk-clunk" sensation
 - often repairable
 - If resection is necessary, the fragment should first be subluxated into the center of the joint.
 - 2) Incomplete Vertical tears.

- Post horn of meniscus usually an accompanying tear of the ACL
- Superior or inferior surface
- Sup. surface near the tibial attachment, no greater than 1-1.5cm left alone
- longer than 1.5cm, instability of posterior horn → resection → piecemeal fashion using a basket forcep.

3. The oblique tears

1) "flap tear" or "parrot beak tear": most common meniscal tear

2) location: middle & posterior ⅓의 junction

3) synovial inflamed & hypertrophied

4) General techniques

(1) The goal is to amputate the mobile segment at its base and then contour the remaining meniscus so as to leave as wide and function a rim as possible.

(2) Patience and good joint exposure are the Keys to success with this type of tear.

- Folded flap tear on the inferior surface of the lateral meniscus

- Anterior flap of the lat meniscus

- localized area of chondromalacia on the adjacent femoral condyle.

- flap can be excised with a 90° basket forceps & motorized cutter.

- Folded flap in the medial or lateral gutter: unusual

- Post - based flap tears

- Double flap tears

4. Degenerative tars

- over age 40

- degenerative arthritis

- post horn: soften, fibrillation

- Typically, the tears do not extend into the capsule, nor is the outer ⅓ involved in the degenerative process

- motorized suction cutter

- it is not necessary to remove every fibrillation fragment of meniscus and care should be taken to leave the capsular rim into

5. Radial tears

- seldom solitary but occur in combination with other tears.

- location: lat. meniscus at either the junction of the middle and post. $\frac{1}{3}$ or near the posterior tibial attachment.
- techniques: excision of the corners of the tear and then enough resection of the remaining rim to give it even contour.

6. Horizontal tears

- Lat. meniscus common
- common in runner, but all age group
- It is important not to leave any part of the rim that feels softened or in which there are still signs of a cleavage plane that extends toward the capsule. (except, the horizontal tear frequently present in the remaining rim of a chronic bucket handle tear).
- Technique: constant probing and the alternate use of basket forceps and motorized suction cutters.

Postoperative care following partial meniscectomy.

- 1) At the completion of all arthroscopic meniscal procedures, the joint is thoroughly irrigated to remove any loose bodies
- 2) Compressive dressing
 - Tourniquet release before irrigation
 - Jones type padded cotton dressing (for 24 ~ 48hrs)
- 3) Isotonic, isokinetic, isometric quadriceps exercise (preoperatively, immediate post-operatively)
- 4) Full-wt bearing: on the day of procedure.
- 5) Early active range of motion:
 - 1wk after surgery: at least 90° of flexion and good isometric tightening of the quadriceps.
 - 2wk: nearly full range of motion
 - 4~6wk: complete knee motion
 - chondromalacia patella, femoral condyle: only isometric exercise for 4~6wks.
- 6) Stationary bicycle, walking, swimming as soon as possible.
 - Running & jumping activities: not permitted until full range of motion, absence of swelling & pain good quadriceps strength.
- 7) Return to sports activities 6~8 wks.
 - protect the knee from any strenuous sports activities for at least 6 months.

- 8) Post-operative effusion & synovitis usually subsides with the return of quadriceps muscle strength.
- Effusion beyond 2 or 3 months, quadriceps strength is adequate, ⇒ suspicion of further problems with the knees.
 - Degenerative tears: longer recovery time, synovial effusion that persist for 6 to 8wks.

***Fifteen-year follow-up of arthroscopic meniscectomy.
(Burks RT, Metcalf MH, Metcalf RW: AAOS, 1994)**

1. Results are nearly universally good in stable knees at 15-year follow-up.
2. Age was not a factor in the results in this series.
3. ACL-deficient knees with meniscectomy had clearly poorer results than had stable knees with meniscectomy.
4. Results of medial and lateral meniscectomy showed no statistical difference in results.
5. Knees with alignment of $<4^\circ$ showed poorer radiography and Lysholm scores compared with knees $>4^\circ$ with medial meniscectomy. This was also true for alignment of $<0^\circ$ compared with $>0^\circ$.
6. Men had superior results than women if both had intact ACL, but this difference was eliminated if both were ACL deficient.