

Discoid Meniscus

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uncommon meniscal anomaly - Young(1889), snapping knee syndrome (1910, Kroiss).
- occur more frequently laterally than medially.

Incidence

1. lateral discoid: 1.5~15.5%
26% (Korean & Japanese patient)
1% (Other patient population)
- bilaterality: 20~25%
2. medial discoid: 0.06~0.3%

Anatomy and classification

1. Normal anatomy of lateral meniscus:
 - 1) varies much more than medial meniscus in size & shape.
 - 2) greater normal excursion with flexion & extension.
- 1 cm of motion on lateral side
(3 mm on medial side)
 - 3) percentage of coverage on tibial plateau
- lateral - 75~93%
(medial - 51~74%)
2. Classification of discoid lateral meniscus (Watanabe, 1979)
 - Type I : complete
 - Type II : incomplete
more common, disc shape, asymptomatic
 - Type III : Wrisberg - ligament type
 - 1) complete & incomplete type (type I & II)
- have normal meniscotibial attachment.
- different by the amount of tibial plateau that is covered by meniscus.

- no abnormal motion of meniscus during knee flexion or extension.
- 2) Wrisberg - ligament typen (type III)
 - not have a discoid shape nor normal posterior meniscotibial attachment.
 - presence of lig of Wrisberg - meniscus unstable & displace (med, lat, ant.).
 - occur at a younger age(6~8th year of life) than complete or in complete types.
 - unassociated with trauma:
 - popping sound during knee flexion & extension(snapping knee syndrome).
 - palpable clunk during last 15~20 degrees of extension of flexed knee.
- * Ring-shaped lateral meniscus (4th variant ?)
- * Accessory lateral meniscus: double layered meniscus
- 3. Discoid medial meniscus
 - much less than discoid lateral menisci
 - disc shaped
 - more often associated with trauma - meniscal tears.

Etiology

1. Smillie (1948):
 - failure of resorption of central area of cartilage plate during fetal stage of normal development
 - depend on when arrest of development occured.
2. Kaplan (1957):
 - develops because of absence of posterior tibial attachments of normal meniscus.
 - meniscus abnormally subluxate to notch because of attachment of Wrisbeig ligament
 - discoid shape resulted from repetitive trauma to meniscus druring normal activities.
 - does not explain more common type of discoid meniscus & medial discoid meniscus.
3. Woods and Whelan (1990):
 - discoid meniscus must be cengenital origin.

Type of tear

1. longitudinal tear
2. horizontal tear
3. oblique tear
4. complex tear
5. peripheral detachment
6. degenerative tear

Clinical features

1. Classic symptom of discoid lateral meniscus:
 - snapping or popping knee
 - visible & audible clunk in knee with flexion and extension
2. Presentation:
 - asymptomatic
 - pain during ordinary activities.
 - locking, giving way, limping, clicking.
 - swelling, snapping.
 - related to tear of discoid
3. Physical examination:
 - limited extension, effusion, quadriceps atrophy
 - lateral joint line tenderness, clicking
 - visible buldge at anterolateral in flexion.
 - positive Mc Murray test.
 - ambulate bent knee.

Radiographic evaluation

1. Simple X ray:
 - AP, lateral, tunnel, skyline views.
 - radiographic findings are generally subtle
 - AP view: widening of lateral joint space
 - cupping of lateral tibial plateau
 - flattening of lateral femoral condyle
 - tibial spine hypoplasia
 - elevation of fibula head
 - varus inclination, subchondral bone sclerosis

marginal osteophyte in lateral compartment

Discoid suspected → arthrography or MRI: confirm

2. Arthrographic diagnosis:

meniscus extends toward region of intercondylar notch & abnormally large, elongated cannot determine amount of central degeneration of meniscus like MRI

3. MRI

(diagnosis)

- 3 or more 5 mm thick consecutive saggital images demonstrate continuity of the meniscus between ant. & post. horns

: increased superoinferior height

abnormally thickened bow tie appearance

1) coronal images : show complete meniscus in all sections through knee (20 % of tibial width)

2) asymmetric discoid meniscus:

wide body on coronal image

but normal anterior & posterior horns on saggital images

3) value in determining intrasubstance degeneration & tears that are difficult to evaluate arthroscopically

Treatment

Treatment option depends on patient's symptoms and age, type of discoid meniscus, type of meniscal tear.

1. Intact, complete or incomplete discoid meniscus seen as an incidental finding at arthroscopy or arthrotomy.

not necessarily require treatment

: occasional lateral knee snapping without pain, locking, swelling.

- observation with no further treatment unless symptoms progress.

2. Based on biomechanical research knowlege of meniscal function.

1) central partial menisectomy (saucerization)

: risk of degenerative arthritis after total menisectomy

(1) piecemeal resection

(2) one piece excision

(3) semiarthroscopy

(4) open

desirable width of remaining rim of meniscal tissue:

6 mm in complete discoid meniscus

8 mm for incomplete discoid meniscus (1988 Hayashi)

appropriate width of meniscal rim is left to avoid retears and further surgery

2) peripheral tear in vascular zone of discoid meniscus

partial menisectomy with meniscal repair of remaining rim:

preoperative MRI - helpful in determining extent of meniscal degeneration before meniscal repair

3) Wrisberg - ligament type of discoid lateral meniscus:

total menisectomy (open or arthroscopic)

central partial menisectomy + peripheral reattachment (Rosenberg, 1987)

Combined disease with lateral discoid meniscus

Osteochondritis dissecans in lateral femoral condyle:

abnormal contact force onto lateral femoral condyle.

(Treatment)→ meniscoplasty (Saucerization)

multiple drilling

weight bearing limitation

<Goal of treatment>

: Establish stable meniscal rim or meniscus that can function as a meniscus in as normal as possible.

Limit the risk of early arthritis in children or progressive arthritis in adult.

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