Arthroscopic Treatment of Lateral Discoid Meniscus in the Knee*

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Introduction

Young, in 1889, was the first to describe a discoid lateral meniscus in a cadaver specimen, and the term 'snapping knee syndrome' was attributed to it by Kroiss[1].

The vague and intermittent symptoms associated with this anomaly may produce difficulty and delay in the diagnosis. Arthroscopy allows a more precise diagnosis and can identify an associated tear[2, 3]. The purpose of this study is to report the clinical feautres of discoid meniscus and to suggest an adequate arthroscopic technique.

Materials and Methods

From 1989 to 1993, 35 discoid menisci of 33 patients were treated by arthroscopic surgery. There were 19 males and 14 females. The patient's ages ranged from 11 to 40 years(average: 22.3). There were 13 right lesions, 18 left, and 2 bilateral. In this period, 205 patients underwent an arthroscopic examination because of variable symptoms attributable to the meniscus or other structures of the knee.

The discoid lateral meniscus was present in 17.1% of all patients whose knees were examined arthroscopically by the authors. It was present in 20.1% of all meniscal lesions, and 36.4% of all lateral meniscal lesions.

In 35 discoid meniscus, 4 knees with intact meniscus and mild symptoms were left alone. 12 had arthroscopic partial menisectomy for the longitudinal and transverse tears with stable posterior attachment. The other injured 19 knees underwent arthroscopic or semi-arthroscopic total meniscectomy.

Results

1. Duration of symptoms

Two cases (5.7%) were 1 month, 9 cases(25.7%) were 1 year, 24 cases(68.6%) were more than 1 year.

2. Presence of trauma history

Only 11 patients (31.4%) had symptoms associated with definite trauma.

3. Clinical symptoms & signs

All patients complained of pain. Click was positive in only 48.6%. An experience of giving way and locking was present in 22.8% and 20% of the patients, respectively(Table 1).

Table 1. Pre-operative clinical symptoms

	No. of cases (%)
Pain	35 (100.0)
Click	17 (48.6)
Giving way	8 (22.8)
Locking	7 (20.0)
Swelling	4 (11.4)

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Physical examinations revealed that the McMurray test was the most frequent positive finding(40%), followed by joint line tenderness (34.3%), and atrophy of the quadriceps(28.6%) (Table 2).

Table 2. Pre-operative clinical signs

	No. of cases (%)
McMurray test	14 (40.0)
Joint line tenderness	12 (34.3)
Quadriceps-muscle atrophy	10 (28.6)
Flexion contracture	8 (22.9)
Effusion	3 (8.6)

4. Pre-operative X-ray findings

Routine anteroposterior, lateral and tunnel views were taken. The most frequent findings were widening of lateral joint space(25.7%) followed by sclerotic lateral tibial plateau(14.3%), and squaring off of the lateral femoral condyle (8.8%). Osteochondritis dissecans affecting the lateral condyle was found in 2 knees(5.7%) (Table 3).

5. Classification of discoid meniscus

By Watanabe's classification, complete type was found in 30 knees, and incomplete and Wrisberg's types in 3 and 2 knees, respectively.

6. Associated findings with discoid meniscus

Twenty-one cases of discoid meniscus were associated with synovial hypertrophy, and 9 case were synovial plica syndrome (Table 4).

Table 3. Pre-operative X-ray findings

	No. of cases (%)
Windening of lateral joint space	9 (25.7)
Sclerotic lateral tibial plateau	5 (14.3)
Squaring off of the lateral femoral condyle	3 (8.5)
Cupping of the lateral tibial plateau	2 (5.7)
Osteochondritis dissecans	2 (5.7)
Ossification defects on the lateral femoral condyle	0 (0.0)

Table 4. Associated findings with discoid meniscus

Fingings	No.
Synovitis or synovial hypertrophy	21
Synovial plica syndrome	9
Chondromalacia patella	3
Osteochondritis dissecans	2
Loose body	1
ACL injury	1

7. Locations and types of ruptures

The most common location was posterior horn (45.8%), followed by combined portion(25%) (Table 5-1). Longitudinal type rupture was most common(41.6%), followed by combined type(37.5%) (Table 5-2).

Table 5-1. Locations of ruptures

	No. of cases (%)
Anterior	4 (16.7)
Middle	3 (12.5)
Posterior	11 (45.8)
Combined	6 (25.0)
Total	24 (100.0)

Table 5-2. Types of ruptures

	No. of cases (%)
Longitudinal	10 (41.6)
Transverse	3 (12.5)
Horizontal	1 (4.2)
Radial	1 (4.2)
Combined	9 (37.5)
Total 24	(100.0)

8. Relations between tear and age group

Higher incidence of tear was noted at older ages(Table 6).

Table 6. Relations between tear and age group

Age	No of cases	No. of tear (%)
0–10	1	0 (0.0)
11–20	16	10 (62.5)
21–30	11	8 (72.7)
31–40	7	6 (85.8)
Total	35	24 (100.0)

9. Treatment

Discoid meniscus, which has no tear or has a short duration of symptoms, has been treated with conservative methods. But intact meniscus with long duration of pain, flexion contracture or prominent quadriceps atrophy has been treated with partial menisectomy. Arthroscopic partial menisectomy was indicated in longitudinal or transverse tear with stable posterior attatchment. Arthroscopic total menisectomy was done in extensive tear, multiple tear or instability of posterior attachment. If it was difficult to perform arthroscopic total menisectomy, we tried semi-arthroscopic total menisectomy in which posterior cuts were made using an arthroscope, and anterior cuts through a small arthrotomy. Four knees with intact meniscus were left alone. Twelve had arthroscopic partial menisectomy, 8 had arthroscopic total menisectomy and 11 had semi-arthroscopic total menisectomy (Table 7).

Table 7. Methods of Treatment

Method	No. of Knees
Arthroscopy only	4
Arthroscopic partial menisectomy	12
Arthroscopic total menisectomy	8
Semi-arthroscopic total menisectomy	11
Total	35

10. Post-operative Results

To obtain the postoperative results, it was possible to follow up 30 cases for longer than one years period, with maximum follow up of 54 months and average 30 months.

The clinical results were analyzed using Ikeuchi's knee rating system(Table 8). Thirty percent of the knees had excellent results, 46.7% had good results, and 23.3% had fair results; none were poor(Table 9). Unsatisfactory results were related with associated findings.

Table 8. The knee rating system (according to Ikeuchi 1982, Vandermeer and Cunningham 1989[3,4])

Grade	Description
Excellent	No mechanical symptoms (click, locking), no pain, full range of movement
Good	No mechanical symptoms, occasional mild pain on exercise, full range of movement
Fair	Mechanical symptoms, mild to moderate pain on exercise, full range of movement
Poor	Mechanical symptoms, moderate to severe pain on exercise or pain at rest, limitation of movement

Table 9. Post-operative results according to method of teatment

Methods	Excellent	Good	Fair	Poor	Total
Arthroscopy only	0	3	1	0	4
Arthroscopic partial menisectomy	4	4	2	0	11
Arthroscopic total menisectomy	3	4	1	0	7
Semi-arthroscopic total menisectomy	2	3	3	0	8
Total (%)	9(30.0)	14(46.7)	7(23.3)	0	30(100.0)

Discussion

In 1889, Young described a discoid meniscus in a cadaver specimen, but it was not until 1910 that the 'snapping-knee syndrome' was attributed to the anomaly[1]. In 1948, Smillie stated that the cause of the anomaly was the persistence of a disc shaped meniscus arrested at varying stages of embryological development[5]. Kaplan, however, was unable to find a cartilaginous disc representing the meniscus at any stage of human embryological development or in any of his comparative anatomical dissections. Therefore, he contended the human discoid lateral meniscus was normal-shaped meniscus that had no attachement to the tibial plateau posteriorly, the lateral meniscofemoral ligament, or the ligament of Wrisberg. This ligament was too short to accomodate the normal flexion and extension of the knee, so there was hypermobility of the posterior portion of the lateral meniscus with secondary hypertrophic thickening of the meniscus as a result[6]. Recently, Seong reported a high presence of posterior meniscofemoral Wrisberg's ligaments in Koreans; over 90% of a dissection series. This may be one of the factors that explains the high incidence of discoid meniscus in Koreans[7], but this study and others showed results contrary Seong's[2~4]. We found Wrisberg's ligament to be rare.

Simlle reported a 4.7% incidence of the lesion in a group of approximately 10,000 menisectomy patients[8]. In arthroscopic examinations, Dickaut reported 5.2%[9]. But Ikeuchi reporting a 16.6% incidence in the Japanese[3]. In Koreans, discoid lateral meniscus has been reported as a common disorder among meniscal lesions[10, 11]. In this study, discoid lesions were present in 17.1% of patients who had undergone arthroscopic exami- nations due to variable knee symptoms. This is exceedingly high compared to most of the reports in western series, but it is similar to that of Ikeuchi in Japan. And medial lesions are 78 cases and lateral 96 cases in 174 cases of meniscal lesions; discoid meniscus are 36.4% of all lateral meniscal lesions. This means the main cause of lateral meniscal lesions are discoid meniscus. Also, the predominant cause of lateral lesion in Korea compared with the Westerns.

45.7% of our patients could not remember any episode of trauma, even though there were definite tears on arthroscopic examination, suggesting that the discoid meniscus has a high risk of damage even with very minimal stress.

We confirmed the clinical diagnosis by arthroscope, refered to clinical symptoms and signs. The most common locations and types of ruptures are posterior horn and longitudinal type as seen in Seong's paper[7].

Most authors agree that the intact discoid meniscus of the complete or incomplete type, should not be removed[4, 9, 12]. However, we were able to obtain satisfactory overall results by performing partial menisectomy in intact discoid meniscus with long duration of pain, flexion contracture or prominent quadriceps atrophy. Kurosawa obtained, by total menisectomy, satisfactory results in more than 90% of cases[13]. Fujikawa et al, reserved partial menisectomy only for discoid meniscus with slight degeneration or minimal tear when it was not Wrisberg type or hypermobile; and capsular attachment was intact[14]. Dickhaut advocated total meni- sectomy for Wrisberg type of discoid lateral meniscus because partial menisectomy would leave an unstable posterior rim of meniscus[9]. Recently, the importance of the biomechanical functions of the meniscus in load bearing, weight transfer, nutrition of articular cartilage, and stabilization of the knee have become well-known, and therefore preservation of the intact part of the meniscus as much as possible by partial menisectomy is desirable for prevention of degenerative change in the knee and to preserve these functions of the meniscus[2, 9, 14~17].

Our principle for the arthroscopic treatment of discoid meniscus is based on preservation of the

intact part of the meniscus as much as possible. Arthroscopic partial menisectomy was indicated by longitudinal or transverse tear with stable posterior attachment. Arthroscopic total menisectomy was done in extensive tear, multiple tear or instability of posterior attachment. If, it was difficult to perform arthroscopic total menisectomy due to synovial hypertrophy or markedly increased thickness and size of the meniscus, we tried semi-arthroscopic total menisectomy in which posterior cuts were made using an arthroscope, and an anterior cut through a small arthrotomy.

There were no significant difference in the end results, either berween arthroscopic total memisectomy and semiarthroscopic total menisectomy, or between total menisectomy and partial menisectomy in the period of average 30 months follow up. But, the results of this study which showed no significant difference between total and partial menisectomy requires a study with a greater number of cases and a longer follow up period for confirmation.

Summary

The overall incidence of discoid meniscus was 17.1% in patients who had undergone arthroscopic examinations due to various knee symptoms. Discoid meniscus was most frequent in the age groups between 11 and 20 years old(45.7%) and more prevalent in males by a ratio of 1.2. All of the patients complained of pain. Click was positive only in 48.6%. The most common location & type were posterior horn & longitudinal types. There was no difference between the long term results of arthroscopic with semi-arthroscopic total menisectomy, and total menisectomy with partial menisectomy. Based on Ikeuchi's grading, 30.0% of the knees had excellent results, 46.7% had good results, and 23.3% had fair results: none were poor. Unsatisfactory results were related with associated findings.

Key Words: Arthroscopic treatment, Discoid Meniscus, Knee.

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= 국문초록=

슬관절 외측 원판형 연골의 관절경적 치료

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최근에 원판형 연골의 치료에 있어, 관절경적 수술이 많이 이용되고 있으나, 좁은 슬관절내 공간으로 인해 기술적으로 어려운 단점이 있다. 이 연구의 목적은 원판형 연골의 임상적 특징과 추시관찰에 따른 효과적 치료방법의 연구에 있다. 1989년에서 1993년까지 본원에서 관절경으로 확진된 35례의 슬관절 원판형 연골을 대상으로 하였다. 경한 증상을 가지고 있거나 손상이 없었던 4례에서는 특별한 시술없이 그대로 두었고, 후방부착에 안정성이 있는 종파열, 횡파열등이 12례에서는 관절경적 부분 절제술을 시도하였으며, 나머지 예에서는 관절경적 또는 반관절경적 전절제술을 시도하였다. 평균 30개월의 추시관찰 결과는 관절경적 전절제술과 반관절경적 전절제술의 결과에 큰 차이가 없었으며, 전절제술과 부분절제술 사이에도 큰 차이가 없었다. Ikeuchi의 grading에 따라 30%에서 우수, 46.7%에서 양호, 23.3%에서 보통의 결과를 얻었으며, 불량의 결과는 없었다. 만족치 못한 결과는 동반손상이 있는 경우가 많았다.