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Discoid lateral menisci in older patients

A radiographic study of 21 cases

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Abstract Twenty-three knees of 21 patients over 40 years of age with discoid lateral menisci were examined by radiography. The mean age of the patients was 59.7 years (range: 40–78 years). No patient had symptoms before the age of 40 and only 12 knees gave symptoms from the lateral compartment, although tears of a discoid lateral meniscus were diagnosed by arthrography in 21 of the 23 knees. Varus inclination occurred more frequently than valgus inclination. Subchondral bone sclerosis was more common in the medial compartment. However, high incidences of marginal osteophytes in the lateral compartment and morphological anomalies (cupping or flattening) of the lateral tibial plateau were revealed by radiography.

Résumé Vingt-trois genoux de 21 patients âgés de plus de 40 ans avec des ménisques latéraux discoïdes furent examinés par radiographie. L' âge moyen des patients était de 59.7 ans (40–78 ans). Aucun des patients ne montra de symptômes avant l' âge de 40 ans et seulement 12 genoux devinrent symptomatiques dans le compartiment latéral, bien qu'un déchirement du ménisque latéral discoïde fut remarqué par arthrographie sur 21 des 23 genoux. Un varus fut observée plus fréquemment qu'un valgus. Une ostéosclérose sous-chondrale fut remarquée plus souvent dans le compartiment médial. D'autre part, des incidences élevées d'ostéophytes marginales dans le compartiment latéral ainsi que des anomalies morphologiques (bombement ou aplatissement) du le plateau tibial latéral furent aussi signalées par radiographie.

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Introduction

Discoid lateral menisci are commonly thought to give symptoms at relatively young ages [4, 8, 11] and their radiographic characteristics, such as widening of the lateral tibiofemoral joint space and cupping of the lateral tibial plateau, have been described previously [1–3]. However, some studies have reported patients who neither had symptoms nor became symptomatic until middle age [1, 2]. Only scarce information is available regarding discoid lateral menisci in these patients. We therefore assessed clinical and radiographic characteristics of the discoid lateral meniscus in patients over 40 years of age.

Patients and methods

Between 1991 and 1994 we studied 21 patients (23 knees) who developed knee symptoms after 40 years of age and in whom arthrography revealed a discoid lateral meniscus. The average age was 59 years and our findings are summarised in Table 1.

The clinical and radiographical findings in these patients were retrospectively assessed by 2 independent observers who had no knowledge of the patients' clinical course. The average interval between the onset of symptoms and the radiographic examination was 4 weeks (range: 0–12 weeks).

The presence of osteophytes and subchondral bone sclerosis, together with the morphology of the lateral tibial plateau, were demonstrated by anteroposterior and lateral radiography of the knee in the supine position. The presence or absence of flattening or of cupping of the lateral tibial plateau was noted. If the distance between the deepest part of the concavity of the tibial plateau and a line connecting the medial and lateral margins of the tibial plateau excluding osteophytes was greater than 2 mm on a radiograph (magnification=110%), cupping of the lateral tibial plateau was considered to be present. If the entire lateral tibial plateau was above the line, it was regarded as flattened (Fig. 1). The femorotibial angle was measured on the AP film with the patient standing.

Results

According to Hall's classification [5] the discoid lateral meniscus revealed by arthrography was of the slab type

Table 1 Clinical and radiographic data

Case	Age at Diagnosis	Gender	Involved side	Cupping	Flattening	Femoro-tibial angle in degrees	Type	Tear	Tenderness at medial joint line	Tenderness at lateral joint line	Treatment
1	43	F	R	+	–	175	Biconcave	+	–	+	Arthroscopic meniscectomy
2	78	F	R	+	–	179	Wedge	+	+	+	TKA
3	48	F	L	+	–	173	Wedge	+	–	+	Arthroscopic meniscectomy
4	76	F	R	+	–	173	Wedge	+	–	+	Arthroscopic meniscectomy
5	47	F	R	–	–	173	Slab	+	–	+	Arthroscopic meniscectomy
	54		L	–	–	171	Slab	+	–	+	Arthroscopic meniscectomy
6	60	F	R	–	–	179	Slab	+	–	+	Arthroscopic meniscectomy
7	41	F	R	–	–	177	Biconcave	+	–	+	Arthroscopic meniscectomy
8	47	F	L	–	–	175	Biconcave	+	–	+	Arthroscopic meniscectomy
9	63	F	R	–	–	174	Wedge	+	–	+	Arthroscopic meniscectomy
10	55	M	L	–	+	176	Wedge	+	+	–	Conservative
11	72	F	R	+	–	155	Wedge	+	–	+	Arthroscopic meniscectomy
12	59	F	R	+	–	160	Slab	+	+	+	TKA
13	61	F	R	–	–	184	Biconcave	–	+	–	Arthroscopy, High Tibial Osteotomy
14	70	F	R	–	+	189	Biconcave	–	+	–	Arthroscopy, High Tibial Osteotomy
15	76	F	L	–	+	185	Biconcave	+	+	+	Arthroscopy, TKA
16	67	F	R	–	–	181	Wedge	+	+	–	Conservative
17	72	F	R	–	+	191	Wedge	+	+	–	Conservative
18	65	F	R	–	+	181	Biconcave	+	+	–	Conservative
	65		L	–	+	185	Biconcave	+	+	–	Conservative
19	59	F	L	+	–	196	Wedge	+	+	+	Arthroscopy, TKA
20	41	F	R	–	–	180	Biconcave	+	–	+	Arthroscopic meniscectomy
21	54	F	R	–	–	183	Biconcave	+	–	+	Arthroscopic meniscectomy

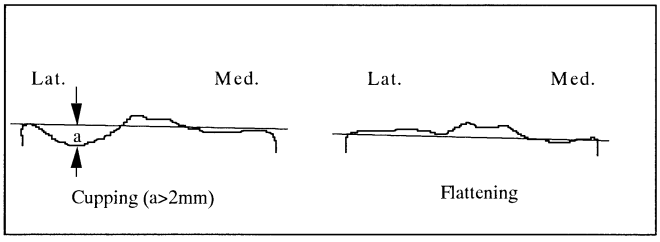

Fig. 1 Radiographic evaluation of the lateral tibial plateau (AP view)

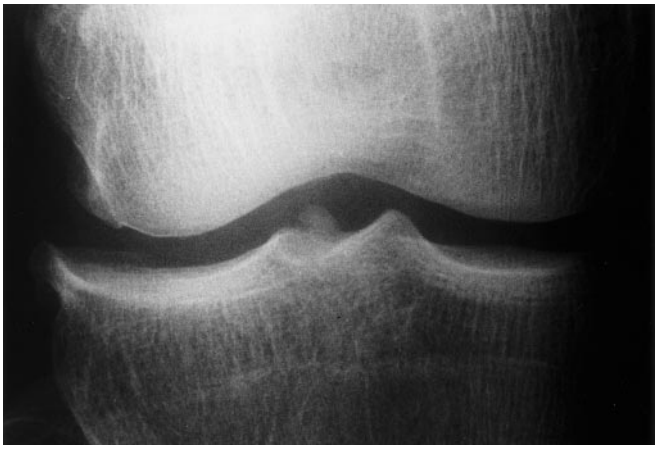

Fig. 2 Cupping of the lateral tibial plateau and marginal osteophyte

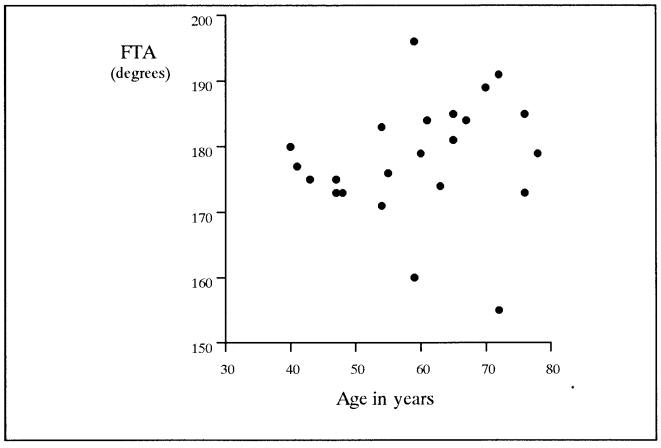

Fig. 3 Femoro-tibial angle (FTA) with age

in 4 knees, the biconcave type in 10 knees and the wedge type in 9 knees. No discoid lateral menisci of the asymmetric anterior and grossly torn types were observed. Suspicion of tears of the discoid lateral meniscus was suggested on arthrography in 21 of the 23 knees.

Twelve of the 23 knees with no angular deformity had symptoms caused by the torn discoid lateral meniscus, such as repeated locking or an extension block. These 12 knees were treated by arthroscopic subtotal menisectomy with symptom relief and increased knee function. The average follow-up was 5.2 years.

Seven of the 23 knees had arthrosis giving symptoms only in the medial compartment. Five of these 7 knees are now being managed conservatively. Another 2 knees had disabling pain in the medial compartment but no symptoms in the lateral compartment. Radiography revealed varus deformity but no tear of the discoid lateral meniscus was revealed by arthrography. These 2 knees were treated by high tibial osteotomy following arthroscopy.

Four of the 23 knees were diagnosed radiographically as having bicompartmental osteoarthritis and were treated by total knee arthroplasty (TKA), radiography having revealed degenerative changes in both the medial and lateral compartments. Three knees had a varus deformity and one a valgus deformity (Table 1).

According to Watanabe's classification [14], the discoid lateral meniscus in the 18 operated knees was of the complete type in 15 and of the incomplete type in 3, but no examples of the Wrisberg ligament type were seen. In all of the operated knees (except the 4 treated by TKA) there was only mild degeneration of the articular cartilage of the lateral compartment with surface fibrillation or fissuring.

Cupping of the lateral tibial plateau was observed in 7 of 23 knees (Fig. 2) and flattening was observed in 6 of 23 knees (Table 1). Marginal osteophytes were observed more frequently than valgus inclination. Nine of the 23 knees showed varus inclination of over 180° and 2 of the 23 knees had valgus inclination of less than 170° (Fig. 3).

Discussion

Engber et al. [3] reported a 22-year-old patient with a discoid lateral meniscus in whom cupping of the lateral tibial plateau was revealed by radiography. However, the incidence of this radiographic abnormality, and how aging affects the conditions and radiographic findngs of the discoid lateral meniscus, need to be studied. Burson et al. [1] reported adults with torn lateral discoid menisci who only became symptomatic in middle age. However, they only reported 4 cases, and little information is available on the clinical and radiographic characteristics of the discoid lateral meniscus in middle-aged patients.

In the present study our patients did not exhibit symptoms until middle age. Only 12 knees had symptoms in the lateral compartment, although possible tears of the discoid lateral meniscus were suggested by arthrography in 21 of the 23. Discoid menisci are prone to develop asymptomatic intra-meniscal degenerative changes [6, 8, 9], and it is suspected that these changes predispose to symptomatic tears of the discoid meniscus with aging. Both a male and a female predominance have been identified in patients with lateral discoid menisci [2, 4, 6, 7, 9, 10, 12]. There were many more females (n=20) than males (n=1) in our series.

Varus inclination was observed more frequently than valgus inclination. Subchondral bone sclerosis was more

Table 2 Incidence of osteophyte formation and subchondral bone sclerosis

Location	Osteophyte formation	Subchondral bone sclerosis
Lateral femoral condyle	14	1
Lateral tibial plateau	18	5
Tibial spine	10	–
Medial femoral condyle	16	6
Medial tibial plateau	13	17

frequent in the medial compartment (Table 2). However, radiography revealed high incidences of both marginal osteophytes and morphological anomalies (cupping or flattening) in the lateral tibial plateau.

In knee joints of patients with a discoid lateral meniscus the whole lateral compartment is covered and therefore the mechanical balance between the medial and the lateral compartment of the femoro-tibial joint may be different from that of knee joints with a normal semi-lunar shaped lateral meniscus. The tendency to varus in these patients may in time lead to relatively heavy loading on the medial compartment. It is considered that in middle-aged patients with discoid lateral menisci, osteoarthritic changes often occur in the medial compartment. However, characteristic radiographic changes are also observed in their lateral compartment and these may be induced by several factors such as the abnormal morphology of the lateral meniscus, asymptomatic tears of the discoid meniscus, and aging.

Recently, MRI has become the best ancillary method for examining the knee and its value in assessing a discoid lateral meniscus has been reported [6, 9, 10]. Unfortunately it was not available at the time that our study was made.

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