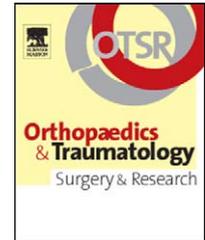




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WORKSHOPS OF THE SOO (2010, LA ROCHELLE). SYMPOSIUM: PAINFUL MEDIAL KNEE COMPARTMENT SYNDROME IN OVER-45 YEAR-OLDS

# Painful medial knee compartment syndrome in over-45 year-olds: I – Medical or surgical management: a series of 174 patients

C. Andro<sup>a</sup>, F. Dubrana<sup>b,\*</sup>, G. Marcillaud<sup>c</sup>, J.-L. Rouvillain<sup>d</sup>, F.-X. Gunepin<sup>a</sup>, P. Dewerpe<sup>e</sup>, S. Guilbert<sup>f</sup>, L. Wessely<sup>g</sup>, P. Buisson<sup>a</sup>, P. Chicault<sup>h</sup>, J.-P. Nguyen-Khanh<sup>i</sup>, T. Brune<sup>j</sup>, M. Dhénain<sup>k</sup>, Y. Maugars<sup>l</sup>

<sup>a</sup> Service de chirurgie orthopédique et traumatologique, hôpital instruction militaire Clermont-Tonnerre, 29200 Brest, France

<sup>b</sup> Service de chirurgie orthopédique et traumatologique, CHU La Cavale-Blanche, boulevard Tanguy-Prigent, 29269 Brest cedex, France

<sup>c</sup> Clinique Saint-Charles, BP 669, boulevard René-Levesque, 85016 La-Roche-sur-Yon, France

<sup>d</sup> Service de chirurgie orthopédique et traumatologie 2C, CHU du Fort-de-France, 97200 Fort-de-France, Martinique

<sup>e</sup> Clinique du Ter, chemin de Kerbernes, 56270 Ploemeur, France

<sup>f</sup> Polyclinique des longues allées, 25, rue de Mondésir, 45800 Saint-Jean-de-Braye, France

<sup>g</sup> Clinique Keraudren, rue Ernestine-de-Trémaudan 29200 Brest, France

<sup>h</sup> Cabinet de rhumatologie, 30, rue Voltaire, 29200 Brest, France

<sup>i</sup> Clinique du Val-d'Olonne, 85100 Les Sables d'Olonne, France

<sup>j</sup> TBF génie tissulaire, 6, rue d'Italie, 69780 Mions, France

<sup>k</sup> Haute Autorité de santé, 2, avenue du Stade-de-France, 93218 Saint-Denis-La-Plaine cedex, France

<sup>l</sup> Service de rhumatologie, CHU de Nantes, Hôtel-Dieu, 44093 Nantes, France

## KEYWORDS

Clinical results;  
Medial menisectomy;  
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## Summary

*Introduction:* There is at present no consensus on the management of degenerative medial meniscus lesions in patients aged over 45 years without proven osteoarthritis, especially given that the causal relation between degenerative meniscal lesion and osteoarthritis remains controversial. A prospective multicenter non randomized study was therefore performed. The principal objective was to assess surgeons' practice in the management of degenerative medial meniscus lesions. The secondary objectives were to identify predictive and prognostic factors and to compare medical versus surgical attitudes so as to draw up an adapted treatment strategy.

\* Corresponding author. Tel.: +33-2 98 34 78 02.

E-mail address: frederic.dubrana@chu-brest.fr (F. Dubrana).

**Patients and method:** One hundred and seventy-four patients were included between September 2008 and February 2010, and distributed between a surgical ( $n=104$ ) and a medical group ( $n=70$ ). Minimum follow-up was 6 months. Patient satisfaction and health-related quality of life on the SF-36 questionnaire were assessed at 6 months.

**Results:** No difference emerged between the surgical and medical groups. However, predictive factors for poor results were identified: overweight ( $p=0.005$ ), cartilage lesions ( $p=0.035$ ) and meniscus extrusion ( $p=0.006$ ).

**Discussion:** Results clarified the relation between degenerative meniscus lesions and osteoarthritis, in terms of meniscal incompetence. Meniscal extrusion should be seen as an arthrogenic degenerative meniscus lesion. We recommend a management strategy based on terrain and imaging data (X-ray and MRI), with the aim of providing patient relief while conserving cartilage.

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## Introduction

Painful medial knee compartment syndrome in over-45 year-olds without proven osteoarthritis is a complex multifactorial situation [1–3], generally involving a degenerative medial meniscus lesion, cartilage lesion or both [4,5]. With a view to establishing an adapted management approach, a prospective multi-center non-randomized study was performed. The principal objective was to assess surgeons' practice in painful medial knee compartment syndrome. The secondary objectives were to identify predictive and prognostic factors and to compare medical versus surgical treatment.

## Patients

The study was performed in the framework of a round table on medial knee pain in over-45 year-olds, presented at the 2010 Société d'Orthopédie de l'Ouest (SOO) Congress in La Rochelle, France. The prospective multi-center non-randomized study was run in six centers (Brest, Lorient, La Roche sur Yon, Les Sables d'Olonnes, Orléans and Fort de France) from September 2008 to February 2010. Inclusion criteria were: age greater or equal to 45 years, presenting with medial knee pain. Exclusion criteria were: history of knee surgery, and more than 50% joint impingement with respect to the lateral compartment.

## Method

As this was a study of professional practice, surgeons included all patients presenting with the inclusion criteria, for 6 months' follow-up. Initial clinical and radiological assessment comprised standard clinical work-up (height, weight, body-mass index, morphotype, hydrarthrosis, ranges of motion and quadriceps amyotrophy) plus SF-36

questionnaire; and AP and lateral loaded knee X-ray, 30° flexion AP weight-bearing view (Schuss) and systematic MRI assessment. The SF-36 questionnaire comprises eight dimensions of physical activity and psychological status, scored 0–100, with higher scores representing better quality of life [6,7]. Patients were followed up at 6 months for radioclinical and functional (SF-36) reassessment. Data were entered on Excel spreadsheets and analyzed using SSP2 software. Treatment was either medical or surgical. The latter consisted in arthroscopy associating joint lavage and partial meniscectomy in case of meniscal lesion. The former, depending on the physician, comprised joint rest, simple analgesia, infiltration and/or weight-loss diet.

## Results

One hundred and seventy-nine patients were recruited; five were excluded (three failing to match inclusion criteria, and two defective clinical forms); finally, 174 were studied. Two subgroups were distinguished: surgical ( $n=104$ ) and medical ( $n=70$ ). Mean age was 55.4 years (range, 45 to 77 yrs), with 67% males (117), and 30% females in the surgical and 37% in the medical group. Mean BMI was 26.5 kg/m<sup>2</sup> (Table 1). On MRI, meniscal lesions were mainly in the posterior segment (Table 2). Other lesions frequently identified on MRI were meniscal extrusion, subchondral edema and cartilage lesions (Table 3). Extrusion concerns the relation between the medial meniscus and the edge of the tibial plateau: normally, on mid-segment slices, the lateral edge of the meniscal triangle is aligned with the medial edge of the tibial plateau, and projection on these two landmarks is considered abnormal when the distance exceeds 3 mm [8,9]. Meniscal extrusion was thus found in 26% of the total population, and predominantly in the medical group (41%). There was a high rate of cartilage lesions in the total population (34%), and predominantly in the surgical group (38%). About

**Table 1** Clinical data.

	Age	Mean BMI	Varus	Hydrarthrosis	Amyotrophy
Total population $n=174$	55.4	26.5	47	40	29
Surgery group $n=104$	55.6	26.5	46	42	33
Medical group $n=70$	54.9	26.5	49	36	23

**Table 2** Meniscal lesion location on MRI.

	Posterior segment	Mid segment	Anterior segment
Total population <i>n</i> = 174	94.8% (165)	45% (78)	4% (7)
Surgery group <i>n</i> = 104	96.2% (100)	50% (52)	5% (5)
Medical group <i>n</i> = 70	92.9% (65)	37% (26)	3% (2)

**Table 3** Meniscal lesion type on MRI.

	Extrusion	Meniscal cyst	Cartilage lesion	Subchondral edema
Total population <i>n</i> = 174	26	13	34	29
Surgery group <i>n</i> = 104	16	11	38	27
Medical group <i>n</i> = 70	41	17	30	31

**Table 4** Treatment prescribed in the medical group.

Treatment	Proportion ( <i>n</i> = 70)
Rest/no sport	83% (57)
Level 1 analgesics	77% (53)
Level 2 analgesics	7% (5)
Infiltration: (corticosteroids and/or hyaluronic acid)	69% (48)
Rehabilitation	54% (37)
NSAIDs	41% (28)
Chondroprotector	23% (16)
Weight-loss (diet, specialized consultation)	12% (8)
Insoles	9% (6)

a third of the patients showed subchondral edema, similarly in the two groups (Table 3). Intra- and perimeniscal cysts were rare. 70 patients (40%) were assigned to purely medical treatment (Table 4). Only two of the surgery patients did not undergo meniscectomy. 75% of the surgery patients (79/104) had cartilage lesions, including 14% cartilage flap requiring surgical debridement.

At 6 months' follow-up, clinical signs showed improvement in both groups, with no significant differences (Table 5). Eighty percent of patients were satisfied by their clinical evolution at 6 months, with no significant difference between groups (Table 6). The three pretreatment (medical or surgical) SF-36 physical status scores were significantly lower than general population reference values (INSEE data) [7], and physical and psychological status scores were little changed by treatment (Table 7). Three of

**Table 6** Percentage satisfied/dissatisfied patients after treatment.

	Satisfied	Dissatisfied	<i>p</i>
Total population	20.06	28.42	0.006
Surgery group	25.82	29.24	0.005
Medical group	26.4	27	NS

the various clinical, radiological and arthroscopic criteria influenced prognosis: BMI, meniscal extrusion and cartilage lesion. Whichever the treatment, BMI tended to be higher in dissatisfied patients (Table 8), and significantly so in the surgery group ( $p = 0.005$ ). Percentage dissatisfaction was higher in case of meniscal extrusion, whichever the treatment (Table 9), and very significantly so in the surgery group ( $p = 0.006$ ). BMI was higher in case of meniscal extrusion: 27.7 versus 26.1 ( $p = 0.001$ ). MRI showed a tendency for more cartilage lesions in case of extrusion: 39% versus 33% ( $p = ns$ ). The third prognostic criterion was presence of cartilage lesions on MRI, significantly associated with dissatisfaction in the surgery group (31% dissatisfied with vs. 14% without cartilage lesion on MRI;  $p = 0.035$ ).

## Discussion

Analysis of the present series shows that meniscectomy is not the sole treatment for chronic medial knee pain syndrome and the meniscal lesion that is associated in nearly 98% of cases. Whether medical or surgical treatment was implemented, the results were identical and quite satisfac-

**Table 5** Evolution of clinical criteria with treatment.

	Hydrarthrosis	Amyotrophy	Degree of flexion	Flexion contracture
<i>Surgery group n</i> = 104				
Before treatment	42% (44)	33% (34)	132°	34% (35)
After treatment	19% (20)	18% (19)	136.3°	9% (9)
<i>Medical group n</i> = 170				
Before treatment	36% (25)	23% (16)	136.8°	14% (10)
After treatment	16% (11)	10% (7)	136.4°	0%

Table 7 Initial and 6-months SF-36 scores according to type of treatment.

	Physical activity	Limited by physical status	Physical pain	Perceived health	Vitality	Life and relation with others	Psycho-logical health	Limited by psycho-logical status
INSEE	85.3	82.2	73.0	67.8	57.4	80.9	66.7	82.0
Total population (174)	64.6	42.5	40.5	66.3	57.9	77.3	72.9	72.9
	83.4	72.7	68.1	71.3	65.5	87.6	86.2	86.2
	+29%	+71%	+68%	+8%	+13%	+13%	+7%	+18%
Surgery group (104)	61.4	37.7	37.5	37.5	61.2	77.9	71.5	75.3
	83.0	70.4	68.7	68.7	67.5	87.6	76.8	84.6
	+35%	+87%	+83%	+7%	+10%	+13%	+7%	+12%
Medical group (70)	69.3	49.6	44.9	66.5	53.1	76.4	70.2	69.5
	84.1	76.1	67.1	71.6	62.5	87.5	75.4	88.6
	+21%	+53%	+49%	+8%	+18%	+14%	+7%	+27%

Table 8 Mean BMI according to treatment type and subjective result.

	Satisfied	Dissatisfied	p
Total population (174)	28.42	26.06	0.006
Surgery group (104)	29.42	25.82	0.005
Medical group (70)	27	26.4	ns

Table 9 Percentage satisfaction according to meniscal extrusion.

	Extrusion (%)	No extrusion (%)	p
Total population (33)	30	15	0.02
Surgery group (21)	47	15	0.006
Medical group (12)	21	15	ns

tory: 80% patient satisfaction and improved SF-36 score. A significant impact of overweight, cartilage lesion and meniscal extrusion emerged, notably in the surgery group. Regarding obesity, it should be noted that patients in this series were on average overweight (mean BMI, 26.5). In a case-control study, Ding et al. [10] showed that the prevalence of degenerative meniscus lesions correlated with elevated BMI. BMI, although easily identifiable, served as an indication for medical treatment in only 12% of the present series, whereas 18% showed BMI > 30%. This raises the issue of how our consultations are organized, relations with nutritional services, and certainly of the patient's own attitude. The second factor of poor prognosis was cartilage lesion. Cartilage flap found on arthroscopy was a factor of poor prognosis. Discovery is usually peroperative, as MRI findings are underestimated [11,12]. The third factor of poor prognosis was meniscal extrusion, isolated or associated with osseous edema or meniscal cyst; the osseous edema or meniscal cyst alone, however, were not factors of poor prognosis.

In the SOO series, extrusion was found in 26% of cases, with significant impact on results, especially for surgical treatment: extrusion was associated with a 3- to 5-fold increase in dissatisfaction rates [8,13]. The term most often seen in the literature is "extrusion", but synonymous terms include "subluxation" [8,14], "débord meniscal" [15], and "radial displacement" [16,17].

Extrusion, when greater than 3 mm, is strongly associated with joint line height loss [13]. There is a strong and proven association between extrusion and chondral lesions, joint impingement and osteoarthritis [14]. The degree of extrusion is proportional to the degree of joint impingement and osteoarthritis [8], and there is also a strong correlation between extrusion and cartilage loss [9,10,18]. Extrusion may be induced by chondrolysis and the resulting joint impingement caused by relaxation of the capsule-ligament plane to which the meniscus is attached: this hypothesis has been suggested [8,19] but, to the best of our knowledge, there are no data on the spatial evolution of the meniscus during osteoarthritis. Adams et al. [19] reported 10% extrusion without chondrolysis, but no chondrolysis without extrusion. Conversely, primitive extrusion may, due to the loss of meniscal function it induces (diminished contact

area and increased unit pressure) cause chondrolysis and impingement. This hypothesis is reasonable, inasmuch as extrusion can occur without any associated chondral lesion [8,13,14,16,19] and joint line height loss can be induced by extrusion alone [8,14,19]. According to Kenny [16] and Miller et al. [9], extrusion is associated with the same radiologic signs as total meniscectomy or may precede such signs [13,16]. The relative risk of cartilage loss increases with the degree of extrusion [14,18]. Taken together, all this suggests that extrusion may be of meniscal origin, preceding chondrolysis. A variety of meniscal lesions may be implicated: complex radial meniscal tear [13,20,21], more than 50% meniscectomy [20], or medial meniscus posterior horn (MMPH) lesions. MMPH lesions are strongly associated with extrusion, at 70 to 100% [13,22]. All this suggests that extrusion is a primitive meniscal pathology, inevitably causing meniscal incompetence.

In case of non-traumatic medial meniscus syndrome, the French Health Authority recommends 6 months' symptomatic medical treatment associated to radiologic assessment on AP weight-bearing, Schuss, lateral and 30° Merchant views [23]. Only in case of failure of completed medical treatment is MRI prescribed; arthroscopic meniscectomy is recommended only if there is no femorotibial impingement on standard X-ray and MRI shows a grade III meniscal lesion. Our present findings suggest that these recommendations should be adapted, defining a clinical pattern of meniscal incompetence.

## Conclusion

Painful medial knee syndrome in patients over the age of 45 years without proven osteoarthritis is a complex multifactorial situation from the point of view of both diagnosis and treatment. The present study demonstrated the relation between degenerative meniscal lesion and osteoarthritis. Notably, it highlights the concept of meniscal incompetence: i.e., all those situations in which the meniscus fails to play its role of shock absorption and stress distribution. Such is the case of meniscal extrusion, which should be seen as an arthrogenic degenerative meniscus lesion. Meniscectomy should therefore be considered with caution and be as economic as possible. Factors of poor prognosis were identified: overweight, cartilage lesions and meniscal extrusion. In the light of these findings, we recommend medical management in these cases.

## Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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