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Original article

Analysis of short and long-term results of horizontal meniscal tears in young adults

E. Sallé de Chou[a,*], N. Pujol[b], G. Rochcongar[a], T. Cucurulo[c], J.-F. Potel[d], F. Dalmay[e], F.-P. Ehkirch[f], C. Laporte[g], G. Le Henaff[h], R. Seil[i], C. Lutz[h], F.-X. Gunepin[j], B. Sonnery-Cottet[k], the Société Française d'Arthroscopie

[a] *Département d'orthopédie traumatologie, CHRU de Caen-Côte-de-Nacre, avenue de la Côte-de-Nacre, 14033 Caen, France*
[b] *Centre hospitalier de Versailles, 177, rue de Versailles, 78150 Le Chesnay, France*
[c] *118, rue Jean-Mermoz, 13008 Marseille, France*
[d] *Medipôle, 45, rue de Gironis, 31036 Toulouse, France*
[e] *2, rue du Docteur-Marcland, 87025 Limoges, France*
[f] *Clinique Maussins-Nollet, 67, rue de Romainville, 75019 Paris, France*
[g] *CHU de Rennes, 2, rue Henri-Le-Guilloux, 35033 Rennes, France*
[h] *Clinique du Diaconat, 50, avenues des Vosges, 67000 Strasbourg, France*
[i] *Centre hospitalier de Luxembourg, 78, rue d'Eich, 1460 Luxembourg, Belgium*
[j] *Clinique Mutualiste, 3, rue Robert-de-la-Croix, 56324 Lorient, France*
[k] *Centre orthopédique Santy, 24, avenue Paul-Santy, 69008 Lyon, France*

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ABSTRACT

Introduction: Symptomatic horizontal meniscal tears are rare but worrisome lesions in young adults. These are overuse injuries not amenable to the classic arthroscopic sutures. An open meniscal repair allows the meniscal lesion to be suture vertically, perpendicular to its in the vascularized zone. The purpose of this study was to evaluate the short and long-term clinical and radiological outcomes of the aforementioned surgical technique.
Material and method: The first cohort consisted of 24 patients operated between 2009 and 2011 (6 women, 18 men; mean age 26 years) having 11 lateral and 13 medial meniscal tears. The second cohort was of 10 patients operated between 2001 and 2002 (3 women, 7 men; mean age 24 years) having 8 lateral and 2 medial meniscal tears. Patients were reviewed at the last follow-up using the IKDC, Lysholm and KOOS scores. Patients in the first cohort had an MRI, while those in the second cohort had X-rays.
Results: Eighteen patients in the first cohort were reviewed with a mean follow-up of 2 years (12–45 months) and 9 patients from the second cohort were reviewed after 10 years (97–142 months). In the first cohort, one patient required secondary menisectomy. The mean Lysholm score was 90 and the subjective IKDC was 85. Every MRI examination found reduced extent and intensity of the hyperintense signal. In the second cohort, no patients required secondary meniscectomy. Two patients had joint space narrowing (less than 50%) on radiographs. The mean Lysholm score was 99 and the subjective IKDC was 91.
Conclusion: Open repair of horizontal meniscal tears in young adults leads to good subjective and objective results in the short term, which are maintained in the long-term.
Level of evidence: Level IV – retrospective study.

1. Introduction

Symptomatic meniscal tears are treated conservatively initially, while meniscectomy or meniscal repair are performed if conservative treatment fails [1]. Preserving as much meniscal tissue as possible is the primary concern [2], so as to prevent osteoarthritis (OA), which occurs in 19% of cases 13 years after total meniscectomy and in 36% of cases 30 years later [3,4]. The clinical outcomes

* Corresponding author.
E-mail address: salledechou.etienne@neuf.fr (E. Sallé de Chou).

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Table 1
Preoperative data for both patient cohorts.

	Number of patients	Mean age	Sex	Average follow-up	Time from symptoms to surgery	Lateral meniscus (*n*)	Medial meniscus (*n*)	Cyst (*n*)	Side
Cohort 1 Short-term	24	26 years	6 W/18 M	2 years (12–45)	14 months (6–13)	11	13	14	12R/12L
Cohort 2 Long-term	10	24 years	3 W/7 M	10 years (97–142)	23 months (6–90)	2	8	3	5R/5L

L: left, M: men, R: right, W: women.

are better and OA progression is less when the meniscus is repaired than when it is partially resected [5].

Horizontal cleavage tears in young adults were first described by Biedert in 1993 [6]. These injuries are graded on a scale of 1 to 3 based on MRI images [7]. They make up 20–23% of symptomatic meniscal lesions [8,9]. The etiology of these lesions has not been defined. They are not the result of specific trauma causing vertical tears nor are they degenerative lesions in young, non-arthritic patients. A synovial cyst is usually present at the same time. More than half of patients who have a meniscal cyst also have a horizontal cleavage tear [10,11]. Several treatments have been proposed: conservative treatment alone, arthroscopic suturing with or without fibrin clot, partial meniscectomy [12,13], arthroscopic partial meniscectomy of the inferior flap [14] and open suture repair [15].

Repair of fresh traumatic vertical meniscal tears results in good outcomes [1,16]. Repair of horizontal tears so as to preserve as much meniscal tissue as possible can be contemplated, as long as it is effective in the short term (pain, return to sports) and long term (low reoperation and OA rate). The purpose of this study was to evaluate the survival of suture repairs performed for horizontal cleavage tears in the meniscus of young adults and to review the short- and long-term clinical and radiological outcomes. We hypothesized that function would improved quickly and permanently, the hyperintense MRI signal would be reduced early on and the rate of OA on radiographs would be low in the long term.

2. Material and methods

This was a retrospective, multicentre study of two patient cohorts reviewed at different times. All patients had meniscal pain for at least 6 months that did not respond to conservative treatment and that forced them to stop their sports activities. All patients were operated on, either by open suturing after arthroscopy or by arthroscopic suturing.

2.1. First cohort

Twenty-four patients with a minimum follow-up of 12 months. All had normal preoperative radiographs, without signs of OA. The mean age at the time of the procedure was 27 ± 9 years (13–40 years). There were 6 women and 18 men; an equal number of left and right knees were affected. Fourteen patients (58%) also had a meniscal cyst. Six patients had a medial meniscus tear and 18 patients had a lateral meniscus tear. All knees were stable, without associated ligament damage. The symptoms had been present for a mean of 14 months (6–36 months) before surgery. Seventeen patients underwent open suture repair and seven patients had an all-inside repair. After a mean follow-up of 25 ± 11 months (12–45 months), these patients underwent an MRI examination to evaluate meniscal healing and the meniscal signal. Objective and subjective outcomes were evaluated using the KOOS, Lysholm and subjective IKDC questionnaires; the level of return to sport was recorded, as was the range of motion.

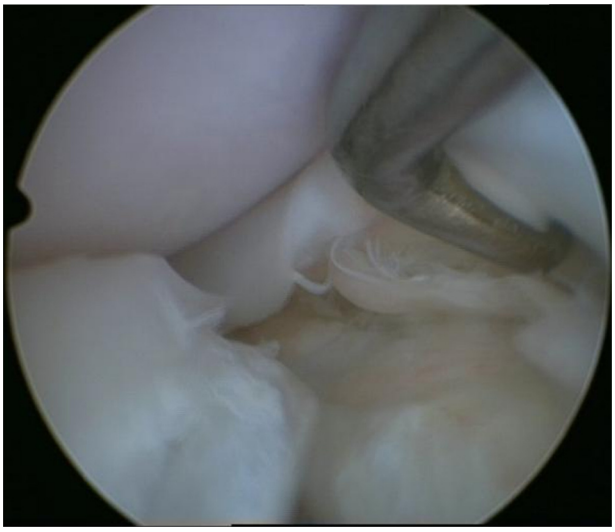

Fig. 1. Horizontal cleavage tear with unstable flap.

2.2. Second cohort

Ten patients with a minimum follow-up of 10 years. All had normal preoperative radiographs, without signs of OA. The mean age at the time of the procedure was 24 ± 11 years (14–45 years). There were 3 women and 7 men; an equal number of left and right knees were affected. Three patients also had a meniscal cyst. Eight patients had a medial meniscus tear and two patients had a lateral meniscus tear. All knees were stable, without associated ligament damage. The symptoms had been present for a mean of 23 months (6–90 months) before surgery. All of these patients were treated by open suture repair. After a mean follow-up of 10 ± 1.25 years (97–142 months), these patients underwent anteroposterior, lateral, schuss and sunrise radiographs that were interpreted using Ahlbäck's classification system [17]. Objective and subjective outcomes were evaluated using the KOOS, Lysholm and subjective IKDC questionnaires; the level of return to sport was recorded, as was the range of motion.

The two groups were comparable in terms of standard preoperative data ($P > 0.05$), except for the duration of symptoms and delay before surgery ($P = 0.0057$) (Table 1). Arthroscopy was performed in all cases. Grade 2 lesions were normal during arthroscopic exploration, while grade 3 cases had a horizontal tear. If an unstable meniscal flap was present, a minimal partial meniscectomy was performed (Fig. 1). When the open repair was performed, retroligamentous arthrotomy was used to address the lesions. If a meniscal cyst was present, it was excised through the incision. Vertical meniscus and synovium detachment was carried out so that an abrasive hook could be used to stimulate the injured area. The tear was repaired with PDS 0 by placing single vertical sutures (5 ± 1 points in the first cohort and 4 ± 1 in the second) perpendicular to the tear (Fig. 2).