

# Arthroscopic debridement of minor meniscal lesions: Clinical outcome of three years follow up based on questionnaire and search for causes of failure.

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## ABSTRACT

Meniscal debridement of minor lesions remains the most common procedure performed by knee arthroscopy surgeons. Does removing or smoothing the edges of these lesions really alleviate the symptoms? We set up a simple, postal questionnaire in order to let the patients evaluate the outcome of their arthroscopic treatment. We studied 105 patients (78 male and 27 female) with an average of 50,4 years of age, treated in the last 3 years in our department. We recorded the pain, the impairment in daily activities, sports activities and the range of movement, the use of pain killers and the presence of night pain before and after the arthroscopy. We noticed a significant improvement in these parameters in most of the patients (good and excellent results in 80%) but there was also a small percentage that remained unsatisfied (very poor and poor results 13,5%). The causes of treatment failure in these cases appeared to be coexisting underlying pathology such as lesions of the opposite meniscus and joint instability, patellar instability, end stage chondromalacia, osteoarthritis, elderly age, spinal disease, and hip arthritis.

**KEYWORDS:** Meniscal tears; arthroscopy trimming

### Introduction

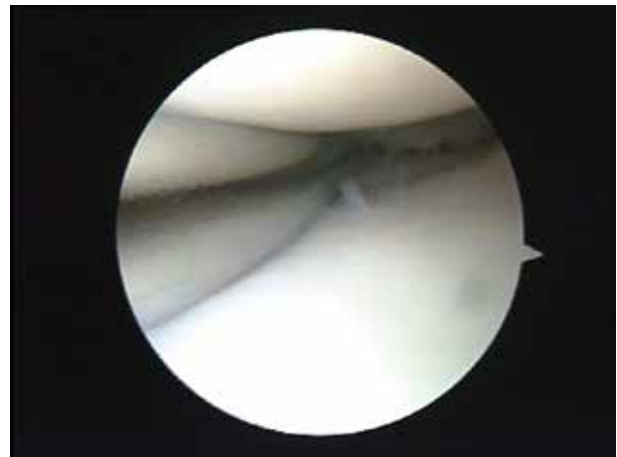
The arthroscopic debridement of meniscal tears is a standard technique performed by orthopaedic surgeons. The rationale of removing these small lesions is two-fold; first, to remove, together with the degenerate tissue, the innervation that follows the

new vascularization [1,2] after trauma in the meniscus. In the normal meniscus innervation [3,4,5] of the central part is absent. It is only after blood vessels and innervation grows into the central part that symptoms begin [6,7]. The second reason for arthroscopic removal of these lesions is the healing

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*Fig. 1: Arthroscopic treatment of minor meniscal lesion.*

incapability of degenerate tissue or of tissue in the white on white zone [8]. There are also other causes that generate pain in the knee joint such as plica syndrome [9,10], chondral defect [11], osteoarthritis [12] or more complicated situations such as instability of the knee joint due to anterior cruciate ligament insufficiency [13], patella instability [14] etc. The cause of knee pain can be difficult and can be easily missed. History and careful clinical evaluation are the cornerstones of successful diagnosis, while radiographs and MRI can confirm the final diagnosis.

Despite the thorough diagnostic approach, there is still a percentage of patients that remain unsatisfied after the arthroscopic treatment. The purpose of this study is to evaluate the clinical outcome after arthroscopic debridement of meniscal tears and individualize the possible causes in cases of treatment failure.

### **Patients and Methods**

We studied 105 patients (78 male, 27 female) who underwent arthroscopic treatment of minor meniscal tears in the last three years in our department (from 1/1/2005 to 1/10/2007). Preoperatively, a meticulous history, erect anteroposterior and mediolateral radiographs and knee MRIs were taken from each patient. The inclusion criteria were a) meniscal symptomatology, b) no radiographic signs of osteoarthritis c) MRI evidence of meniscal

injuries, d) small meniscal lesions, affecting less than half the central part of the meniscus, so that removal would not alter the biomechanical stability of the joint e) meniscal cyst that can only be treated arthroscopically f) no other coexisting conditions that could cause joint instability, such as anterior cruciate insufficiency and g) no previous operation on the same knee.

We excluded a) severe meniscal lesions that needed to be repaired b) meniscal cysts treated with open techniques c) cases of anterior cruciate insufficiency and e) previous surgery.

The mean average of patient's age was 50,4 years (range: 23-80). The arthroscopy was performed in 48 right and 57 left knees. The damaged meniscus was medial in 70, lateral in 24 and both in 11 cases. The type of lesion was bucket handle in 12, horizontal cleavage in 6, parrot beak in 2, fibrillation in 8, torn in 14, tear of discoid in 2, flap tear in 2, meniscal cyst in 8, and various tiny lesions in 48 cases (**Fig.1**). The mean follow-up time was 3 years (0.5 – 3).

Arthroscopy was performed under general anaesthesia. The meniscus was approached by the anteromedial and the anterolateral portals in all patients. Eight knee joints were approached by a supplementary third portal (5 high anteromedial and 3 central). We didn't use tourniquet in any patient.

We set up a simple questionnaire (**Fig.2**) that is easy to be completed by the patients, to have their evaluation of the arthroscopic treatment. This

### Questionnaire

		Pre-operatively	Post-operatively	Score
Pain	No pain	<input type="checkbox"/>	<input type="checkbox"/>	2
	Modest pain	<input type="checkbox"/>	<input type="checkbox"/>	1
	Severe pain	<input type="checkbox"/>	<input type="checkbox"/>	0
Daily activities	Not impaired	<input type="checkbox"/>	<input type="checkbox"/>	2
	Slightly impaired	<input type="checkbox"/>	<input type="checkbox"/>	1
	Severely impaired	<input type="checkbox"/>	<input type="checkbox"/>	0
Sport activities	Not impaired	<input type="checkbox"/>	<input type="checkbox"/>	2
	Slightly impaired	<input type="checkbox"/>	<input type="checkbox"/>	1
	Severely impaired	<input type="checkbox"/>	<input type="checkbox"/>	0
Range of movement	Not impaired	<input type="checkbox"/>	<input type="checkbox"/>	2
	Slightly impaired	<input type="checkbox"/>	<input type="checkbox"/>	1
	Severely impaired	<input type="checkbox"/>	<input type="checkbox"/>	0
Pain killers	Never	<input type="checkbox"/>	<input type="checkbox"/>	2
	Intermittently	<input type="checkbox"/>	<input type="checkbox"/>	1
	Regularly	<input type="checkbox"/>	<input type="checkbox"/>	0
Night pain	Never	<input type="checkbox"/>	<input type="checkbox"/>	2
	Intermittently	<input type="checkbox"/>	<input type="checkbox"/>	1
	Regularly	<input type="checkbox"/>	<input type="checkbox"/>	0

Knee score:  
 Minimum 0 (worst clinical status)  
 Maximum 12 (best clinical status)

### Numeric scale of pain

Pre operative pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain score	1	2	3	4	5	6	7	8	9	10
Post operative pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	↑ No pain				↑ Moderate pain					↑ Worst Possible pain

Fig. 2: Questionnaire, scoring and numeric scale of pain. For each parameter 0 is assigned for the worst, 1 for the intermediary and 2 for the best symptom. Thus, the total knee score could range between 0 for the worst clinical status and 12 for the best, taking into account all 6 parameters that the questionnaire assessed. The questions were answered before and after arthroscopy

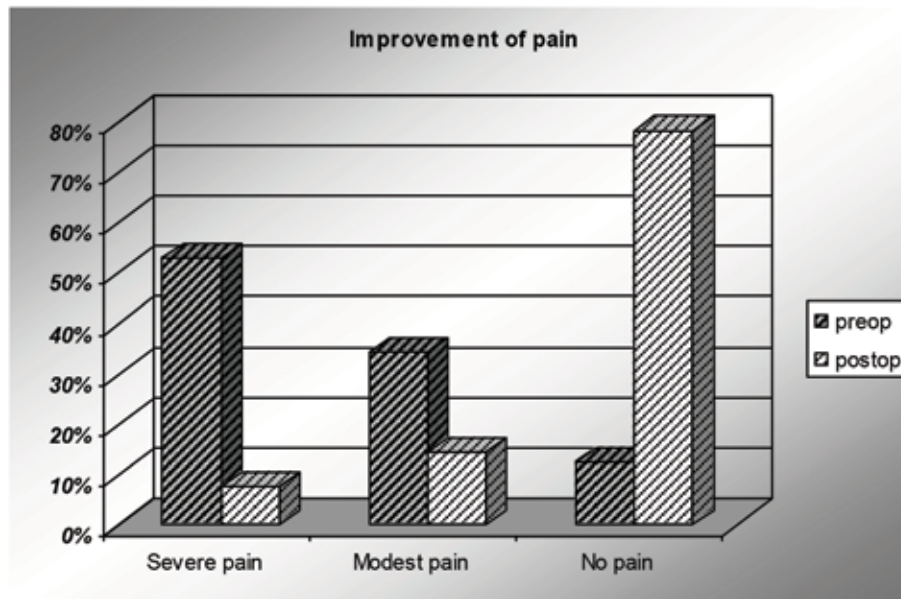


Fig. 3: Outcome of pain

questionnaire included: 1) a numeric pain score (0-10), 2) a three grade evaluation of: pain (minor, intermediate, major), daily activities, sport activities and the range of movement (not impaired/slightly impaired/severely impaired), the use of pain killers and the presence of night pain (never/intermittently/regularly). The patient's answers to the questionnaire supplied us with a scoring for further statistical analysis. For each parameter 0 was assigned for the worst, 1 for the intermediary and 2 for the best symptom. Thus, the total knee score could range between 0 for the worst clinical status and 12 for the best, taking into account all 6 parameters that the questionnaire assessed. The questions were answered before and after arthroscopy.

We sent the questionnaire by mail to 210 patients who met the including criteria. After we received their answers, we contacted all patients with complains to obtain further information about it. All data were registered and underwent a statistical analysis with SPSS 10 software.

### Results

We recorded one superficial infection treated with antibiotics. We did not notice significant intra-ar-

TABLE 1 Clinical outcome in 3 years follow up

		Pre-operatively %	Post-operatively %
<b>Pain</b>	No pain	12,4	78,1
	Medium pain	34,3	14,3
	Severe pain	53	7,6
<b>Daily activities</b>	Not impaired		
	Slightly impaired	3,8	65,7
	Severely impaired	60	28,6
<b>Sport activities</b>	Not impaired		
	Slightly impaired	1	39
	Severely impaired	72,4	18,1
<b>Range of movement</b>	Not impaired		
	Slightly impaired	6,7	53,3
	Severely impaired	39	7,6
<b>Pain killers</b>	Never	35,2	79
	Intermittently	41	15,2
	Regularly	23,8	5,7
<b>Night pain</b>	Never	21,9	70,5
	Intermittently	45,7	24,8
	Regularly	32,4	4,8

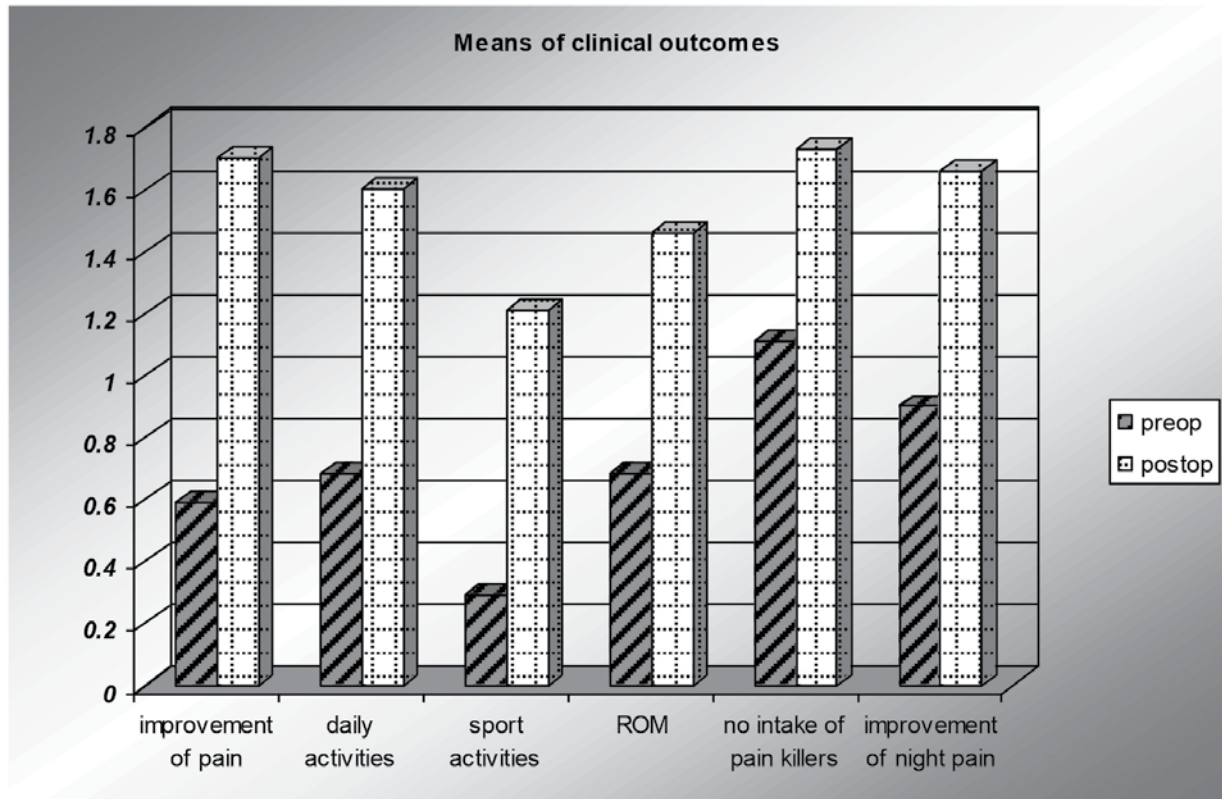


Fig. 4: Means of clinical outcomes

ticular bleeding postoperatively in any of the 210 patients who underwent arthroscopy.

The results represent the evaluation of 112 patients (7 questionnaires weren't properly compiled) so we finally had a sum of 105 questionnaires out of 210 asked patients (50%). The mean average of numeric scale pain was 6,28 (range 0-10) preoperatively and 2,20 (range 0-10) postoperatively. Fifty three percent of the patients had severe pain, 34,3% modest pain and a 12,4% had no pain preoperatively. Postoperatively, 7,6% had severe pain, 14,3% moderate pain and 78,1% had no pain (Fig.3). Daily activities were severely impaired in 36,2%, slightly impaired in 60% and not impaired in 3,8% of the patients preoperatively. Postoperatively, daily activities were severely impaired in 5,7%, slightly impaired in 28,6% and not impaired in 65,7% of the patients. Performance in sport activities was severely impaired in 72,4%, slightly impaired in 26,7% and not impaired in 1,0% of the patients preoperative-

ly. Postoperatively, performance in sport activities was severely impaired in 18,1%, slightly impaired in 42,9% and not impaired in 39,0% of patients. We observed similar results in the range of movement (ROM) that was severely impaired in 39,0%, slightly impaired in 54,3% and not impaired in 6,7% of patients preoperatively. Postoperatively, the ROM was severely impaired in 7,6%, slightly impaired in 39% and not impaired in 53,3% of patients. The daily intake of pain killers was regular in 23,8%, intermittent in 41% and never in 35,2% of the patients preoperatively. Postoperatively, the intake decreased in 5,7% in those who took regular dosages, 15,2% intermittent and 79% never. Night pain was present regularly in 32,4%, intermittently in 45,7% and never in 21,9% of the patients preoperatively. Postoperatively, night pain was present regularly in 4,8%, intermittently in 24,8% and never in 70,5% of the patients (Table 1).

The mean overall score of our questionnaire was



**TABLE 2** Group rating of the clinical outcomes based to our knee score.  
*Evaluation of clinical outcomes*

	Group	Knee score	N. patients	%	
<b>Very poor</b>	I	0-2	5	4,9	13,5
<b>Poor</b>	II	3-5	9	8,6	
<b>Modest</b>	III	6-7	7	6,7	
<b>Good</b>	IV	8-9	20	19,1	80
<b>Excellent</b>	V	10-12	64	60,9	

4,26 (range, 0-10) preoperatively and 9,36 (range 0-12) postoperatively. The mean pain score was 0,59 (range, 0-2) before and 1,70 (range, 0-2) after arthroscopy. The mean score of daily activities was 0,68 (range,0-2) before and 1,60 (range, 0-2) after arthroscopy. The mean score of sport activities was 0,29 (range, 0-2) before and 1,21 (range, 0-2) after arthroscopy. The mean score of the range of movement (ROM) was 0,68 (range, 0-2) before and 1,46 (range 0-2) after arthroscopy. The mean score of pain-killer's intake was 1,11 (range, 0-2) before and 1,73 (range, 0-2) after surgery. The mean score of night pain was 0,90 (range, 0-2) before and 1,66 (range, 0-2) after surgery (**Fig.4**).

Statistical analysis using Pearson's correlation coefficient indicates no significant linear relationship between the time after surgery in neither the numeric scale of pain score  $r(105)=-0.150$ ,  $p>0.001$ , nor the knee score  $r(105)=0.096$ ,  $p>0.001$  postoperatively. This suggests that we didn't observe the placebo effect, which occurs during the first year, in our series of patients.

The overall scores of our questionnaire ranged between 0 and 12. Based on clinical observations we distinguished five grades of scoring. We considered as very poor results the range between 0 and 2 (group I), poor results the range between 3 and 5 (group II), modest results the range between 6 and

7, good results the range between 8 and 9 and excellent results the range between 10 and 12. Thus, 5 patients had very poor results (4,9%), 9 patients had poor results (8,6%), 7 patients had modest results (6,7%), 20 patients had good results (19,1%) and 64 patients had excellent results ( 60,9% ), (**Table 2**). Nine patients from the first two groups (I and II), (13,5%), had a second operation within 9 months postoperatively. That was an arthroscopy (at 6 of them), a tibial tubercle transfer (patella alta), a medial unicompartmental knee replacement and a total knee replacement. The indication for the second arthroscopy was a missed coexisting lesion in the opposite meniscus in 4 of them, loose bodies intra-articularly and insufficiency of the anterior cruciate ligament. Six of them were treated in our clinic and 3 in other institutes. In groups III-IV the coexisting pathologies that could influence the clinical outcome involved some kind of spinal disease in two patients (spinal stenosis, intervertebral disc herniae), and hip osteoarthritis.

Cartilage lesions, assessed by arthroscopy, were grade II-III in most of the patients (90,4%) and grade IV in 10 of them (9,5%). Six of the 10 (grade IV) had poor results postoperatively (group I and II), three of whom underwent a second operation and more precisely a microfracture treatment of the cartilage damage, a medial unicompartmental knee arthroplasty and a total knee arthroplasty. The other 4 of the 10 patients had modest or good postoperative results (group III and IV) and therefore did not need another surgery in the last 2,5 years. Statistical analysis using Pearson's correlation coefficient indicates a strong association between the grade of cartilage damage and our knee score postoperatively ( $r = -0.52$ ). The correlation coefficient is very significant ( $p < 0.001$ ).

### Discussion

The principles of meniscal repair have been described [15,16,17] by many well-established authors. The clinical assessment, before and after surgery, has been described [18,19,20] only for more severe meniscal lesions.


This study claims that there is a clear clinical im-

provement after the arthroscopic trimming of minor meniscal lesions, when this treatment is based on appropriate indications. In this study we included lesions that occupied less than the central half of meniscus i.e. the white in white region, because such lesions wouldn't make the meniscal structure unstable. Moreover, because in these cases there is no indication for repair due to tissue incapacity to heal. We excluded patients with obvious signs of osteoarthritis in x-ray films or MRI.

Despite the accurate selection of patients without obvious osteochondral signs on imaging studies, we discovered 10 patients (9,6%) with arthroscopic findings of grade IV cartilage damage. The extent of these lesions was limited and for that reason not evident in MRI. Six of these patients had poor results (groups I and II) and the other 4 had good results (groups III and IV). There was strong association between the grade of cartilage damage and

our knee score postoperatively ( $r = -0.52$ ,  $p < 0.001$ ).

Following strict including criteria, we had good results (group IV and V) in 80% of the patients. Fourteen patients (13,5%) had poor clinical outcomes (group I and II). The reason behind this failure was a missed concomitant lesion in the opposite meniscus in 4 of them, loose bodies in 1 case, an insufficiency of the anterior cruciate ligament in 1 case, a patella alta in 1 case, and osteoarthritis in 2 cases. In the remaining 5 patients there was not an obvious cause for the persisting pain apart from grade IV cartilage damage and associate synovitis.

Conclusively, this study stresses the good clinical outcome of arthroscopic meniscal trimming of minor lesions, when the appropriate indications are met. 

**Conflict of interest:**

*The authors declared no conflicts of interest.*

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## ΠΕΡΙΛΗΨΗ

Ο αρθροσκοπικός γλυφανισμός των ελάσσωνων μηνισκικών βλαβών αποτελεί κοινή πρακτική της αρθροσκοπικής αντιμετώπισης παθολογιών του γόνατος. Θελήσαμε να διερευνήσουμε αν η αφαίρεση αυτών των βλαβών και η λείανση της υπολειπούμενης τραυματισμένης περιοχής του μηνίσκου όντως ανακουφίζει από τα συμπτώματα. Χρησιμοποιήσαμε ένα ερωτηματολόγιο αυτό-αξιολόγησης που απεστάλη ταχυδρομικώς στους ασθενείς που υπεβλήθησαν σε μια απλή αρθροσκόπηση προκειμένου να αξιολογήσουν τα αποτελέσματα της αντιμετώπισης. Μελετήσαμε 105 ασθενείς (78 άρρενες και 27 θήλειες) με μέσο όρο ηλικίας 50,4 έτη, που αντιμετωπίστηκαν στο τμήμα μας τα τελευταία 3 έτη. Καταγράφηκαν η ένταση του πόνου, η επίδραση στις αθλητικές και στις καθημερινές δραστηριότητες, το εύρος κίνησης της άρθρωσης, η λήψη αντιφλεγμονωδών φαρμάκων και ο νυχτερινός πόνος πριν και μετά την επέμβαση. Από την μελέτη προέκυψε ότι οι περισσότεροι ασθενείς είχαν καλά και εξαιρετικά αποτελέσματα (80%) αλλά όμως ένα μικρό ποσοστό των ασθενών δεν έμεινε ικανοποιημένο (13,5% φτωχά και πολύ φτωχά αποτελέσματα). Οι αιτίες αποτυχίας της αρθροσκόπησης ήταν άλλες συνοδές παθήσεις που υποεκτιμήθηκαν ή διαλάθανε όπως βλάβη και στον απέναντι μηνίσκο, αστάθεια άρθρωσης, αστάθεια επιγονατίδας, προχωρημένη χονδρομαλάκυνση, οστεοαρθρίτιδα γόνατος, μεγάλης ηλικίας ασθενής, παθολογία σπονδυλικής στήλης και οστεοαρθρίτιδα ισχίου.

**ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ:** Βλάβες μηνίσκων, αρθροσκοπικός γλυφανισμός.