

## Arthroscopic Meniscectomy in Adults Over 60 Years Old: Save the Knee Semeiotics

Rosa Ballis<sup>1\*</sup> and Giuseppe Laura<sup>2</sup>

<sup>1</sup>Orthopaedic Surgery, Department Policlinico Di Monza- Monza, Italy

<sup>2</sup>Knee Surgery, Department Istituto Clinico Città Studi (ICCS) Milan, Italy

\*Corresponding Author: Rosa Ballis, Orthopaedic Surgery, Department Policlinico Di Monza- Monza, Italy.

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### Abstract

**Background:** A retrospective analysis in 61 patients over 60 years old who had undergone an arthroscopic partial meniscectomy was carried out. At time of surgery, the average age of patients was 69 (range 60 to 79). In 44 patients, the medial meniscus was concerned, in 11 patients the lateral and in 6 both menisci.

**Materials and Methods:** There were 34 men and 27 women operated between January 2010 and September 2014 at the ICCS of Milan. The indication to arthroscopy was based mainly on positive meniscal clinical evaluation with the secondary support of MRI scan. In our opinion MRI is not reliable in this age group because the meniscal lesions are typical in these patients. In each case, the surgical procedures were limited to a partial meniscectomy with restricted debridement of cartilaginous free flaps if present. In the postoperative period, an immediate load was always granted with crutches support and FKT. The patients were divided into two groups in relation to the articular cartilage degeneration degree. Group A consisted of 44 knees with grade 0-2 articular cartilage degeneration. Group B consisted of 17 patients with a 3-4 degree cartilage degeneration.

**Results:** The final results were graded as excellent (E), good (G), fair (F) and poor (P) according to modified Lysholm score and the overall outcome was favourable in 49 patients (78,6 %). We had 13 unfavorable results (21,4%), mostly fair. All these last results were female, mostly from group B. 2 patient over 69 years had unfavourable results.

**Conclusions:** In presence of symptomatic meniscal tears, where the joint line is preserved or minimally reduced, as seen in Rosenberg's view, the arthroscopic treatment of these lesions may allow favourable results in more than 75% of subjects over 60 years old. With an exhaustive clinical examination, we can give the correct indication which is the key to have good results in arthroscopic surgery in patients over 60 years with a meniscal lesion. MRI is needed to confirm the diagnosis.

We know that improvement of pain after meniscectomy, compared to nonoperative treatment, is evident in the first 6 months, while after 2 years, they did not differ from each other.

Arthroscopic meniscectomy is the correct answer in active people who need a quick resolution of pain and disability due to the meniscal tear.

**Level of Evidence:** Level IV.

**Keywords:** Arthroscopy; Meniscus; Chondropathy; Middle Aged Patients

### Introduction

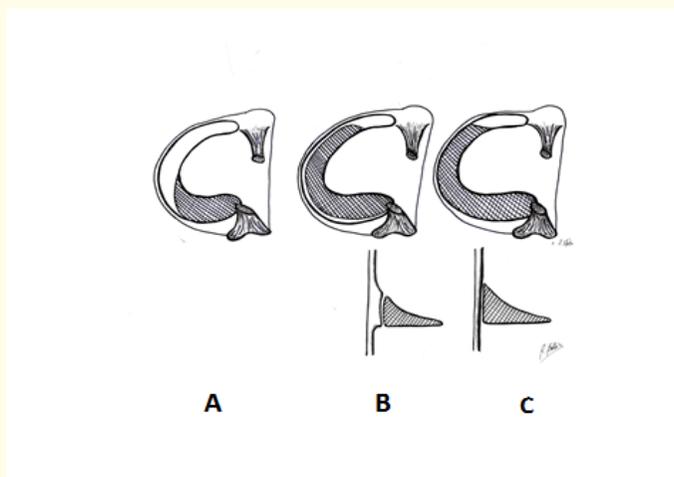
Indication for arthroscopic meniscectomy in subjects over 60 years old is still controversial according to the following considerations.

- After meniscectomy contact stress that undergoes the articular cartilage will increase proportionally to the amount of meniscus removed [1-4].

- In damaged meniscus, transmitting loads function is preserved if the meniscal lesion is stable and there are no free meniscal flap tears [5, 6]. Persistence of an injured meniscus does not result in significant cartilage damage.

- Typical degenerative lesions of this age requires, sometimes, a segmental meniscectomy [7] involving the posterior horn-third medium of the medial meniscus, or the lateral meniscus anterior horn, which will often be considered as a total meniscectomy.

Total meniscectomy in contrast to circumferential meniscectomy, may compromise the peripherals longitudinal fibers implicated in load distribution, and it may create a segmentary contact stress concentration (8-11). This worsen the degenerative phenomena involving that articular district.



**Figure 1:** (A) segmental meniscectomy: can affect an entire meniscal segment and can be compared to total meniscectomy  
 (B) circumferential meniscectomy (partial): there is a residual meniscal wall portion more or less extended.  
 (C) total meniscectomy: removal of the entire meniscus from the articular capsule.

In this age group is often present a coexistence of articular cartilage damages in different kind and extensions that may result in same district gonarthrosis or affect other sites: femoro-patellar joint, in particular, trochlea, or less frequently the lateral compartment. Chondropathy brings to progressive articular degeneration and leads to a conclamate gonarthrosis and a prosthetic indication. These may affect meniscectomies short-term results due to persistence or recurrence of painful symptoms.

Lower limbs pattern in varus-valgus is another element to keep in mind for gonarthrosis prognosis [12]. In valgus deformity, associated with lateral meniscus lesion, results of meniscectomies are less favorable than in varus [13].

Negative reputation kept by arthroscopic surgery, may rise from inadequate treatment like simple wash-out or by more extensive articular debridement in a 3-4° gonarthrosis stage that lead to bad results [14,15].

Versus some publications showing arthroscopy poor results in elderly [14-22], we can mention many others according with arthroscopic meniscectomies good results, even after more than 5 years follow-up, with none or minimal articular debridement [13,23-38].

Indication is the key to have these favorable results: arthroscopy may be done only if there is a diagnoses meniscal lesion and the patient want to return quickly to his normal activities and work [27,30]. This lesion may influence pain and mechanical troubles even in presence of a mild or medium gonarthrosis degree as seen in Rosenberg view in weight bearing with a little narrowing of the joint line [39].

Arthroscopic treatment success is conditioned by quality of pre-operative assessment that will require an expert clinical evaluation that, in our opinion, is more important than MRI scan [40]. Degenerative meniscal injuries in older patients are reported in 70 - 80% of the MRI specimens so it's hard to distinguish between a true symptomatic meniscal rupture from an horizontal or complex lesion that can be less or not symptomatic [41,42]. Literature about this subject is controversial. Different papers report anamnestic and clinical characteristics that can predict a positive or negative value of meniscal injury useful for an adequate surgical planning [43]. On the other hand, in some AA, we found data that deviate from the prevailing trends [24].

Predictive positive value for meniscal lesions are: sudden beginning of painful symptoms after knee's twisting or bending and its persistence for three months [13]; presence of mechanical disturbances such as snap sensation, block or failure; retroiligamentous or third medium pain during medial joint line palpation with positivity of McMurray test for click sensation and/or pain; presence of lateral meniscal cysts in the outer compartment; pain and difficult squatting (Ege's squat test); low radiographic alterations [43].

There are also negative predictive values: gradual beginning of disorders and persistence over a year; past knee surgery; clear joint line narrowing on the X-ray; medico-legal procedures or accidents at work; significant lower limb angular deviations with tilting during walk [13].

For diagnostic and prognostic purposes, other parameters, have discordant opinions. Among these: persistence of pain between 3 and 12 months; female sex and obesity; articular deficit, in particular during extension; articular effusions and flushes; pain during flexion or during palpation along the entire joint space, especially on the lateral side; lower limbs pattern; medio-lateral laxity; mild gonarthrosis signs; disorders bilaterality; age, even if many authors [24] does not consider this parameter negative for predictive values.

Purpose of this study is to demonstrate that arthroscopic surgery, with restricted indications, may be effective in people over 60 years old.

## **Materials and Methods**

### **Patients selection**

In this study 61 knees were evaluated. The medial meniscus was involved in 44 patients, the lateral meniscus in 11 patients and both menisci in 6 patients.

The age was between 60 and 79 years, with an average of 69 years old. The distribution is: 19 patients between 60 - 65 years old, 20 between 66 - 70, 13 between 71 - 75 and 9 between 76 - 79.

34 men and 27 women had surgery from same surgeon between January 2010 and September 2014 at the Istituto Clinico Città Studi (ICCS) of Milan.

Symptoms appeared in 27 patients suddenly, generally after a slight twisting or during flexion, and in 34 patients gradually. Elapsed time between beginning of symptoms and arthroscopic treatment was >1 year in 7 knees, between a year and three months in other 12 and < 3 months in 42 patients.

For surgical indication, we considered: onset and persistence of symptoms; pain felt during twisting and bending, in going up and down the stairs, at rest and at night; articular blocking episodes; articular instability incidence; feeling of bound knee; presence and frequency of joint effusions. During knee examination, we evaluated: lower limbs pattern in monopodal and bipodal stance, any walking tilt, lack of extension, pain location in the joint line, femoro-patellar joint disorders associated or not with articular crepitus, meniscal cysts, Mc Murray test and pain during deep squat, medio-lateral laxity on the coronal plane, with knee flexed at 10°-20°, that is indicative of osteocartilaginous compartmental damage.

When present we used to perform a X-ray posterior-anterior Rosenberg view weight-bearing at 45° of flexion and we always examined the MRI radiologist report and images, often owned by the patient during consultation.

We planned the surgery in presence of: lack of extension disappeared or not with rotational manipulations; medial knee joint line tenderness in retro-ligamentous side and/or in third medium with a possible small meniscal cyst relief; pain in the maximal flexion and during squatting; Mc Murray test positivity for click and/or pain; absence or minimal medio-lateral laxity on the coronal plane; safe joint line or reduced not more than 1/3 of it, assessed with X-ray scan in weight-bearing.

External meniscal injury diagnosis is more difficult cause less reliability of clinical evaluation due to femoro-patellar joint painful manifestations overlap and MRI scan rated often as negative (false negative). In lateral meniscus assessment, we look for: possible lack of extension, pain and/or clicking on Mc Murray test in full flexion, meniscal cyst, pain site often present in third anterior- third medium of the external joint line (but not pathognomonic); possible valgus laxity that confirms joint line narrowing which requires an X-ray scan in stress rather than in load.

In the MRI scan, however, we will assess cartilage status and exclude presence of bone bruises that can conceal an algodystrophic or an osteonecrosis, if there is no trauma history. These are characterized by pain during femoral condyle palpation near the intercondylar groove and should be suspected in presence of deep endurance and intense pain at rest. So, diagnosis of post-arthroscopic osteonecrosis will be excluded, or at least limited. We believe that if present, is not evident during arthroscopy, rather than a complication of it.

Our choice was not to treat patients who had a significant lower limbs axial deviation with an important medio-lateral laxity on the coronal plane, and/or a joint line narrowing equal or higher than its half.

#### **Evaluation forms and anatomic-pathological finds**

Data of pre-and post-operative clinical evaluation have been derived from a modified Lysholm data sheet evaluating pain, lockings, instability, support, joint effusion, stair climbing and squatting [44]. Other parameters were also noted such as the symptoms onset, acute or gradual pain lasting, preoperative symptoms, past contralateral meniscectomies, femoro-patellar crepitus.

A detailed description of the anatomic-pathological data highlighted in the arthroscopic procedure helps to define meniscal injuries characteristics and associated chondropathies.

Medial meniscus injuries were 44 and only 6 of them were longitudinal; the other 25 were horizontal injuries with flap and the last 13 were complex, radial-horizontal.

Cartilage injury was classified by ICRS classification. Grade 0: normal. Grade 1: superficial fissures or cracks. Grade 2: extent < 50% of thickness. Grade 3: extent > 50% of thickness down to the surface of subchondral bone without penetration. Grade 4: penetration of the subchondral bone.

In arthroscopic procedures meniscectomy was always practiced and it has been associated, if necessary, to a simple chondrectomy for a selective removal of cartilaginous fragments. In this group of patients debriding such as perforations, microfractures, cheiloplastics and chondroabrasions has never been done. Immediate postoperative load was always given with crutches support. Rehabilitation consisted in repetitive isometric contractions of quadriceps. There were not allowed heavy activities like bringing weights or walking long time for the first two weeks. Prophylaxis for postoperative thromboembolism was sodium enoxaparin with a mean dosage about 4000 UI, 1 injection a day for 10 days.

We have never found specular femoro-tibial cartilage lesions (kiss-lesions) but we found some third or fourth grade stage chondropathies in one or more knee compartments. We excluded from our study, posterior root meniscal lesions and meniscal extrusions.

We assessed every joint damage in the same meniscectomy compartment or in other locations. Patella and femoral trochlea were the most involved, isolated or associated. Femoral trochlea isolated chondropathy, rare in our report, often with butterfly wings classic configuration, is localized in the central knee area third or fourth grade and can simulate meniscal injury symptoms; when present, this is difficult to treat and may change meniscectomy outcome.

Because of small number patients, statistical analysis does not allow us to aggregate them in an homogenous group in order to show combination of meniscal injuries and location and type of chondropathy. For this reason, we limit to consider two groups of patients, A and B, as usually taken in literature [24,45]. In the first group, we placed together knees with healthy cartilage and those with 1° - 2° grade chondropathy and in the other those with 3° - 4° grade.

In the A group, we found 44 patients, with 31 medial meniscus injuries, 7 with lateral and 6 with both menisci involved. In group B we found 17 patients in which 13 medial meniscus lesions and 4 lateral lesion. The surprise was to found the 6 bi-meniscal injuries limited to the A group with no chondral attempts.

In the A group, 25 cartilages were untouched, 13 were associated with an isolated medial femoral condyle (MFC) chondropathy, 5 with an isolated femoro-patellar (F-P) chondropathy and 1 had a combined cartilage damage of the MFC and the femoro-patellar joint.

Between the 17 meniscal lesions of the B group we found 4 isolated chondropathies of the MFC and 8 related to the MFC and the P-F joint, 2 associated lesions of the LFC and the F-P, 2 chondropathies isolated of P-F and one chondral lesion isolated of the lateral tibial plateau.

The 6 bi-meniscal injuries were all included in the A group and only one of them had no cartilage damage.

In addition, we distinguished two patient groups about the ratio between cartilage damage and age: 38 patients were among 60 and 69 years old and 23 over 69. Among the first we found 12 B group and 26 A group patients. Between the 23 patients aged over 69 years old, 17 belonged to the A group and 6 belonged to B group. In this last group 14 of 17 patients were free of cartilaginous damage in order to confirm the low incidence of age factor in this selection of patients.

### Results

Follow-up consisted in assessment in 41 patients and telephone interviews in 20, using the same standard Lysholm questionnaire which has already been employed for the pre-operative evaluation and IKDC assessment. We analyzed differences between these 2 time points using Student t tests.

Patients were required to express if they still agreed to have surgery and their degree of satisfaction after intervention.

We used the Lysholm numerical evaluation for sporting activities in which excellent stay for score more than 90 points, good for points between 84 and 90, fair when points are between 65 and 83 and poor when points are under 65.

We found favorable results (excellent 34 and good 14) in 48 patients (78,6 %) and unfavourable (7 fair and 5 poor) in 13 (21,4 %). The mean Lysholm score improved form  $66,4 \pm 15,7$  preoperatively to  $89,2 \pm 4,1$  postoperatively ( $P < 0.05$ ).

The mean IKDC subjective score also improved significantly from  $40,4\% \pm 28,5\%$  preoperatively to  $85,2\% \pm 6,7\%$  postoperatively ( $P < 0.001$ ).

In 34 males, there were 21 excellent, 9 good and 2 fair and 2 poor results; in 27 females, there were 13 excellent, 6 good, 5 fair and 3 poor results (Table 1 and Figure 2).

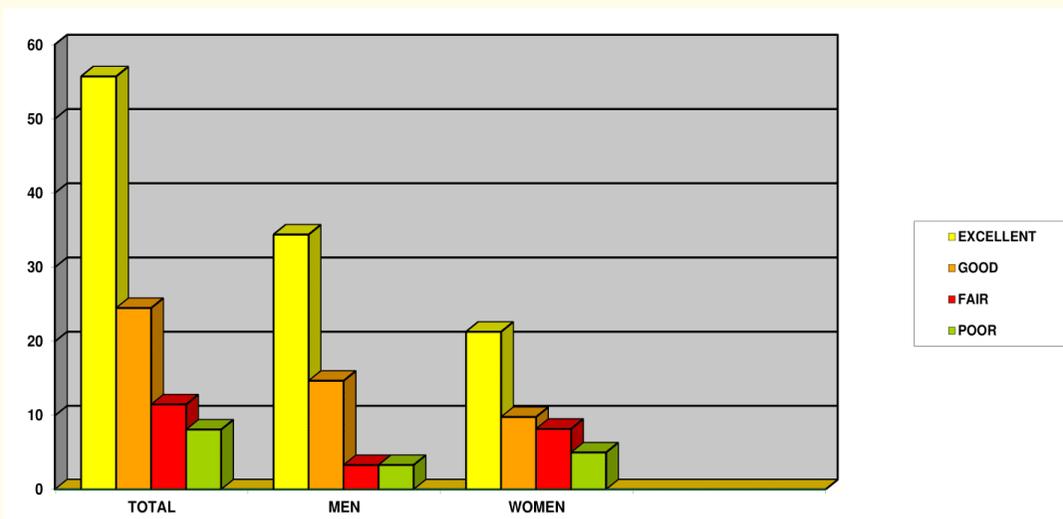


Figure 2: Arthroscopic Meniscectomy Results in Men and Women.

Group	Number Of Patients	Excellent	Good	Fair	Poor
Males	34	34,4 %	14,7 %	3,3%	3,3%
Females	27	21,3 %	9,8 %	8,2%	5%
Total	61	55,7%	24,5%	11,5%	8,3%

Table 1: Results by sex.

Among the 22 patients between 70 and 79 years of age, we found a 90% of favorable results (13 excellent and 7 good) and only 2 fair due to a MFC and femoro-patellar chondropathy (Table 2 and Figure 3).

Group	Number Of Patients	Excellent	Good	Fair	Poor
60-69 yo	39	34,4% (21)	13,1% (8)	8,2% (5)	8,2 (5)%
70-79 yo	22	21,3% (13)	11,5% (7)	3,3% (2)	0%

Table 2: Results in different age. Group A 60-69 y.o.; group B 70-79.

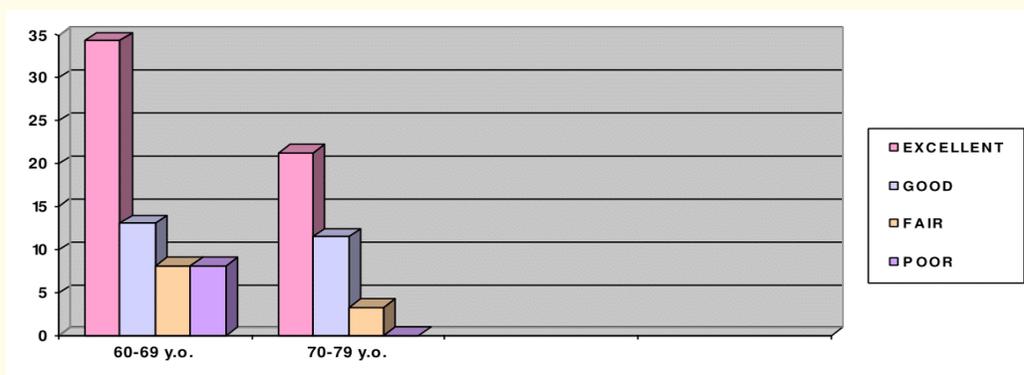


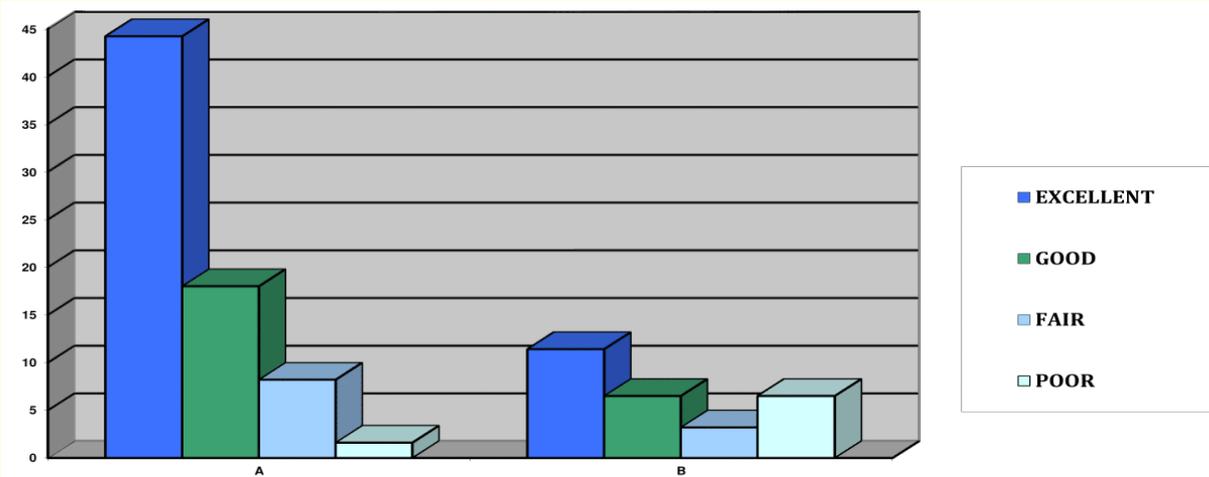
Figure 3: Patients age at time of intervention: A 39 from 60 to 69 y.o. B 22 from 70 to 79 y.o.

In the group A medial meniscus lesions, we have 13 excellent cases, 3 good and one fair between isolated lesions; 6 excellent, 7 good and one fair with isolated chondropathy of the MFC, F-R and trochlea; 1 excellent with a combined chondropathy.

For the same medial meniscal injuries in the B group, between the isolated chondral lesions we have 2 excellent, 1 good and 1 fair; between combined chondral lesions, 4 excellent, 2 good and 2 poor.

Between the 11 lesions of the lateral meniscus, we found 3 excellent, 1 good and 2 fair in group A and 1 excellent, 1 good, 1 fair and 2 poor in group B, while, among the 6 bimeniscal lesions, we noted 4 excellent 1 fair and 1 poor.

The 12 unfavorable results were 8 from B group and 4 from A group with 5 lesions of the medial meniscus, 5 lesion of lateral meniscus and 2 bimeniscal lesion. There were all with an isolated chondropathy or a combined patellofemoral chondropathy. In 2 cases, there was no chondropathy but there was a bimeniscal lesion in one and a lateral meniscal lesion in the other (Figure 4).



**Figure 4:** Arthroscopic meniscectomy results in group A (patients with meniscal injury isolated or with associated grade 1-2 chondropathy according to the classification of Jackson) and in group B (patients with meniscal injury associated with grade 3-4 chondropathy according to the classification of Jackson).

One-way ANOVA test was applied specifically to the samples used in: pooled data (male vs female; A vs B; < 69yrs vs > 69 years) and female data (A vs B; < 69 yrs vs > 69 yrs). Data were expressed as mean ± SE, and statistical significance was established as P < 0.05 (Table 3).

	Male	Female	P
Grading	3.54 ± 0.2	3.01 ± 0.19	0.059
	< 69	> 69	P
Grading	3.15 ± 0.17	3.40 ± 0.21	0.38
	A	B	P
Grading	3.5 ± 0.14	3.05 ± 0.24	0.12

**Table 3:** Statistical analysis between gender, age and kind of lesion.

About patient's satisfaction degree, 43 patients were very satisfied, 11 satisfied and 7 poorly satisfied while 5 patients reported that, in relation to the surgical experience, they didn't want to have another surgery if new meniscal injury will occur. All the patients admitted a clinical advantage in relation to the pre-operative condition.

### Discussion

The aim of this study is to assess if a non-invasive surgery proposal, as arthroscopic meniscectomy, would be a right choice among patients over 60 years old and when it may resolve or at least alleviate meniscal injury symptoms. So, all those orthopaedic-physical practices (including injections) that are usually proposed to patients who suffer from a generic meniscopathy, or in a beginning gonarthrosis, should be avoided.

Related literature does not show unequivocal evaluations even if there is a prevalence of surgical solutions [13,24,25,42,46] with the right indications.

Indication represents the real problem related to this disease. It can be only partially supported by diagnostic imaging current in medical practice.

Clinical semeiotic has a central role in this pathology: in fact it can allow an accurate diagnostics even if judgment mistakes are not excluded. However, arthroscopy is the only procedure that can clear diagnostic doubt and may allow the resolution of symptoms when there is clinically a clear meniscal injury.

In other pathologies, such as gonarthrosis or chondropathies not associated with meniscal injury, arthroscopic surgery has shown relative advantages. Procedures like wash-out or articular debridement must be considered not appropriate if there is an initial or intermediate grade gonarthrosis [14,15].

Clinical evaluation is the key to approach this kind of pathology and the patients' age is not an influencing element at intervention time. Among the 22 patients between 70 and 79 years old we found a 90% of favorable results (13 excellent and 7 good).

As reported, clinical diagnosis of lateral meniscal injury has a faintful positive clinical diagnosis than medial one. Also, the MRI shows a false negatives high amount [41,42].

In our experience, patient's clinical history and clinical evaluation are the most significant elements in medial meniscus lesion diagnosis and between them, the greatest importance for us is the lack of extension and the squatting pain.

For lateral meniscus injuries, we will always search for a cyst in the antero-lateral third of the joint line, even if small. When present, this is a meniscal injury sign.

If a diagnostic doubt will be present, we schedule a FKT time to recover the knee extension and to strengthen the extensor knee apparatus. We will examine again the knee after one-two months in case of symptoms persistence.

Sex incidence on the results is rather significant in our patients even if the literature data about this subject are scarce. Prevalence of poor results were confined to female sex: all these patients had a femoro-patellar chondropathy, third-fourth grade in three and first-second grade in one.

Favorable results incidence is significantly higher, as expected, among the A group patients with absence or low incidence of cartilaginous damage (1° - 2°). We have discovered among B group patients with favorable results, 3 excellent and 1 good, in 6 lesions of the medial meniscus. The surprise was the high incidence (3 over 6) of excellent results, among A group, of patients with bi-meniscal lesions and patello-femoral and medial femoral condyle first-second grade chondropathy associated with a lateral meniscus lesion.

We should carefully consider, in subjects over 60 and 70 years old with acute knee pain or gradual knee pain risen from less than three-four months, clinical features as first step to the diagnosis of meniscal injury or gonarthrosis that strictly influences the surgical choice. X-ray and MRI are useful but not are a decisive factor for our surgical indication.

Gonarthrosis will be clinically characterized by axial deformity with laxity highlighted at about 5° - 10° of knee flexion on the coronal plane and a possible loss of extension about or more than 10°. In absence of deformity or laxity on the frontal plane, we may be addressed to a symptomatic femoro-patellar joint disease.

An X-ray postero-anterior Rosenberg view in weight-bearing with lateral radiographs in 45° flexion and a skyline patellar view will allow you to define the gonarthrosis degree. In presence of a joint line narrowing less than its half, Kellgren-Lawrence 2 - 3 [47], arthroscopy will be a right choice if clinic assessment is positive for a meniscal injury.

We noticed the highest failure incidence in women. This result may be improved focusing on the surgical selection which have to be more selective. We know that improvement of pain after meniscectomy, compared to nonoperative treatment, is evident in the first 6 months [22], while after 2 years, they did not differ from each other.

### Conclusions

Arthroscopic meniscectomy is the correct answer in active people who need a quick resolution of pain and disability due to the meniscal tear despite the advanced age.

In our series, we found good results due to the selective indication. We believe that with right indication, also in people over 60 years old, meniscectomy may be effective.

In published randomized controlled trials, where patients recruitment is biggest and not uniform, surgical indications may be largest, and can change the number of patients that finally undergo the conservative treatment before choosing a surgical option.

In our series, we gave surgical indication only when a clear meniscal tear and mechanical symptoms are present and when there were no benefits from the conservative treatment.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

- "All patients gave the informed consent prior being included into the study".
- "All procedures involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments".
- "The study was approved by the Research Ethics Committee (or Institutional Review Board)".

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