

UNICOMPARTMENTAL KNEE ARTHROPLASTY: CURRENT PERSPECTIVES AND TRENDS IN BRAZIL

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ABSTRACT

Objective: The aim of this study was to evaluate the approaches and procedures used by Brazilian orthopedic surgeons for treating osteoarthritis by means of unicompartmental knee arthroplasty and high tibial osteotomy of the knee. **Methods:** A questionnaire with 14 closed questions was developed and applied to Brazilian knee surgeons during the three days of the 43rd Brazilian Congress of Orthopedics and Traumatology. **Results:** A total of 113 surgeons filled out the questionnaire completely and became part of the sample analyzed. In this study, the majority of the surgeons performed fewer than five unicompartmental knee arthroplasty procedures/year (61.1%) and between 5 and 15 high tibial osteotomy procedures/year (37.2%). Use of computerized navigation systems during surgery remains uncommon in our environment, since only 0.9% of the specialists were using it. 65.5% of the surgeons reported

that they had chosen to use total knee arthroplasty rather than partial arthroplasty due to lack of familiarity with the surgical technique. When asked about the possibility that the number of unicompartmental prostheses used in Brazil would grow as surgeons in this country become increasingly familiar with the technique, 80.5% of the respondents believed in this hypothesis. In this sample, we found that the greater the surgeon's experience was, the greater the numbers of unicompartmental prostheses and tibial osteotomies performed annually were ($r = 0.550$ and $r = 0.465$, respectively; $p < 0.05$). **Conclusions:** There is a clear evolutionary trend towards treatment of unicompartmental osteoarthritis using partial knee arthroplasty in Brazil. However, further prospective controlled studies are needed in order to evaluate the clinical and scientific benefits of these trends.

Keywords – Arthroplasty, Replacement, Knee; Osteotomy; Osteoarthritis; Knee Joint

INTRODUCTION

Osteoarthritis is a condition that is characterized by progressive degeneration of various structures present in the knee joint, including the cartilage, bone surface, ligaments, meniscus, synovia and joint capsule^(1,2).

This disorder is considered a public health problem. This is because it is the most prevalent joint disease in the world, and the most common single cause of disability in individuals aged over 18 years. It affects more than twice as many people as heart disease, and its prevalence and incidence increase with age^(3,4).

At present, this there is no known cure for this condition, and the main goal of treatment is to improve the pain, function, and quality of life⁽⁵⁾.

The forms of surgical treatment for osteoarthritis of the knee include proximal osteotomies of the tibia and distal osteotomies of the femur, partial and total knee arthroplasties, and arthroscopies for lavage and joint debridement⁽⁶⁻⁸⁾.

The role of unicompartmental knee arthroplasty as a treatment option for osteoarthritis is still highly controversial. Despite the enormous advances in the design of prostheses and surgical techniques, this form of treatment is still little used today, corresponding to

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just eight to 15% of the total knee prostheses used^(9,10).

In recent years, randomized clinical trials and systematic reviews have been carried out on this theme. However, there is still no consensus in the literature on various subjects⁽¹¹⁻¹³⁾.

Due to the high incidence of this lesion, and the importance of the social and economic aspects related to it, associated with the wide divergence of opinion that exists in the literature on this subject, assessment of the conducts and trends that exist in Brazil, in this area, is extremely important.

The objective of this study is to assess the conducts and procedures carried out by knee surgeons in Brazil in the treatment of osteoarthritis with unicompartmental arthroplasty and high tibial osteotomy of the knee. The results of this study give us an idea of the national trends in this area of treatment, as well as guiding good quality studies in the future.

MATERIAL AND METHODS

This is a descriptive study, with the application of a questionnaire to a group of Brazilian knee surgeons. The questionnaire was designed and approved by the authors in such a way that it was very comprehensive and straightforward. It consisted of 14 closed questions on topics such as number of years of experience and the number of unicompartmental arthroplasties and tibial osteotomies of the knee performed by the surgeons each year, as well as various aspects related to the indication and treatment using these methods (Appendix 1).

The questionnaire was applied to Brazilian knee surgeons during the three days of the 43rd Brazilian Congress of Orthopedics and Traumatology in 2011. Only orthopedists who worked with knee surgeries filled out the questionnaire. In all, 126 questionnaires were completed, of which 13 were excluded due to failure to fill out the questionnaire completely. In all, 113 questionnaires were fully completed. To resolve any questions during the completion of the questionnaires, three researchers were present throughout the period of application of the questionnaires.

Based on the data gathered from the questionnaires, a descriptive statistical analysis was performed of the variables involved to characterize the sample.

The data were analyzed in the program SPSS for Windows version 16.0 and a significance of 5% was adopted.

RESULTS

A total of 113 knee surgeons fully completed the questionnaire and formed part of the sample analyzed. The majority of the participants were from the Southeast region of the country (72.6%). In relation to the length of experience of the surgeons, we obtained a mean of 13.7 years. The results for the number of partial arthroplasties and tibial osteotomies of the knee performed each year by the surgeons, according to their experience, are shown in Figures 1 and 2. In this study, the majority of surgeons performed less than five unicompartmental arthroplasties of the knee per year (61.1%) and between five and 15 high tibial osteotomies (37.2%). The sports most often authorized by the doctors after unicompartmental knee arthroplasty were swimming (96.5%) and tennis (51.3%), while soccer was not authorized after surgery by all the participating surgeons. In terms of the methods and tools used in the preoperative assessment of the patients, the results are shown in Table 1. The cement

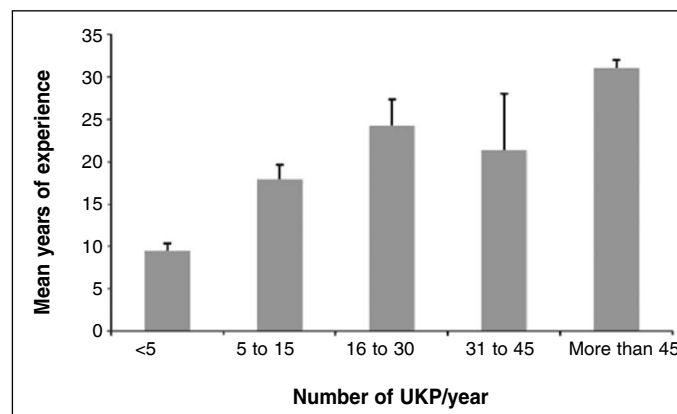


Figure 1 – Number of partial knee arthroplasties performed per year, according to the surgeon's length of professional experience.

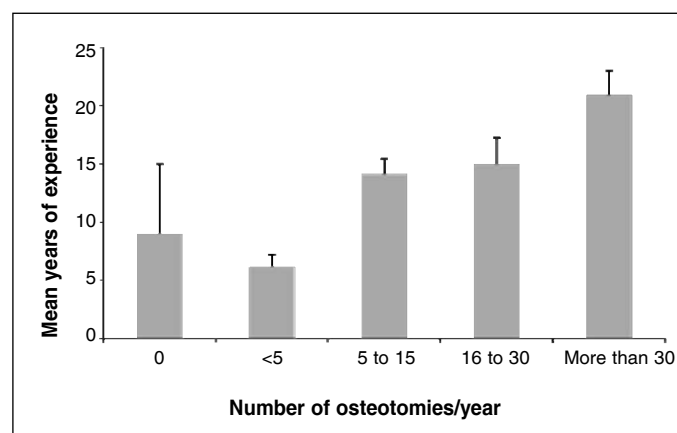


Figure 2 – Number of high tibial osteotomies of the knee performed per year, according to the surgeon's length of professional experience.

Table 1 – Methods and tools used in the preoperative assessment of patients.

Preoperative tools	Frequency	%
AP radiography	93	82.3
Arthroscopy	21	18.6
AP radiography with 30 degree flexion	31	27.4
Stress radiography in varus/valgus	14	12.4
MRI	53	46.9
Panoramic x-ray of the lower limbs	86	76.1
Axial x-ray of the patella	57	50.4
Total	113	100.0

fixation method of unicompartmental arthroplasty is the preferred one, used in 61.1% of the sample. The use of computerized navigation during the surgery is still infrequent in Brazil, and was used by only 0.9% of the specialists. The choice of patients aged under 65 years for unicompartmental knee prosthesis was considered ideal by the majority of participants (89.3%). The option to use total rather than partial knee arthroplasty due to a lack of familiarity with the surgical technique of the latter was reported by 65.5% of surgeons. The majority of the sample (61.1%) believed that the surgical procedures unicompartmental arthroplasty and high tibial osteotomy do not compete with each other, since each has its own indications. As for the main factors that led to the surgical indication of high tibial osteotomy as opposed to unicompartmental knee arthroplasty, 95.6% and 74.3% of the surgeons indicated the former procedure for younger patients (< 55 years) and those who are very physically active. The main advantages of unicompartmental knee arthroplasty over total prosthesis of the joint, as reported by the surgeons, are shown in Table 2. When questioned about the validity of unicompartmental knee arthroplasty as a treatment method for unicompartmental osteoarthritis, 84.1% of the participants replied that they saw this procedure as a treatment option. When questioned about the possibility of growth in the number of unicompartmental prostheses in Brazil as surgeons in the country become increasingly familiar with the technique, 80.5% of those interviewed said they believed in this hypothesis. In this sample, we observed that the more experience the surgeon had, the more unicompartmental prostheses and tibial osteotomies were performed ($r = 0.550$ and $r = 0.465$, respectively, and < 0.05). In our sample, the professionals who performed the

Table 2 – Advantages of partial vs. total knee arthroplasty.

Advantages of UKP vs. TKA	Frequency	%
Greater range of motion of the knee	53	46.9
Reduction of postoperative morbidity	69	61.1
Faster rehabilitation	64	56.6
Better proprioception	52	46.4
Delays TKA	96	85.0
Ability to play sports	10	8.8
Total	113	100.0

UKP: Unicompartmental knee prosthesis, TKA: Total knee arthroplasty

highest number of unicompartmental arthroplasties per year were also those who performed the most high tibial osteotomies ($r = 0.561$ and $p < 0.001$).

DISCUSSION

Some studies were found in the literature that seek to evaluate the perspectives and trends in the indication and treatment of patients with unicompartmental knee arthroplasty^(10,14,15). However, no similar studies were found in the national literature. A recent study was carried out in Brazil, but with the aim of evaluating the treatment methods used in lateral ankle sprain⁽¹⁶⁾.

Evaluating the frequency of the participating orthopedists by Brazilian region, we noted a predominance of participants from the Southeast region. We believe this may be due to the existence of a higher number of specialists in knee surgery in this part of Brazil, and due to the location of the Congress where the participants were recruited (São Paulo).

This research found that the majority of knee surgeons in the country perform less than five unicompartmental knee arthroplasties per year. The majority of orthopedists in the United Kingdom, meanwhile, perform between five and 15 of these arthroplasties each year, as presented in a similar study carried out in 2010. In this study, 20% of the participants reported that they believe a surgeon must perform at least 15 partial prostheses per year to maintain their surgical skills in this procedure⁽¹⁴⁾. However, another study showed that the learning curve does not have a significant influence on the result of unicompartmental prostheses, with substantial rates of complications persisting even with the improvement of the surgical technique⁽¹⁷⁾. These results show that this treatment method is still little used worldwide, and even less so in Brazil. A study carried out in German found that

only 12.3% of the prostheses used in this country were partial arthroplasties⁽¹⁵⁾. Another study showed that only eight to 15% of prostheses performed in the United Kingdom were partial arthroplasties, although 47.6% of the patients submitted to surgery had been indicated for this procedure⁽¹⁰⁾. This may be due to a lack of familiarity of the majority of surgeons with the procedure, since 65.5% of the participants recognized the change of indication from partial to total arthroplasty for this reason, the majority even believing that partial prosthesis of the knee is a good treatment option in cases of unicompartmental osteoarthritis. The same data were also found in another similar study⁽¹⁴⁾.

In relation to the practice of sports following unicompartmental knee arthroplasty, the sports most commonly authorized by Brazilian doctors were swimming and tennis. In the United Kingdom, golf and tennis were the sports that were least ill-advised by local orthopedists⁽¹⁴⁾. Previous studies show that the majority of patients submitted to partial knee arthroplasty resume low impact sports (95 to 96.7%), and the majority of patients submitted to unicompartmental prosthesis take up sports again after the surgery for a longer period than before the prosthesis. However, the variety of sports practiced by patients decreases after receiving an implant^(18,19).

The tools used in the preoperative assessment of patients are still a source of much controversy. In our sample, anteroposterior (AP) radiographies of the knees, and panoramic radiography of the lower limbs were the preferred subsidiary exams. In the United Kingdom, AP radiographies of the knee and arthroscopy were the procedures most cited by the participants. In both studies, only 30% of the participants stated that they request posteroanterior (PA) radiographies of the knees with 30 degrees of flexion (Rosenberg) in the preoperative assessment, despite the fact that this tool proved to be superior for assessing the extent of degenerative processes of this joint⁽¹⁴⁾. Although half of the surgeons request axial radiographies for the assessment of the patellofemoral joint, a study defends the view that the presence of degenerative changes in the medial portion of this joint cannot be considered a contraindication for unicompartmental knee arthroplasty. The same results were obtained after this procedure in patients with and without degeneration of this part of the patellofemoral joint⁽²⁰⁾.

The fixation method for unicompartmental knee

prosthesis has changed very little in recent years. Despite the recent introduction of uncemented components, fixation with cement is still the most popular technique in Brazil (61.1%). This popularity is still greater in some parts of the world, with a preference among orthopedists of up to 96%. Although a retrospective study comparing these two fixation methods has shown better results in the clinical scores in patients submitted to uncemented arthroplasties, better quality studies are still necessary, such as randomized clinical trials, to elucidate this subject⁽²¹⁾.

The intraoperative use of computerized navigation is still infrequent in Brazil, and is carried out by only 0.9% of specialists. In the United Kingdom, 8.5% of surgeons use this method during surgery⁽¹⁴⁾. However, there is no evidence, to date, of better long-term results for implants performed using this technology^(22,23).

The ideal age for performing partial knee arthroplasty is still a topic of debate. In this sample, 89.3% of participants considered age below 65 to be ideal for this procedure. In the United Kingdom, however, 50% of surgeons believe there is no age limit for this type of treatment⁽¹⁴⁾. Currently, the patient considered ideal for a partial knee prosthesis is aged over 55 years, not very physically active, with unicompartmental osteoarthritis, and good alignment and range of motion of the joint⁽²⁴⁾.

The main indications for high tibial osteotomy, according to most of the participants, are being aged under 55 years, and being physically active. Similar findings were obtained in another published study⁽¹⁴⁾.

When compared with total knee arthroplasty, the main advantages of partial prosthesis mentioned by the Brazilian surgeons were that it delayed the need for total knee prosthesis, and the lower postoperative morbidity. Another study pointed out the presence of a wider range of motion in the postoperative period as the main advantage mentioned by knee surgeons of the United Kingdom⁽¹⁴⁾. There is still no consensus among studies found in the literature comparing these two types of treatment. A study demonstrated the presence of a wider range of motion postoperatively and shorter hospitalization time in patients submitted to partial knee arthroplasties⁽²⁵⁾. Another study published recently did not show any differences between the results obtained after treatment with total and partial knee arthroplasties⁽²⁶⁾.

CONCLUSION

This study demonstrates that despite the small number of partial prostheses carried out in Brazil, there are clear trends evolving in the treatment of

unicompartmental osteoarthritis with partial knee arthroplasty. However, further prospective controlled studies are necessary to assess the clinical and scientific benefits of these trends.

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Appendix 1 – Unicompartmental prosthesis/tibial osteotomy questionnaire.

<p>City/State: _____</p> <p>1 – Years of experience in knee surgery: _____ years.</p> <p>2 – How many prostheses (UKP) do you perform per year? Number per year:</p> <p><input type="checkbox"/> < 5</p> <p><input type="checkbox"/> 5-15</p> <p><input type="checkbox"/> 16-30</p> <p><input type="checkbox"/> 31-45</p> <p><input type="checkbox"/> > 45</p> <p>3 – What tools do you use in the preoperative assessment? (you may select more than one response)</p> <p><input type="checkbox"/> AP radiography</p> <p><input type="checkbox"/> Arthroscopy</p> <p><input type="checkbox"/> PA radiography with flexion at 30°(Rosenberg)</p> <p><input type="checkbox"/> Stress radiography in varus/valgus</p> <p><input type="checkbox"/> Magnetic resonance imaging</p> <p><input type="checkbox"/> Panoramic radiography of the lower limbs</p> <p><input type="checkbox"/> Axial radiography of the patella</p> <p>4 – What activities do you not allow after UKP? (you may select more than one response)</p> <p><input type="checkbox"/> Soccer <input type="checkbox"/> Running</p> <p><input type="checkbox"/> Volleyball <input type="checkbox"/> Basketball</p> <p><input type="checkbox"/> Tennis <input type="checkbox"/> Swimming</p> <p>5 – What are the advantages of UKP in relation to TKA? (you may select more than one response)</p> <p><input type="checkbox"/> Greater range of motion of the knee</p> <p><input type="checkbox"/> Reduction of postoperative morbidity</p> <p><input type="checkbox"/> Faster rehabilitation</p> <p><input type="checkbox"/> Better proprioception</p> <p><input type="checkbox"/> Delays TKA</p> <p><input type="checkbox"/> Ability to play sports</p> <p>6 – What is your preferred fixation method?</p> <p><input type="checkbox"/> Cemented</p> <p><input type="checkbox"/> Uncemented <input type="checkbox"/> Hybrid fixation</p> <p>7 – Do you use navigation technology in UKP?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>8 – Which age group(s) is/are more susceptible to UKP? (you may select more than one response)</p> <p>Age group:</p> <p><input type="checkbox"/> < 55 years</p> <p><input type="checkbox"/> 55-65 years</p> <p><input type="checkbox"/> 66-75 years</p> <p><input type="checkbox"/> > 75 years</p> <p><input type="checkbox"/> No age limit</p> <p>9 – Do you believe UKP is a good option for the treatment of localized unicompartmental osteoarthritis?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>10 – Do you believe that UKPs will become more common as surgeons become more familiar with the surgical technique?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>11 – Do you think the lack of familiarity with the surgical technique causes surgeons to use TKP even when a UKP might be the best option?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>12 – Do you see tibial osteotomy and UKP as competing techniques with identical clinical indications?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>13 – How many osteotomies (HTOs) do you perform each year?</p> <p>Number per year:</p> <p><input type="checkbox"/> 0</p> <p><input type="checkbox"/> < 5</p> <p><input type="checkbox"/> 5-15</p> <p><input type="checkbox"/> 16-30</p> <p><input type="checkbox"/> > 30</p> <p>14 – What do you believe are the main indications for osteotomy compared with UKP? (you may select more than one response)</p> <p><input type="checkbox"/> Young patients (< 55 years)</p> <p><input type="checkbox"/> Physically active patients</p> <p><input type="checkbox"/> Male</p> <p><input type="checkbox"/> Less severe degenerative changes (Ahlback grades 1 and 2)</p>
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