

Patient Dissatisfaction after Total Knee Arthroplasty for Advanced Painful Osteoarthritis of the Knee

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ABSTRACT

BACKGROUND: In advanced painful osteoarthritis of the knee (APOAK) the last resort is total knee arthroplasty (TKA). However, some patients with APOAK are not satisfied despite a good clinical result.

PURPOSE: The purpose of this article is to review the literature on APOAK with the aim of clarifying what is the rate of dissatisfaction after TKA and its main causes.

METHODS: A review the literature on APOAK was performed to know their rates of dissatisfaction after TKA and their main causes. The search engines were MedLine and the Cochrane Library. The keywords used were: "TKA patient satisfaction". Three hundred and seventy-four articles were found in MedLine on osteoarthritis. Of those, only 10 were selected and reviewed because they were strictly focused on the topic of this article (this was the basis for rejection or acceptance of articles). The second search engine was the Cochrane Library, where only four randomized clinical trials (RCTs) were found on osteoarthritis. Overall, 14 papers have been analyzed.

RESULTS: In APOAK the rate of dissatisfaction ranges between 8% and 19% (12% on average). Causes of dissatisfaction in APOAK are high preoperative body mass index (BMI), lack of fulfillment of patient expectations, a low 1-year WOMAC (Western Ontario and

McMaster University Arthritis Index), preoperative pain at rest, a postoperative complication requiring hospital readmission, a poor preoperative psychological state, and African American population. The use of femoral/sciatic analgesia and therapy dogs has shown to increase the degree of satisfaction.

CONCLUSION: In APOAK the rate of dissatisfaction ranges between 8% and 19% (12% on average). Causes of dissatisfaction in APOAK are high preoperative BMI, lack of fulfillment of patient expectations, a low 1-year WOMAC, preoperative pain at rest, a postoperative complication requiring hospital readmission, a poor preoperative psychological state, and African American population. The use of femoral/sciatic analgesia and therapy dogs has shown to increase the degree of satisfaction. It is important to emphasize that some causes of dissatisfaction cannot be easily avoided or changed.

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Key words: Knee; Osteoarthritis; Total knee arthroplasty; Satisfaction

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INTRODUCTION

In advanced painful osteoarthritis of the knee (APOAK) the last resort is total knee arthroplasty (TKA). However, some patients with APOAK are not satisfied despite a good clinical result^[1-14]. In this study APOAK was defined when the radiological study showed a grade 4 involvement in the Kellgren-Lawrence's scale (Table 1)^[1]. The purpose of this article is to review the literature on APOAK with the aim of clarifying what is the rate of dissatisfaction and its main causes.

| Table 1 Kellgren and Lawrence system of classifying the severity of knee osteoarthritis ^[1] . |
|--|
| Grade 0 - no radiographic features of osteoarthritis (OA) are present |
| Grade 1 - doubtful joint space narrowing (JSN) and possible osteophytic lipping |
| Grade 2 - the presence of definite osteophytes and possible JSN on anteroposterior weight-bearing radiograph |
| Grade 3 - multiple osteophytes, definite JSN, sclerosis, possible bony deformity |
| Grade 4 - large osteophytes, marked JSN, severe sclerosis and definitely bony deformity |

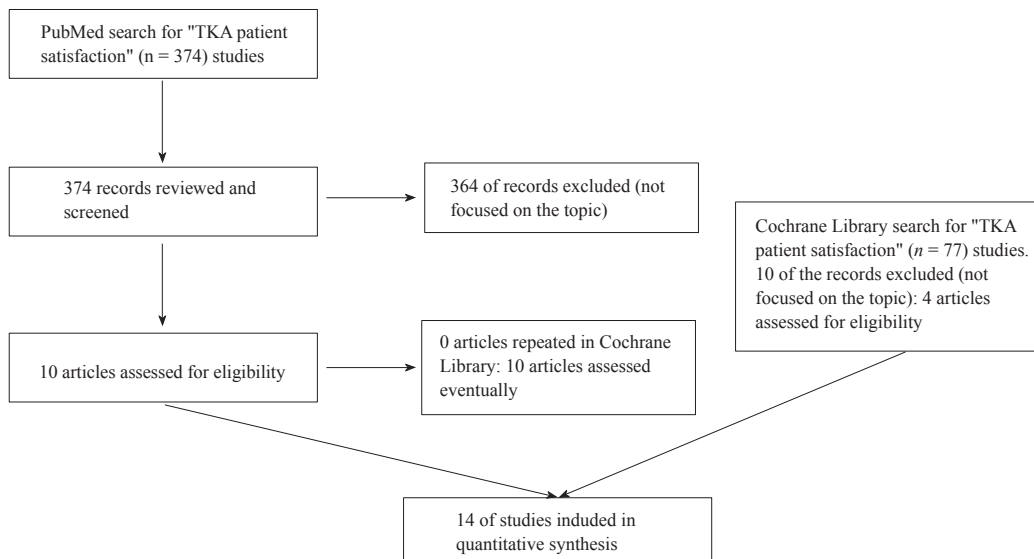


Figure 1 AFlowchart for the eligibility selection of the included studies (TKA = Total knee arthroplasty).

MATERIALS AND METHODS

A review the literature until 3 September 2015 was performed to clarify what is the rate of dissatisfaction and its main causes in APOAK. Keywords used were “TKA patient satisfaction”. The first search engine was MedLine (keywords: TKA patient satisfaction). Three hundred and seventy-four articles were found in MedLine on osteoarthritis. Of those, only 10 were selected and reviewed because they were strictly focused on the topic of this article (this was the basis for rejection or acceptance of articles)^[2-11]. The second search engine was the Cochrane Library, where only four randomized clinical trials (RCTs) were found on osteoarthritis^[12-15]. Overall, 14 papers have been analyzed. Figure 1 shows the flow chart for the eligibility selection of the included studies.

RESULTS

The rate of dissatisfied patients ranged between 8% and 19% (12% on average) in the osteoarthritis literature^[2-11]. We found many causes of dissatisfaction reported in osteoarthritic patients that we must try to avoid, mainly a high preoperative body-mass index (> 27 kg/m²), lack of fulfillment of patient expectations (expectations not met - 10.7 × greater risk), a low 1-year WOMAC (2.5 × greater risk), preoperative pain at rest (2.4 × greater risk), a postoperative complication requiring hospital readmission (1.9 × greater risk), preoperative mental factors (poor preoperative psychological state of a patient), and African American population^[2-11]. The use of femoral/sciatic analgesia^[14] and therapy dogs^[15] has shown to increase the degree of satisfaction. Table 2 shows the rates of dissatisfaction, its main causes and the way dissatisfaction was measured in APOAK.

DISCUSSION

The purpose of this article is to review the literature on APOAK with the aim of clarifying what are their rates of dissatisfaction and their main causes. The narrative review the literature on APOAK found a rate of dissatisfaction ranging between 8% and 19% (12% on average)^[2-11]. Causes of dissatisfaction in APOAK were mainly a high preoperative BMI, lack of fulfillment of patient expectations, a low 1-year WOMAC (Western Ontario and McMaster University Arthritis Index), preoperative pain at rest, a postoperative complication requiring hospital readmission, and a poor preoperative psychological state.

For Robertson *et al*^[2] the main causes of patient dissatisfaction were long-standing disease, absence of primary patellar resurfacing, and revised knees. They administered a self-administered, validated “Knee Function Questionnaire,” which examined each patient’s participation in a broad range of activities involving the knee, their level of satisfaction, and the extent to which TKA had fulfilled their expectations.

For Noble *et al*^[3] the causes of dissatisfaction are age > 60, presence of residual symptoms, lack of fulfillment of expectations, and presence of functional impairment.

Kim *et al*^[4] reported that more severe functional disabilities were related with patient dissatisfaction. They used a questionnaire designed to evaluate functional disabilities, perceived importance, and patient satisfaction. The top five severe functional disabilities were difficulties in kneeling, squatting, sitting with legs crossed, sexual activity, and recreational activities. The top five in order of perceived importance were difficulties in walking, using a bathtub, working, recreation activities, and climbing stairs.

Bourne *et al*^[5] found that the causes of dissatisfaction in osteoarthritic patients were expectations not met (10.7 × greater

Table 2 Rates, causes of dissatisfaction, and methods used for measuring dissatisfaction after Total Knee Arthroplasty (TKA) in the literature on idiopathic osteoarthritis.

| Author | Year | Mean rate of dissatisfaction | Causes of dissatisfaction | Methods used for measuring dissatisfaction |
|------------------------------|------|------------------------------|--|--|
| Robertsson ^[2] | 2000 | 8% | Patients operated on for a long-standing disease more often being satisfied than those with a short disease-duration. For TKAs performed with primary patellar resurfacing, there was a higher ratio of satisfied patients than for TKAs not resurfaced, but this increased ratio diminished with time passed since the primary operation. Unrevised knees had a higher proportion of satisfied patients than knees that had been subject to revision | During a validation process of the Swedish Knee Arthroplasty Register (SKAR), living registered patients were sent a questionnaire to ask if they had been reoperated on. 95% of patients answered a simple four-question questionnaire |
| Noble ^[3] | 2006 | 15% | Satisfaction correlated significantly with age less than 60, absence of residual symptoms, fulfillment of expectations, and absence of functional impairment. Satisfaction with TKA is primarily determined by patients' expectations, and not their absolute level of function. Real improvements in the outcome of TKA must address prevention of residual pain, stiffness and swelling, and each patient's preoperative concept of the likely outcome of these procedures. | Self-administered, validated "Knee Function Questionnaire," which examined their level of satisfaction. |
| Kim ^[4] | 2010 | 8.80% | The patients dissatisfied with their replaced knees had more severe functional disabilities than the patients satisfied for most activities. The dissatisfied patients tended to perceive functional disabilities in high-flexion activities to be more important than the satisfied. | Questionnaire designed to evaluate patient satisfaction. |
| Bourne ^[5] | 2010 | 19% | The strongest predictors of patient dissatisfaction after primary TKA were expectations not met (10.7x greater risk), a low 1-year WOMAC (2.5x greater risk), preoperative pain at rest (2.4x greater risk) and a postoperative complication requiring hospital readmission (1.9x greater risk). Satisfaction with pain relief varied from 72-86% and with function from 70-84% for specific activities of daily living. | Predictors of patient dissatisfaction |
| Johnson ^[12] | 2011 | 5.50% (range, 3% to 8%) | This RCT showed that preoperatively, patients satisfied with the consent process may have better recall of risks/benefits and expectations of surgery. Neither retention nor satisfaction was influenced by reinforcement methods, such as video or nurse education; they may therefore be unnecessary. | The authors hypothesized that utilization of multiple standardized education modalities in the informed consent process would allow for better retention and a more informed patient. A total of 151 patients undergoing primary TKA were randomized to 3 groups: group 1 received standardized informed consent and a paper handout detailing the risks/benefits of TKA; group 2 received standardized informed consent, a paper handout, and a video discussing the risks/benefits of TKA; and group 3 followed the same process as group 2 plus formal nurse education. All patients completed a 15-item questionnaire (risks, indications, and expectations) immediately following this consent process on the morning of surgery and 6 weeks postoperatively. |
| Merle-Vincent ^[6] | 2011 | 10.20% | Prospective multicenter study of patients followed up for 2 years after TKA for osteoarthritis. The authors evaluated pain and function (Lequesne index and WOMAC) at baseline and after 2 years. Factors significantly associated with good satisfaction in the multivariate model were absence of complications, BMI less than 27 kg/m ² , high radiological joint narrowing score, age greater or equal to 70 years, and absence of depression at the 2-year evaluation. This study identified three factors that predict patient satisfaction and can be assessed before surgery (age greater than 70 years, absence of obesity, and severe joint space narrowing). | After 2 years, the patients rated their satisfaction as a percentage, with values greater than 50% defining good satisfaction. Factors associated with good satisfaction were identified by univariate analyses followed by multivariate analysis. |
| Schnurr ^[7] | 2013 | 14.80% | The data of 1 121 consecutive TKA patients with a follow-up between one and six years have been analyzed retrospectively in this study. Patients' satisfaction was independent of the time after operation. The only factor which influenced patients' satisfaction was the osteoarthritic severity. In comparison to severe arthritis Kellgren Lawrence IV°, the risk for dissatisfaction was 2.556-fold elevated for arthritis grade III° and 2.956-fold higher for grade II°. Patients suffering from mild or moderate osteoarthritis are at risk for dissatisfaction after TKA. The TKA indication in those patients should therefore be critically proven. Furthermore, to adjust patients' expectations, the elevated dissatisfaction risk in case of mild or moderate osteoarthritis should be included into patients' pre-operative information. | Demographic, radiologic and perioperative variables have been recorded and all patients were asked by questionnaire for satisfaction with the implanted knee. Logistic regression models were used to identify significant risk factors. |
| Schulze ^[8] | 2013 | 15% | This systematic review compared patient satisfaction and analyzed the causal connections and influencing factors after TKA between 1990-1999 and 2000-2012. From 1990 to 1999 a total of 81.2% of patients were satisfied after TKA and in the period 2000-2012 patient satisfaction increased to 85%. Influencing factors on postoperative satisfaction derived from the 25 publications included in the study were consistently body-mass index, patient expectations, pain, joint function and mental factors. A lack of satisfaction scores and different designs resulted in difficulties in comparing the studies and were subsequently limitations of this study. | Systematic review |

| | | | | |
|--------------------------|------|---------------------------|--|---|
| Marsh ^[13] | 2014 | 16.50% (7% to 26%) | <p>Results of this RCT showed moderate to high satisfaction levels with a web-based followup assessment. Patients who completed the usual method of in-person followup assessment reported greater satisfaction; however, the difference was small and may not outweigh the additional cost and time-saving benefits of the web-based followup method. The authors determined (1) patient satisfaction and (2) patients' preferences for followup method (web-based or in-person) after TKA. They randomized patients who were at least 12 months after primary TKA to complete a web-based followup or to have their appointment at the clinic. There were 410 eligible patients contacted for the study during the recruitment period. Of these, 256 agreed to participate, and a total of 229 patients completed the study (89% of those enrolled, 56% of those potentially eligible; 111 in the usual-care group, 118 in the web-based group). Their mean age was 69 years (range, 38-86 years). There was no crossover between groups</p> | <p>All 229 patients completed a satisfaction questionnaire at the time of their followup appointments. Patients in the web-based group also completed a satisfaction and preference questionnaire 1 year later. Only patients from the web-based group were asked to indicate preference as they had experienced the web-based and in-person followup methods. The authors used descriptive statistics to summarize the satisfaction questionnaires and compared results using Pearson's chi-square test. Ninety-one patients (82.0%) in the usual-care group indicated that they were either extremely or very satisfied with the followup process compared with 90 patients (75.6%) who were in the web-based group. Similarly, patients in the usual care group were more satisfied with the care they received from their surgeon, compared with patients in the web-based group (92.8% <i>vs</i> 73.9). Forty-four percent of patients preferred the web-based method, 36% preferred the usual method, and 16% had no preference</p> |
| Anastase ^[14] | 2014 | NA | <p>This RCT showed that continuous combined femoral/sciatic analgesia was successfully used after TKA and offered a high satisfaction level immediately as well as after a long period, with 98% patients choosing this technique for a possible future similar intervention. The aim of this prospective randomized controlled study was to compare the analgesia and the level of satisfaction at short-term (7 postoperative days) and after 6 and 12 months in patients with a femoral/sciatic (FEM/SCI) nerves blocks versus epidural analgesia (AP) for TKA. 123 patients, ASA I-III, proposed for TKA under spinal anesthesia were randomized to the EA group or to the FEM/SCI group, to receive 48 hours postoperatively, continuous epidural analgesia, respectively continuous perineural combined FEM-SCI block. The pain relief was achieved through catheter patient controlled analgesia (PCA) with 0.2% ropivacaine and was supplemented by the administration of piritramid i.v. at request.</p> | <p>On the 7th postoperative day all patients completed a questionnaire regarding their satisfaction with anesthesia and analgesia and also answered a telephone interview at 6 and 12 months concerning the outcome quality. Both groups were similar in respect to the demographic data. Opioid consumption was comparable for the first 48 hours (median 18 mg for the AP group and 17 mg for the FEM/SCI group, <i>p</i> > 0.05). The short-term satisfaction level was similar for both groups. At 6 months postoperatively, patients from the FEM/SCI group declared a lower analgesic use and after 12 months less knee pain, less analgesic use and a better knee mobility.</p> |
| Jacobs ^[9] | 2014 | 10.40% | <p>Postoperative Knee Society Pain Scores and passive knee flexion were most related to a lack of satisfaction. Age, gender, and BMI did not appear to be related to patient satisfaction. By and large, dissatisfied patients in the current study had not experienced improvements in passive flexion, Pain Scores, or Function Scores when compared to their preoperative state.</p> | <p>With 2 to 5 year follow-up of 768/959 (80%) cruciate-retaining TKAs performed by a single surgeon, we evaluated the prevalence of dissatisfied patients and determined which factors were most related to patient satisfaction. Of the 768 TKAs, 80 were dissatisfied with their procedure (10.4%).</p> |
| Jacobs ^[10] | 2014 | 9.50% | <p>African American patients were 3 times more likely to be dissatisfied than Caucasians. Patients with less severe degenerative changes were 2.1 times more likely to be dissatisfied. This study compared patient demographics and factors recorded at the time of surgery between patients that were either satisfied or dissatisfied with their TKA at mid-term follow-up. From our prospective outcomes database, 989 primary TKAs with complete preoperative and intraoperative data were identified.</p> | NA |
| Khatib ^[11] | 2015 | 17.90% (7.5% to 28.3%) | <p>The authors performed a systematic review and meta-analysis of prospective observational studies published in MEDLINE, CINAHL(®), EMBASE™, and PsycINFO(®) databases from their date of inception to October 2013, augmented with a manual search of bibliographies. Study eligibility was performed according to an a priori protocol. Included studies were assessed for quality according to the Newcastle-Ottawa scale. Two reviewers independently performed the search, identified eligible studies, assessed their methodologic quality, and extracted data. Outcomes of interest included postoperative dissatisfaction, pain, or limited function of the patients.</p> | Systematic review and meta-analysis |
| Harper ^[15] | 2015 | NA | <p>This RCT showed that the use of therapy dogs has a positive effect on patients' pain level and satisfaction with hospital stay after total joint replacement. Surgeons are encouraged to inquire about the status of volunteer-based animal-assisted therapy programs in their hospital as this may provide a means to improve the immediate postoperative recovery for a select group of patients having TKA. A randomized controlled trial of 72 patients undergoing primary unilateral TKA was conducted. Patients were randomized to a 15-minute visitation with a therapy dog before physical therapy or standard postoperative physical therapy regimens. Both groups had similar demographic characteristics. Reduction in pain was assessed using the VAS after each physical therapy session, beginning on postoperative Day 1 and continuing for three consecutive sessions.</p> | <p>To ascertain patient satisfaction, the proportion of patients selecting top-category ratings in each subsection of the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) was compared.</p> |

RCT: Randomized clinical trial; BMI: Body mass index; WOMAC: Western Ontario and McMaster University Arthritis Index; VAS: Visual analog scale; NA: Not available.

risk), a low 1-year WOMAC ($2.5 \times$ greater risk), preoperative pain at rest ($2.4 \times$ greater risk) and a postoperative complication requiring hospital readmission ($1.9 \times$ greater risk).

Merle-Vincent *et al*^[6] reported the following causes of patient dissatisfaction: presence of complications, BMI > 27 kg/m², low radiological joint narrowing score, age < 70 years, and presence of depression at the 2-year evaluation. They performed a prospective multicenter study of patients followed up for 2 years after TKA for osteoarthritis. They evaluated pain and function (Lequesne index and WOMAC) at baseline and after 2 years. After 2 years, the patients rated their satisfaction as a percentage, with values greater than 50% defining good satisfaction. Factors associated with good satisfaction were identified by univariate analyses followed by multivariate analysis.

Schnurr *et al*^[7] found that patients with mild or moderate osteoarthritis had a higher rate of dissatisfaction. The data of 1 121 consecutive TKA patients with a follow-up between one and six years were analyzed retrospectively. Demographic, radiologic and perioperative variables were recorded and all patients were asked by questionnaire for satisfaction with the implanted knee. Logistic regression models were used to identify significant risk factors.

Schulze *et al*^[8] reported the following causes of dissatisfaction: high body-mass index, great patient expectations, severe preoperative pain, severe limitation joint function and preoperative mental factors. This systematic review compared patient satisfaction and analyzed the causal connections and influencing factors after TKA between 1990-1999 and 2000-2012. From 1990 to 1999 a total of 81.2% of patients were satisfied after TKA and in the period 2000-2012 patient satisfaction increased to 85%.

Jacobs *et al*^[9] reported that high postoperative Knee Society Pain Scores and poor passive knee flexion were important causes of dissatisfaction in osteoarthritic patients. With 2 to 5 year follow-up of 768/959 (80%) cruciate-retaining TKAs performed by a single surgeon, the authors evaluated the prevalence of dissatisfied patients and determined which factors were most related to patient satisfaction. Of the 768 TKAs, 80 were dissatisfied with their procedure (10.4%).

In another report, Jacobs *et al*^[10] found that African American patients and those with less severe degenerative changes presented a higher rate of dissatisfaction. This study compared patient demographics and factors recorded at the time of surgery between patients that were either satisfied or dissatisfied with their TKA at mid-term follow-up. From their prospective outcomes database, 989 primary TKAs with complete preoperative and intraoperative data were identified.

Khatib *et al*^[11] found that a poor preoperative psychological state of a patient lead to a higher rate of dissatisfaction. The authors performed a systematic review and meta-analysis of prospective observational studies published in MEDLINE, CINAHL®, EMBASE™, and PsycINFO® databases from their date of inception to October 2013, augmented with a manual search of bibliographies. Study eligibility was performed according to an a priori protocol. Included studies were assessed for quality according to the Newcastle-Ottawa scale. Two reviewers independently performed the search, identified eligible studies, assessed their methodologic quality, and extracted data. Outcomes of interest included postoperative dissatisfaction, pain, or limited function of the patients.

In a RCT, Johnson *et al*^[12] showed that preoperatively, patients satisfied with the consent process may have better recall of risks/benefits and expectations of surgery. Neither retention nor satisfaction was influenced by reinforcement methods, such as video

or nurse education; they may therefore be unnecessary. The authors hypothesized that utilization of multiple standardized education modalities in the informed consent process would allow for better retention and a more informed patient. A total of 151 patients undergoing primary TKA were randomized to three groups: group 1 received standardized informed consent and a paper handout detailing the risks/benefits of TKA; group 2 received standardized informed consent, a paper handout, and a video discussing the risks/benefits of TKA; and group 3 followed the same process as group 2 plus formal nurse education. All patients completed a 15-item questionnaire (risks, indications, and expectations) immediately following this consent process on the morning of surgery and 6 weeks postoperatively. The authors used t-test and analysis of variance for data analyses

In another RCT, Marsh *et al*^[13] showed moderate to high satisfaction levels with a web-based followup assessment. Patients who completed the usual method of in-person followup assessment reported greater satisfaction; however, the difference was small and may not outweigh the additional cost and time-saving benefits of the web-based followup method. The authors determined (1) patient satisfaction and (2) patients' preferences for followup method (web-based or in-person) after TKA. They randomized patients who were at least 12 months after primary TKA to complete a web-based followup or to have their appointment at the clinic. There were 410 eligible patients contacted for the study during the recruitment period. Of these, 256 agreed to participate, and a total of 229 patients completed the study (89% of those enrolled, 56% of those potentially eligible; 111 in the usual-care group, 118 in the web-based group). Their mean age was 69 years (range, 38-86 years). There was no crossover between groups. All 229 patients completed a satisfaction questionnaire at the time of their followup appointments. Patients in the web-based group also completed a satisfaction and preference questionnaire 1 year later. Only patients from the web-based group were asked to indicate preference as they had experienced the web-based and in-person followup methods. They used descriptive statistics to summarize the satisfaction questionnaires and compared results using Pearson's chi-square test. Results: Ninety-one patients (82.0%) in the usual-care group indicated that they were either extremely or very satisfied with the followup process compared with 90 patients (75.6%) who were in the web-based group. Similarly, patients in the usual care group were more satisfied with the care they received from their surgeon, compared with patients in the web-based group. Forty-four percent of patients preferred the web-based method, 36% preferred the usual method, and 16% had no preference.

In conclusion, the rate of dissatisfied patients ranged between 8% and 19% (12% on average) in the osteoarthritis literature. We found many causes of dissatisfaction reported in osteoarthritic patients that we must try to avoid, mainly a high preoperative body-mass index (> 27 kg/m²), lack of fulfillment of patient expectations (expectations not met - $10.7 \times$ greater risk), a low 1-year WOMAC ($2.5 \times$ greater risk), preoperative pain at rest ($2.4 \times$ greater risk), a postoperative complication requiring hospital readmission ($1.9 \times$ greater risk), preoperative mental factors (poor preoperative psychological state of a patient), and African American population. The use of femoral/sciatic analgesia and therapy dogs has shown to increase the degree of satisfaction. It is important to emphasize that some causes of dissatisfaction cannot be easily avoided or changed, like the lack of fulfillment of patient expectations, african american populations or a postoperative complication. The main limitation of this study is that the overall level of evidence for the analysis was

not the ideal one (only four randomized clinical trials have been reported so far).

CONFLICT OF INTEREST STATEMENT

The author certifies that he has no commercial associations (*e.g.* consultancies, stock ownership, equity interest, patent/licensing arrangements, *etc.*) that might pose a conflict of interest in connection with the submitted article.

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