Study of Pain Level Control Targets After Arthroscopic Surgery

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Abstract

Objective: To explore the goal of pain control in patients after arthroscopic surgery.

Design: Investigation. Postoperative pain, pain control satisfaction and the effect of pain on daily activities were investigated and evaluated.

Setting: Department of Sports Medicine, Peking University 3rd Hospital, Beijing, P.R.China

Subjects: 514 patients selected by convenience sampling from patients hospitalized in a level A hospital in Beijing from 2020.06-2020.11. The patient inclusion criteria were an age of at least 18 years, no history of diagnosis of mental illness, the ability to clearly express his or her pain and an agreement to voluntarily cooperate with the investigators. The exclusion criteria were patients who were unable to complete follow-up.

Methods: Postoperative pain, pain control satisfaction and the effect of pain on daily activities were investigated and evaluated by administering a homemade questionnaire to 514 patients selected by convenience sampling from patients hospitalized in a level A hospital in Beijing from 2020.06-2020.11. Pain was assessed using a digital pain numerical rating scale (NRS) (0-10), and a digital score ranging from 0 to 10 was used for satisfaction with pain control and the impact of pain on aspects of daily living.

Results: The pain level was most severe in patients 6-24 hours after arthroscopic surgery, during which pain control satisfaction was at its worst. The pain score was significantly related to the effects of pain on aspects of daily life, and the degree of these effects changed significantly for pain scores greater than 2 points.

Conclusion: Pain control 6 to 24 hours after surgery is not satisfactory. It is recommended that a pain score of 2 points is used as the goal for pain control after arthroscopic surgery to guide both doctors and patients to effectively control postoperative pain.

1 Introduction

In 2001, International Association for the Study of Pain defined pain as an unpleasant, emotionally subjective feeling consisting of a combination of physical and psychological factors accompanied by existing and potential tissue damage.

In clinical work, pain has been receiving increasing attention and is now considered the 5th vital sign along with body temperature, pulse, respiratory rate and blood pressure. The U.S. Guidelines for Practice on Acute Pain during the perioperative period clearly state that [1] consideration should be given to determining the level of pain that requires pain relief or intervention as well as the goal of pain level management. In recent years, some scholars [2–5] have proposed limiting the level of noncancer pain to less than 4 points on the pain score; that is, according to these studies, a score of 4 points should be the threshold that distinguishes mild and moderate pain. Guo et al. [6] also suggested that the goal of pain control after general surgery should be a score of ≤ 4 points, and Gerbershagen et al. [4] research suggested that a score of 4 points should be considered a critical threshold of postoperative acute pain, while pain with a score of 2 could affect mood, sleep, and activity. Similarly, Boonstra's study of chronic musculoskeletal pain indicated that [7] ≤ 5 points on the pain scale should be considered mild pain, 6-7 moderate pain, and 8 or more severe pain, suggesting that pain intervention should be provided for a score of 5. Several small studies have led many clinicians to believe that when the pain score is 4 or more, they need to increase the dose of painkillers, change the type of medication, or implement other interventions [8, 9]. However, some studies have noted that the pain management target score should be set at 2 points, indicating that pain scoring 3 or more points should be treated accordingly. Although the standards for postoperative pain control have not yet been harmonized across various countries, a number of studies from China and other countries have shown that [1, 10–14] postoperative pain control remains unideal and that if postoperative pain is not effectively controlled, it will seriously affect the patient's prognosis and satisfaction.

The benefits of arthroscopic surgery over traditional open surgery include minimal surgical trauma and tissue damage and rapid patient recovery, but postoperative pain control following arthroscopic surgery remains unsatisfactory [15]. Pain should be controlled after arthroscopic surgery to a level that will both be acceptable to the patient and not affect their physiological function and postoperative rehabilitation. This philosophy is directly related to the quality of postoperative pain control and patient satisfaction and can help Chinese and foreign scholars, medical personnel, and pharmaceutical industries develop effective drugs and methods that can substantially guide pain control. Therefore, the purpose of this project is to establish a goal for pain control after arthroscopic surgery, to prepare for the further development of arthroscopic pain control guidelines and standards and to fill the gaps in this field for future reference.

2 Objects And Methods

2.1 Object

Convenience sampling was used to recruit 514 patients admitted to the arthroscopic surgery department of a third-level sports medicine hospital in Beijing for pain-related assessment and investigation from 2020.06 to 2020.11. The patient inclusion criteria were an age of at least 18 years, no history of diagnosis of mental illness, the ability to clearly express his or her pain and an agreement to voluntarily cooperate with the investigators. The exclusion criteria were patients who were unable to complete follow-up.

2.2 Method

2.2.1 Questionnaire design

Study of Mascha EJ et al.[13] have shown that using a multi-dimensional questionnaire for assessing post-operative pain should be quite a number of validated questionnaires exist. Through a literature review, the Practice Guidelines on Acute Pain in the Perioperative Setting, developed by the American Association of Anesthesiologists (ASA) in conjunction with the American Pain Association (APS) [1], the commonly used McGill Pain Questionnaire (MPQ), and the Houston Pain Questionnaire were selected in this study to assess patient pain control goals. The first draft was designed by the researchers, then discussed, revised and perfected in a meeting of five experts selected from the fields of sports medicine, surgical care, and pain management. The criteria for selecting the experts were as follows: (1) Bachelor's degree or above; (2) title of deputy chief of staff or above; and (3) at least 10 years of working experience in his or her respective field.

The expert meeting finally determined the contents of the questionnaire(a translated version of the questionnaire is attached in the supplementary materials section), which consisted of three parts: (1) general demographic information and preoperative and past pain conditions: age, sex, marital status, education, number of previous operations, site of the operation, surgical anaesthesia, expected value of the most severe postoperative pain, satisfaction with the postoperative pain control, and the most severe past pain score; (2) postoperative pain: 9 items including the site of pain, pain score at 6 different postoperative time periods (immediately and 6, 9, 12, 24, and 48 hours after surgery) and patient satisfaction; and (3) effects of postoperative pain on daily life, including 10 items: pain associated with lying in bed (turning over, transition between lying down and sitting up), dressing, eating/drinking water, getting into and out of bed, toilet, walking, sleep, mood, relationships with others, and rehabilitation exercise.

Both the validity and confidence of the questionnaire were tested as follows: (1) Content validity(Expert validity): the contents of the questionnaire were assessed by 7 experts engaged in nursing management, surgical care, sports trauma and anaesthesia, which yielded a content validity of 0.94; (2) Internal Consistency: The first 20 enrolled patients were pre-investigated for data analysis. the second (postoperative pain) and third parts (the effect of postoperative pain on daily life) of the questionnaire were tested for internal consistency with Cronbach's alpha, yielding values of 0.73 and 0.94, respectively, both of which indicated good confidence in the questionnaire.

2.2.2 Survey tool(See attached questionnaire in the supplementary materials section)

A digital pain numeric rating scale (NRS) (0-10) was used to score the pain, where 0 means no pain and 10 means the most severe pain imaginable. Satisfaction with pain control was assessed by a numerical score from 0 to 10, with 0 meaning very dissatisfied and 10 very satisfied. The influence of pain on daily life was assessed by a score from 0 to 10, with 0 indicating that daily life was unaffected and 10 indicating that it was completely affected.

2.2.3 Investigator training and timing

The caregivers involved in the study were trained in the use of the NRS pain scores, satisfaction with pain control, and the degree of the impact of pain on daily life. Additionally, they were taught how to unify guidance and communication terms, explain the purpose, significance and methods of the investigation, and obtain patient cooperation.

The questionnaire was evaluated and completed by nurses when they returned to the patient ward immediately after surgery and 6, 9, 12, 24 and 48 hours after surgery to assess the patient's pain level score, satisfaction with pain control, and the impact of pain on daily activities.

2.2.4 Pain control regimen

This study based on the results of relevant studies[2–7], pain control with oral, intravenous or muscular analgesics was determined when the NRS score reached 4 points or above. In this study, when the NRS score was 0-3 points, the patients were given non-drug therapy, that is, effective communication, distraction, listening to soothing music and other psychological counseling to reduce the pain of patients. ≥ 4

points were given drug treatment, of which 4-6 points were given oral analgesics, such as paracetamol, hydrocodone aminophen and etocoxib; Intramuscular injections, such as pethidine hydrochloride and sulamine, were given at 7-10 points. In other words, the postoperative pain level score, satisfaction with pain control, the impact of pain on daily life, etc., in this study are the result of the pain control guidelines derived from this standard.

2.3 Statistical processing

SPSS 21.0 statistical software was used for data analysis. First, the Kolmogorov-Smirnov and homogeneity of variance tests were performed. Measurement data satisfying a normal distribution and homogeneity of variance are expressed as $\bar{X} \pm s$ and were statistically analysed with the t-test. Measurement data that did not satisfy a normal distribution or homogeneity of variance are expressed as the median and were statistically analysed using the non-parametric Mann-Whitney U test. The Kendall correlation coefficient was used in the correlation study. The non-parametric Mann-Whitney U test was used to calculate the test statistics and their corresponding P values. $P < 0.05$ was considered statistically significant.

3 Results

3.1 General information

514 patients were approached for recruitment and 95 excluded(Figure 1). Of the 514 included patients, 308 were male and 206 were female, aged 18-69 years, with an average age of 31.82 ± 13.56 years. 32 patients underwent shoulder arthroscopic surgery, 32 underwent hip arthroscopic surgery, 334 underwent knee arthroscopic surgery, and 116 underwent ankle arthroscopic surgery. General anaesthesia was administered to 95 patients and joint epidural and spinal anaesthesia to 419 patients. There were 58 patients with a history of chronic pain before surgery, and 26 patients with long-term use of analgesics. The patients reported a worst movement NRS pain score they have ever experienced of 7.0(5.0,8.0) points, expected postoperative pain to be controlled below 4.0(2.0,5.0) points during movement, and had an average postoperative pain control satisfaction score of 7.9 ± 2.2 .

3.2 Analytical results for postoperative pain status

Postoperative pain was the most severe from 6 to 24 hours, higher than the average after surgery (4.3 ± 1.9), while the patients expected postoperative pain to be controlled at a score of 4.0(2.0,5.0), suggesting that 6-24 hours after surgery, the patients were not satisfied with their pain control (Figure 2).

3.3 Correlation analysis between pain score and pain control satisfaction score at different time periods

Immediately and 6, 9, 12, 24 and 48 hours after surgery, the pain score during movement was negatively correlated with satisfaction; that is, as the pain score increased, satisfaction with pain control decreased. Except immediately and 48 hours after the operation, when the satisfaction score was higher than the average level of satisfaction (7.9 ± 2.2), the score for the satisfaction with pain control 6-24 hours after the operation was lower than average, suggesting that the pain control 6-24 hours after the operation was relatively unsatisfactory (Table 1). Since correlations between the pain score and satisfaction were not normally distributed, Spearman correlation was used to analyze and P value was obtained.

Table 1 Correlation between pain control satisfaction score and pain score over time				
	Pain Score	Satisfaction Score	r	p
Immediately after surgery	1.0(0.0-5.0)	8.4+2.6	-0.255	<0.01
6 hours after surgery	5.0(4.0-7.0)	7.8+2.5	-0.203	<0.01
9 hours after surgery	5.0(4.0-7.0)	7.8+2.5	-0.247	<0.01
12 hours after surgery	5.0(3.0-6.0)	7.8+2.5	-0.247	<0.01
24 hours after surgery	4.0(3.0-6.0)	7.6+2.8	-0.24	<0.01
48 hours after surgery	3.0(2.0-5.0)	7.8+2.9	-0.194	<0.01

3.4 Different pain scores affect various factors in daily life

Furthermore, the pain score was analysed to determine the effects of pain on activity, undressing, eating/drinking water, getting into/out of bed, using the toilet, walking, sleep, mood, relationship with others, rehabilitation exercise, and satisfaction. The results are as follows.

Correlations were calculated between the overall pain score during movement (the average pain score during movement at immediately and 6,9,12,24 and 48 hours after surgery) and the influence of pain on various aspects of daily life; in addition to being negatively correlated with the effect of satisfaction, the pain score was positively correlated with the degree of influence on other daily life aspects ($P < 0.001$), i.e., the degree of impact on each aspect of daily life increased with increasing pain score (Table 2).

Table 2
Correlation between pain score and the degree of influence on aspects of daily life

Aspect	Correlation coefficient (r)	P value
Activity	0.509	0.001
Undressing	0.438	0.001
Eating/drinking water	0.313	0.001
Getting into and out of bed.	0.450	0.001
Toilet use	0.414	0.001
Walking	0.460	0.001
Sleep	0.550	0.001
Mood	0.481	0.001
Relationships with others	0.362	0.001
Rehabilitation exercise	0.419	0.001
Pain control satisfaction	-0.242	0.001

The effects of different pain scores on daily factors were compared in pairs, as shown in Table 3. The test variable is the impact score of different activities, the grouping variable is the pain score, and the data in the table is the p-value for pairwise comparison. A pain score of ≤ 2 points does not seem to have an obvious influence on the daily aspects, but when the score increases from 2 to 3 points, a significant influence can be observed on many of the daily aspects.

Table 3
Comparing the impact between pairs of pain scores on each daily aspect (P values shown)

Pairs	Activities	Undressing	Eating/drinking water	Getting in and out of bed	Using the toilet	Walking	Sleep	Mood	Relationships with others	Rehabilitation exercise
0 vs. 1	0.967	0.813	0.333	0.896	0.914	0.813	0.586	0.818	0.395	0.763
1 vs. 2	0.022	0.138	0.718	0.207	0.514	0.217	0.038	0.136	0.162	0.176
2 vs. 3	0.003	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.075	0.000
3 vs. 4	0.607	0.603	0.518	0.461	0.441	0.025	0.077	0.492	0.465	0.874
4 vs. 5	0.000	0.000	0.001	0.000	0.006	0.009	0.001	0.019	0.088	0.114
5 vs. 6	0.000	0.001	0.019	0.000	0.004	0.000	0.000	0.000	0.004	0.002
6 vs. 7	0.000	0.005	0.166	0.072	0.011	0.061	0.017	0.005	0.126	0.000
7 vs. 8	0.007	0.077	0.026	0.210	0.665	0.047	0.032	0.374	0.047	0.126
8 vs. 9	0.971	0.268	0.425	0.006	0.017	0.165	0.001	0.008	0.994	0.174
9 vs. 10	0.166	0.034	0.104	0.075	0.631	0.159	0.186	0.005	0.000	0.002

The change curve of the various factors affected by the pain score is shown in Figure 3. The higher the pain score is, the greater the effect of pain on daily life. When the pain score is 2-3, the pain curve of the influence of each daily factor changes greatly, showing a clear upward trend.

4 Discussion

4.1 Analysis of pain and satisfaction degrees after arthroscopy

As shown in Table 1, the pain degree of the patients was the most severe 6 to 24 hours after surgery, reached a peak of 5.0(4.0,7.0) points 9 hours after surgery, and gradually decreased over time. The table shows that the average pain level of the patients after arthroscopy was between moderate and severe. Table 2 indicates that the pain control 6-24 hours after surgery was relatively unsatisfactory, neither meeting the expectation of patients nor reaching the average level of satisfactory control. Although the pain did not reach the most severe level at its peak, pain control did not meet patient expectations, indicating that it was not satisfactory and that postoperative pain management was inadequate. Therefore, pain control requires further improvement, consistent with the results reported in the literature [1, 10–14]. Table 3 indicates that as the pain score increases, the degree of influence on daily aspects increases while the influence on satisfaction decreases, which further suggests that the quality of life and satisfaction of patients can be improved by reducing the degree of pain. This result is consistent with the research results of Lin et al. [16]. In this study, when the NRS score was 0-3 points, the patients were given non-drug therapy, that is, effective communication, distraction, listening to soothing music and other psychological counseling to reduce the pain of patients. ≥ 4 points were given drug treatment, of which 4-6 points were given oral analgesics, such as paracetamol, hydrocodone aminophen and etocoxib; Intramuscular injections, such as pethidine hydrochloride and sulamine, were given at 7-10 points. To analyze the reasons for unsatisfactory pain control, one of them may be related to the principle that only 4 points and above should be given analgesic drugs in this study, so as to guide postoperative analgesic drugs. Moore Ra et al. [17] showed that Pain measures and cut-offs – no worse than mild Pain as a simple matter of the moment. Therefore, we cannot use a unified standard to measure the pain control goals of different patients after surgery. We need to develop personalized goals, reasonably set the goal value of postoperative pain control after arthroscopy, especially strengthen the pain management for 6-24 hours after surgery, so as to improve the quality of life and satisfaction of patients. Secondly, Mascha EJ et al. [13] showed that pain treatment is closely related to satisfaction, and in the process of pain treatment, we need to give treatment according to patients' willingness to take medication. However, Chinese people's personality

characteristics and understanding of postoperative pain make them more inclined to tolerate pain [18-20], which also leads to dissatisfaction with pain control to a certain extent. Therefore, it is also very important to strengthen health education for patients, so that they have the courage to express and accept pain treatment. In the follow-up work, special research will be carried out on this issue. In summary, it is suggested that the target value of pain control be reasonably set after arthroscopy and that, specifically, pain management be strengthened 6-24 hours after surgery to improve the patients' quality of life and satisfaction with pain control.

4.2 Recommendations for pain control goals after arthroscopic surgery

As shown in Table 3, the impact of pain on bed-related activities (turning over, transitioning from lying down to sitting, getting into and out of bed), undressing, eating/drinking water, using the toilet, walking, sleep, mood, relationships with others and rehabilitation exercise are positively correlated with pain scores; that is, the higher the pain score, the greater the impact on the above daily aspects is. Additionally, a lower satisfaction with pain control was associated with a higher pain score. Figure 3 shows that the effect of pain scores ≤ 2 on daily aspects is not obvious; however, a significant influence can be observed for pain scores > 2 points. Additionally, there is a clear upward trend in the effect of pain score on daily aspects, as shown in Figure 2. These results are consistent with the findings of Salaudeen et al. [8] and Roy et al. [9]. In summary, the present study suggests a pain score of 2 points as the goal for pain control after arthroscopic surgery; that is, when the pain score after surgery is at least 2 points, positive treatment should be administered to the patient to control the post-arthroscopy pain level to at most a score of 2 points. In addition, between 6 and 24 hours after surgery, non-drug treatment methods [21], such as effective communication, diverting attention, listening to soothing music, virtual reality (VR) technology [22], and psychological guidance, can be used as an effective supplement to drug analgesia.

4.3 Limitations

A control group would have been beneficial to the study design, which would be advantageous to compare pain management with another procedures and to elicit possible weaknesses in the respective hospital regarding postoperative pain management.

5 Conclusion

Unsatisfactory pain control is reported by patients 6 to 24 hours after arthroscopic surgery. This study therefore recommends a pain score of 2 points as the goal of pain control after arthroscopic surgery to guide both doctors and patients to effectively control postoperative pain. At the same time, advance analgesia techniques, including multi-mode analgesia, intravenous, epidural and nerve block pain pumps and other anti-pain measures for pain control after arthroscopic surgery have played a positive role in promoting recovery. The establishment of a pain control target after arthroscopic surgery will further improve the quality of pain management during the perioperative period as well as the postoperative quality of life and satisfaction of the patients.

Declarations

Human Ethics and Participant

1. Ethical Approval statement: Ethical Approval was obtained from Peking University Third Hospital Medical Science Research Ethics Committee for this study.

2. Guidelines/Accordance statement: All methods were performed in accordance with the relevant guidelines and regulations.

3. Informed Consent: Informed consent was obtained from all participants for this study.

Publication

Not applicable.

Competing of interest

The authors have no conflicts of interest to declare.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Authors' contributions

WJQ contributed to the conception of the study; WX and LCY contributed significantly to analysis and manuscript preparation, and wrote the main manuscript text; ZXL and WH contributed to the data collection; XY and LBH participated in the coordination of the study and reviewed the manuscript.

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References

1. Chou R, Gordon DB, De Leon-Casasola OA, Rosenberg JM, Bickler S, Brennan T, Carter T, Cassidy CL, Chittenden EH, Degenhardt E, Griffith S, Manworren R, McCarberg B, Montgomery R, Murphy J, Perkal MF, Suresh S, Sluka K, Strassels S, Thirlby R, Viscusi E, Walco GA, Warner L, Weisman SJ, Wu CL. Management of postoperative pain: a clinical practice guideline from the American pain society, the American society of regional anesthesia and pain medicine, and the American society of anesthesiologists' committee on regional anesthesia, executive committee, and administrative council. *J Pain*. 2016;**17**: 131-57.
2. Forchheimer MB, Richards JS, Chiodo AE, Bryce TN, Dyson-Hudson TA. Cut point determination in the measurement of pain and its relationship to psychosocial and functional measures after traumatic spinal cord injury: a retrospective model spinal cord injury system analysis. *Arch Phys Med Rehabil*. 2011;**92**: 419-24.
3. Woo A, Lechner B, Fu T, Wong CS, Chiu N, Lam H, Pulezas N, Soliman H, DeAngelis C, Chow E. Cut points for mild, moderate, and severe pain among cancer and non-cancer patients: a literature review. *Ann Palliat Med*. 2015;**4**: 176-83.
4. H.J. Gerbershagen, J. Rothaug J, Kalkman CJ, Meissner W. Determination of moderate-to-severe postoperative pain on the numeric rating scale: a cut-off point analysis applying four different methods. *Br J Anaesth*. 2011;**107**: 619-26.
5. Boekel RLM et al. Moving beyond pain scores: Multidimensional pain assessment is essential for adequate pain management after surgery. *PLoS One*. 2017 May 10;12(5):e01773456. Guo XL, Zhou L, Zhao J. Postoperative patient pain control goals research. 2011;25: 585-8.
7. Boonstra AM, Stewart RE, Köke AJ, Oosterwijk RF, Swaan JL, Schreurs KM, Schiphorst Preuper HR. Cut-off points for mild, moderate, and severe pain on the numeric rating scale for pain in patients with chronic musculoskeletal pain: variability and influence of sex and catastrophizing. *Front Psychol*. 2016;**7**: 1466.8. Salaudeen GO, Afuwape OO, Eyelade OR, Olapade-Olaopa EO. Effectiveness of postoperative analgesia in the management of acute pain in day-case surgeries. *Ann Afr Med*. 2018;**17**: 140-4.9. Roy R, Agarwal G, Patel A. IPB with LFCN can provide ambulatory analgesia for hip surgeries. *Reg Anesth Pain Med*. 2020;**45**: 840.
10. Elkbulli A, Stotsenburg M, Epstein C, Calvert K, Boneva D, McKenney M, Deaton K. A multidisciplinary approach to improve pain management and satisfaction in a trauma population. *J Trauma Nurs*. 2020;**27**: 96-103.
11. Yunus AA, Ugwu EM, Ali Y, Olagunju G. Postoperative pain management in emergency surgeries: a one-year survey on perception and satisfaction among surgical patients. *Niger J Surg*. 2020;**26**: 42-7.
12. Siu E, Quick JS, Xu X, Correll DJ. Evaluation of the determinants of satisfaction with postoperative pain control after thoracoscopic surgery: a single-center, survey-based study. *Anesth Analg*. 2019;**128**: 555-62.
13. Mascha EJ, Wu CL. Studies on Postoperative Analgesic Efficacy: Focusing the Statistical Methods and Broadening Outcome Measures and Measurement Tools. *Anesth Analg*. 2017 Sep;125(3):726-8
14. Benzon HT, Dunn LK, Tran DQ. I Can't Get No (Patient) Satisfaction. *Anesth Analg*. 2019 Mar;128(3):393-5.

15. LaPorte C, Rahl MD, Ayeni OR, Menge TJ. Postoperative pain management strategies in hip arthroscopy. *Curr Rev Musculoskelet Med*. 2019;**12**: 479-85.
16. Lin J, Hsieh RK, Chen JS, Lee KD, Rau KM, Shao YY, Sung YC, Yeh SP, Chang CS, Liu TC, Wu MF, Lee MY, Yu MS, Yen CJ, Lai PY, Hwang WL, Chiou TJ. Satisfaction with pain management and impact of pain on quality of life in cancer patients. *Asia Pac J Clin Oncol*. 2020;**16**: e91-8.
17. Moore RA, Straube S, Aldington D. Pain measures and cut-offs - 'no worse than mild pain' as a simple, universal outcome. *Anaesthesia*. 2013 Apr;**68**(4):400-12.
18. Hsieh AY, Tripp DA, Ji LJ, Sullivan MJ. Comparisons of catastrophizing, pain attitudes, and cold-pressor pain experience between Chinese and European Canadian young adults. *J Pain*. 2010 Nov;**11**(11):1187-94.
19. Zhang Y, Zhang S, Gao Y, Tan A, Yang X, Zhang H, Wu C, Lu Z, Liao M, Xie Y, Zhang Z, Qin X, Yu X, Li L, Hu Y, Mo Z. Factors associated with the pressure pain threshold in healthy Chinese men. *Pain Med*. 2013 Sep;**14**(9):1291-300. doi: 10.1111/pme.12158.
20. Ahn H, Sorkpor SK, Kim M, Miao H, Zhong C, Wang J, Lyon D, Fillingim RB. The Relationship between Acculturation and Experimental Pain Sensitivity in Asian Americans with Knee Osteoarthritis. *Pain Res Manag*. 2018 Nov 29;2018:9128015. doi: 10.1155/2018/9128015.
21. Eti Aslan F, Şahin SK, Secginli S, Bülbüloğlu S. Patient satisfaction with nursing practices about postoperative pain management: a systematic review. *Agri*. 2018;**30**: 105-15.
22. Ahmadpour N, Randall H, Choksi H, Gao A, Vaughan C, Poronnik P. Virtual reality interventions for acute and chronic pain management. *Int J Biochem Cell Biol*. 2019;**114**: 105568.

Figures

Figure 1

Flow chart of the methodological procedure

Figure 2

Postoperative pain score over time

Figure 3

Additionally, a lower satisfaction with pain control was associated with a higher pain score Figure 3 shows that the effect of pain scores ≤ 2 on daily aspects is not obvious; however, a significant influence can be observed for pain scores > 2 points.

Supplementary Files

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- [Targetquestionnaireofpatientpaincontrolafterarthroscopy.docx](#)