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QUALITY OF PATIENT'S LIFE WITH TRANSVERSE PATELLAR FRACTURES WITH VARIOUS TYPES OF OSTEOSYNTHESIS

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Abstract

Aim - to carry out a comparative analysis of the indicators of the quality of life of patients undergoing treatment for a transverse patellar fracture using various methods of treatment.

Materials and methods: Study design: controlled clinical trial. The study was conducted in 2015-2018 on the clinical basis of the emergency hospital in Semey. The study included 81 patients with patellar fractures, including 55 men (67.9%), 26 women (32.1%). The average age is 47.7 ± 2.6 years. The main group included 39 patients, including 27 men and 12 women, mean age - 48.3 ± 2.4 years, the comparison group - 42 patients, 28 men and 14 women, mean age - 47.2 ± 2.6 years old. In the main group, treatment was carried out using an improved method of transosseous osteosynthesis. The patients of the comparison group underwent surgical treatment according to Weber-Muller [3].

To study the quality of life, the SF-36 and KOOS methods were used [13,14].

Research results: At a follow-up period of 3 months after treatment, using the SF-36 technique, significant differences between the groups on the scales - PF (Physical Functioning) (19.3%), RE (Role-Emotional) (23.9%) and BP (Bodily pain) (19.5%), $p < 0.05$ in favor of the use of transosseous osteosynthesis.

When using the KOOS method on the pain scale, significant differences between the groups were revealed after 1 week (52.3% in favor of the main group), after 3 weeks (30.8%) and after 1.5 months (18.0%, $p < 0.05$). On a symptom scale, significant differences were observed after 3 weeks and 6 months. Also, a significant excess of the quality of life was revealed in the main group on the scales "activity in everyday life" and "sport and recreation".

Output: The quality of life of patients with fractures of the patella was significantly higher in the group where the method of transosseous osteosynthesis was used.

Keywords: fracture of the patella; transosseous osteosynthesis; the quality of life.

Резюме

КАЧЕСТВО ЖИЗНИ ПАЦИЕНТОВ, С ПОПЕРЕЧНЫМИ ПЕРЕЛОМАМИ НАДКОЛЕННИКА, ПРОЛЕЧЕННЫХ РАЗЛИЧНЫМИ ВИДАМИ ОСТЕОСИНТЕЗА

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Цель исследования – сравнить показатели качества жизни пациентов с переломами надколенника, которые лечились разными методами.

Материалы и методы: Дизайн исследования: контролируемое клиническое исследование. Исследование проводилось в 2015-2018 гг. на клинической базе Больницы скорой помощи г. Семей. В исследование были

включены 81 пациентов с переломами надколенника, из них мужчин 55 (67,9%), женщин – 26 (32,1%). Средний возраст – $47,7 \pm 2,6$ года. В основную группу включены 39 больных, в том числе 27 мужчин и 12 женщин, средний возраст – $48,3 \pm 2,4$ года, в группу сравнения – 42 пациентов, 28 мужчин и 14 женщин, средний возраст – $47,2 \pm 2,6$ года. В основной группе лечение проводилось путем применения усовершенствованного способа чрескостного остеосинтеза. У пациентов группы сравнения проводилось оперативное лечение по Вебер-Мюллеру [3].

Для исследования качества жизни использованы методики SF-36 и KOOS [13,14].

Статистический анализ проводился с использованием параметрических методов (критерий t Стьюдента). При неприменимости t-критерия по причине отсутствия нормального распределения вариационного ряда дополнительно использована методика бутстреп.

Результаты исследования: В срок обследования 3 месяца после лечения при применении методики SF-36 были выявлены значимые различия между группами по шкалам — PF (Physical Functioning) (19,3%), RE (Role-Emotional) (23,9%) и BP (Bodily pain) (19,5%), $p < 0,05$ в пользу применения чрескостного остеосинтеза.

При применении методики KOOS по шкале «боль» значимые различия между группами были выявлены через 1 неделю (52,3% в пользу основной группы), через 3 недели (30,8%) и через 1,5 месяца (18,0%, $p < 0,05$). По шкале «симптомы» значимые различия прослеживались через 3 недели и 6 месяцев. Также было выявлено значимое превышение качества жизни в основной группе по шкалам «активность в повседневной жизни» и «спорт и отдых».

Вывод: Качество жизни больных с переломами надколенника существенно выше в группе, где применялся метод чрескостного остеосинтеза.

Ключевые слова: перелом надколенника; чрескостный остеосинтез; качество жизни.

Түйіндеме

ТІЗЕ ҮСТІ СҮЙЕГІНІҢ КӨЛДЕНЕҢ СЫНЫҚТАРЫН ӘРТҮРЛІ ОСТЕОСИНТЕЗ ТҮРЛЕРІМЕН ЕМДЕГЕН НАУҚАСТАРДЫҢ ӨМІР САПАСЫ

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Зерттеудің мақсаты – Тізе үсті сүйегінің сынығын әртүрлі жолдармен емдеген науқастардың өмір сүру сапаларын салыстыру.

Мәліметтер мен әдістер: Зерттеудің дизайны: бақыланушы клиникалық зерттеу. Зерттеу жұмысы 2015-2018 жылдар аралығында Семей қаласының жедел медициналық көмек ауруханасының клиникалық базасында жүргізілді. Зерттеуге тізе үсті сүйектері сынған 81 науқас қатысты және олар ем түрлеріне қарай 2 топқа бөлінді: негізгі және салыстыру топтары. Зерттелгендер ішінде ер адамдар саны 55 (67,9%), әйелдер – 26 (32,1%). Науқастардың орташа жастары – $47,7 \pm 2,6$. Негізгі топқа 39 науқас кірді, оның ішінде 27 ер адам және 12 әйел, орташа жасы - $48,3 \pm 2,4$ жас, салыстыру тобында - 42 науқас, 28 ер адам және 14 әйел, орташа жасы - $47,2 \pm 2,6$ жас. Негізгі топтағы науқастар жетілдірілген сүйек арқылы остеосинтездеу жолымен емделді. Салыстыру тобындағы науқастар Вебер-Мюллер әсімен емделген[3].

Өмір сүру сапасын бағалау мақсатында SF-36 және KOOS әдістертер қолданылды [13,14].

Зерттеу нәтижелері: Емнен кейінгі 3 айда SF-36 әдісі арқылы тексергенде сүйек арқылы остеосинтез кезінде көрсеткіштер ЖБ (19,3%), РБ (23,9%), ЖА (19,5%), $p < 0,05$, яғни жақсырақ болған.

KOOS әдісін қолданғанда «ауырсыну» шкаласы бойынша топтар арасында айтарлықтай айырмашылық 1 аптадан кейін (52,3% негізгі топтың есебінен), 3 аптадан кейін (30,8%) және 1,5 айдан кейін (18,0%, $p < 0,05$) болған. «Симптомдар» шкаласы бойынша айтарлықтай айырмашылықтар 3 аптадан кейін және 6 айдан кейін анықталған. Сонымен қатар негізгі топта өмір сапасы «күнделікті өмірдегі белсенділік» пен «спорт және демалыс» шкалалары бойынша да айтарлықтай жоғары екені анықталды.

Қорытынды: Тізе үсті сүйегі сынығын жетілдірілген сүйек арқылы остеосинтездеу жолымен емдеген науқастардың өмір сүру сапасы айтарлықтай жоғары.

Түйінді сөздер: тізе үсті сүйегінің сынығы; сүйек арқылы остеосинтез; өмір сүру сапасы.

Bibliographic citation:

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Relevance

In trauma practice, patellar fractures are less common, but nevertheless play a significant role in the structure of injuries to the lower limb. Their frequency is, according to data from various authors, from 1.0% to 7.0%. This problem has a great socio-economic significance, as an addict often breaks down among young and middle-aged people, that is, people of hard-working age. [1,2].

The impact on the patella of one of the strongest muscles of the body - the quadriceps - requires the achievement of stable fixation, carried out most often by surgery. However, surgical treatment has its drawbacks, mainly in the need for a longer rehabilitation of patients, re-intervention to remove the fixing devices. Therefore, the use of hardware osteosynthesis methods for patellar fracture seems preferable [6].

Currently, there is a very small amount of detailed information on the clinical and morphological results of surgical treatment of fractures of the knee joint. Although fractures of the knee joint are usually sufficiently healed little that is known about the postoperative function of the knee joint, the quality of life of patients and the degree of deterioration of the function of the lower extremity. Clinical indicators, including the incidence of complications, duration of treatment and rehabilitation, do not always give a complete picture that allows adequate comparison of different treatment methods. Additional information is provided by the quality of life indicator [4,5].

Purpose of the study - to carry out a comparative analysis of the indicators of the quality of life of patients undergoing treatment for a transverse patellar fracture using various methods of treatment.

Materials and methods. Study design: controlled clinical trial. The study was conducted in 2015-2018 on the clinical basis of the emergency hospital in Semey.

The investigation is proactive. The author of this article perfected the method of cross-osteosynthesis and on this method of cross-osteosynthesis the knee joint was obtained Kazakhstan patent (Patent № 76234 Republic of Kazakhstan, 2012). Ethical issues were observed in accordance with the order of the Ministry of Health of the Republic of Kazakhstan No. 744 dated 19.11.09 "On approval of the Rules for conducting clinical trials and testing of pharmacological and medicinal products, medical devices and medical equipment".

The study included 81 patients with patellar fractures, divided depending on the treatment into 2 groups: the main group and the comparison group.

Among the surveyed men were 55 (67.9%), women - 26 (32.1%). All patients were between 18 and 70 years old (mean age - 47.7 ± 2.6 years).

The leading mechanism of the fracture in the group was falling to the knees.

Inclusion criteria: oblique fracture of the patella, transverse fracture of the patella, comminuted fracture of the patella, including an open fracture complicated by purulent arthritis; the presence of concomitant diseases that cause contraindications to anesthesia. Exclusion criterion: multiple fracture.

The main group included 39 patients, including 27 men and 12 women, average age - 48.3 ± 2.4 years, the comparison group - 42 patients, 28 men and 14 women, average age - 47.2 ± 2.6 years old.

In the main group, treatment was carried out using an improved method of transosseous osteosynthesis. The patients of the comparison group underwent open surgical treatment.

To determine the quality of life, we used two methods - general medical SF-36 (The Short Form - 36) [4,6] and specialized KOOS (Knee injury and Osteoarthritis Outcome Score), Russified and adapted version [7].

The use of the SF-36 questionnaire requires data from the control group, which included 30 volunteers aged from 25 to 60 years old (mean age - 45.5 ± 2.6 years).

Statistical analysis was carried out using parametric methods (Student's t test). If the t-criterion is inapplicable due to the absence of the normal distribution of the variation series, the bootstrap technique was additionally used [8].

For each patient, informed consent was filled out for interventions and participation in the study. The choice of the method of treatment was made based on the date: on counting days, transosseous osteosynthesis was performed; on countless days, the traditional method of treatment was chosen.

Research results

Examinations using the SF-36 questionnaire were carried out 3 weeks, 3 months and 12 months after surgery. At the same time, in this publication we present the data obtained after 3 months (Figure 1).

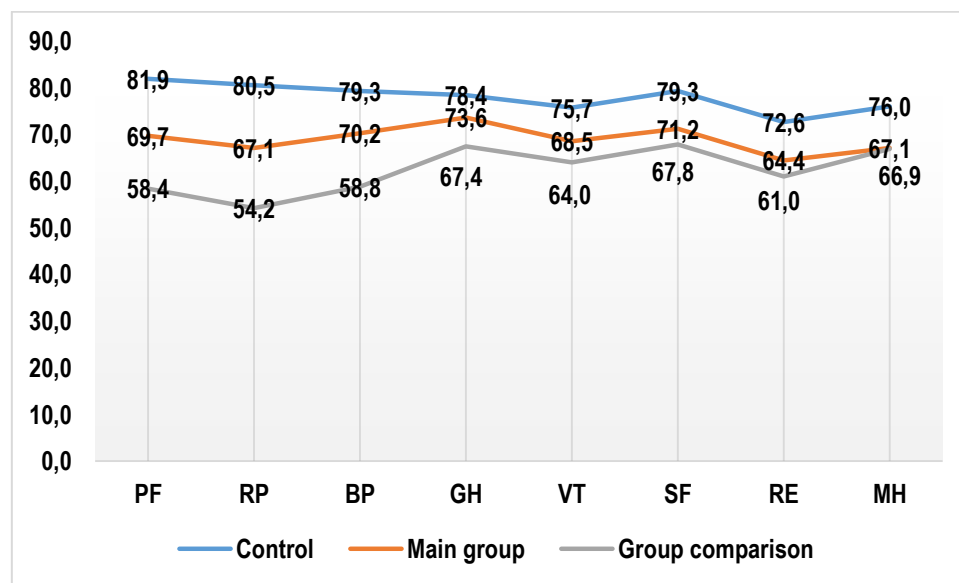


Figure 1. Indicators of the quality of life in the compared groups according to the SF-36 method.

During this period, in patients of the main group, significant differences from the control were revealed only on the scales Physical Functioning (PF), Role-Physical Functioning (RP) and Social Functioning (SF), whereas in the comparison group there were no significant differences in only one scale - Mental Health (MH). Significant differences between the groups were determined using scales Physical Functioning (19.3%), Role-Physical Functioning (23.9%) and Bodily pain (BP) (19.5%), $p < 0.05$ in all cases.

SF-36 is a questionnaire for the general determination of the quality of life of patients; there are specially designed questionnaires in trauma practice. For injuries in the area of the knee joint, the KOOS questionnaire is used. The analysis using this questionnaire was carried out seven times: 1, 3 weeks after surgery, 1.5, 3, 6, 9 and 12 months.

The KOOS questionnaire includes 4 scales: "pain"; "symptoms"; "Being active in everyday life"; "Sports and recreation". The results are shown in Figures 2-5.

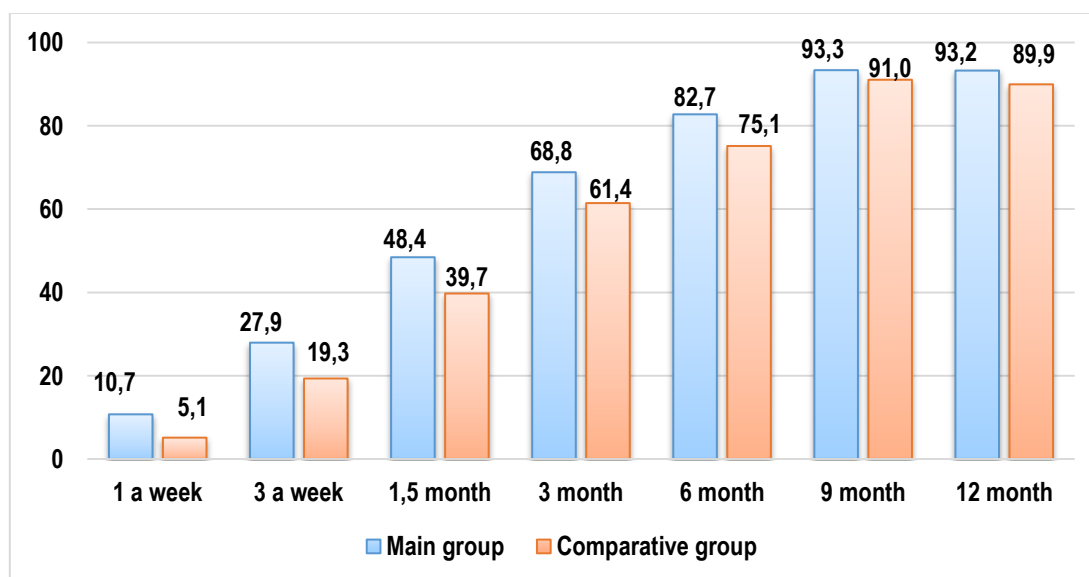


Figure 2 - The results of the analysis of indicators on the "pain" scale of the KOOS questionnaire in the compared groups.

On the pain scale, significant differences between the groups were found within 1.5 months. So, after 1 week, the level of differences reached 52.3% in favor of the main

group, after 3 weeks it decreased to 30.8%, and after 1.5 months - to 18.0% ($p < 0.05$ in all cases).

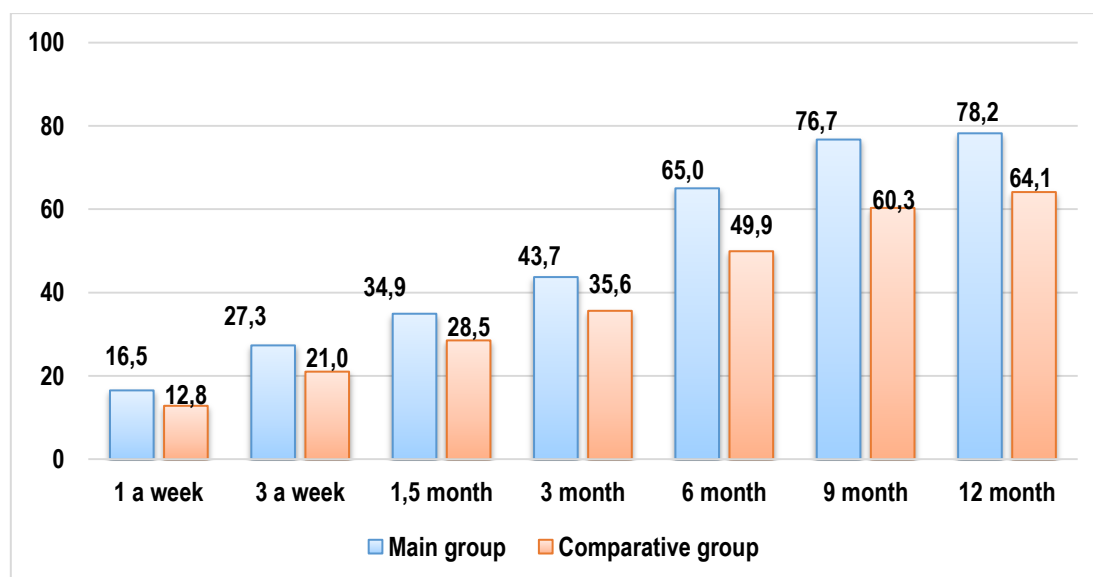


Figure 3. The results of the analysis of indicators on the "symptoms" scale of the KOOS questionnaire in the compared groups/

On the "symptoms" scale, significant differences were observed after 3 weeks (23.1%) and 6 months (23.2%). However, in contrast to the "pain" scale, approximately the

same level of differences on this scale was found throughout the study, up to the last application of the questionnaire.

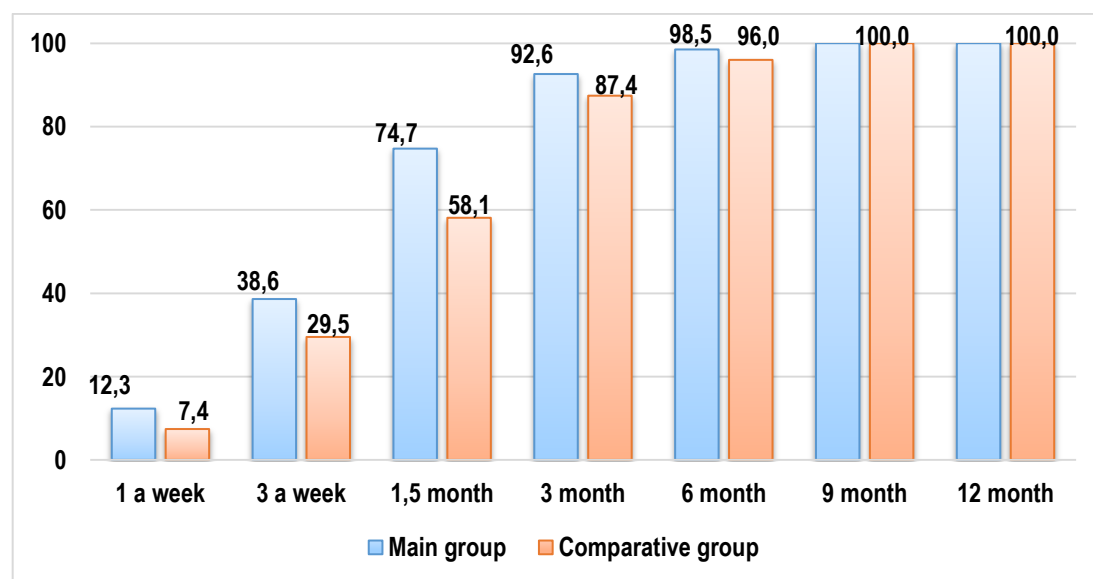


Figure 4. The results of the analysis of indicators on the scale of "activity in everyday life" of the KOOS questionnaire in the compared groups.

On the scale of "activity in daily life", the timing of the differences was consistent with the scale "pain". After 1 week, the excess of the degree of violations in the comparison group over the main one was 39.8% ($p < 0.01$), after 3 weeks - 23.6% ($p < 0.05$) and after 1.5 months - 22.1% ($p < 0.05$). Further, after 3 months, the differences practically leveled out, and after 9 months, complete recovery was achieved in both groups.

On the scale characterizing the possibility of active rest and sports, in the early stages after the operation, completely negative results were obtained, up to 3 months. Significant differences between the groups were revealed up to 9 months inclusive and amounted to 38.2% after 3 months, 39.0% after 6 months and 23.2% after 9 months ($p < 0.05$ in all cases).

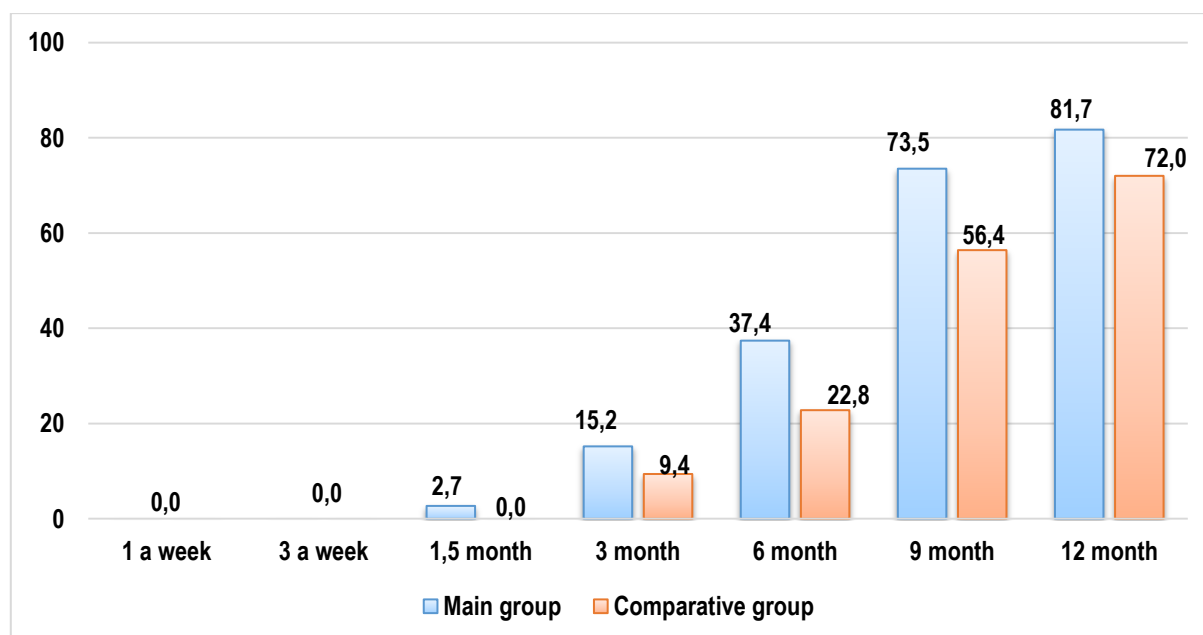


Figure 5. The results of the analysis of indicators on the scale "sports and recreation" of the KOOS questionnaire in the compared groups.

Discussion of the results

Fractures of the knee joint are relatively rare among traumatic injuries. Ignoring the obvious cause and simplicity of treatment, leads to many complications [7]. In the first knee joint there is the most complex [8]. Although the kneecap is only part of the knee joint, it performs important functions, such as ensuring physiological integrity and proper kinematics of the joint. In the second knee, the strongest muscle of the body is the four-headed muscle. Therefore, in order for a patient in the postoperative period to be able to gradually become active, it is necessary to establish a corresponding device that will provide reliable fixation, even in bed [10]. In the third, traditional methods of submersible osteosynthesis complicate the precise association of fragments of the fracture in the frontal plane [138].

The presence of the above-mentioned problems indicates that the treatment of fractures of the knee joint is still needed to improve.

According to the literature [9], patellar fractures usually do not cause significant difficulties in the early stages of treatment. In simple fractures, the fragments can usually be easily compared, and their operative fixation using modern methods is rarely accompanied by secondary displacement [11]. Potential problems include the possibility of displacement of bone fragments in the sagittal plane or rotation of the fragment, leading to the formation of a "step" on the inner surface of the patella [12]. A negative point in terms of the duration and cost of treatment is the need for a second operation to remove the fixation device.

There are also restrictions on the use of the developed method. In general, this type of treatment can be used only in transverse fractures of the knee joint, to the limits of use are fragmentary fractures of the knee joint. However, according to the epidemiological data, transverse cuts of the knee joint are more likely to be applied to this method.

Conclusion

The improved technique of transosseous osteosynthesis applied in the main group, when used in accordance with clinical indications, will avoid the above problems. This is confirmed, in particular, by the results of the analysis of the quality of life. We found its significant increase when analyzed using two methods and according to all existing scales of the KOOS questionnaire. It should be noted that certain differences in the analysis results persist even at a relatively late date already after a considerable period of time after the removal of the apparatus or fixation device.

The results obtained allow us to recommend the developed technique for widespread use. Taking into account the peculiarities of transverse fractures, we came to the conclusion that the use of the transosseous osteosynthesis developed by us for their treatment is safe and quite effective.

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

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