Transylvanian Review

Vol XXV, No. 17, 2017

Transylvanian Review
Centrul de Studii Transilvane| str. Mihail Kogalniceanu nr. 12-14, et.5, Cluj-Napoca
Email: transylvanianreview@gmail.com
Online Submission System: http://transylvanianreviewjournal.org/

Comparing the Satisfaction Rate in Patients with Total Knee Arthroplasty (TKA) Surgery in Two Groups of With and Without Patella Resurfacing

Mehdi Moghtadaei[1], Babak Otoukesh[1], Hossein Farahini[1], Tohid Safaei[1], Negin Hatami[2], Bahram Boddouhi[1] and Ali Yeganeh*[1]

[1]Bone and Joint Reconstruction Research Center, Shafa Orthopedic Hospital, Iran University of Medical Science, Tehran, Iran
[2]Division of Nuclear Medicine and Molecular Imaging, Stanford University Medical Center, Stanford, California, United States of America

Abstract

Background: The total knee arthroplasty (TKA) is a surgery which is operated on the lower limb. The most important reasons of the necessity of reoperation of the patients in this surgery include infections or movement of the implants. One of the approaches which there have been many studies about evaluating its results is resurfacing. The purpose of the present study is to evaluate the satisfaction rate (evaluation of the function rate) in the patients who had a TKA surgery with and without resurfacing.
Materials and Methods: This is a Randomized Clinical Trial. After determining the input and output standards, 100 patients who were eligible for the test were selected and brought into the experiment. Then the selected patients brought into trial and then underwent TKA. It is noticeable that the patients were selected randomly were divided into two groups (with and without resurfacing of the patella) and the satisfaction rate of both groups was evaluated.
Results: The data show that there is no significant difference (P-value>0.05) between the averages of Total Post Final Knee and Function Score (156.33±36.56 for 'without resurfacing' and 156.78±36.42 for 'with resurfacing') and the averages of Total Pre Final Knee and Function Score (33.42±19.01 for 'without resurfacing' and 34.02±25.03 for 'with resurfacing'). Also the results demonstrate no significant correlation between Post Pain standards and these groups (P-value>0.05).
Conclusion: This study indicates that resurfacing the patella does not affect the satisfaction of the studied patients and improvement of the studied variables comparing to patella without resurfacing.

Keywords: Tka, resurfacing, surfacing, patella, knee.

* Corresponding author: Bone and Joint Reconstruction Research Center, Shafa Orthopedic Hospital, Iran University of Medical Science, Tehran, Iran.

Introduction

Some cases which can cause damages to the knee joint include: osteoarthritis and arthritis rheumatoid. If the mentioned cases take place, there will be a necessity of TKA with a specialist. TKA is one of the surgeries of the lower limb (Singh *et al.*, 2011). TKA is accepted as a reliable treatment in the patients suffering from osteoarthritis (Maradit Kremers *et al.*, 2015, Lu *et al.*, 2017). TKA usually applies for patients over 40 years old suffering from osteoarthritis. TKA has more candidates of surgery comparing to before. This is because of the progress of medicine in this case. Also following recovery measures to improve the functionality of the patients with progressing joint disorder is useful. Reviewing the previous articles, it is concluded that the prevalence of TKA is variable, and is extremely depended on the social-economic circumstances of therapy organizations, patient preference, and prevalence of arthritis. Therefore, experts suggest that extensive studies are supposed to evaluate these differences (Lenza *et al.*, 2013, Wu *et al.*, 2016, Sonni *et al.*, 2016). One of the items which the patients who going to undergo the TKA should notice, is the morbidity and mortality of this surgery, as about 5% of the patients encounter morbidity and mortality and about 5% of the patients need re-hospitalization (Poultsides *et al.*, 2015). Based on data presented in 5th Annual Report of the National Joint Registry (NJR), the mechanical aseptic loosening and infection are considered as the major reasons of revision TKA (De Ruiter *et al.*, 2017, Moghtadaei *et al.*, 2016, Yeganeh *et al.*, 2015). Research that study the involved factors in unsuccessfulness of TKA demonstrate that some items such as the sex (females), high BMI, previous knee surgeries, diabetes, depression, disabilities, and lung disease may play an important role in an unsuccessful TKA surgery (Fisher *et al.*, 2007). Making precisely right decisions for the surgery and the recovery process is very essential for pain relief and improvement of the other side effects of the TKA surgery. Research outcomes revealed that early rehabilitation and delayed recovery can lead to increasing the hospitalization time and medical costs (Filos and Lehmann, 1999, Moghtadaei *et al.*, 2016). The importance of this matter is more noticeable in the case of patellofemoral symptoms. In such cases employing special surgery methods can reduce the mentioned symptoms and cause more stability in the joint (Tanikawa *et al.*, 2017, Malo and Vince, 2003). Today, along with this problem and in order to reduce the patellofemoral symptoms, various therapies are being employed. Each of them has their own characteristics and beneficent (Breugem and Haverkamp,2014, Patel *et al.*,2017). The intolerable pain after the TKA is one of the essential problems to be solved. Using the tourniquet, vast destruction of muscle tissues, and bone trauma are the major reasons of the increased pain (Andersen *et al.*, 2010). Resurfacing is one of the methods which there are many studies that tried to evaluate its results (Losina *et al.*, 2009). Studies show that the persons who have undergone the patellar resurfacing, have better clinical conditions in the case of the anterior knee pain and knee function (Schindler, 2012). However, totally employing TKA depends on the circumstances of the patient and the therapist`s opinion, and generally, TKA can cause a 50% percent less pain after the surgery (Li *et al.*, 2011). This causes more patient`s satisfaction. Based on this fact, the purpose of this study is comparing the patient`s satisfaction of the TKA surgery in with and without resurfacing the patella. Many research have been done about this subject, here we point to some of the most important. In 1991, Jeffery evaluated 115 patient`s knee which underwent TKA surgery in the years 1976-1981. All the surgeries were done with an intramedullary guide and the patients were surveyed with alignment view radiography before the surgery, after the surgery and some years (up to 12 years) after the surgery. In 68% of the knees (2/3 of the knees) the mechanical axis of the limb had passed through the middle 1/3 of the prostheses after the surgery and the looseness of the prostheses was about 3% of the cases in which the mechanical axis of the limb had passed through the lateral or medial of the center of the knee. This percentage even increased within the 8 years up to 24%, which is a significant increase (P=0.001) (Wu *et al.*, 2017). NN Mahomed *et al* had a research about description of the initial and revised results of replacing the knee in the patients over 65 years old in the USA in 2005. This research discusses the side effects of replacing the knee joint within 90 days in the participants. The black participants had less TKA surgeries comparing to white ones, because of their lower income. They declared that the black society have more morbidity and mortality, re hospitalization, and Wound infection after the arthroplasty comparing to the white participants. NN Mahomed concludes that totally the side effects of the surgery were few within 90 days. Also in the USA, the black people or other persons with a low income faced more side effects comparing to others (Mahomed *et al.*, 2005). The aim of the study is to evaluate the satisfaction rate (evaluation of the function rate) in the patients who had a TKA surgery with and without resurfacing.

Materials and Methods

This is a Randomized Clinical Trial from the Open Label type. This study was performed on the patients who referred to Rasuleh-Akram Hospital for the arthroplasty in 2014. The standards for bringing the participants into the study include patients suffering from knee joint osteoarthritis who did not have any underlying disease such as arthritis rheumatoid and patellofemoral maltracking. The patients who needed surgery because of arthritis rheumatoid were dismissed. According to the previous studies and after applying the inputting standards for the participants, 79 patients who were candidates of knee surgery were selected and brought into the research. Participants were volunteered for the study and the testimonial was signed by them and they were informed about the procedure of the study according to medical ethics. Then they entered trial and then they underwent the TKA surgery. Noticeably, the participants were divided into two groups of with surfacing and without surfacing the patella in a Block Randomization way, and after the surgery they were asked about their satisfaction of the results (Arbuthnot *et al.*, 2004, Abdel *et al.*, 2014).

All the patients were examined by CT-scan and also to see about the petellofemoral maltracking and it revealed that not one of the patients had this problem before and after the surgery.

The follow up time for the patients was 12 months. The data was brought into SPSS software ver.19 and then the normality of the data was surveyed for all the variables. Then suitable statistical tests were selected based on the normality. In this study the Independent Sample T-Test and Chi-squared test were employed to analyze and survey the data. Also the statistical significance limit (P-value) was considered less than 0.05.

Results

At first the variables were introduced and then the raw data were evaluated by a suitable statistic test. This study was performed on 79 patients suffering from knee joint pain who referred to Rasuleh-Akram Hospital in 2012. 53.2% of the patients were in the 'without resurfacing' and 46.8% were in the 'with resurfacing' group. 72.2% of the patients were females and 27.8% were males. 59.09% of the males and 50.88% of the females were in the 'without resurfacing' group. 49.12% of females and 40.91% of the males were in the 'with resurfacing' group. The Post Pain index was evaluated in both groups (with and without resurfacing) about males and females. The results demonstrate that in both groups of males and females, the most prevalence belongs to the None Pain state. Also the statistics showed that the most prevalence of Pre-Pain variable in both genders belongs to the severe parameter. The average and standard deviation of two parameters of Total Post Final Knee and Function Score and Total Pre Final Knee and Function Score in with and without resurfacing the patella are shown in the table 1 in terms of the gender.

Table 1: Average and Total Post Final Knee and Function Score and Total Pre Final Knee and Function Score in two groups in terms of gender

	Sex	**Group**	**Mean ± S.D**
Total Post Final Knee and Function Score	Men	No Resurface	45.17 ± 153.62
		Resurface	33.22 ± 158.56
	Women	No Resurface	32.83 ± 157.55
		Resurface	37.96 ± 156.21
Total Pre Final Knee and Function Score	Men	No Resurface	20.70 ± 35.30
		Resurface	18.41 ± 36.33
	Women	No Resurface	18.52 ± 32.58
		Resurface	27.07 ± 33.28

In this study, the prevalence of Total Post Final Knee and Function Score is divided into four parts of Excellent (160-200), Good (140-158), Fair (120-138) and Poor (less than 120) according to the patient`s satisfaction rate. The dispersion distribution of Total Post Final Knee and Function Score is shown in the Figure 1 for both groups (with and without resurfacing the patella) in terms of the gender.

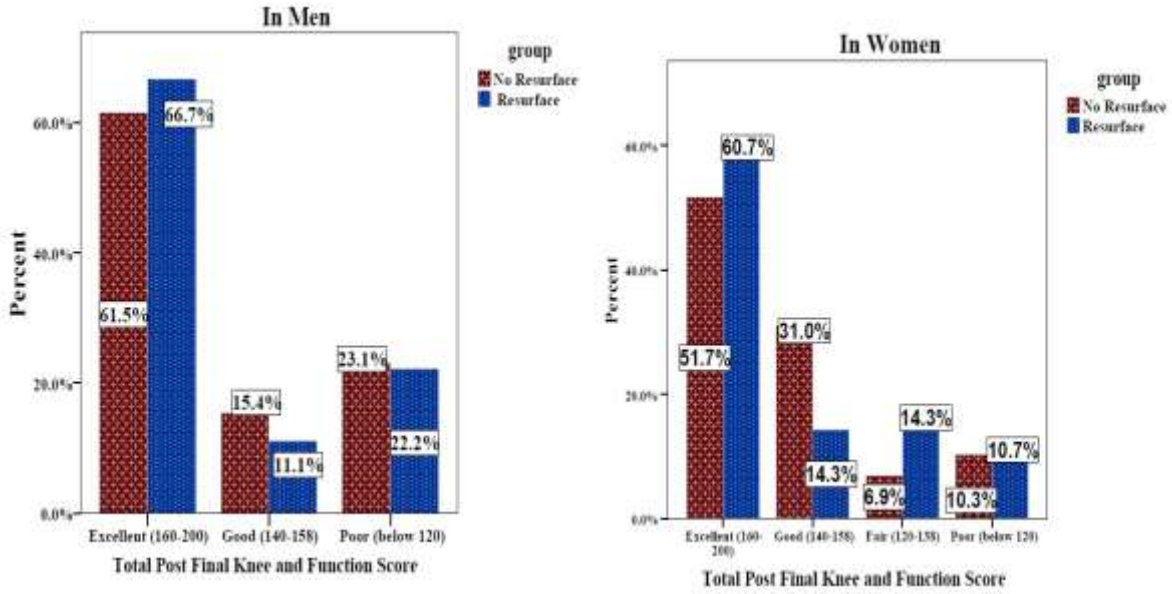


Figure 1: The prevalence of Total Post Final Knee and Function Score based on the quality and satisfaction rate of the patients in both groups (with and without resurfacing) in terms of the gender

Also in this study, the Total Pre Final Knee and Function Score were surveyed based on the satisfaction rate of the patients for both groups of with and without resurfacing the patella. The results show that the satisfaction rate for the males and females in both groups (with and without resurfacing the patella) belongs to the Poor part (less than 120). In this study the average of Total Post Final Knee and Function Score for the participants of 'without resurfacing' was reported 156.33 with a standard deviation of 36.556. Also, the average of Total Pre Final Knee and Function Score for the patients of 'with resurfacing' group was reported 156.78 with a standard deviation of 36.429. According to the studies, it revealed that without resurfacing group the average of Total Pre Final Knee and Function Score in this group was 33.42±1.1901. The average of Total Pre Final Knee and Function Score with resurfacing group was 34.027±2.503. In this study, the Post Pain variable has 7 parts including None, Mild, occasional, Mild (walking and stars), Moderate-Occasional, Moderate-Continual, and Severe. The most distribution of prevalence of the Post Pain with and without resurfacing groups belonged to none with 35.7% (15 persons of the whole society) belonging to without resurfacing group and 40.5% (15 persons of the whole society) belonging to with resurfacing group. The least prevalence of Post Pain in the without resurfacing group belonged to Moderate-Continual with the rate of 2.4% (1 person of the whole society) and with resurfacing belonged to Mild (Stairs Only), Mild (Walking and Stars), and sever with 5.4% (in each part, 2 persons of the whole society). The Pre Pain variable had 7 parts as well, the most prevalence of Pre Pain in both groups of with and without resurfacing belonged to the severe part. The prevalence was 40.5% (17 persons of the whole society) for the without resurfacing group and the rate of 51.4% (19 persons of the whole society) belonging with resurfacing group. The least prevalence of the Pre Pain part for the without resurfacing belonged to Mild/Occasional part with the rate of 2.4% (one person of the whole society) and about resurfacing group belonged to none (stairs only), Mild, and Moderate-Continual with the rate of 5.4% (2 persons of the whole society per each part). In order to evaluate the normality of all the data of this study, the Kolmogorov–Smirnov Test was employed. In this study, the correlation of Total Post Final Knee and Function Score and Total Pre Final Knee and Function Score was evaluated (table 2). The comparison of averages of Total Post Final Knee and Function Score in both groups (with and without resurfacing) demonstrates no significant difference between these two parameters (P-Value>0.05).

Table 2: The distribution and evaluation of the correlation of Total Post Final Knee and Function Score in different groups

Group	Total Post Final Knee and Function Score	Men ± S.D	Min	Max	P-Value	Df
No Resurface	42	36.56 ± 156.33	42	200	0.956	77
Resurface	37	36.42 ± 156.78	22	193		

The results (table 3) demonstrates no significant difference (P-Value>0.05) between the averages of Total Pre Final Knee and Function Score about both groups (with and without resurfacing).

Table 3: The distribution and evaluation of the correlation of Total Pre Final Knee and Function Score in different groups

Group	Total Pre Final Knee and Function Score	Men ± S.D	Min	Max	P-Value	Df
No Resurface	42	33.42 ± 19.01	-2	78	0.904	77
Resurface	37	34.02 ± 25.03	-13	115		

The results of evaluating the correlation of Post pain and pre pain [which consist None, Mild/Occasional, Mild (Stairs Only), Mild (Walking and Stars), Moderate-Occasional, Moderate-Continual, and Severe] each one separately with two groups (with and without resurfacing) demonstrated no statistical significant difference between the Post Pain standards (P-Value=0.31) and Pre Pain (P-Value= 0.35) in different groups.

Discussion

The role of resurfacing in the TKA surgery is a challenging topic. Some professionals consent to this surgery because of some clinical reasons such as more knee`s abilities after resurfacing the patella, strengthening the quadriceps femoris muscle, as well as the reduction of peripatellar pains. In a retrospective study with plenty of samples, the Patellofemoral pains took place for 4% of the patients who underwent the patella resurfacing, while 12% of the patients who underwent patella resurfacing, faced Patellofemoral pains (Canale and Beaty, 2012). Also, durability of the posterior knee pain as a general phenomenon was meaningfully observed in the patients without resurfacing. In a 5 years randomized futuristic study which was performed on one knee, it revealed that 25% of patients without resurfacing the patella were complaining about the posterior knee pain, while only 5% of the patients with resurfacing the patella had the mentioned problem (Canale and Beaty, 2012). The secondary patella resurfacing because of the remained posterior knee pain after the TKA surgery has been evaluated by many researchers. Totally, the researchers concluded that the pain relief after the secondary resurfacing was by far less than the first resurfacing, and it is companied by a higher rate of side effects such as fracture of the patella, and hardness after the surgery. Nevertheless, some of the researchers consent to the selective secondary resurfacing the patella for some patients. The justification of the agreement about the selective resurfacing of the patella and supporting it is that the side effects of resurfacing the patella is related to the patients who underwent the secondary surgery after the TKA. The discoveries of the futuristic studies that compared the TKA with resurfacing the patella and TKA without resurfacing the patella demonstrate that there are no significant differences between these two approaches regarding the privileges of functionality, the posterior knee pain, the revise rate, and the satisfaction rate of the patients (Canale and Beaty, 2012). These results acknowledge that posterior knee pain after the surgery is mostly related to other reasons such as the design of the components and the rotation, rather than maintenance of the patella or the resurfacing. The beneficent and the satisfaction rate of resurfacing are still being discussed, and seems that the results of resurfacing depends on the design of the Trochlear Grooves. Using the creation of the joint of the natural patella between the Trochlear Groove, similar results of resurfacing the patella can be obtained. In some cases it is suggested that the patella remains without resurfacing. Some of such cases are as below: recognition of Osteoarthritis, normal cartilage of the patella without jagged hard bones, Congruent Patellofemoral, normal structure of the patella, and lack of evidence of crystallization or arthropathy (Canale and Beaty, 2012). The weight of the patient is also considered as an important parameter, as the patients with less weight have good conditions without a resurfaced patella, and probably that is one of the reasons that about the European patients, the patella is left naturally and without any resurfacing. Some specialists suggest that resurfacing the patella in very fat patients (BMI≥50) causes an extra load on sesamoid bone, which causes pain. But there is no clinical study so far to demonstrate the difference in the pain which fat patients suffer from, and patients with less weight (Canale and Beaty, 2012). Hence, the researchers in this study tried to evaluate the satisfaction rate of the patients who had the TKA surgery in two groups of with and without resurfacing the patella. The analyzes and evaluation of the data obtained from this study showed that the resurfacing process has no significant influence on the Total Post Final Knee and Function Score comparing to the state in which the patella has not been manipulated. These results are in coordinate with the results of studies done by Peng (Peng *et al.*, 2003), and Ogon (Ogon *et al.*, 2002), while these results are in opposition to the results of the studies done by Waters (Waters and Bentley, 2003), and Abraham (Abraham *et al.*, 1988). Peng and his colleagues in 2003 investigated the functional and symptomatic results of resurfaced versus non-resurfaced patella in 35 patients with simultaneous bilateral TKA. In their study in which the mean of follow-up was 3.18 years, the left knee of patients suffered patella resurfacing and right knee patella retained non-resurfaced. After an extensive evaluation, the results revealed that there was no significant difference between resurfaced patella and non-resurfaced patella with respect to the pain, function sub scores, postoperative range of motion and overall Knee Society clinical score. Ogon and his colleagues performed a long-term follow-up among 67 patients with TKA to investigate the significance of patella resurfacing outcomes. Using Knee Society Roentgen graphic Evaluation System, they evaluated knee functions. In their

study, the statistical analysis confirmed that there was no significant difference in the clinical and radiological results between the knees with or without patella resurfacing. At the end of the study, they declared that there is no superiority for resurfaced patella compared with patella retention in the long duration. Waters *et al* declared that totally the knee scores after the surgery in the without resurfacing group was meaningfully less than with resurfacing group (P-value <0.01) while the function score of the knee was almost the same for both groups and did not have any meaningful difference. Eventually the researchers briefly declared that the anterior knee pain followed by the TKA surgery in the patient without resurfacing was meaningfully higher that others and they offer the resurfacing after the TKA if the circumstances are okay. Studies of Abraham *et al* showed that two groups of with and without resurfacing are very similar. But considering all the recognition parameters, the remained pain in the without resurfacing group was slightly less than the other group (P-value$=0.04$). The results of statistical surveys about the post pain between two groups demonstrates no significant difference (P-Value>0.05), the same results obtained for Per Pain variable. These obtained results about Pre Pain and Post Pain in both groups are contradict results reported by Enis *et al* (Enis *et al.,* 1990). In Enis's study, patients who received prosthesis in their both knee were enrolled for the investigation of the advantages and disadvantages of patella resurfacing. The results of their study showed that knee patella resurfacing can be more efficient in power and the pain relief for the patients. Reviewing all the studies done about resurfacing the patella in recent years, and the vast range of patients with different diseases, ages, BMIs, and other clinical variables, it can be briefly asserted that resurfacing the patella either had no significant effect on relieving the pain and improving the movement range, or the positive influence had been in a short period of time in a feeble form.

Conclusion

Therefore, the results of this study show that resurfacing the patella does not cause a major improvement comparing to the patients who their patella remained natural. This result is in coordinate with other studies and approving their results. In addition, precise designing of the prosthesis and employing a precise surgery technique can lead to equal results with or without resurfacing the patella in addition to obtaining satisfying results. Finally, based on results, it can be concluded that the patella resurfacing process is not an efficient way to reduce pain after TKA surgery and regarding to the additional costs for this process, it is not recommended for patients.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

References

Abraham W., Buchanan J.R., Daubert H., Greer, R.B., Keefer J., Should the Patella Be Resurfaced in Total Knee Arthroplasty: Efficacy of Patellar Resurfacing. Clinical orthopaedics and related research. 1988, 236: 128-34.

Andersen K.V., Bak M., Christensen B.V., Harazuk J., Pedersen N.A., Søballe K., A randomized, controlled trial comparing local infiltration analgesia with epidural infusion for total knee arthroplasty. Acta Orthop. 2010, 81 (5): 606-10.

Arbuthnot J.E., McNicholas M.J., McGurty D.W., Rowley D.I., Total knee replacement and patellofemoral pain. Surgeon. 2004, 2 (4): 230-3.

Breugem S.J.M., Haverkamp D., Anterior knee pain after a total knee arthroplasty: What can cause this pain? World journal of orthopedics. 2014, 5 (3): 163.

Canale S.T., Beaty J.H., Campbell's Operative Orthopaedics: Expert Consult Premium Edition-Enhanced Online Features: Elsevier Health Sciences, 2012.

De Ruiter L., Janssen D., Briscoe A., Verdonschot N., A preclinical numerical assessment of a polyetheretherketone femoral component in total knee arthroplasty during gait. J Exp Orthop. 2017, 4 (1): 3.

Enis J.E., Gardner R., Robledo M.A., Latta L., Smith R., Comparison of patellar resurfacing versus nonresurfacing in bilateral total knee arthroplasty. Clinical orthopaedics and related research. 1990, 260: 38-42.

Filos K.S., Lehmann K.A., Current concepts and practice in postoperative pain management: need for a change. European surgical research Europaische chirurgische Forschung Recherches chirurgicales europeennes. 1999, 31 (2): 97-107.

Fisher D.A., Dierckman B., Watts M.R., Davis K., Looks good but feels bad: factors that contribute to poor results after total knee arthroplasty. The Journal of arthroplasty. 2007, 22 (6): 39-42.

Lenza M., Ferraz S.D.B., Viola D.C.M., Garcia Filho R.J., Cendoroglo Neto M., Ferretti M., Epidemiology of total hip and knee replacement: a cross-sectional study. Einstein (Sao Paulo). 2013, 11 (2): 197-202.

Li S., Chen Y., Su W., Zhao J., He S., Luo X., Systematic review of patellar resurfacing in total knee arthroplasty. International orthopaedics. 2011, 35 (3): 305-16.

Losina E., Walensky R.P., Kessler C.L., Emrani P.S., Reichmann W.M., Wright E.A., *et al*. Cost-effectiveness of total knee arthroplasty in the United States: patient risk and hospital volume. Archives of internal medicine. 2009, 169 (12): 1113.

Lu M., Sing D.C., Kuo A.C., Hansen E.N., Preoperative Anemia Independently Predicts 30-Day Complications after Aseptic and Septic Revision Total Joint Arthroplasty. J Arthroplasty. 2017 Mar 21. pii: S0883-5403 (17) 30196-1.

Mahomed N.N., Barrett J., Katz J.N., Baron J.A., Wright J., Losina E., Epidemiology of total knee replacement in the United States Medicare population. The Journal of Bone & Joint Surgery. 2005, 87 (6): 1222-8.

Malo M., Vince K.G., The unstable patella after total knee arthroplasty: etiology, prevention, and management. B J Am Acad Orthop Surg. 2003, 11 (5): 364-71

Maradit Kremers H., Larson D.R., Crowson C.S., Kremers W.K., Prevalence of Total Hip and Knee Replacement in the United States. J Bone Joint Surg Am. 2015, 97 (17): 1386-97.

Moghtadaei M., Otoukesh B., Bodduhi B., Ahmadi K., Yeganeh A., Evaluation of Patellar Position before and After Medial Opening Wedge High Tibial Osteotomy: Radiographic and Computed Tomography Findings. Med Arch. 2016, 70 (4): 293-295.

Moghtadaei M., Otoukesh B., Kaghazian P., Hatami N., Boddouhi B., Risk of Superior Gluteal Nerve Injury After Using Ante-Grade Femoral Nailing. Biomedical and Pharmacology Journal 2016, 9 (1): 419-424

Ogon M., Hartig F., Bach C., Nogler M., Steingruber I., Biedermann R., Patella, resurfacing: no benefit for the long-term outcome of total knee arthroplasty. Archives of orthopaedic and trauma surgery. 2002, 122 (4): 229-34.

Patel A., Haider Z., Anand A., Spicer D., Early results of patellofemoral inlay resurfacing arthroplasty using the Hemi Cap Wave prosthesis. J Orthop Surg (Hong Kong). 2017, 25 (1): 2309499017692705.

Peng C.W., Tay B.K., Lee B.P., Prospective trial of resurfaced patellaversus non-resurfaced patella in simultaneous bilateral total knee replacement. Singapore medical journal. 2003, 44 (7): 347-51.

Poultsides L.A., Memtsoudis S.G., Do H.T., Sculco T.P., Figgie M.P., Perioperative morbidity and mortality of same-admission staged bilateral TKA. Clin Orthop Relat Res. 2015, 473 (1): 190-7.

Schindler O.S., The controversy of patellar resurfacing in total knee arthroplasty: Ibisne in medio tutissimus. Knee Surgery, Sports Traumatology, Arthroscopy. 2012, 20 (7): 1227-44.

Singh J.A., Epidemiology of knee and hip arthroplasty: a systematic review. The open orthopaedics journal. 2011, 5: 80.

Sonni I., Minamimoto R., Jamali M., Hatami N., Berndt M., Koglin N., Imaging of tumor-associated system x C-activity with 18F-fluoropropylglutamate (18F-FSPG) PET/CT for intracranial malignancies. Journal of Nuclear Medicine 2016, 57 (supplement 2): 181-181

Tanikawa H., Tada M., Harato K., Okuma K., Nagura T., Influence of Total Knee Arthroplasty on Patellar Kinematics and Patellofemoral Pressure. J Arthroplasty. 2017, 32 (1): 280-285.

Waters T., Bentley G., Patellar resurfacing in total knee arthroplasty. The Journal of Bone & Joint Surgery. 2003, 85 (2): 212-7.

Wu F., Jamali M., Hatami N., Sonni I., Baratto L., Guo H.H., 99mTc-MDP scintigraphy vs. 18F-NaF PET/CT for detection of skeletal metastases. Journal of Nuclear Medicine 2016, 57 (supplement 2): 599-599

Wu W., Guo W.S., Cheng L.M., Liu Z.H., Zhang Q.D., Zhang N.F., Individual difference of coronal bowing of femur and its influence on the lower limbs alignment after the total knee arthroplasty. Zhonghua Yi Xue Za Zhi. 2017, 97 (13): 1006-1010.

Yeganeh A., Hatami N., Mahmoudi M., Boduhi B., Saidifard M., Otoukesh B., Prevalence of Hepatitis B virus, Hepatitis C virus and human immunodeficiency virus infections among patients candidate for orthopedic trauma surgeries. Med J Islam Repub Iran. 2015, 29: 274.