

Quality of life of patients before and after implantation of total knee endoprosthesis

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Abstract- INTRODUCTION: Diseases of the locomotor system or musculoskeletal disease are on the rise, mainly due to the ageing of the population but also due to lifestyle changes. Those are the main cause of chronic pain and disability in the modern world. Thanks to the achievements of modern medicine, in patients with advanced osteoarthritis of the hip or knee it is possible to replace the diseased joint with an endoprosthesis, with very good long-term results related to pain reduction and function improvement. The aim of this study is to examine are there any differences in the quality of people's life before and after implantation of total knee endoprosthesis. **RESPONDENTS AND RESEARCH METHODS:** There were 30 subjects of both genders with knee joint disease enrolled in the study, who were treated with the surgical course at the Orthopedics clinic and the traumatology of the UKCS by implanting a total endoprosthesis, from the beginning of April until the end of October 2018. As an instruments of this research are used standardized SF-36 questionnaire for assessing the quality of life and overall health status and a modified questionnaire on the socio-demographic characteristics of the respondents. **RESULTS:** Patients after implantation of total knee endoprosthesis have a better quality of life, i.e. statistical significance at physical function level ($P = 0.0001$), role limits due to physical problems ($P = 0.0001$), social functions ($p = 0.0001$), energy or vitality ($P = 0.0001$), pain ($p = 0.0001$), limitations of the role due to emotional problems ($P = 0.0001$), and emotional prosperity ($P = 0.0001$) and general health ($P = 0.004$). **CONCLUSIONS:** The quality of life of patients was worse before the period after the total knee endoprosthesis, where statistically significant improvement was demonstrated.

Index Terms— quality of life, knee, degenerative diseases, total endoprosthesis, education, orthopedics, SF-36

1 INTRODUCTION

The human body represents harmony, a true essence composed of a large number of parts of different functions that interact and mutually complement each other.[1] All living things have a universal need for movement, because without movement there would be no life.[2] The lack of movement of modern man leads to a number of health problems and reduces the quality of life.[3]

The World Health Organization defines the quality of life as an individual perception of its own position in life, in the context of culture and the value system in which the individual lives and in relation to their own goals, expectations, standards and worries.[4] Diseases of the system for movement are common diseases in the general population. They significantly affect the increase in morbidity, more frequent use of health care, decrease in performance and ability, increase in professional absenteeism and the emergence of disability.[5] Degenerative, inflammatory and metabolic changes and post-traumatic conditions may develop in the area of the knee joint. The central place occupies degenerative changes that can occur on the bone and soft tissues, leading to a change in mechanical relations.[6] The reasons for excessive wear of cartilage are multiple and among the most important factors of knee joint overload, in addition to congenital joint deformities, are overweight, constant burden due to the nature of the work and micro-infringement cartilage during recreational sporting activities or due to improper occupation of sporting activities in which there is no expert supervision. [7]

Osteoarthritis of the knee (OA) is a chronic degenerative knee joint disease, which is the leading cause of locomotor disability in the world, and is very unpleasant because it causes pain,

limitation of the mobility of the joint and man as a whole and largely affects the limitation of normal life activities.[8-10] Also known as arthrosis, degenerative arthritis or degenerative joint disease, but due to the presence of inflammation in the etiopathogenesis today is the accepted name of osteoarthritis. [11]

Osteoarthritis (OA) is the most common a knuckle disease of the developed world, which suffers about 15% of the world's population. It is a major public health problem because it affects the impairment of the function, limitation of daily activities and work ability with the effect on quality of life.[12] The assessment of prevalence in the general adult population is 11% for OA of the hip and 24% for OA for the knee but in a population older than 65 years, it is estimated that the OA suffers from 30-50% of people.[13]

In patients with advanced osteoartrosis of the hip or knee it is possible to replace the diseased joint with an endoprosthesis, with very good long-term results related to pain reduction and function improvement.[14]

Installation of artificial joints is a surgical procedure in which the articular body of the damaged joint is replaced completely or partially.[15] It is a routine operation that is carried out in order to relieve pain and improve the level of functioning and quality of life. The choice of prosthesis and operative techniques depends on the age of the patient, the cause of the damage, the state of the knee and the activities that the patient deals with.[16]

In total knee endoprosthesis, the entire joint is replaced. The most popular are Bicondilarian cement or non-cement prosthetic[15]. Total endoprosthesis of the knee (TPK) was demon-

strated by a reliable method of treatment for advanced osteoarthritis of the knee, which by Swedish Knee arthroplasty Register-in 82% of cases gives satisfactory result.[17] The main objective after the installation of a total knee endoprosthesis is to establish a painless, functional scope of mobility.[18] The most common indication for surgery is degenerative joint change. Other indications are: severe pain that compromises functional mobility, significant instability or limitation of knee movement, deformity correction, rheumatoid arthritis, psoriatic arthritis, tumor, trauma, failure of conservative treatment or prior surgery.[15, 16]

Treatment of sick joints does not end with surgery. Therefore, great significance is given to post-operative rehabilitation. Successful rehabilitation tasks after the TPK implant are focused on the painless movements of the operated wrist, improving the movement, establishing a correct schematic of the walk, when a walk should be economic and aesthetically satisfactory, as well as achieving independence in the activities of daily life, and higher functional capabilities and adaptation. [19] The goal of this research was to question whether there is a difference in the quality of life in person before and following the surgery of a total endoprosthetic knee.

2 MATERIAL AND METHODS

In the period from the beginning of April to the end of October 2018 a study was conducted at the Orthopaedology clinic and the trauma of the Clinical center of the University of Sarajevo. The study included 30 subjects of both genders, who were questioned about their quality of life before surgery and after the total knee endoprosthesis was installed.

Questionnaires were used as a research instrument: a modified questionnaire on the socio-demographic characteristics of subjects and a standardized questionnaire of the Short Form 36 Health Survey (SF-36).

The SF-36 is a set of generic, coherent measures and the most commonly used general questionnaire to evaluate the quality of life. There are 36 issues, of which 35 questions are grouped into eight domains: physical functioning, physical role, pain, general health, vitality, social functioning, emotional role and mental health. One question relates to the change of health compared to the year preceding the survey, i.e. whether the present health is better, the same or worse. The result of the response is ranging from 0 to 100 and counts for each domain, where greater score is better quality of life in connection with health.[20, 21]

3 RESULTS

In our survey of the total number of respondents (n = 30)

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Average life age 65.4 ± 8.4 years, it was 8 (26.7%) Men and 22 (73.3%) Woman. The largest number has primary education 13 (43.3%) and married 18 (60%) Respondents. The average income of the households were 561.87 ± 323.97 KM. The largest number of respondents 18 (60%) Are pensioners, a slightly smaller number is unemployed 10 (33.3%), while the smallest number of respondents is 2 (6.7%) working. In relation to the place of residence, the largest number of respondents 16 (53.3%) Lives in the city, 9 (30%) Lives in a suburban neighborhood, while a total of 5 (16.7%) respondents live in the village. Of the total number of respondents (n = 30), the largest number of respondents 20 (66.7%) Lives in the house, while 10 (33.3%) respondents live in the apartment. The elevator in the building or home is 6 (20%) respondents, while 24 (80%) don't have an elevator.

Of the total number of respondents in our survey of gender, 15 (50%) Diagnosed with gonarthrosis Lateris Dextri and the other half 15 (50%) Diagnosis of gonarthrosis lateral synistry. In the past, respondents had problems with a coed of 10.51 ± 7.58 years.

Table 1. General characteristics of the respondents

		N	%
Gender	Male	8	26,7
	Female	22	73,3
Age	Mean \pm SD	65,4 \pm 8,4	
Education	Elementary education	13	43,3
	Secondary education	12	40,0
	Higher Education	5	16,7
Marriage status	In marriage	18	60,0
	Divorced	10	33,3
	Not married	2	6,7
Place of residence	City	16	53,3
	Suburbs	9	30,0
	Village	5	16,7
Household	Apartment	10	33,3
	House	20	66,7
Lift in building / house in which they live	Yes	6	20,0
	No	24	80,0
Working status	Employed	2	6,7
	Unemployed	10	33,3
	Pensioner	18	60,0
Revenues (KM)	Mean \pm SD	561,87 \pm 323,97	
Duration of knee problems (years)	Mean \pm SD	10,51 \pm 7,58	
Diagnosis	Gonarthrosis l.dex	15	50,0
	Gonarthrosis l.sin	15	50,0

In our survey, based on the SF-36 questionnaire, we tested the differences in the quality of life of patients before and after the total knee endoprosthesis, where it showed a significant improvement in the quality of life after operation in all domains: Physical functions (P = 0.0001), role limits due to physical problems (P = 0.0001), social functions (P = 0.0001), energy or vitality (P = 0.0001), pain (p = 0.0001), limitations of the role due to emotional problems (P = 0.0001), and emotional prosperity (p = 0.0001) and general health (P = 0.004). (table 2.)

Table 2. Statistics of respondents before and after surgery

		N	Mean	Std. Deviation	Std. Error Mean	p
Physical functioning	Before surgery	30	20,17	13,68	2,50	0,0001
	After surgery	30	78,33	10,37	1,89	
Role functioning /physical	Before surgery	30	5,83	16,97	3,10	0,0001
	After surgery	30	86,67	19,40	3,54	
Role Functioning/emotional	Before surgery	30	24,44	40,05	7,31	0,0001
	After surgery	30	93,33	20,34	3,71	
Energy/fatigue	Before surgery	30	52,83	23,33	4,26	0,0001
	After surgery	30	79,17	9,83	1,80	
Emotional well-being	Before surgery	30	58,27	24,38	4,45	0,0001
	After surgery	30	81,73	9,67	1,76	
Social functioning	Before surgery	30	37,50	19,97	3,65	0,0001
	After surgery	30	86,67	11,34	2,07	
Pain	Before surgery	30	22,67	19,91	3,64	0,0001
	After surgery	30	89,33	11,08	2,02	
General health	Before surgery	30	57,67	19,15	3,50	0,004
	After surgery	30	70,67	13,57	2,48	

Patients after installation of total knee endoprosthesis show higher values of the coefficient in all domains (see table No. 2), indicating that general health is significantly improved. The values of this domain before the operation were on average 57.67 ± 19.15 , and after the operation there was an improvement, so the average of general health was 70.67 ± 13.57 , from minimum zeros to maximum 100 on the health scale.

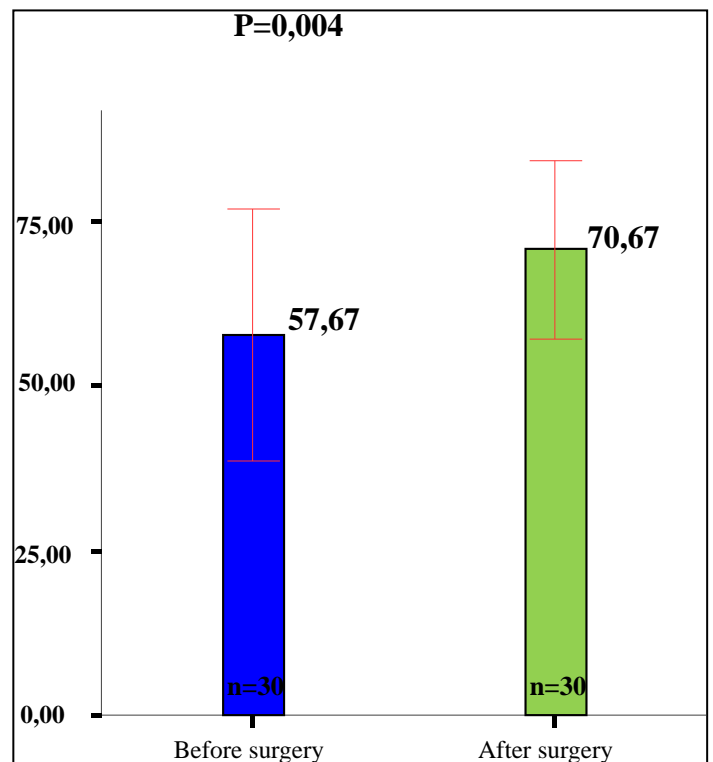


Chart 1 . General health

4 DISCUSSION

Due to the increasing ageing of the population, which also requires maximum possible mobility of joints regardless of age, the number of artificial joints, especially the hip and knee, is getting bigger every day. [22]

Brkić S. and Associates (2017) in their study received statistical significance (P = 0.004) when it comes to the gender of subjects with integrated total knee endoprosthesis, where there were 29 (72.5%) Women and 11 (27.5%) Males, of average age 67.9 ± 5.1 years. (15), which is correlated with our research where subjects were of average age 65.4 ± 8.4 years and of the total number of subjects (n = 30) were 8 (26.7%) Males and 22 (73.3%) Woman.

Grazio S. (2005) in his research states that there are differences in the incidence of osteoarthritis (OA) by gender. The incidence of OA is generally higher in females, especially after age of 50. [23] Nožica-Radulović T. and Associates (2016) in their work state that the body mass index, age, level of education, social support and place of residence had no influence on the outcomes of the knee arthroplasty, and that in 95% of patients in the first three months showed significant improvement in the quality of life after knee arthroplasty, while 5% of patients had mild symptoms and after 12 months of operating treatment. [19] Of the total number of respondents in our survey, half of respondents, 15 (50%) had a diagnosis of gonarthrosis Lateris Dextri, and the other half 15 (50%) Diagnosis of Gonarthrosis Lateris Sinistri. On average, subjects had knee problems lasting 10.51 ± 7.58 years, correlated with the research by Nikolic G., Djordjevic B. (2014), which stated that in the largest

number of respondents in their research, the disease lasted from 5 to 10 years, confirms the fact that osteoarthritis of the knee joints is chronically ill. [24] Grazio S. (2005) in his work states that OA represents a significant expense for society as a whole, both for health care providers and for the patients themselves. [23] Šantić V and Associates (2012) in his study in which the SF-36 questionnaire was used, statistically significant improvements ($p < 0.001$) were obtained after the operation, measured at the level of physical function, limitations of roles due to physical problems, social functions, Energy or vitality, pain, general health and limitations of the role due to emotional problems ($P < 0.003$), which is correlated with our research where statistically significant improvements were obtained in the same domains. The difference is in the domain of mental health where the authors did not receive statistical significance ($P = 0.517$), while in our study it was statistically significant ($P = 0.001$). [25] Brkić S. and associates (2017) have demonstrated in their work the differences in quality of life estimates (KŽ) measured by the EQ5D-5L questionnaire were tested with the Wilcoxon test. After completing the treatment, subjects were statistically significantly better evaluated for mobility ($p < 0.05$), daily activities ($P = 0,037$), pain and discomfort ($P = 0.003$) and anxiety and depression ($P = 0,034$), and statistically significantly higher assessment assessed their health ($P < 0.05$) [15], which is correlated with our research where respondents general/general health was rated with better grades after the total knee endoprosthesis ($P = 0.004$). Miljanic Grčević M. and Josipovic I. (2018) in his research indicate that pain in osteoarthritis can significantly reduce mobility and the level of participation in life activities, and thus be the main source of stress in such individuals. People can often be found in a situation when they are unable to retain the level of function they have had before. Chronic stress and pain can affect the body and mind, thus manifesting panic attacks and worsening general health. This is why the onset of depression and anxiety in such individuals is a very common occurrence. This research has demonstrated that psychological conditions such as anxiety and depression are correlated with pain intensity and impaired functional ability in people suffering from osteoarthritis of the hips and knees.[26] Rehabilitation of patients with embedded TPK should not focus solely on the improvement of functionality and pain reduction, but it is necessary to devote an entire segment of protection to their mental and emotional health and satisfaction with the quality of life. Very often in elderly patients there is also the problem of social isolation, poor communication which leads to a sense of unwillingness, and this is also an element that prevents adequate participation in rehabilitation by patients. The primary goal of the whole treatment and rehabilitation process is to improve the quality of life of these patients. [15] Legović A. (2006) In his research came to the results that the highest number of respondents (92%) After rehabilitation after knee alloarthroplastic was satisfied with the outcome of the operation, and 65% evaluated the performance of the operative procedure with a high score contributing to further affirmation of the implantation of the knee endoprosthesis as a method of operating treatment and rehabilitation, as an integral and indispensable factor in the overall treatment of such patients.

The results of this study determined a significant effect of early rehabilitation on the improvement of functional status and quality of life in patients with RA and in patients with OA with favorable final outcome of the knee alloarthroplastics. [27] Patients undergoing rehabilitation after the implantation of total knee endoprosthesis achieved a significant reduction in pain, reduced the use of analgesics, improved the volume of the knee movement, increased strength and improved muscle tone of the muscles on the side of the surgical knee. By improving the functional status, patients are faster and more qualitative involved in the performance of daily life activities and social contacts, giving them improved quality of life. [27]

5 CONCLUSION

A statistically significant difference in all domains of quality of life was obtained, indicating that the quality of life of patients after the total knee endoprosthesis was better compared to the pre-operation period: at the level of physical function ($P = 0.0001$), Due to physical problems ($P = 0.0001$), social functions ($P = 0.0001$), energy or vitality ($P = 0.0001$), pain ($p = 0.0001$), limitations of role due to emotional problems ($P = 0.0001$), and emotional well-being ($P = 0.0001$) and general health ($P = C 0.004$). A crucial part of the patient's recovery and improvement in its quality of life depends not only on the implantation of the knee endoprosthesis, as the positive effect of this surgery is demonstrated in both our and other investigations.

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