



Sports activities after total hip arthroplasty

Športne aktivnosti po vstavitvi totalne kolčne endoproteze

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Abstract

Total hip arthroplasty (THA) is one of the most commonly performed orthopaedic procedures and has been acknowledged as an extremely efficient and reliable surgery with a high percentage of satisfied patients. The number of implanted total hip prostheses has been increasing every year worldwide especially among younger patients. After the surgery, patients are allowed to continue with everyday activities, suitable for their age and physical performance. Nevertheless, specific, evidence-based guidelines on sports activities after THA have not been established. Surgeons usually rely on various recommendations and their own experience. The aim of our retrospective observational pilot study was to assess the level of sports activities before and more than one year after THA in Slovenian patients younger than 60 years. We analysed Harris Hip Score (HHS) and University of California Los Angeles (UCLA) questionnaires that patients filled in before surgery and more than one year after surgery. Preoperatively, most of our patients were limited to a low level of activity, with 62% of them achieving a medium level postoperatively (swimming, dancing, hiking, golf, housework) and 15% of them even achieving a high level of activity (tennis, alpine skiing, contact sports). Although we should respect some general recommendations, each patient should be individually counselled regarding sports participation based on his or her preoperative participation in different sports and the desired postoperative activity level.

Izvleček

Vstavev totalne kolčne endoproteze je ena od najpogostejših in najuspešnejših ortopedskih operacij z visokim deležem zadovoljnih bolnikov. Število vstavljenih kolčnih endoprotez po svetu iz leta v leto narašča, vse večji je tudi delež mlajših operirancev. Po posegu bolniki v večini lahko nadaljujejo vsakodnevne aktivnosti, primerne svoji starosti in telesni zmogljivosti. Z dokazi opredeljena jasna navodila in smernice, katerih športnih aktivnosti naj bolniki po operaciji ne bi izvajali, se še niso oblikovala. Kirurgi se ravnajo po posameznih priporočilih in osebnih izkušnjah. Z retrospektivno opazovalno pilotsko raziskavo smo preverili izvajanje športnih aktivnosti pred in več kot eno leto po vstavitvi totalne kolčne endoproteze pri slovenskih bolnikih, mlajših od 60 let. Analizirali smo vprašalnika *Harris Hip Score* (HHS) in *University of California Los Angeles* (UCLA), ki so ju preiskovanci izpolnili pred operacijo in več kot 1 leto po njej. Pred operacijo se je večina slovenskih preiskovancev omejevala na nizko stopnjo aktivnosti; kar 62 % iz te podskupine je bilo po operaciji sposobnih zmernih obremenitev (plavanje, ples, hoja v hribe, golf, balinanje, hišna opravila), 15 % pa je celo doseglo visoke stopnje aktivnosti (tenis, smučanje, delo na kmetiji, kontaktni športi). Čeprav je smiselno, da se držimo določenih priporočil, bi vsakemu bolniku morali individualno svetovati glede športnega udejstvovanja po posegu, glede na njegovo preoperativno ukvarjanje z različnimi športi in želeno stopnjo aktivnosti po operaciji.

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1 Introduction

Total hip arthroplasty (THA) is one of the most frequent and most successful orthopaedic operations with a 90% of satisfied patients 15 years after the procedure (1-5). From the first hip arthroplasty in 1891, the development has led to improvements in surgical techniques and technology (shape of the prosthesis, the materials, navigation). THA is a repeatable and reliable procedure that provides the patient with good hip mobility and stability, and improves their quality of life (3). Decades ago, hip arthroplasty was aimed especially at the older, inactive population of patients with advanced hip arthrosis (6,7). The average age of patients when they receive THA, the long-term survival of the implant with an active population is increasing important (3). The improved implantation technique for THA also leads to higher expectations and patient desires. An important part are the desires to participate in various sports activities, especially with the more active part of the population (1,5,6,8). If we fail to achieve the expectations of the more active patients regarding their participation in various sports, they give a poor subjective assessment of the outcome of the THA operation, even though it was technically successful (9). To make this work, it is very important to talk to patients regarding their expectations before the surgery and appropriately explain the potential of the expected adjustments (1). We aim to respond to the patients' questions based on results and literature; however, there is not much information regarding sports activities after THA, in spite of increasing interest in the past

years. The two main considerations are increased risk of injury (dislocation or fracture) and shorter lifespan of the implant. The aim of the article was to search the available literature and present different aspects of sport activities in patients after THA. We will also present the results of the pilot study, conducted on a group of Slovenian patients, which is, according to our information, the first on this topic.

2 Epidemiology

The incidence of implanted hip arthroplasties has increased tremendously over the past two decades. Only in the US, approximately 500,000 are performed every year; taking 2005 as a baseline, US expects a growth of 174% by 2030. The data for 2018 from the Australian Orthopaedic Association National Joint Replacement Registry show a growth of 124.9% of primary hip arthroplasty compared to 2003, and 3% compared to 2017 (11). The number of performed procedures is growing because of the ageing population, a more active lifestyle of the older population, longer life expectancy, as well as because of extended indications for hip arthroplasty (5,8,10,12,13). The average patient age according to the Australian registry is 67.7 years. 23.2% of patients are aged 55–64, 12.4% less than 55, and most are between 65–84 years old (11).

This trend is the same in Slovenia. In 2016 there were 4,105 hip arthroplasties implanted (14), and an increasing share of patients come from active population below 60 years of age (21% of all prima-

ry hip arthroplasties in 2016 at the Novomesto General Hospital, data from the internal registry of arthroplasties). According to forecasts, the need for a hip arthroplasty will increase by 20% until 2050 (15). When implanting hip prostheses in younger patients, we are faced with growing demands (return to the job, immediate participation in various sports and sexual activities, etc.), which is not expressed as often with the older population (5,12,13,16,17).

3 Sports activities after hip arthroplasty

The improved technique for THA also leads to higher expectations and desires from the patients. An important part are desires to participate in various sports activities (1,5,6,17). Especially younger patients want to know before the procedure which sports they will be able to practice after the procedure, and how soon (6,17). After the operation, many patients begin gradually practising the same sports; however, because of fear or their surgeon's recommendations, they put it off for several years after the procedure (5,17,18). The actual risks posed by participation in different sports activities are not known. There are considerations regarding high intensity sports that could increase the danger of dislocation, periprosthetic fracture or early arthroplasty weakening (1,17,19). There are no specific guidelines on recommended and restricted sports after THA: however, several publications regarding this matter have been published in the past years (2,5,6,17-21).

3.1 Impacts on the hip joint

Impacts on the hip joint during various activities have been well researched (17,22). During sports activities, there are additional mechanic impacts on the hip joint that could theoretically lead to

loosening of the arthroplasty. For example, while walking, the impact on the hip joint equals to 3-fold force of the body's weight; with slow running this force is 4.7-fold, and with fast running it's 6-fold. The least favourable movements for the hip arthroplasty are sudden, repeating impacts, e.g., during running, playing football and alpine skiing, with alternating fast load-offload rotational shear forces (10). Van den Bogert defined them as high-impact activities (22). Clifford and Mallon divided activities by level of impact into low, potentially low, medium and high loads, and listed sports and recommendations on how to perform each of them (Table 1) (6).

Patients can handle the low-impacts sports best. With a somewhat higher impact (e.g., cross-country skiing or bicycle riding) there is an increased reaction force on the hip; however, most orthopaedic surgeons still recommend these sports. Unlike in the results from the survey of orthopaedic surgeons in 1999, when most recommended only low-impact sports, most orthopaedic surgeons in 2007 already permitted sports with moderate activities (2,23). This can be contributed to improvements in materials for implants and the development of minimally invasive surgical techniques (2). Medium-impact sports are especially attractive to patients who previously already practised them. It is essential that after the surgery we advise them to participate in the same sport types, yet with a lower level of intensity (e.g. tennis doubles, skiing on suitable types of snow, etc.), and to prepare appropriately before restarting specific activities (proprioception, muscle power and flexibility training under appropriate supervision) (6,19) Lübbecke et al. established in their study that patients who were practising high-impact activities before hip injury should limit their participation to lower impact ones. A large share of patients (28%) practice high-impact sports

5 to 10 years after the surgery (24). With more active patients, regular monitoring is recommended with logging of their sports activities and imaging diagnostics (13) that can provide more detailed long-term guidelines for permitted and recommended sports activities after total hip arthroplasty (25). Most orthopaedic surgeons do not recommend high-impact sports. Not only because of the long-term lifespan of the arthroplasty, but also because of the increased risk for other activity-related complications, such as periprosthetic fracture, disloca-

tions, injuries to the components of the arthroplasty (6,10,19).

3.2 Dislocation of the hip arthroplasty

Dislocations occur most often in the first 10 weeks after the operation (10). They are characteristically related to deep bending when putting on shoes or taking them off, sitting low, etc., which is not related to high intensity and load (19). Ollivier et al. have noted a 1.4% of incidence of dislocations in the active

Table 1: Patient participation in sports activities after total hip arthroplasty by level of intensity, summarised from Clifford et al. (6).

Level of intensity	Examples	Recommendations
Low	Exercise bicycle Cross trainer Dance Golf Swimming Walking Water aerobics	Can improve general well-being. Desired for most, but can increase rate of wear. Orthoses and activity modification can reduce intensity. Focus on flexibility, not strength.
Potentially low	Fast walking Rowing Cross-country skiing Cycling Table tennis Isokinetic weightlifting	Desired for most, but can increase the incidence of wear and tear. Estimation of the rate of activity before the operation is mandatory monitoring, surgeon's recommendations. Prerequisite is retained balance and proprioception. Orthoses and activity modification can reduce intensity. It is recommended to make a lot of repeats with minimum resistance.
Moderate	Hiking Free weightlifting Low intensity aerobics Tennis Skiing Ice skating Climbing	Recommended only for select patients. Estimation of the rate of activity before the operation is mandatory monitoring, surgeon's recommendations. A prerequisite is good physical fitness of the patient. Orthoses, appropriate footwear, and modified activities are frequently needed.
High	Running Football Basketball Handball Volleyball Martial arts Water skiing	Should be avoided. Significant risk for injury and secondary operations.

patient group, and 1.9% in the low-activity group (27). With high-impact activities, there is most likely a higher level of risk for dislocation from injury (due to falling, impact, etc.). The incidence of dislocations is not higher for more active patients (17).

3.3 Periprosthetic fractures

Meek et al. analysed the registry and discovered a 0.9% rate of periprosthetic fractures 5 years after the primary THA, and 1.7% after 10 years (28). Higher age is related to higher risk for fracture (17,28). Sports activity can help increasing bone density (29). Running and jumping create high torque on the femoral head, carried to the femoral component in the femoral canal, presenting risk for periprosthetic fractures (19). Despite this, fractures in sports activities are most often the result of a direct injury. This makes establishing a causal link difficult. There is no clear evidence that specific sports activities more frequently result in fracture if the athlete has had an arthroplasty. However, consequences with periprosthetic fractures are worse than with fractures with no implants (17).

3.4 Loosening the components of the arthroplasty

Aseptic loosening of the arthroplasty is the most frequent long-term complication. In spite of the improved statistics, it remains an issue especially with younger population, where an active lifestyle can be expected for several decades (24,27,30). Various studies have proven a higher level of loosening with high-intensity activities and the fact that low-intensity activities do not influence it (24,27,30). In their study, Ollivier et al. noted an 80% survival rate for implants with patients who participated in high-impact sports, and 93.5% surviv-

al rate for low-impact sports (27). All patients included in the study had an anatomical cementless hydroxyapatite (HA)-coated femoral component, a 28-mm ceramic femoral head implant, and a cementless HA-coated titanium alloy acetabular cup with a conventional ultra-high-molecular-weight polyethylene (UHMWPE) implant (27). Lubbeke et al. conducted a prospective study, which included patients with a primary hybrid THA (cementless acetabular press-fit component, 28-mm ceramic aluminium head, cement femoral component) during the 5-to-10-year period after the surgery and proved a statistically significant more than 3-fold increase in risk for osteolysis surrounding the femoral component for patients with a high level of activity, compared to those with a moderate level of activity (30). The level of secondary operations due to aseptic loosening was also the highest in the group of patients with a high level of activity (30).

Cherian et al. conducted a systematic analysis in 2015, establishing a link between aseptic loosening with high activity levels and the male sex (31). The main limitation of all studies performed so far, and the systematic analysis, was using different types of arthroplasty components (cement and cementless), and different types of polyethylene implants. Even the studies conducted in this decade (24,17,30) analyse the level of aseptic loosening when using a UHMWPE conventional component polyethylene implant, which has been mostly replaced in the past decade by cross-linked polyethylene (XLPE), exhibiting a significantly lower rate of wear (32,33).

3.5 Time frame for beginning with sports activities

Another important question is, how soon after the procedure can the patient begin participating in a particular

Table 2: Demographic characteristics of the sample with HHS and UCLA results.

	Mean (SD)	p
Age (years)	52.4 (6.7)	
Time from surgery in months	19.6 (3.5)	
HHS (preoperatively)	48.6 (18.4)	
HHS (postoperatively)	88.9 (16.4)	
Difference HHS	40.3 (23.7)	< 0.001
UCLA (preoperatively)	3.8 (2.2)	
UCLA (postoperatively)	6.5 (1.9)	
Difference UCLA	2.7 (2.3)	< 0.001

Abbreviations: HHS – Harris Hip Score; UCLA – University of California Los Angeles score; SD – standard deviation; Student's T-test

sports activity. Cowie et al. came to the conclusion in their 2013 study that following THA, most patients can return to their jobs and sports activities without any limitations 4–6 months after surgery (20). Ortmaier et al. published in 2017 that 80% of patients from their study returned to sports activities within 6 months after surgery, most of them in 1–3 months, with younger patients returning sooner than older (12). Hoorntje et al. concluded in their 2018 meta-anal-

ysis that most patients return to sports activities in the 28-week timeframe (5). It is a general consensus that patients can begin participating in sports activities 3–6 months after surgery (23), with approximately a third of orthopaedic surgeons recommending the time-frame of 1–3 months after surgery as acceptable (2,19).

3.6 Reasons for inactivity

Hoorntje et al. stated in their meta-analysis that 82% of patients return to sports activities following THA (5). Based on the meta-analysis, age above 65 years can be the reason for lesser participation or complete suspension of sports activities after THA. An important forecasting factor is the level of physical activity before surgery, however, none of the studies analysed the impact of patient motivation. Jassim et al. conducted a retrospective study and established that the most frequent reasons for not participating in sports activities concern the patient or their healthcare provider: the patient's fear from damaging the implant, the instructions of the surgeon, instructions from their family physician or physiotherapist. Patients who were not active before THA, often remained less active even after the improved function of the joint (34). Arnold et al. discovered in their meta-analysis that in four of eight studies that compared patients after THA and total knee

Table 3: Level of activity according to UCLA.

Level of activity UCLA	Before surgery (n, %)	After surgery (n, %)	p
Low level (1–4)	40 (70.2%)	9 (15.8%)	0.441
Moderate level (5–8)	14 (24.6%)	37 (64.9%)	0.239
High level (9–10)	3 (5.3%)	10 (17.5%)	0.46

Abbreviations: UCLA – University of California Los Angeles Score; n – number of patients; Chi-squared test

arthroplasty (TKA) with health check-ups, the THA patients did not achieve the compared levels of physical activity. They recommended improvements of strategies for raising the activity level in THA and TKA patients.

4 Sports activities after total hip arthroplasty in Slovenian patients

4.1 Description of the pilot study

We aimed to estimate the level of sports activities in Slovenian patients aged below 60 years, before and one to two years after receiving THA. For our pilot study, we selected participants who had their surgery performed in two Slovenian hospitals. Using the hospital computer information programme Birpis, archived questionnaires and the internal registry of arthroplasties we retrospectively obtained the data on the participants.

Inclusion criteria were: primary total hip arthroplasty, age below 60 years, operation performed in 2016 (1.1.–31.12.2016) at the Novo mesto General Hospital or Celje General Hospital.

Exclusion criteria were: secondary hip arthroplasty, aged 60 or more, patient's refusal to participate in the study, incomplete documentation (questionnaires that were needed for analysis were not filled out completely or correctly).

4.2 Methods

The patients filled out the Harris Hip Score (HHS) questionnaire and the University of California Los Angeles (UCLA) scorecard enquiring about their activities before the surgery and at least one year after the surgery.

HHS (36) is a disease-specific questionnaire for assessing the condition of a patient's hip before and after hip arthro-

plasty, which Harris introduced in 1969, and is one of the most frequently used orthopaedic assessment tools. It assesses several areas – pain, function, activity, flexibility, and deformations. The range of values is 0–100, with higher scores meaning a better patient status (Appendix 1).

The UCLA scorecard (37,38) is a questionnaire that patients fill out circling one of ten listed claims on the frequency and type of activities. Patients with items 9–10 fall into the group with high impact (occasionally or regularly participating in running, tennis, skiing, aerobics, lifting heavy burdens, etc.), those with items 1–3 fall into the group with low impact (not active in sport or only occasionally participate in lighter activities, such as walking, easier domestic chores, shopping, etc.). In our study, we used a modified questionnaire in Slovenian language (Appendix 2) (39).

4.3 Statistical analysis

Numerical variables are expressed as mean and standard deviation (SD), and statistical analyses performed by using Student's t-test, while categorical variables are expressed as the number and percentage, and statistical differences analysed by Chi-squared test. We set the value at $p \leq 0.05$ as the threshold for statistical significance. We conducted the statistical analysis using computer programme (SPSS v. 17, SPSS Inc., Chicago, IL).

4.4 Results

We invited 117 patients who met the inclusion criteria to participate in the study. We excluded all the patients who did not want to participate in the study (did not fill out the questionnaire) or who did not completely fill out the documentation. We received all the required data (completely filled-out question-

naires) from 57 patients who were then included in the analysis.

The mean age of the participants in the study ($n = 57$) was 52.4 ± 6.7 , which represents the active population. 27 patients (47.3%) were men. Table 2 shows basic characteristics of the participants, and the HHS and UCLA results before and after the surgery. Both, the assessment of the hip joint function (HHS) and the level of activity (UCLA) after the surgery are statistically significantly higher, compared to the condition before the surgery ($p < 0.001$).

Table 3 shows the distribution of participants regarding the level of activity before and after the surgery. Before the surgery, 70% (40/57) of participants were limited to a low level of activity, such as the easiest daily activities, walks, lighter domestic chores. 62% (25/40) of such participants were able to perform activities with moderate impact after surgery, such as swimming, dancing, hiking, golf, bowls, household chores, etc. 15% (6/40) of them even achieved a high level of activity, such as tennis, skiing, farm work, contact sports.

4.5 Discussion

Our pilot study showed that after hip arthroplasty, the function of the replaced joint evidently improves, and accordingly also the level of activity, compared to the condition before the surgery, which is in line with the findings of most studies (7,10,12,13,16,19,40-42). The difference between the HHS value before and after the surgery is comparable to the results of previous studies (27,41). Ollivier et al. noted an increase in the HHS score by 34 points in patients who had a high level of activity, and 14 points in patients with a low level of activity (27). The value of average activity after the surgery according to UCLA also achieved the values of previous studies in both hospitals (24,38). In their study, Williams et

al. measured the level of activity using the UCLA questionnaire before the surgery and one year after. 43% of patients had UCLA values of 7 or above after the surgery, compared to 17% before (43). In our sample, there were 54% such patients, compared to 12% before the procedure.

The main limitation of our pilot study is the absence of data on sports activities before hip injury, as this would provide a comparison of the level of sports activity before the injury and after the surgery.

5 Conclusion

All types of sports activities that patients perform after the surgery, first and foremost depend on the condition/satisfaction with the operated hip and the level of activity they were able to perform in the past, before the hip failure. It is recommended to start practising specific sports gradually (after 3 months), as during this time a patient can safely and appropriately prepare (under supervision): to improve flexibility, to strengthen muscles of the hip, improve balance and gait pattern, without increasing risk of dislocation, loosening/not growing the arthroplasty and other complications (2).

The patient's physical activities before the operation have an important impact on his postoperative expectations and his satisfaction following the procedure. Consequently, a pre-operative interview with the patient is very important and can also affect the selection of the type of implant (10,13,19,24). With more active patients, it is recommended to use implants with a low level of wear and femoral heads with a diameter of up to 36 mm (5,17). With the patients, we discuss their sports activities and other physical activities before their hip failure, and their expectations. It should also be explained to the patient that they might not be able to perform all of their activities at the same

level as before the injury and that they should find some adjustments. A focused and intensive physiotherapy also plays an important role in the return to performing numerous sports activities. Along with the basic exercises for hip flexibility and learning to walk, it should also include exercises for strengthening muscles of the hip (13,19). It is sensible to expand the exercises to strengthening other muscle groups of the lower limbs and the body that can affect the stability of the hip or the whole lower limb, and to reduce the force on the hip arthroplasty (19). Especially with patients who had been inactive for a longer period of time due to hip failure and/or were only mobile with crutches, walker or even tied to a wheelchair, focused exercise with clear goals is of exceptional importance. THA in these patients only provides the conditions for a successful return to normal activities; however, achieving the final goals depends on numerous factors, among which the most important are the patient's motivation and focused rehabilitation (6). The objective for all the patients should be to manage the activities at the low level, as they have been proven to improve the patient's general physical condition and prevent cardiovascular complications (44). Even with patients who had been active before the operation, focused, customised exercise and appropriate footwear bring an added value to the final result of the surgical treatment and the possibility of returning to physical activities at a high level (19,44).

The patients must be aware of the fact that high-intensity activities with repeat high-impact actions can result in shorter lifespan of the arthroplasty, and that low-impact exercise is recommendable (10,13,24,44). Studies that assess the oc-

currence of aseptic loosening of arthroplasties in connection with the level of activity are not many, but have proven a higher level of arthroplasty loosening with high-intensity activities; however, they also concluded that low-intensity activities do not affect the level of loosening (24,27,30,31). It should be emphasized that these studies have been made with different combinations of arthroplasty components, of which the polyethylene implant is the most important part. Studies used conventional ultra-high-molecular-weight polyethylene implant, which has been proven to have a higher rate of wear, unlike the cross-linked polyethylene that has mostly replaced it in the past decade (32,33).

A study that would assess the occurrence of aseptic loosening of arthroplasties with an implant from cross-linked polyethylene in patients with various levels of activity, would be highly valuable for preparing more current recommendations regarding participation in sports activities for modern patients.

Sports that physicians are supposed to currently recommend are swimming, cycling, Nordic walking, golf, cross-country skiing, tennis doubles and low-intensity aerobics (13,19).

Even though it is reasonable to adhere to certain recommendations, every patient should receive individual advice regarding his sport participation after the procedure, with regard to their participation in sports before the surgery and their desired level of activity after the surgery (34).

6 Appendices

- HHS
- UCLA

HARRIS HIP SCORE (HHS)

First name: _____ Last name: _____ Date of birth: _____

Dear patient!

In order to better define the issues that you have with your hip, please fill out the following questionnaire. Cross out the question mark in front of the most suitable answer.

1. Pain:		4. Distance walked:	
44	None, or ignores it	Unlimited	11
40	Slight, occasional, no compromise in activity	Six blocks (30 minutes)	8
30	Mild pain, no effect on average activities, rarely moderate pain with unusual activity, may take aspirin	Two or three blocks (10 - 15 minutes)	5
		Indoors only	2
20	Moderate pain, tolerable but makes concessions to pain. Some limitations of ordinary activity or work. May require occasional pain medication stronger than aspirin.	Bed and chair only	0
		5. Stairs:	
		Normally without using a railing	4
10	Marked pain, serious limitation of activities	Normally using a railing	2
0	Totally disabled, crippled, pain in bed, bedridden	In any manner	1
		Unable to do stairs	0
2. Limp:		6. Activities - shoes, socks:	
11	None	With ease	4
8	Slight	With difficulty	2
5	Moderate	Unable to fit or tie	0
0	Severe or unable to walk		
3. Support:		7. Sitting:	
11	None	Comfortably, ordinary chair for one hour	5
7	Cane/Walking stick for long walks	On a high chair for 30 minutes	3
5	Cane/Walking stick most of the time	Unable to sit comfortably on any chair	0
3	One crutch	8. Public transportation:	
2	Two canes/walking sticks	Able to use transportation (bus)	1
0	Two crutches or not able to walk	Unable to use public transportation (bus)	0
The physician fills out			
9. Does your patient have any of the following:		10. Mobility:	
1	< 30 ° flexion contracture	Full (flexion > 90 °)	5
1	< 10 ° abductor contracture	Partial (flexion up to 45 – 89 °)	3
1	< 10 ° internal rotation contractures when stretching	Full (flexion < 45 °)	0
1	< 3 cm in absolute length of the legs		
		TOTAL (max¹⁰⁰):	

Date: _____

PATIENT'S ACTIVITY SCORE

First name: _____ Last name: _____

Date of birth: _____

Date of last hip surgery (approximately): _____

Please, circle one of the below activities that most fit your current condition.

1	Wholly inactive, dependent on others, cannot leave residence
2	Mostly inactive, very restricted to minimum activities of daily living
3	Sometimes participates in mild activities such as walking, limited housework, and limited shopping
4	Regularly participates in mild activities
5	Sometimes participates in moderate activities such as swimming and can do unlimited housework or shopping
6	Regularly participates in moderate activities
7	Regularly participates in active events such as bicycling
8	Regularly participates in active events such as bowling or golf
9	Sometimes participates in impact sports such as jogging, tennis, skiing, acrobatics, ballet, heavy labor, or backpacking
10	Regularly participates in impact sports

*Questionnaire, adapted in 2010 (V. Levašič, I. Milošev, Valdoltra Orthopaedic Hospital, Ankaran, Slovenia) from the questionnaire of the University of California Los Angeles (UCLA) from the article: HC Amstutz, BJ Thomas, R Jinnah, W Kim, T Grogan, C Yale: Treatment of primary osteoarthritis of the hip. A comparison of total joint and surface replacement arthroplasty; J Bone Joint Surg Am. 1984;6:228-41.

Appendix 2: UCLA

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