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Return to Sports and Recreational Activity After Unicompartmental Knee Arthroplasty

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Background: There is a lack of detailed information concerning patients' sports and recreational activities after unicompartmental knee arthroplasty.

Hypothesis: Patients treated by unicompartmental knee arthroplasty will be able to return to sports and activity.

Study Design: Case series; Level of evidence, 4.

Methods: The authors surveyed 83 patients by postal questionnaires to determine their sporting and recreational activities at a mean follow-up of 18 ± 4.6 months (range, 12-28) after unicompartmental knee arthroplasty. For data analysis, patients were divided into groups of women and men, and older and younger patients (those above and below the median age of the group). The authors also assessed the state of general health (SF-36) of the patients at the time of the survey and compared the results with those of a matched (for age and side-diagnoses) reference population.

Results: Before surgery, 77 of 83 patients were engaged in an average of 5.0 sports and recreational disciplines; postoperatively, 73 (88%) participated in an average of 3.1 different sports disciplines, resulting in a return to activity rate of 95%. The frequency of activities (sessions per week) was 2.9 preoperatively and remained constant at the time of survey (2.8). The group of older patients (mean age 73.0 y) revealed a significantly higher frequency than the group of younger patients (mean age 57.8 y). The minimum session length decreased from 66 minutes before surgery to 55 minutes after surgery. The most common activities after surgery were hiking, cycling, and swimming. Several high-impact activities, as well as the winter disciplines of downhill- and cross-country skiing had a significant decrease in participating patients. The majority of the patients (90.3%) stated that surgery had maintained or improved their ability to participate in sports or recreational activities. The patients generally scored very high on the SF-36 compared with the matched reference population. Higher SF-36 values in the physical-related domains correlated with an increased level of activity ($r = 0.425$). The preoperative body mass index showed a weak, negative correlation with the postoperative extent of activities ($r = -0.282$).

Conclusion: The majority of patients returned to sports and recreational activity after unicompartmental knee arthroplasty. However, the numbers of different disciplines patients were engaged in decreased as well as the extent of activities. The activities in which most patients participated were primarily low- or midimpact. The patients scored higher on the SF-36 than age-related norms, which might be due to the patient-selection process for unicompartmental knee arthroplasty and geographical differences.

Keywords: unicompartmental knee arthroplasty; UKA; sports; recreational activity

In recent years, unicompartmental knee arthroplasty (UKA) has increased in popularity. Indications for this procedure are broadening since encouraging mid- and long-term results have been published.[29,31,36] These results and the development of new techniques, such as minimally invasive surgery, computer navigation, and improved implant quality, have given rise to the treatment of younger and more active patients.[5,8,32,34] Unicompartmental knee arthroplasty in general offers several advantages compared with total knee arthroplasty (TKA): the procedure is less invasive, patients tend to achieve a better range of motion, and they report a more "normal feeling" joint.[3,23] The knee kinematics after UKA are closer to a normal knee than those after TKA because of the preservation of both cruciate ligaments.[3,23] These circumstances, together with an increased life expectancy of relatively healthy patients, result in increasing patients' expectations concerning the postoperatively achievable levels of sports and daily activities. Few

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studies have been published assessing patients' recreational and sport activities after TKA. Bradbury and associates[4] demonstrated that 65% of their patients participated in sports after TKA, mainly in low-impact activities such as bowling and cycling. Similarly, Chatterji and colleagues[6] reported 75% of their patients engaged in at least 1 activity after TKA; again, low-impact activities such as exercise walking, swimming, and bowling were the most common disciplines. Moreover, they found men to be significantly more active than women.[6] This finding has been confirmed by another report that also revealed an age-dependent decline in sports engagement 5 years after total knee replacement[14] However, there is a lack of information with regard to patients' sports and recreational activities after UKA. As recently stated by Walton et al,[39] at a minimum of 12 months after surgery, more patients treated with UKA returned to or increased their sporting activities (67%) compared with those who had undergone TKA (44%). Another group demonstrated that 59% of the patients regularly participated in sports and recreation activity at an average of 18 months after Oxford medial UKA, a metal-backed implant with a mobile bearing.[10] Considering the broadening indications and the continuously increasing numbers of younger and more active patients treated with UKA, the present study was designed to assess the return to activity rate and to descriptively demonstrate the detailed sports and recreational activities patients are engaged in after UKA. We paid special attention to the influence of patients' age and gender and tried to better classify our patient sample by comparing their state of general health with that of a matched reference population.

MATERIALS AND METHODS

Study Design

Between January 2004 and June 2005, 119 consecutive UKAs (compared with about 750 conventional TKAs) were performed by 3 senior surgeons using the Preservation prosthesis (DePuy International Ltd, Leeds, England), an implant with a cemented all-poly tibial component and a "J" curve sagittal femoral geometry.[17] During this period, no other UKA prostheses were used at our department. Our selection criteria for UKA were based on the criteria of Kozinn and Scott,[19] which are presented in detail in Table 1. Bodyweight as well as patients' age were not strict selection criteria.

At the time of the survey we excluded all patients with any additional total joint arthroplasty of the lower limb from the study (total hip, knee, or ankle arthroplasty). Those with bilateral UKA were included. Overall, 17 patients had 1 or more additional total joint arthroplasty, so 102 patients were left who were contacted by postal survey. Patients were requested to complete a sports and activity questionnaire and the standardized SF-36 form. Eighty-eight patients returned the questionnaire (86.3%), 5 of which were not complete and could therefore not be used (3 patients had died and 2 suffered from severe neurological diseases). Overall, 83 questionnaires were considered for evaluation (81.4%). For data analysis, patients were additionally divided into groups of women and men and older and younger patients. We did this by calculating the median of the patients' age and classifying all patients older than the median as the older group and all patients younger than the median as the younger group of patients.

Of the 14 patients who did not answer, we were able to contact 10 by phone to ask whether they participate regularly in sports or recreation activities or not, but these data were not included.

TABLE 1
Selection Criteria for UKA[a,b]

Noninflammatory osteoarthritis
Unicompartmental degeneration
A maximum of 10° varus or 5° valgus deviation from the mechanical axis, correctable
Flexion contractures not exceeding 10°
Intact anterior cruciate ligament
No signs of mediolateral subluxation
No clinical patellofemoral symptoms
No clinical symptoms in the contralateral compartment
Preference of patients with a BMI not exceeding 32

[a]UKA, unicompartmental knee arthroplasty; BMI, body mass index.
[b]Patients' age was not considered a selection criterion.

Sports and Activity Questionnaire

The sports and activity questionnaire ascertained patients' preoperative and postoperative engagement in 20 different sports and recreational activities (cycling, hiking, jogging, nordic- and exercise walking, inline skating, aerobics, gymnastics, fitness-/weight-training, dancing, swimming, golf, tennis, downhill- and cross-country skiing, riding, handball, basketball, volleyball, and soccer). Patients could name other disciplines in an open-ended section. Preoperative sports engagement was defined as participation in sports before the onset of restricting symptoms. We asked for sports frequency (0-7 sessions per week) and duration of sport activities (length per session). To facilitate questionnaire completion regarding session length, ranges were provided by minutes per session (0-15, 15-30, 30-60, 60-120, and >120). From this information we calculated the minimum session length by considering the shortest time of each given range for statistical analysis. Patients were asked when after surgery they returned to activities and for an explanation for a possible reduction in sports or the change of disciplines. Furthermore, the questionnaire asked for the patients' sense of well-being while participating in sports (pain, pain medication, range of motion, anxiety/insecurity, and self-assessment of the state of physical fitness) and the overall satisfaction with surgery.

SF-36 Questionnaire

The state of general health of our patients was assessed at the time of survey using the SF-36 questionnaire.[20,40] The SF-36 form (0-100 points, the higher the score, the better the outcome) asks for the patients' self-assessment in 8

different domains that describe health-related quality of life (physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health). To better "classify" our patients sample, we compared the SF-36 values with those of a matched reference population.[9] The values were correlated with the results of the sports and activity questionnaire.

Clinical Data

After surgery, all patients underwent regular clinical and radiographic follow-up at 6 weeks, 3 months, and 12 months after surgery and yearly thereafter. The clinical outcome was assessed at each follow-up using the Knee Society Score (KSS). We studied the last radiographs for radiolucencies and signs of loosening.

Statistics

Statistical analysis was performed using the software package SPSS (Version 14, SPSS Inc, Chicago, Ill). The Mann-Whitney *U* Test was used to analyze unpaired nonparametric data and the Wilcoxon Signed Ranks Test for the paired nonparametric data. Correlations were performed using Spearman's correlation coefficient (r). The significance level was defined at $P < .05$ for all tests.

RESULTS

Demographics

At the time of the survey, surgery was performed an average of 18 ± 4.6 months (range, 12-28) earlier. Mean age of the patients was 65.5 ± 9.1 years (range, 47-83); there were 45 men (54.2%) and 38 women (45.8%). The younger group of patients comprised 41 patients (mean age, 57.8 ± 4.8 y), and the older group comprised 42 patients (mean age, 73.0 ± 5.0 y). Mean body mass index (BMI) was 28.3 ± 4.4 (range, 19.6-39.2) preoperatively and 27.5 ± 4.2 (range, 19.8-39.4) at time of survey. Thirty-five UKAs were performed on the right side, 36 on the left side, and 12 were bilateral. The majority (n = 77) were medial UKAs, and 6 were implanted laterally (all in women). The underlying diagnoses were osteoarthritis in 72 cases and osteonecrosis of the femoral condyle in 11.

Sports and Recreational Activities

After surgery, 73 of 83 patients (88%) were active in at least 1 sport or recreation activity, compared with 77 of 83 (92.8%) preoperatively, giving a return to activity rate of 94.8%. None of the patients who had been inactive before surgery took up new activities postoperatively. Within 3 months of surgery, 45.8% of patients returned to activities, and 68.6% resumed activities within 6 months. The rest of the patients (31.4%) required more than 6 months to return to sports. There were no age- and gender-related differences. Patients were engaged in an average of 3.1 different sport disciplines at the time of request, which was significantly less than preoperatively (5.0 disciplines; $P < .001$; Figure 1). Older patients and men tended to participate in more different disciplines than younger patients and women (3.3-2.9 and 3.4-2.5, respectively). These differences did not reach statistical significance ($P = .329$ and $P = .128$, respectively). Concerning single-sport disciplines, high-impact activities such as jogging, tennis, soccer, and mountain climbing revealed a significant decrease in participation as well as the winter activities of downhill- and cross-country skiing. Swimming, dancing, and hiking dropped significantly as well in patient participation. None of the activities significantly increased (Tables 2 and 3). Seven of the 10 patients who had not returned the questionnaire and had been contacted via phone said they were regularly active in sports.

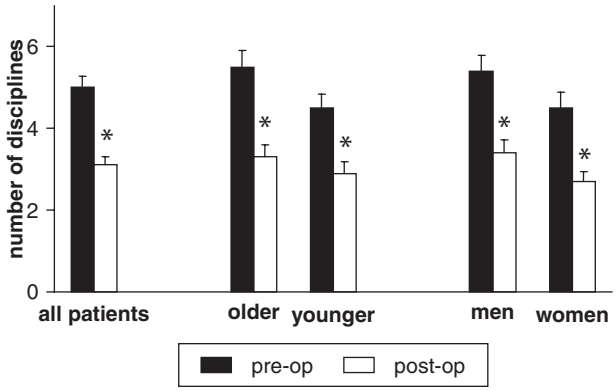

Figure 1. Numbers of different disciplines each patient was active in before and after UKA. Despite an individual average of 3.1 different disciplines at time of survey, the average decreased significantly from 5.0 disciplines preoperatively ($P < .01$). This was similarly seen without differences in each of the subgroups (women, men, older and younger patients, respectively). Asterisks indicate significance ($P < .01$).

Extent of Activities

The overall sports frequency (sessions per week) did not change preoperatively to postoperatively: patients were active 2.9 and 2.8 times per week, respectively ($P = .723$; Figure 2). When analyzing the subgroups, older patients participated significantly more often in sports than younger patients (3.2-2.6 times per week, respectively, $P = .013$) at time of questioning. We found no gender-related differences. About every third patient (34.2%) was engaged in sports 4 times per week or more often postoperatively compared with 28.6% before surgery; however, this difference was not statistically significant ($P = .21$). Postoperatively, 42.5% of the patients performed sports once to twice per week, which was almost the same proportion as preoperatively (45.5%).

The overall minimum session length decreased from 66 min before surgery to 55 min at time of the survey ($P = .08$). There were no statistically significant differences between

TABLE 2
Individual Sports That Patients (N = 83) Participated in Before and After Unicompartmental Knee Arthroplasty[a]

Sport	No. of Participating Patients Before Surgery	No. of Participating Patients After Surgery	Difference (%)
Hiking	56	43	– 23.2[b]
Cycling	49	42	– 14.3
Downhill skiing	48	18	– 62.5[b]
Swimming	42	34	– 19.0[c]
Exercise walking	33	28	– 15.1
Cross-country skiing	21	7	– 66.7[b]
Dancing	21	6	– 71.4[b]
Tennis	21	3	– 85.7[b]
Jogging	18	2	– 88.9[b]
Fitness-/weight-training	12	16	+ 33.3
Mountain climbing	12	1	– 91.7[b]
Soccer	10	2	– 80.0[b]
Aerobics	6	5	– 16.7
Hand-/volley-/basketball	6	3	– 50.0
Golf	5	8	+ 60.0
Gymnastics	5	6	+ 20.0
Riding	4	1	– 75.0
Nordic walking	3	7	+ 133.0
Inline skating	3	0	– 100.0
Fishing	2	2	+/– 0.0
Ice hockey	2	1	– 50.0
Snowboard	2	0	– 100.0
Leichtathl	2	0	– 100.0
Shooting	1	1	+/– 0.0
Boxing	1	0	– 100.0
Water skiing	1	0	– 100.0
Home trainer	0	3	
Ice skating	0	1	

[a]Several disciplines demonstrated significant net decreases in participation, in particular, high-impact sports and winter disciplines, in favor of several mainly low-impact activities. However, no sport discipline increased significantly after surgery.
[b]Highly significant ($P < .01$).
[c]Significant ($P < .05$).

TABLE 3
Top 5 Activities of Different Patient Groups Before and After Surgery[a]

	Preoperative Participation (% of Patients)	Postoperative Participation (% of Patients)	Difference
Top 5 sports, women			
Hiking	63.2	47.4	– 25.0[c]
Cycling	57.9	47.4	– 18.1
Swimming	57.9	44.7	– 22.8[c]
Downhill skiing	44.4	10.5	– 76.3[b]
Exercise walking	39.5	26.3	– 33.4[c]
Top 5 sports, men			
Hiking	71.1	55.6	– 21.8[c]
Downhill skiing	64.4	31.1	– 51.7[b]
Cycling	60.0	53.3	– 11.2
Swimming	44.4	37.8	– 14.9
Exercise walking	40.0	40.0	± 0.0
Top 5 sports, older patients (≥66 y)			
Hiking	73.8	59.5	– 19.4[c]
Cycling	61.9	47.6	– 23.1[c]
Swimming	52.4	40.5	–22.7[c]
Downhill skiing	50.0	11.9	–76.2[b]
Exercise walking	50.0	38.1	– 23.8[c]
Top 5 sports, younger patients (<66 y)			
Downhill skiing	65.9	31.7	– 51.9[b]
Hiking	61.0	43.9	– 28.0[c]
Cycling	56.1	53.7	– 4.3
Swimming	48.8	41.5	– 15.0
Tennis	31.7	4.9	– 84.5[b]

[a]Data revealed mostly the same disciplines. Most activities demonstrated a significant decrease in patients' participation postoperatively.
[b]Highly significant ($P < .01$).
[c]Significant ($P < .05$).

women and men as well as between older and younger patients (Figure 3). Before surgery, 62.3% of the patients participated in activities for more than 60 min each session compared with 46.6% after surgery, which was significantly less ($P = .0314$). Short sessions of up to 15 min were performed by 10.4% of the patients before and by 15% after surgery. We found a weak, negative correlation between the preoperative BMI and the postoperative sports extent (BMI and weekly sport sessions: $r = –0.217$, $P = .049$; BMI and minimum session length: $r = –0.282$, $P = .01$).

Sense of Well-Being During Sports and Recreation

After UKA, 45% of all patients felt excellent or good during sport activities, 45% reported experiencing a limited range of motion or not feeling fit, and 10% felt unsafe or anxious. We found no age- or gender-related differences. During activities, 47% of all patients were completely pain free, 28.9% reported pain in the operated knee, and 26.5% had pain in other joints. There were no statistically significant age- or gender-related differences. At the time of the survey, 57.8% of the patients did not take any pain killers, 10.8% required regular pain medication, and 31.4% occasionally took pain killers. Of the patients who required pain medication, 42% reported additional pain in joints other than the operated knee. We found no differences between the patients reporting pain in the operated knee during activities and those without pain regarding age, gender distribution, BMI, follow-up period, number of different disciplines they were engaged in, or the weekly frequency of activities. The duration of activities was, however, significantly shorter in this group than in the pain-free patients (43.4-55 min, $P = .0361$). Ninety percent of our patients, without age- or gender-related differences, stated that surgery had maintained or improved their

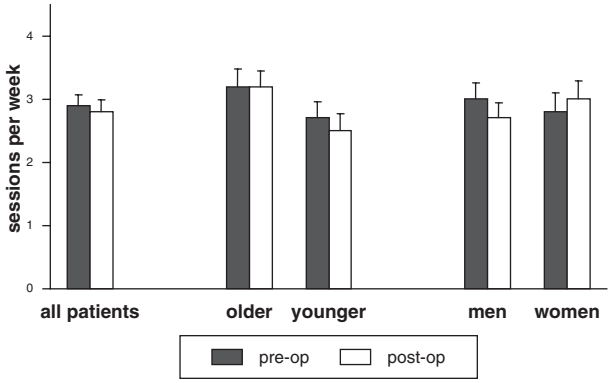

Figure 2. Patients' preoperative and postoperative sports frequency (sessions per week). There was no difference between preoperative and postoperative sports events per week. No age- and gender-related differences were found.

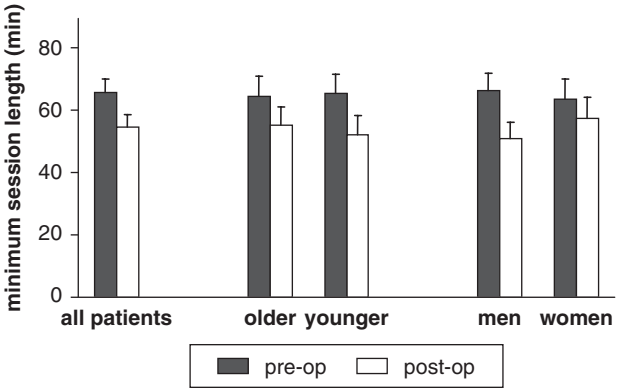

Figure 3. Minimum preoperative and postoperative length of each sport session. The mean session length for all patients decreased from 66 min before surgery to 55 min at time of request but did not reach statistical significance ($P = .08$). No age- or gender-related differences were found.

sports ability, and 82% considered the overall outcome of the surgery to be excellent or good.

General Health

At the time of the survey, patients scored high on the SF-36. The values in each of the 8 domains (Figure 4) were significantly higher than those of the matched reference population.[9] The values in the component scales were significantly higher than those of the matched reference population as well: physical component scale, 47.2 versus 42.0 ($P = .017$); mental component scale, 54.5 versus 51.2 ($P = .423$). We found a positive correlation between the number of disciplines patients were engaged in postoperatively and the physical-related SF-36 domains: physical component scale and number of disciplines, $r = 0.425$ ($P < .001$); minimum session length and physical functioning, $r = 0.387$ ($P < .001$).

Clinical Outcome

The KSS improved from 129.9 ± 24.8 (range, 60-185) preoperatively to 186.9 ± 18.3 (range, 111-200) at last follow-up. We found femoral radiolucencies in 1 case, revealing progression compared with earlier control radiographs. The patient had no clinical symptoms. There were no radiolucencies or signs of loosening in any of the other cases.

DISCUSSION

UKA and Indications

The improvements in implant design and surgical technique and lessons from past failures, as well as a more proper patient selection, have resulted in improved long-term results after UKA. These are comparable with the excellent and well-known results after TKA. Survival rates of 93% and of about 85% after 15 and 20 years have been

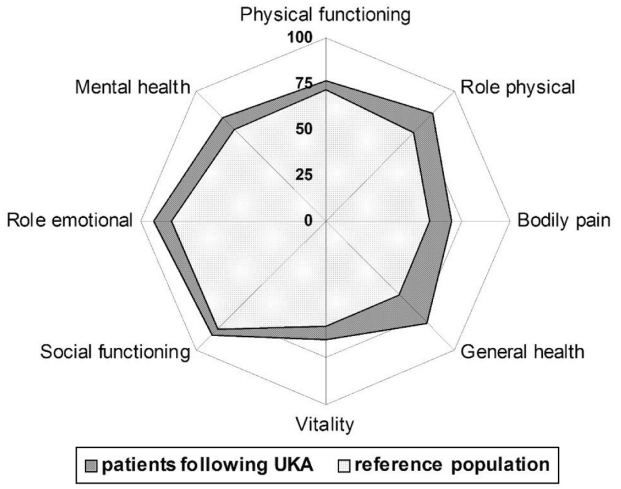

Figure 4. SF-36 results of our patients at a mean of 18 months after UKA. The patients (N = 83) scored very high on the SF-36. The values in each domain were significantly ($P <$ .01) superior to those of the matched reference population.[9]

reported.[29,31,36] These promising reports contributed to a boom of UKA in recent years. In the United States, 2500 UKAs were performed in 1996 and 1997, comprising approximately 1% of all knee arthroplasties.[37] This proportion increased to 6% (33 900 UKA procedures) in 2000 and 2001.[38] Indications for UKA are broadening, especially in younger and more active patients.[5,8,34] The primary indication for knee arthroplasty today is still pain relief and the restoration of function. However, patients' expectations are rising; the restoration of sports ability and the recovery of unrestricted activities of daily living are common goals. Moreover, expectations concerning activities and sports are sometimes even unrealistically high.

Sports Participation and Extent of Activities

Addressing these circumstances, several studies investigated the sports engagement of patients after TKA; however, very little is known about sports participation after UKA. In the present study, we were able to demonstrate that patients treated by UKA are very active and the vast majority will be able to return to sports and recreation following surgery. We demonstrated a return to activity rate of about 95%, which is superior to the rates after TKA, reported to be between 34% and 88%.[4,6,14] In 2 studies, Walton and Jahromi[15,39] stated that 67% of their patients returned to the same or an increased level of activity at a minimum follow-up of 12 months after UKA, a rate obviously lower than we found. A return to sports rate of 93% has been demonstrated by Fisher et al[10] after Oxford UKA, a metal-backed implant with a mobile bearing. This work compares well with our report; patients' mean age and the follow-up period were the same as in the present study (64 y and 18 mo, respectively). Despite the same return to sports rate, only 59% of the patients in the Fisher study regularly participated in sports after surgery, compared with 88% in the present investigation. We found few details in the literature on patients' sports frequency after knee arthroplasty to compare the extent of patients' sports activity after TKA or UKA. We found 1 study in which patients were reported to play golf 3.7 times per week after TKA; however, only active golfers were studied.[24] Other studies solely defined regular sports engagement as participation in activities at least once per week,[4] at least twice a month,[10] or gave no information concerning regularity or frequency.[15,39] Nevertheless, our results are in line with those recently reported for patients after hip resurfacing arthroplasty.[27] Although we were able to demonstrate that the vast majority of our patients remained active after UKA, the number of different disciplines they were engaged in significantly decreased, mainly due to a shift away from high-impact activities. We also observed a trend toward less and shorter sports and recreational activity events after surgery. These findings were even more pronounced in patients after TKA, as previously shown.[4,6,14] Chatterji and associates[6] reported that their patients participated in 1.4 different activities after TKA, a value obviously lower than what we found.

The differences between UKA and TKA might not only be related to the prosthetic design, but rather to geographical differences and patient selection. Most of our patients were Swiss residents; the proximity of mountains, therefore, facilitates the participation in sports and activities such as skiing, hiking, and mountain climbing. This is demonstrated by the comparably high proportion of patients who were engaged in those activities. We can, moreover, observe some kind of "sports enthusiasm" within the population. Together with the relative wealth of Switzerland, the participation in several activities might be facilitated and would, therefore, explain differences to the current literature. Another variable might be the state of general health of the patients. We have no preoperative data of the SF-36, but the comparison of the postoperative scores with those of a matched-reference population[9] and those reported after TKA[16,18] seems to highlight a bias to better results in UKA occurring due to the patient-selection process.

In contrast to other reports, our data revealed that women were not less active than men and younger patients.[6,14] In line with our previous study on patients' activity levels after hip resurfacing arthroplasty, our older group of patients seemed to be more active in sports after UKA than the younger group. This might be explained by retirement, allowing the older patients to spend more time on sports and recreational activities.

Benefits of Activity and the Risk of Increased Wear

It is well known that regular exercise improves general health, reduces mortality, and contributes to physiological and psychological well-being.[1,30] Regular sports activity can lead to an increased bone mineral density, which might be of great importance for implant fixation and longevity.[28] In contrast to these beneficial effects, high levels of activity increase—beside other factors—the production of wear and, therefore, the risk of implant loosening.[2,12,13,33] Wear remains a major concern for long-term implant failure in joint arthroplasty. However, the follow-up period in the present study is definitely too short to draw valid conclusions regarding wear production and loosening in sports-active patients after UKA. Since the majority of patients will be active after surgery and participate in different disciplines with more or less impact, as demonstrated in the present work and reported previously by others, orthopaedic surgeons should educate their patients regarding postoperative activities and assist them with detailed recommendations. This is important, more so as some patients develop pain during sports and therefore exceed their individual loading limit of the operated joint, as shown in the present study. There are some studies that report activity and sports recommendations for patients after TKA.[7,11,21,26] However, these recommendations cannot simply be transferred to patients with UKA. Biomechanical aspects of the knee with a UKA implant and loading patterns of different activities have to be respected. Since to date there is a lack of fundamental scientific data on the risk of different disciplines concerning wear and early implant failure, all recommendations, even those based on earlier reports, biomechanical evidence, and personal experience, represent more of an "expert opinion" and have to be denoted as speculative.

Biomechanical Aspects

Kuster[21] reported peak loads occurring in the knee joint during different activities. Walking produces loads of about 3 to 4 bodyweight (BW), stair climbing 4 to 6 BW, walking downhill up to 8 BW, and jogging or running up to 14 BW. Cycling, in contrast, revealed joint loads of only 1.2 BW. In another study, the same author could demonstrate that jogging and downhill walking produced large areas of overloaded polyethylene.[22] Most knee implants have a higher congruency near extension, which decreases with increasing flexion, leading to a smaller contact area between femoral and tibial component.[21,22] Therefore, activities with peak

loads near extension, such as walking (20°), will produce less stress on the polyethylene than activities with peak loads in more flexion, such as jogging (60°).[21,22] In contrast to TKA, the cruciate ligaments are (normally) both intact in UKA. This implies the maintenance of a normal anteroposterior and rotational stability of the knee joint after UKA and therefore reduced anteroposterior and rotational stresses compared with TKA.[12,13,25,35] However, axial forces, which occur during activities such as running or jumping sequences, will lead to a high load on the unicompartmental implant as well.

Our Sports Recommendations After UKA

We define sport as a physical activity carried out with a recreational or competitive purpose for self-enjoyment, to increase or maintain physical fitness, to attain excellence, for the development of a skill, or a combination of these. We give recommendations for participation in sports after UKA based on biomechanical aspects, our own experiences, and previous reports; however, these recommendations have to be denoted as speculative: (1) our patients are allowed to participate in each sport or activity they wish to participate in after surgery as long as they have no symptoms or pain; (2) we recommend low- and midimpact activities such as cycling, swimming, hiking, fitness-/weight-training, golf, cross–country- and downhill-skiing (except short turns and moguls), and we do not recommend high-impact activities with running and jumping sequences; (3) every patient is individually educated regarding risks associated with higher activity levels and high-impact sports, especially concerning the risks of increased wear production, implant loosening, and traumatic injuries; (4) our patients are advised not to return to their activities before a sufficient muscular restoration of the quadriceps and hamstrings; and (5) a close clinical and radiographical follow-up is of utmost importance for the early assessment of complications, possible implant loosening, or impending failure.

Limitations of the Study

We are compelled to state that our study might suffer from several drawbacks. Patients were asked for activities and information that, in some cases, dated back several years, revealing a potential bias. Furthermore, not all patients responded to our request, and the noncompleted questionnaires were not considered for evaluation. We tried to reduce this potential bias by contacting the patients by phone (all data achieved via phone were not included). Also, we distributed the SF-36 form at the time of survey only, so preoperative values of the patients are missing. However, the goal of the SF-36 evaluation has not been to present preoperative and postoperative values but to classify our patients group by comparison with a matched-reference population. Because of the short period between surgery and survey, we cannot draw valid conclusions regarding wear and activity. This field of interest has to be further investigated after a longer follow-up time of very active patients.

SUMMARY

We were able to demonstrate that the vast majority (90%) of our patients regularly participated in activities and sports after UKA and they were frequently engaged in different disciplines, mainly hiking, cycling, and swimming. Nevertheless, the duration of activities and the number of disciplines patients participated in decreased, mainly due to a shift away from high-impact activities. We demonstrated that older patients presented at least the same activity levels as younger patients. Results presenting activity levels after UKA might be biased by patient selection and geographical differences. Future work should focus on the definition of the right postoperative level of activity, between the level that benefits due to increased muscle strength, improvement of general health, and prevention of bone loss, and the level that unacceptably increases wear production and therefore the risk of implant loosening and early failure.

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