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Primary Knee

A Playtime and Handicap Analysis of 143 Regular Golfers After Total Knee Arthroplasty at Minimum 2-Year Follow-Up

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ABSTRACT

Background: Regular and competitive golfers are concerned by the ability to recover their previous activity golfing after total knee arthroplasty (TKA). The purpose of this study was to conduct targeted analysis of the effect of unilateral total knee replacement on the playtime and golf level in a population of experienced golfers, with a minimum follow-up of two years.

Methods: Questionnaires were distributed to the French Golf Federation's golfing members. Those who were older than 50 years and had undergone a unilateral primary TKA provided information on the timing of return to play, mode of movement on the course, pain during golfing, physical activity via University of California Los Angeles scale, level of golf and weekly playing time, before and after surgery. In addition, surgeons' recommendations and level of arthroplasty satisfaction were collected.

Results: Questionnaires were completed by 290 competitive golfers, of which 143 were eligible for inclusion. The average time to return to the 18-hole course was 3.7 months. Participants surveyed at a minimum 2 years after TKA played at a higher level than before surgery with a handicap improvement of 0.85 and increased their average weekly playtime from 8.9 to 10.2 hours. Knee pain while playing golf decreased after surgery (6.13 to 1.27 on the visual analog scale) and the University of California Los Angeles score improved (7.02 to 7.85).

Conclusion: This study demonstrated the ability of regular golfers to return to golf within six months after unilateral total knee replacement, with increasing level of golf and weekly playtime and better golfing comfort.

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Nowadays, total knee arthroplasty (TKA) surgery is one of the most commonly performed procedures in orthopedic surgery. In 2016, 90,923 knee prosthetic devices were implanted in France, according to the French National Drug Security Agency [1].

This figure is set to increase in response to the rising incidence of knee osteoarthritis worldwide [2]. Although the primary benefit of TKA is to reduce pain and improve the quality of daily life [3], the progress of surgical and industrial techniques has led to new demands. Indeed, many patients are now concerned about their ability to resume playing sports, as well as their level of play after arthroplasty [4–8].

Golf is a popular sport with participants of all ages. Recent demographic analyses highlighted an increased prevalence of younger patients undergoing TKA, from the age of 50 years [2,9]. However, there is still reluctance to return to physical activities, dominated by the risk of wear and tear on prosthetic polyethylene

[10–12]. To our knowledge, there are few publications in the literature concerning the resumption of golf after TKA. In addition, no studies have specifically evaluated the impact of total knee replacement on a population of experienced and regular golfers.

The purpose of this study is to evaluate the effect of unilateral total knee replacement on the ability to return to golf in a population of experienced golfers, with a minimum follow-up of 2 years. To perform this, golf activity, handicap, and playtime were studied.

Material and Methods

Institutional review board approval was granted for this study, and all patients provided informed consent to participate. A retrospective study of active golfers who had undergone unilateral TKA was undertaken.

A standardized questionnaire was sent to 54,625 members of the French Golf Federation (FGF) who were aged at least 50 years and had participated in at least one competition (handicap ≤ 53.5). Only members who had undergone total knee replacement were requested to complete the survey. The questionnaire was designed to capture demographic data (sex, age, hand dominance), determine golf activity (weekly playtime and pain before and after surgery, as well as timing of return to play), and included a validated activity score (University of California Los Angeles [UCLA] activity rating scale [13]). Participants were asked to complete components relating to their preoperative golfing status and their status at the time of survey. A second component involved each participant's surgeon submitting their opinion of the timing of the return to golf and their satisfaction with the arthroplasty. Finally, data were collected on any revisions performed.

Participant Selection

The questionnaire was completed by 290 active golfers. All patients who underwent unilateral TKA, with a handicap ≤ 53.5 and who also had a minimum postoperative period of 2 years were considered eligible. The questionnaires of 147 respondents were excluded (Fig. 1).

Four handicap groups were defined (handicap 0–14; 15–28; 29–41; and 42–54) to assess the influence of handicap on returning to golf activities and weekly playtime. Table 1 reports demographic data and details regarding the surgical procedures performed.

Statistical Analysis

Student's *t*-test was used for the comparison of means pre- and post-TKA in normally distributed variables; the Wilcoxon signed-

Table 1
Patient Demographics.

Characteristics	Overall (n = 143)
Sex, n (%)	
Male	122 (85.3)
Female	21 (14.7)
Hand dominance, n (%)	
Right	136 (95.1)
Left	7 (4.9)
Age (mean \pm SD)	65.66 (7.16)
TKA side, n (%)	
Right	73 (51.0)
Left	70 (49.0)
Experience (y) (mean \pm SD)	14.41 (9.09)
Weekly playtime (h) (mean \pm SD)	8.9 (6.1)
Handicap (mean \pm SD)	25.24 (13.06)
UCLA (mean \pm SD)	7.02 (2.04)
Pain (mean \pm SD)	6.13 (1.82)
Follow-up (months) (mean \pm SD)	55.45 (36.9)

UCLA, University of California Los Angeles; TKA, total knee arthroplasty.

rank test and rank-sum test were used for paired and nonpaired nonparametric data. Chi-square tests were used for the comparison of categorical variables. To study correlations between numeric variables, Pearson's test for normally distributed variables and Kendall's or Spearman's test for nonparametric distributions were used. Alpha was set at 5% ($P < .05$).

Results

There were 143 golfers included in the study. Each had undergone a unilateral TKA only with a minimum 2-year follow-up. All patients had practiced golf before surgery, with a median of 13 years of practice (range: 1–48), with a majority of males (122; 85.3%) and 21 females (14.7%). The mean age of the cohort was 70.7 years (range: 48–87). The mean age at the time of surgery was 65.7 years (range: 43–85). Of the 143 participants, 136 (95.1%) were right-handed.

The split between left and right TKA was balanced, with 73 patients undergoing a right-side TKA (51%) compared with 70 patients with a left-side TKA (49%).

Average follow-up (from surgery to questionnaire response) was 4.6 years (range: 2.0–14.2). Only four surgeons (2.8%) advised their patients not to resume golf. 131 golfers (91.6%) were satisfied or very satisfied with their TKA. All but one of the 143 patients returned to golfing activity after TKA. This one patient did not resume because of their high apprehension level, although satisfied with the arthroplasty.

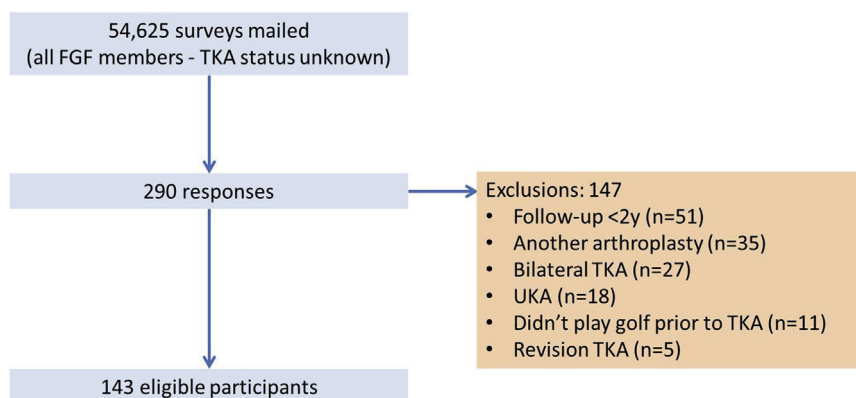


Fig. 1. Participant eligibility. FGF, French Golf Federation; TKA, total knee arthroplasty; UKA, unicompartmental knee arthroplasty.

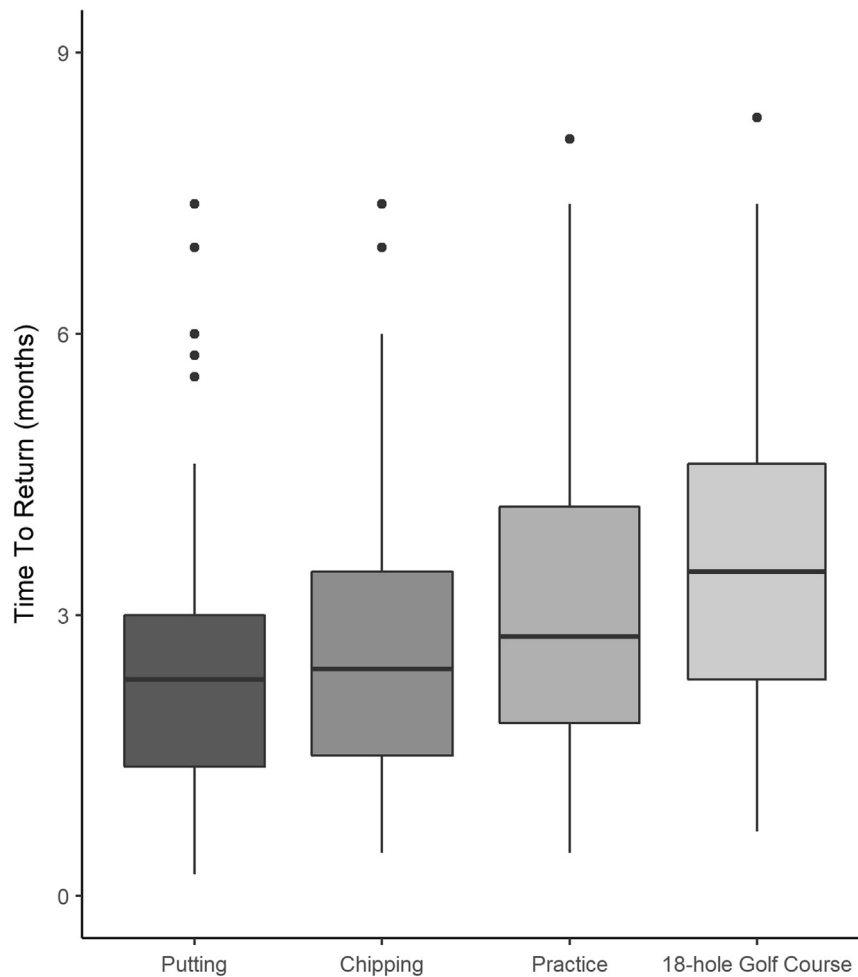


Fig. 2. Time to return to golf activities (months).

The median return to golf (corresponding to the first 18-hole course completed) was 3.7 months (range: 0.7–25) (Fig. 2). There was no significant correlation between age and the resumption of golf or with delay before returning to putting, chipping, practice, or 18-hole golf course.

Comparisons of preoperative means and those reported at a minimum of 2 years after TKA for the parameters of handicap, pain, UCLA score, and weekly playtime are reported in Table 2.

There was no correlation between handicap before knee replacement and time to return to golf ($P = .32$).

The comparison between preoperative handicap (mean 25.2) and postoperative handicap in this population of regular golfers shows an improvement in handicap of 0.85 (IC 95 [0.20; 1.7] $P = .01$) at the time of the survey (Fig. 3) (Table 2).

The cohort reported a significant decrease in knee pain while playing golf after surgery: the mean pain via the visual analog scale before surgery was 6.13 (± 1.82) vs 1.27 (± 1.5) after TKA ($P < .001$).

Physical activity was assessed through the UCLA score. Before prosthetic surgery, we found a mean UCLA score of 7.02 (± 2.04) compared with a mean UCLA score of 7.85 (± 1.14) after surgery ($P < .001$).

The comparison of patients who had undergone a right-side TKA and those who had a left-side TKA showed no significant difference regarding post-surgery pain ($P = .91$), post-surgery handicap ($P = .56$), or post-surgery UCLA score ($P = .12$).

The average weekly playtime was significantly increased, from 8.9 hours before TKA to 10.2 hours afterward ($P = .006$). A positive relationship between weekly playtime and the level of play that

persisted after TKA was further evident when categorizing this population into four handicap-based groups (Fig. 4).

Discussion

This cohort of 143 confirmed golfers (handicap < 54) has demonstrated the ability of regular golfers to return to an equal or better level of golf activity after unilateral TKA. These results confirm that the preoperative golf level is identified as a key patient-related factor in returning to the previous level [4,14]. TKA is also correlated with a significant improvement in pain during golf and the UCLA scale of activity.

After surgery, 99% of golfers in this cohort returned to golf with a median delay of 3.7 months to complete a full 18-hole golf course. This is comparable to other studies [15–17] and confirms that rehabilitation after surgery is achieved within less than 6 months. After TKA, patients were satisfied or very satisfied in 91% of cases

Table 2

Comparison of Means Across Variables Before Total Knee Arthroplasty and When Surveyed at a Minimum of 2 y After Total Knee Arthroplasty.

Variable	Pre-TKA [Mean (SD)]	Post-TKA [Mean (SD)]	<i>P</i>
Handicap	25.24 (13.06)	24.4 (13.26)	.012
Pain VAS	6.13 (1.82)	1.27 (1.48)	<.001
UCLA score	7.02 (2.04)	7.85 (1.14)	<.001
Weekly playtime (h)	8.9 (6.1)	10.2 (6.6)	.006

UCLA, University of California Los Angeles; VAS, visual analog scale.

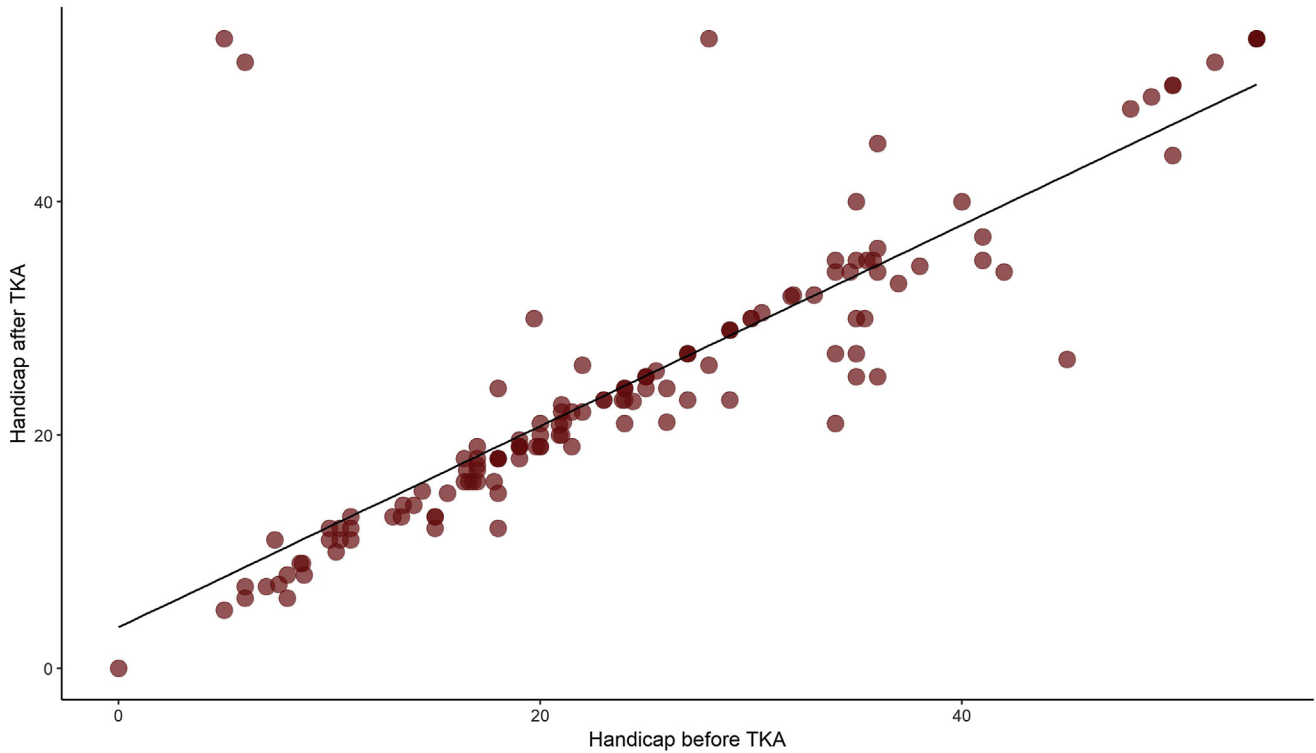


Fig. 3. Handicap before and after total knee arthroplasty. TKA, total knee arthroplasty.

and returned to golf with a handicap at least equivalent to their presurgery handicap, regardless of their preoperative level. Weekly playtime was significantly increased across all handicap groups. Higher rated golfers played more often than their lower rated counterparts before surgery and returned to their playing level by

golfing as much or more after surgery. Interestingly, Mallon and Callaghan [17] showed asymmetry in postoperative pain with patients with left TKAs more painful, although, in our study, similar to Jackson et al. [16], no significant difference in pain was found between the right and left prostheses.

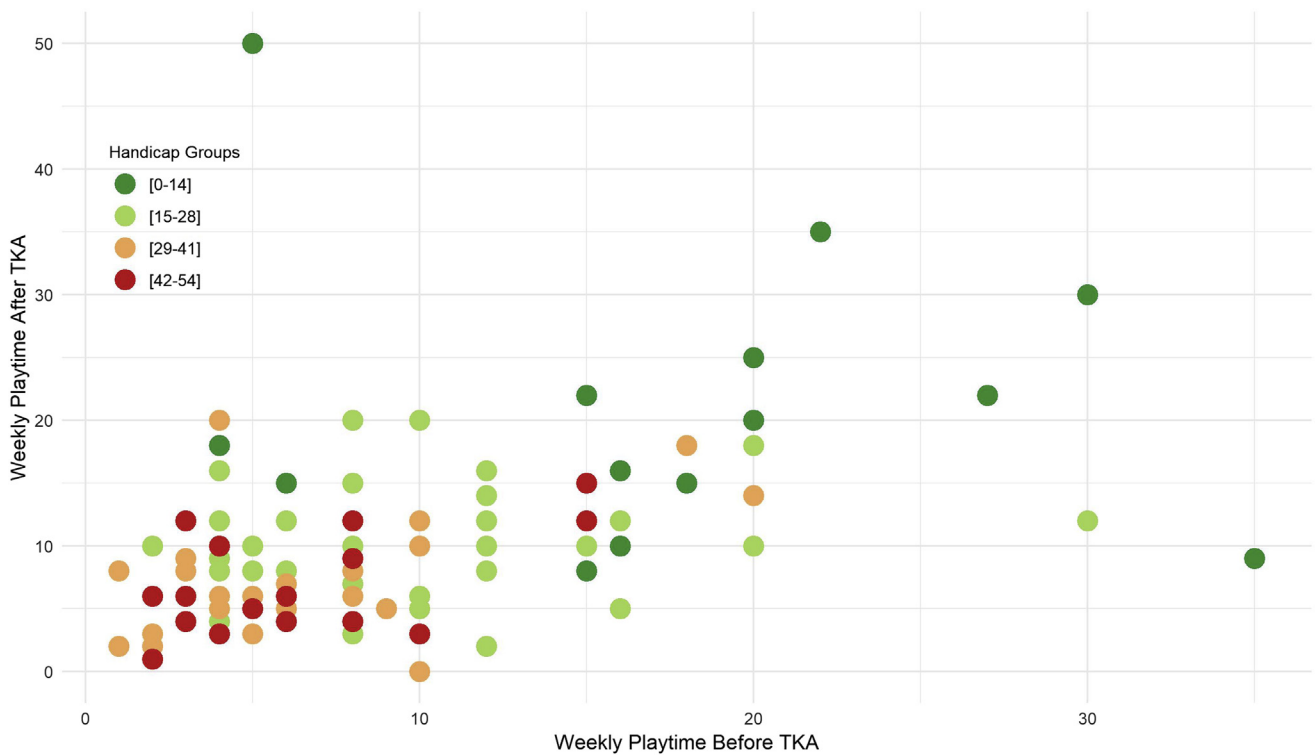


Fig. 4. Weekly playtime by handicap group. TKA, total knee arthroplasty.

Some recent studies have also reported an increase in sports activity, especially in low-impact sports such as cycling, swimming, or golfing [18–20]. These findings are comparable with Hepperger et al. [19], who showed a significant increase of the Tegner Activity Level at 24 months after knee replacement compared with preoperative Tegner Activity Level.

Patient expectations often associate activity level with wear and deformation of the polyethylene insert [11,12]. However, golf is a low-impact sport and our results demonstrating the successful return to golf corroborate the recommendations established by international societies of knee surgery (Knee Society, SFHG/SOF-COT) [21] and confirm the advice of the 97.2% of surgeons involved in this study who authorized their patients to return to golf after surgery.

The ability to return to their favorite sport is an important factor, often a requirement, for patients considering knee replacement [6,8]. The strength of this study is therefore to be able to recommend golf without apprehension to experienced patients who are used to playing regularly. As many studies have reported, a good result after TKA on the resumption of sport is conditioned by the expectations and objectives set during the preoperative period and directly related to the patient's motivation [4,22–25]. In the same way, a recent systematic review highlighted the influence of preoperative psychological factors on outcomes after TKA [26].

To our knowledge, our cohort is the largest in the literature and is the only one targeting the return of experienced golfers to their sport. Limited data have been published on the level of recovery and playtime after arthroplasty in patients with regular and competitive golf practice. In addition, our population is homogeneous with half right-side prosthesis and half left-side prosthesis and only includes patients with unilateral prosthesis to avoid any confounding factors related to bilateral surgery.

There are several limitations in the present study. First, it was a retrospective study by questionnaire aimed at members of the FGF and therefore a possible memory bias may be involved. Questionnaires were sent to over 50,000 FGF members, as the investigators were unaware of whether the member may have had a TKA or not. Therefore, although 290 (143 eligible) responses were received, it is unknown to what portion of members with a TKA this represents in active golfers in the targeted age bracket. The results of the questionnaires were collated without knowledge of the precise type of prosthesis implanted, with or without cement. In addition, too few patients provided information about their medical history that could influence return to golf. However, Jackson et al. [16] who have included this type of data did not find a correlation between medical conditions affecting golf game and walking the course after TKA.

Conclusions

This study highlighted the ability of regular golfers to return to golf within six months after unilateral total knee replacement and with better golfing comfort, activity level, and weekly playtime. Surgeons can reassure their patients about their recovery and show confidence with regard to their ability to return to a similar golf practice after TKA.

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