

Large variability in recommendations for return to daily life activities after knee arthroplasty among Dutch hospitals and clinics: a cross-sectional study

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Background and purpose — Recommendations concerning the return to daily life activities, including work and sport, after knee arthroplasty (KA) are essential for setting realistic patient expectations. Fulfillment of these expectations contributes to more satisfaction and enhanced recovery after KA. However, scientific evidence for such recommendations is limited, and recommendations are often based only on healthcare professionals' expert opinions. We summarized the current recommendations regarding return to daily life activities provided by Dutch hospitals and clinics to KA patients.

Material and methods — Recommendations of 43 Dutch hospitals and clinics were identified, representing the advice provided to 70% of the total Dutch KA patients. Recommendations were retrieved from content from websites (n = 8), brochures (n = 40), and mobile phone applications (n = 9).

Results — Recommendations for 24 daily life activities were identified. Individual hospitals and clinics provided recommendations for, on average, 9 (0–15) of these activities. Recommendations varied greatly. For example, recommendations regarding when to resume cycling after KA were provided by 36 of the 43 hospitals and clinics and varied from 3 weeks to 3 months.

Interpretation — Recommendations for return to daily life activities are often missing and vary considerably between Dutch hospitals and clinics. These findings show the need for more uniformity across healthcare providers regarding recommendations for postoperative return to daily life activities.

In the most recent years, the number of knee arthroplasty (KA) procedures has increased rapidly due to the rising obesity prevalence, the ageing society, and the wish to remain active at a higher age (1-4). For example, in the Netherlands, it is expected that there will be ~57,900 KAs in 2030 (5), a growth of 297% compared with 2005. The highest increase is expected in patients of working age (i.e., < 67 years) (1,6-8).

For younger patients, a safe return to daily life activities such as work and sports is of great importance after a KA (6-9). Periods off work and without involvement in social activities can have a negative impact on a patient's quality of life (10). Furthermore, in comparison with older KA patients, younger KA patients have higher preoperative expectations regarding return to daily life activities (11,12). Despite the good clinical outcomes regarding pain and improved knee function, up to 30% of KA patients have unfulfilled expectations regarding their ability to resume daily life activities after surgery (13). As fulfillment of preoperative patient expectations contributes to patient satisfaction after surgery, realistic expectations concerning recovery and return to daily life activities after KA are of utmost importance (6,14,15). For realistic recovery expectations, good recommendations are essential.

Therefore, we evaluated the current recovery recommendations for return to daily life activities after KA provided by Dutch hospitals and clinics.

Material and methods

Study design

This was a cross-sectional study and reporting was done according to the STROBE checklist. Based on publicly avail-

able Dutch data, we established that 26,186 total knee arthroplasties (TKAs) and 4,863 unicompartmental knee arthroplasties (UKAs) were performed in 2019, and we obtained a list of all Dutch hospitals and clinics that performed KAs in 2019 (16). The year 2019 was selected because KA surgery was influenced by COVID-19 in 2020–2021. We aimed to identify the recommendations that were provided to at least 70% of all Dutch KA patients. ACS and DJMS purposefully selected hospitals and clinics from this list until the sum of patient numbers reached at least 21,734 (i.e., 70% of 31,049), covering urban and rural areas and including academic ($n = 4$), peripheral ($n = 34$), and private ($n = 5$) hospitals and clinics. We selected 43 hospitals and clinics that performed 22,389 KAs (18,819 TKAs and 3,570 UKAs; Table 1, see Supplementary data).

We categorized and tabulated the identified recommendations of all activities into: (i) work, (ii) sports and (iii) other daily life activities. Sports activities were further categorized into light, medium, or heavy during a consensus meeting between ACS and DJMS. If information regarding age was provided, recommendations were stratified based on 2 age categories: ≤ 67 (working population) and > 67 years. If recommendations were specified for TKA or UKA, they were presented separately. We calculated the number of activities for which hospitals and clinics provided recommendations. Next, we summarized recommendations from hospitals and clinics regarding time of resumption of activities. Lastly, we calculated the percentage of patients who were potentially targeted by each recommendation, i.e., the sum of KAs per hospital or clinic that provided a recommendation divided by the total number of KAs performed by all hospitals and clinics.

Data collection took place in January and February 2021. ACS and DJMS identified and summarized recommendations from the 43 hospitals and clinics that were publicly available by searching content from brochures, mobile phone applications, and websites.

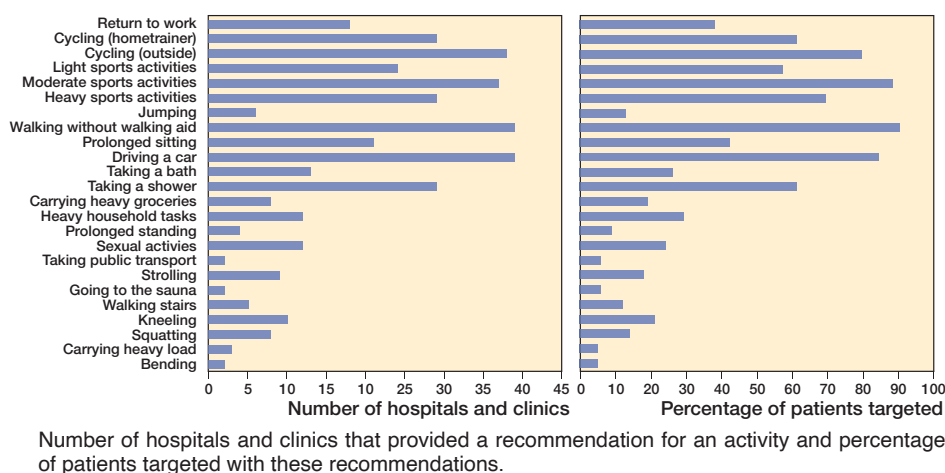
Funding and potential conflicts of interest

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Results

Descriptive data

Recovery recommendations were found in 57 information



sources, including 40 brochures and flyers, 9 mobile applications, and 8 websites. Some hospitals and clinics provided only 1 of those 3 to their patients, while others had 2 or 3 information sources. Only 4 information sources included recommendations specified for UKA. None of the included hospitals and clinics specified their recommendations for different age groups.

Main results

The Dutch hospitals and clinics provided recovery recommendations for 24 different activities in total (Figure). On average, hospitals and clinics provided recommendations for 9 (0–15) activities. The activity “walking without walking aid” was mentioned by most hospitals and clinics, namely by 39/43 hospitals and clinics. The activities that were least mentioned were “going to the sauna,” “bending,” and “taking public transport” (only mentioned by 2 hospitals each).

Table 2 depicts an overview of the range in recommendations reported by Dutch hospitals and clinics regarding the time to resume daily life activities.

Work

18 hospitals and clinics provided a recovery recommendation regarding work. The advice as to when to resume work varied between 2 weeks and 4 months. For heavy work, this difference was even larger and ranged from 6 to 12 months. No specific work-related activities, such as lifting or carrying heavy loads at work, were specified.

Sport

24 hospitals and clinics provided a recommendation for light sports activities such as billiards, 37 for moderate sports activities such as swimming, and 29 for heavy sports activities such as skiing. On average, hospitals and clinics provided recovery recommendations for 4 (0–6) sport-related activities. A large variation between hospital and clinics was found. For example, recommendations regarding when to resume “cycling” varied between 3 weeks and 3 months.

Table 2. Overview of recommendations regarding when to resume activities according to content from Dutch hospitals and clinics

Factor	TKA	Time range UKA	KA	Frequently reported comments (> 5 times)
Work				
Return to work	6 weeks–4 months	n.r.	2 weeks–3 months	Depends on type of job
Heavy work	6–12 months			
Sport				
Cycling (hometrainer)	2–8 weeks	2–6 weeks	2 weeks	Practice for cycling outside
Cycling (outside)	6 weeks–3 months	1–3 months	3 weeks–3 months	
Light sports activities	n.r.	n.r.	6–8 weeks	In consultation with orthopedic surgeon
Moderate sports activities	6 weeks–4 months	4–6 weeks	4 weeks–3 months	In consultation with orthopedic surgeon
Heavy sports activities	n.r.	n.r.	n.r.	Usually not recommended. In consultation with orthopedic surgeon
Jumping	n.r.	n.r.	3 months	
Other daily-life activities				
Walking without walking aid	2–8 weeks	2–6 weeks	2–12 weeks	
Prolonged sitting	n.r.	n.r.	6–8 weeks	Use a high chair
Driving a car	6 weeks–3 months	4–6 weeks	4 weeks–3 months	When able to walk without walking aid
Taking a bath	2 weeks–3 months	2–6 weeks	2 weeks–3 months	When the wound has healed
Taking a shower	0–3 days	0–3 days	0–4 days	Take a shower while sitting during the first time period
Carrying heavy groceries	n.r.	n.r.	n.r.	Do not lift heavy groceries and ask for help during the first time period
Heavy household tasks	6–8 weeks	4–6 weeks	6 weeks	Ask for help during the first time period
Prolonged standing	8 weeks	4–6 weeks	6 weeks	
Sexual activity	0–6 weeks	4–6 weeks	0–6 weeks	When you feel ready
Taking public transport	n.r.	n.r.	n.r.	
Strolling	n.r.	n.r.	0–3 months	
Going to the sauna	6 weeks	n.r.	n.r.	
Walking stairs	> 6 weeks	n.r.	4 weeks–3 months	
Kneeling	n.r.	n.r.	6 weeks–6 months	For most patients not possible
Squatting	6 weeks–not fully able to	n.r.	6–8 weeks	
Carrying a heavy load	6 weeks	n.r.	6 weeks	
Bending	n.r.	n.r.	n.r.	Avoid bending during the first time period

n.r. = activities were not reported in information sources or were reported but without a time range.

Other daily life activities

Recommendations for 17 other daily life activities were found. On average, hospitals and clinics provided recommendations for 5 (0–10) daily life activities. The largest variation in the recommendations regarding when to resume activities was found for “kneeling” and varied between 6 weeks and 6 months or “not possible.”

Discussion

Recommendations for return to daily life activities vary greatly between Dutch hospitals and clinics. Also, the multidisciplinary guideline for TKA developed by orthopedic surgeons and physical therapists provides minimal advice regarding resumption of daily life activities, work, or sports (17). The guideline only provides a recommendation regarding return to work, based on 2 cohort studies regarding time to return to work after KA (18,19), only stating that a TKA patient can return to work within 3 months, preferably guided by an occupational physician. Recommendations concerning return to work (not specifically heavy work) as tabulated in

our study varied between 2 weeks and 4 months, creating a considerable gap between the guideline and the advice provided in clinical practice. The guideline states that no further specific advice could be provided due to the lack of scientific evidence.

A frequently reported comment in the recommendations regarding the resumption of knee-demanding activities such as sports was that an activity should be resumed in consultation with a physical therapist or orthopedic surgeon. Besides the large variation in recovery recommendations, there is also uncertainty as to whether knee-demanding activities could and should be resumed at all. High-contact and high-impact sports like soccer, basketball, jogging, and volleyball are often not recommended, even though this is not based on direct scientific evidence, but merely on expert opinions and due to caution (20). Conversely, Crawford et al. (21) recently concluded that highly active patients do not have an increased risk of revision after UKA over patients with lower activity. Hence, for evidence-based clinical guidelines, it is crucial to obtain evidence and for experts to reach consensus regarding the risks of revision surgery as a result of high-contact, high-impact, and knee-demanding activities.

Gap between patient expectations and recommendations

Based on focus groups and PROMs, Witjes et al. (6) composed a list of 162 activities that are important for younger KA patients. Comparing this list with the results from our study suggests that there is a major gap between what patients need and expect to be informed about compared with the information that is actually provided to them. For example, while “kneeling,” “taking public transport,” and “sexual activity” were found to be important for (younger) patients receiving KA in the study by Witjes et al. (6), only 10/43, 2/43 and 12/43 hospitals and clinics, respectively, provided recommendations on these activities.

Regarding return to sports, Thaler et al. (22) conducted a survey among European Knee Association members, resulting in a list of 21 sports activities that are recommended to be resumed after KA. In the present study, the recommendations for resuming sports activities often did not include a time range. A frequently reported comment in the recommendations from Dutch hospitals and clinics was that patients should discuss this with their orthopedic surgeon, indicating that, in the Netherlands, a consistent time range for resuming sport-related activities is often missing.

Fulfillment of patient expectations is known to be important for patient satisfaction after a KA (7,23–25). However, patient expectations regarding performance of activities after KA can vary greatly, depending on age, type of surgery (i.e., UKA and TKA), lifestyle and other patient characteristics such as body mass index (25–27). Therefore, although there is a need for uniformity in guidelines across healthcare providers, recommendations should be tailored to the specific needs of patients (22). In our study, age-specific recommendations were not mentioned and only 4 out of the 43 hospitals and clinics provided separate recommendations for a UKA. Additionally, no specific advice was given for patients with varying lifestyles, body compositions, and knee-demanding work. This implies that information regarding recommendations for specific subgroups is scarce. Based on our findings, a first priority should be to develop more evidence-based and specialized recommendations to fill the existing knowledge gap in the medical literature.

In the short term, expert focus groups might overcome these gaps. We recently conducted a Delphi study among a panel of 16 experts (28), during which consensus regarding recovery recommendations for 27 daily life activities was reached. This resulted in a set of multidisciplinary recommendations for TKA and UKA for 3 patient groups: patients with a fast, average, and slow recovery. This study was a first step towards the development of evidence-based recovery recommendations for KA patients. In the long term, prospective studies need to be performed to provide a better evidence base on which recommendations can be built.

Coherence between literature and practice

In recent years, several studies have been conducted that determined patient-reported time to return to daily life activities

after KA. Barker et al. (2018) determined time to return to specific functional and leisure activities after KA of 99 patients. For TKA, patients reported that they resumed stair climbing after 50 (SD 40) days, walking > 1 km after 60 (SD 55) days, and housework after 22 (SD 20) days (14). For UKA, this was 51 (SD 47), 39 (SD 40), and 16 (SD 13) days, respectively. In a different study, a Dutch clinic asked 200 of its recently operated TKA patients about their time to return to daily life activities (29) and found that, for example, patients from this clinic resumed stair climbing after on average 42 days.

A systematic review by Tilbury et al. found that 71–83% of TKA patients return to work after surgery (2), which varied between 8 and 12 weeks. The aforementioned study by Barker et al. concluded that TKA patients resumed work after 60 (SD 31) days, and UKA patients after 62 (SD 63) days (14). This is in contradiction with a study from Kievit et al. (2020), who reported that, in general, UKA patients return to work sooner compared with TKA patients (30). However, Barker et al. also reported that TKA patients were satisfied with doing their work 82 (SD 44) days after surgery, whereas UKA patients were satisfied after 65 (SD 45) days (14). The authors concluded that recovery regarding return to work is faster after UKA compared with TKA, because UKA patients feel more comfortable and satisfied with their work activities than TKA patients. Regarding the recovery course for return to work after TKA, Hylkema et al. (31) reported that after 3, 6 and 12 months, 24%, 51%, and 71%, respectively, had fully returned to work. To optimize return to work after TKA, the authors concluded that rehabilitation should be focused on physical impairments and activity limitations of the patient.

In the literature, no consensus exists as to how much physical activity should and can be prescribed to KA patients (32). A large number of patients do not return to sports after KA, varying between 0% and 64% (9). There are various studies that examined the time to return to sports after KA (22,28,33). For instance, in a study by Thaler et al. (22), recommendations regarding resumption of sporting activities after TKA were provided by members of the European Knee Association. For example, the authors stated that “cycling on level ground” was recommended to be allowed within 6–12 weeks.

When looking at the above-mentioned studies and considering implications for practice, it appears that the recovery recommendations of Dutch hospitals and clinics are not evidence-based. There is a lack and/or inconsistency in evidence, and where evidence is available it does not appear to be well implemented yet. Overall, the average patient-reported resumption dates from evidence fall within the time ranges of the included Dutch hospitals and clinics. However, the time ranges of the included hospitals and clinics vary widely. The large variation in recovery recommendations might lead to variation in the patients’ actual recovery, which is clinically and socially undesirable. These findings confirm the need for evidence-based recovery recommendations.

Strengths and limitations

A first strength of this study is that advice that is targeted to > 70% of Dutch KA patients has been incorporated in our overview. Second, hospitals and clinics from rural and urban areas were included, as well as academic, private, and peripheral hospitals. This selection yields that the findings are a good representation of Dutch hospitals and clinics performing KA. However, a limitation is that only the recommendations that are publicly available in brochures, websites, and/or apps were included. It could be that patients in hospitals and clinics, or in primary care, also receive other recommendations (i.e., during consultations with their orthopedic surgeon or physical therapist). These more casual and unformulated recommendations were not assessed in this study. A second limitation is that, although with the recommendations summarized in this study > 70% of Dutch KA patients were targeted, it remains unclear how many of these patients were actually reached. Future studies should be targeted at shedding light on these issues.

Conclusion

In general, hospitals and clinics in the Netherlands provided recommendations regarding only 9 activities of daily life to KA patients. The most reported activity was “walking without walking aid.” Recommendations regarding resumption of daily life activities varied greatly between hospitals and clinics, by often more than several weeks and/or even months. This study confirms that currently there is a lack of uniformity concerning recovery recommendations across healthcare providers. For KA patients, uniform recommendations are essential for setting realistic patient expectations, and we advise more multidisciplinary and patient-tailored recommendations for postoperative return to daily life activities, including work and sports. Such guidelines should preferably be tailored to specific patient needs, e.g., varying between age groups, lifestyles, body compositions, and knee-demanding work.

ACS, DJMS, PC, and PPFMK contributed to the conceptualization and design. ACS and DJMS collected the data, undertook the analysis, and prepared the original draft. PC and PPFMK supervised the project and provided input for the manuscript. PC, GMMJK, JRA, and PPFMK revised the manuscript.

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Supplementary data

Table 1. Overview of hospitals and clinics, in alphabetical order, from which recommendations were included in this study as well as number of KAs performed in 2019 in these centers

Hospital or clinic	TKA	UKA	Total
University Medical Center Groningen	72	3	75
Deventer Ziekenhuis	351	87	438
Flevoziekenhuis	239	19	258
Leiden UMC	49	0	49
Gelre Ziekenhuizen (Apeldoorn)	261	16	277
Ikazia Ziekenhuis	315	5	320
Meander Medisch Centrum	284	119	403
Maasstad Ziekenhuis	396	8	404
Martini Ziekenhuis	451	138	589
Maxima Medisch Centrum	317	24	341
Noordwest Orthopedisch Centrum	428	204	632
Sint Maartenskliniek	869	153	1022
Spaarne Gasthuis	523	106	629
St Anna	634	49	683
Tergooi Ziekenhuis	429	22	451
Annatomie MC	732	74	806
Slingeland Ziekenhuis	231	23	254
Orthopedisch Centrum Albert Schweitzer	419	78	497
Diakonessenhuis	314	79	393
Elizabeth Tweesteden Ziekenhuis	576	23	599
Fransiscus	490	63	553
Ziekenhuis Gelderse Vallei	307	33	340
Gelre Ziekenhuizen (Zutphen)	260	17	277
OCON Orthopedische kliniek	639	79	718
St. Antonius	548	49	597
Westfriesgasthuis & Waterlandziekenhuis	485	23	508
Zaans Medisch Centrum	307	40	347
Isala Klinieken	522	208	730
VieCuri Medisch Centrum	249	50	299
Zuyderland	713	117	830
Onze Lieve Vrouwe Gasthuis	338	45	383
Amphia	326	247	573
Rijnstate	501	72	573
Wilhelmina Ziekenhuis Assen	397	38	435
Zorgsaam	233	49	282
Medisch Centrum Leeuwarden	288	117	405
Bergman Clinics	1943	641	2584
Alrijne Ziekenhuis	646	76	722
Radboud University Medical Center	81	6	87
Maastricht University Medical Center	169	16	185
Kliniek ViaSana	525	247	772
Treant Zorggroep	594	29	623
Bravis Ziekenhuis	368	78	446
Total	18,819	3,570	22,389
% of total patients included in this study	71.9	73.4	72.1