Is there predictive criteria for transfer of patients to a rehabilitation ward after hip and knee total arthroplasty?
Elaboration of French clinical practice guidelines

E. Coudeyre, M.-M. Lefevre-Colau, A. Griffon, A. Camilleri, P. Ribinik, M. Revel, F. Rannou

1. Introduction
Total hip arthroplasty (THA) is a frequent intervention whose incidence is increasing with the aging of the population [3]. Ha-Vinh et al. [11] found an annual incidence of 4705 THA in the Provence area of France for the year 2000, which translates to a national incidence of approximately 105,000 THA per year. In comparison with other countries, the French annual THA rate is one of the highest [9]. For example, although THA is one of the most frequent orthopedic interventions, the rate in UK was only 40,000 for the year 2000 [12]. The French annual rate for total knee arthroplasty (TKA) is approximately 40,000 [8]. Currently, after these interventions, when patients exit the orthopedic surgery ward, they are directed either to a rehabilitation ward or return home directly with assistance; the discharge recommendations vary among internationally [3,7,15,21]. Until recently, in the main industrialized countries, approximately 50–60% of the patients were transferred to a rehabilitation ward after THA or TKA [3,18,19]. In France,
Hu-Vinh et al. [11] showed that among 4705 patients with THA, 46.6% were referred to a rehabilitation ward, and 39.5% returned directly home; the remaining patients either went to another acute-care ward or a long-term stay ward or died. In a more recent retrospective study, Maravic and Landais [16] found 33% of 69,948 patients with THA transferred to a rehabilitation ward versus 44% of 42,733 patients with TKA. However, in UK, a study carried out in 2000 showed that most patients returned directly home and only 6% transferred to another ward after surgery [12].

In the last several years, the mean length of hospital stay has been reduced after THA or TKA but varies within France and internationally. In France, a retrospective study by Maravic and Landais [16] showed a mean length of stay in an orthopedic ward of 13 (± 5.5) days after THA and 12.1 (± 6.3) days after TKA. Forrest et al. [7], in a study in New York, showed a significant reduction of length of hospital stay after THA and TKA, from 6.4 days in 1995 to 5.1 days in 1997. The impact of length of hospital stay on patient transfer after surgery is not yet clearly established. Forrest et al. showed that reduced length of stay was linked to a greater proportion of patients admitted to a rehabilitation ward, from 18% in 1995 to 33% in 1997 [7]. However, Oldmeadow et al. [20], in a more recent study, showed that reduced length of hospital stay could lead to an increase in direct return home, when pre-operative patients’ conditions are assessed and modified during the immediate post-operative phase. Thus, the assumption of responsibility in patients’ post-operative rehabilitation varies within France and internationally.

Post-operative rehabilitation is changing in France because of French health agency (HAS) guidelines [10]. Thus, for THA, recommendations are for rehabilitation at home, in cases lacking complications, comorbidities or limited social support. Complementary evaluations are necessary for TKA. Objective criteria must be evaluated to reduce length of hospital stay and the current tendency to transfer patients directly home to better direct patients to a post-operative care that is adapted to their needs.

Studies have found several criteria, such as age, sex, ethnicity, medicare status, comorbidities, residence conditions, osteoarthritis localization, postoperative complications, patient preference and knowledge about the surgery, related to transfer to a rehabilitation ward or direct return home after THA or TKA surgery [3,6,7,11,15,18,19,25] but did not evaluate their impact on the final results of total arthroplasty. We aimed to develop clinical practice guidelines concerning predictive criteria for transfer of patients to a rehabilitation ward after TKA or THA.

2. Method

We used the SOFMER 3-stage method for developing guidelines, which involves systematic literature review, collection of information about professional practice and final scientific committee review [23].

2.1. Systematic literature review

2.1.1. Study literature review

Literature search professionals systematically searched the PubMed, Pascal Biomed, and Cochrane Library databases for articles published from January 1966 to January 2006 using search terms defined by the scientific committee. Keywords were proposed by the steering committee composed of physical medicine and rehabilitation (PMR) and rheumatology physicians and orthopedic surgeons. The keywords were arthroplasty, replacement, hip, knee, rehabilitation, physiotherapy, exercise, physical therapy, and continuous passive motion. Selected were abstracts of studies of all design that were published in English or French and investigated adult human patients. The literature search professionals sent abstracts to the scientific committee, who then narrowed the selection of abstracts to analyze by ensuring that “rehabilitation intervention” was present in the abstract, then requested the full-length articles of the selection from professional literature searchers. A second selection was made by three experts from two different medical specialties (orthopedic surgeon [A.C.] and PMR physicians [A.G. and M.M.L.C.]) to retain only articles related to predictive criteria for transfer of patients to a rehabilitation ward after THA and TKA. Finally, the abstracts of articles cited as references were analyzed.

The quality of each manuscript was assessed according to the four-level grading scale of the French Agency for Accreditation and Evaluation in Healthcare (ANAES) [23].

2.1.2. Outcomes

Four different types of criteria were used:

- Demographic data.
- Psychosocial and environmental data.
- Deficiency and disability data.
- Medical comorbidities.

2.1.3. Data analysis

Three blinded independent reviewers, an orthopedic surgeon (A.C.) and two PMR physicians (A.G. and M.M.L.C.), analyzed the data.

2.1.3.1. Daily practice. Daily practice for predictive criteria for transfer of patients to a rehabilitation ward was recorded at the national congresses of rehabilitation (SOFMER Congress, Rouen, France, October 18, 2006) and orthopedic surgery (SOFCOR National Congress, Paris, November 7, 2006), by use of an electronic vote device. After the vote, the literature data were presented by one of the three experts (M.M.L.C.). Then, the session was open for questions and comments. A medical secretary took notes during the question-and-comment period.

2.1.3.2. Elaboration of guidelines and external review by a reading committee. Practice guidelines based on literature
review and daily practice were written. These guidelines were reviewed by the scientific committee before validation by a reading committee.

3. Results

3.1. Literature review

3.1.1. Article selection

The scientific committee selected 147 manuscripts from PubMed, 60 from Pascal Biomed, and 10 from the Cochrane database. Among these articles, each reviewer retained 15 articles. One study was added to the scientific committee selection [25]. Final literature analysis involved 16 studies. Five studies concerned THA [3,4,11,13,24], two TKA [18,25], and nine both TKA and THA [6,7,9,14–16,19,20,22].

3.1.2. Studies’ methodologic quality

The three experts did not differ in grading studies by use of the ANAES scale. Among the 16 selected studies, none deserved an ANAES level 1, one study deserved a level 2 [19], seven studies a level 3 [3,6,11,18,20,22,24] and eight studies a level 4 [4,7,9,10,14–16,25]. No randomized controlled trial was found.

3.1.3. Results of data extraction

3.1.3.1. Criteria associated with patient transfer to a rehabilitation ward or direct return home. Demographic data. All the studies selected except one found that older age was associated with transfer to a rehabilitation ward after THA or TKA. These results come from four prospective cohort studies (one level-2 and three level-3 studies) [3,6,16,17] and four retrospective studies (all level-4 studies) [7,11,15,25] (Table 1). Two other studies concerning THA only [3,11] and two TKA only [18,25] found the same results.

Study results were contradictory in terms of the predictive value of sex. Five studies, including three prospective studies (one level-2 and two level-3 studies) [3,18,19] and two retrospective studies (level-4 studies) [11,15] showed that female sex was associated with transfer to a rehabilitation ward (Table 1). However, Forrest et al. [6,7], in two different studies, showed that female sex was not associated with transfer to a rehabilitation ward (level-3 and level-4 studies) (Table 1).

Psychosocial and environmental criteria. All the selected studies showed that living alone was associated with transfer to a rehabilitation ward. These results come from four prospective cohort studies (one level-2 and three level-3 studies) [3,6,18,19] (Table 2). Data from two studies concerning THA only [3] or TKA [18] do not change these results.

Patient preference, which seems to be a main criterion, was not taken into account by many studies. The two studies investigating this criterion showed it to be the most important. In the study of Oldmeadow et al. [18], among 520 patients with THA or TKA, patient preference to return home directly had an odds ratio of 12.94 (95% CI 7.65–21.89) (level-2 study) (Table 1). Mahomed et al. [15], in a retrospective study of 146 patients with THA or TKA, also showed this criterion to be the most predictive factor, with an odds ratio of 34.2 (95% CI 19.1–61.4) (level-4 study). Heine et al. [13] noted, from semidirected interviews carried out near five subjects, that psychosocial factors such as self-confidence and patient safety, as well as family and friends, helped play a major role in the transfer decision (level-4 study). Other environmental criteria were analyzed. The French retrospective study of Ha-Vinh et al. [11], in

<table>
<thead>
<tr>
<th>Author</th>
<th>Type of study</th>
<th>Population</th>
<th>Subject number</th>
<th>Country</th>
<th>Outcomes</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oldmeadow [13]</td>
<td>Cohort level 2</td>
<td>THA + TKA</td>
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<td>Australia</td>
<td>Age = S &lt; 0.001</td>
<td>Gender = S &lt; 0.001</td>
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<td>Forrest [5]</td>
<td>Cohort level 3</td>
<td>THA + TKA</td>
<td>129</td>
<td>USA</td>
<td>Age = S &lt; 0.001</td>
<td>Gender = NS</td>
</tr>
<tr>
<td>de Pablo [2]</td>
<td>Cohort level 3</td>
<td>PTH</td>
<td>758</td>
<td>USA</td>
<td>Age = S: RR 1.60 (95% CI 1.33–1.93)</td>
<td>Gender = S: RR 1.35 (95% CI 1.11–1.64)</td>
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<td>Gender = NS</td>
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<td>Forrest [4]</td>
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<td>THA + TKA</td>
<td>125</td>
<td>USA</td>
<td>Race = S: Odds ratio 4.1 (95% CI 1.7–10.0)</td>
<td>Gender = NS</td>
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<td>Retrospective level 4</td>
<td>THA</td>
<td>4705</td>
<td>France</td>
<td>Age = S: Odds ratio 1.01 (95% CI 1.01–1.02)</td>
<td>Gender = S: Odds ratio 1.45 (95% CI 1.26–1.67)</td>
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<td>Australia</td>
<td>Age = S</td>
<td>Gender = S: P = 0.07</td>
</tr>
<tr>
<td>Wasielewski [21]</td>
<td>Retrospective level 4</td>
<td>TKA</td>
<td>106</td>
<td>USA</td>
<td>Age = S</td>
<td>S: P = 0.07</td>
</tr>
</tbody>
</table>

*THA replacement.
Provence, showed that the stay in a rehabilitation ward was more frequent after the procedure had taken place in a public hospital or when the place of dwelling was located in a mountain or rural area rather than a urban area (level-4 study) (Table 2).

Clinical and functional criteria. Few studies took an interest in clinical and functional outcomes as predictive criteria in patient transfer to a rehabilitation ward. In the study of Oldmeadow et al. [19], among 650 patient with THA or TKA, apart from patient preference, the most significant factor was decreased maximum walking distance and/or use of pre-operative devices such as crutches (level-2 study) (Table 3). The cohort study of de Pablo et al. [3] showed no relation between pre-operative impairment and transfer to a rehabilitation ward, but the inability to walk unaided or with devices, without human assistance, in the immediate post-operative phase, was the most important criteria associated with transfer. In this study, patient preference was not assessed [3]. In the study of Mahomed et al. [15], returning directly home was not linked with pre-operative disability. In the two last studies, the data concerning the pre-operative phase were retrospectively analyzed. Oldmeadow et al. [18] did not find a relation between post-operative range of motion and transfer to a rehabilitation ward (level-3 study) and Wasielewski et al. [25] did not find a relation between post-operative complications and transfer (level-4 study).

Medical comorbidities. Studies are contradictory in terms of the role of comorbidities in transfer to a rehabilitation ward. In the cohort prospective study of Forrest et al. [6], for 129 patients with THA or TKA, a high American Society of Anesthesiology (ASA) score (integrating several comorbidities), pre-operatively assessed by anesthetist physicians, predicted transfer to a rehabilitation ward (level-3 study), but the authors did not assess pre-operative patient impairment. However, this finding was not revealed in the study by Oldmeadow et al. [19] (level-2 study), that by de Pablo et al. [3] (level-3 study), or the two retrospective studies of Mahomed et al. [15] and Forrest et al. [7] (level-4 studies).

For TKA, the study by Wasielewski et al. [25] found that patients with a high ASA score or a low Knee Society Classification System (KSCS; Appendix A) score, which evaluates

| Table 2 Psychosocial and environmental predictive criterias for patients’ discharge destination after THA or TKA |
| --- | --- | --- | --- | --- | --- |
| Author | Type of study | Population | Subject number | Country | Outcomes Results |
| Oldmeadow [13] 2003 | Cohort level 2 | THA + TKA | 520 | Australia | Patient’s preferences S: Odds ratio 12.94 (95% CI 7.65–21.89) P < 0.001 |
| | | | | | Leaving alone |
| | | | | | Social support |
| | | | | | Home environment |
| Forrest [5] 1999 | Cohort level 3 | THA + TKA | 129 | USA | Leaving alone S: P < 0.01 |
| de Pablo [2] 2004 | Cohort level 3 | THA | 758 | USA | Leaving alone S: RR: 1.51 (95% CI 1.27–1.84) |
| | | | | | Bas revenus S: RR: 1.16 (95% CI 1.08–1.26) |
| | | | | | Education level |
| | | | | | Leaving alone |
| | | | | | Bas revenus |
| Ha-Vinh [7] 2005 | Retrospective level 4 | THA + TKA | 28 | France | Public/private hospital S: Odds ratio adjusted 1.93 (95% CI 1.68–2.22) P < 0.0001 |
| | | | | | Urban or mountain leaving S: Odds ratio adjusted 2.53 (95% CI 2.03–3.15) P < 0.0001 |
| Mahomed [11] 2000 | Retrospective level 4 | THA + TKA | 146 | Canada | Patient preferences S: Odds ratio 34.2 (95% CI 19.1–61.4) |
| | | | | | Information quality about surgery |
| | | | | | Education level |
| | | | | | Couple/single S: Odds ratio 3.3 (95% CI 1.6–6.7) P = 0.001 |
| | | | | | Social support NS |
| | | | | | Home environment NS |
| Oldmeadow [14] 2002 | Cohort level 3 | TKA | 105 | Australia | Home environment S: P < 0.003 |
| | | | | | Leaving alone S: P = 0.002 |

*THA revision.
general and musculoskeletal comorbidities, were more often transferred to a rehabilitation ward \( (P = 0.0001) \). However, the number of associated medical risk factors (more than 4), did not influence patient transfer (level-4 study) (Table 4).

### 3.1.3.2. Criteria associated with increased length of stay

Five studies analyzed the criteria associated with increased length of stay in the surgery or rehabilitation ward. Peerbhoy et al. [22] showed, in an observational prospective study of 160 patients with THA or TKA, that being older was associated with increased length of stay in the orthopedic surgery ward \( (r = 0.26, P < 0.001) \) (level-3 study). Wang et al., in a cohort study of 65 Australian patients with THA, showed a low pre-operative muscular peak torque for hip flexors and extensors, as well as low functional score on day 3 after the intervention (modified Barthel index [MBI]) with post-operative \( j_3 \) score \( (66.5 \pm 11.8 \text{ versus } 55.1 \pm 15.4) \) associated with increased length of stay in a surgery ward (level-3 study) [2]. Lin and Kaplan [14], in a retrospective study of 808 patients with THA and TKA, found type of surgical indication, number of comorbidities, marital status and, to a lesser degree, older age or male sex as predictive criteria of an increased length of stay in a rehabilitation ward (level-4 study). In the study by Wasielewski et al. [25], the length of stay in a surgery ward was longer for patients with a low pre-operative International Knee Society (IKS) \( (P = 0.002) \) and for those with more medical or musculoskeletal comorbidities (KSCS score of C). In this study, the number of risk factors \( (P = 0.958) \) or the ASA score \( (P = 0.375) \) were not significantly related with the mean length of stay (level-4 study) [25].

**Table 3**

<table>
<thead>
<tr>
<th>Author</th>
<th>Type of study</th>
<th>Population</th>
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<th>Country</th>
<th>Outcomes</th>
<th>Results</th>
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<td>Pre-operative maximum walking distance ( P &lt; 0.001 )</td>
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<td>THA</td>
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<td>USA</td>
<td>Pre-operative use of sticks ( P = 0.001 )</td>
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<td></td>
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<td>Post-operative incapacity to walk on its own or without sticks</td>
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<td>758</td>
<td>USA</td>
<td>Information quality about surgery ( NS )</td>
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<td>758</td>
<td>USA</td>
<td>ASA score ( NS )</td>
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<td>Obesity ( S: RR: 1.35 (95% CI 1.11–1.65) P &lt; 0.001 )</td>
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<td>THA</td>
<td>425</td>
<td>USA</td>
<td>Obesity ( NS )</td>
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<td>Forrest [4]</td>
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<td>USA</td>
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<td>106</td>
<td>USA</td>
<td>Risk factor number ( NS )</td>
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* : Rheumatoid arthritis.
Finally, few studies took into account biological markers in increasing length of stay. In all these studies, only the biological markers and other medical conditions were taken into account, but none of the other described criteria are mentioned. In the prospective study by Mukand et al., for 39 patients with THA or TKA, dehydration responsible for functional renal insufficiency associated with post-operative orthostatic hypotension increased the mean length of stay in the rehabilitation ward (level-4 study) [16]. The cohort study of Hall et al., of 102 patients with THA and TKA, showed that normal gait recovery was longer for patients with high C reactive protein (CRP) or interleukin 6 level. The interleukin 6 rate was predictive of the time needed to walk 10–25 m into post-operative, and CRP rate at day 2 after the intervention was correlated with pain on discharge day (level-3 study) [8]. Finally, a case report described severe post-operative anemia over the duration of rehabilitation and its associated cardiopulmonary risk (level-4 study) [4].

3.1.3.3. Predictive composite index. Oldmeadow et al. developed and validated the Risk Assessment and Predictor Tool (RAPT), a set of criteria predicting patient transfer to a rehabilitation ward after THA and TKA. The selected criteria resulted from a retrospective cohort study of 650 patients. Criteria were age, sex, pre-operative disability with or without technical assistance, social support, living alone and patient preference. The index was then obtained from a logistic regression analysis. Patient preference, which had a high weight, was withdrawn from the model and was analyzed separately without any change in study power. The index was then validated in a prospective cohort study of 130 patients with THA or TKA. The transfer to a rehabilitation ward was correctly predicted for 74.6% of patients. The authors found the prediction incorrect in 32 cases, which corresponded to intermediate scores of the RAPT (six to nine points; range 0–32 cases, which corresponded to intermediate scores of the RAPT (six to nine points; range 0–12). From this questionnaire, the authors determined that a low score (minus 6) is predictive of transfer to a rehabilitation ward with an accuracy of 89% (level-2 study) [19]. In a second prospective study, the authors confirmed that this pre-operative index was associated with post-operative discharge destination after lower limb arthroplasty (F = 2029, P = 0.003) (level-4 study) [Appendix B] [20].

3.2. Daily practice

3.2.1. THA (Table 5)

Daily practice differs significantly between PMR physicians and orthopedic surgeons. A total of 58% of PMR physicians recruit their patients on the basis of medical and psychological criteria as compared with 36% of the orthopedic surgeons. Of the orthopedic surgeons, 33% direct their patients post-operative according to family or patient requests as compared with 5% of the PMR physicians. The orthopedic surgeons, twice more than PMR physicians, take into account economic and social criteria, whereas PMR physicians advise double the patients orthopedists do according to a usual network (23 versus 10%)

Orthopedic surgeons use their own evaluation to advise patients about post-operative care (90%) as compared with 21% of PMR physicians; 59% of the latter take into account the evaluation of the orthopedic surgeons. Of the PMR physicians, 8%, versus 1% of the orthopedic surgeons, perform a pre-operative multidisciplinary evaluation. Autoadministered questionnaire, physical therapist, social worker or nurse in chief evaluation are not often used by the two groups.

3.2.2. For TKA (Table 6)

Most PMR physicians (66%) and orthopedic surgeons (56%) direct their patients post-operatively according to medical and psychological criteria. The usual network is used by 29% of the PMR physicians and 16% of the orthopedic surgeons. Lastly, 19% of the orthopedic surgeons and only 1% of PMR physicians base the transfer decision on family or patient requests, economic and social criteria being taken into account by only 7% of orthopedic surgeons and 3% of PMR physicians.

Concerning the procedures used to direct the patient, orthopedic surgeons use mainly their own evaluation (90%), which is ratified by most PMR physicians (65%). A lesser proportion of PMR physicians use their own evaluation (18%) or a pre-operative multidisciplinary evaluation (9%).

4. Discussion

The systematic review of the literature on criteria related to transfer of patients to a rehabilitation ward after THA or TKA reveals a lack of studies in this area and their low level of scientific proof. Indeed, we found no level-1 study and only one level-2 study; most were levels 3 and 4. For only nine studies of 16, the main criteria in transfer was the discharge
inform and educate patients\[1,2\]. Thus, Oldmeadow et al.
important factor. This criterion could be probably modified by
[12]. If patient preference is taken into account, it is the most
operative care does not appear in the international literature
main limitations in returning home directly.
ment, health resources and limited home accessibility are the
patients. In a practical way, in France, the medical environ-
particular, the length of stay differs between THA and TKA
criteria according to type of arthroplasty (THA and TKA). In
in patients
medical, functional and social criteria of assumption of respon-
sibility according to the pre-operative RAPT values
(criterion related to transfer to a rehabilitation ward after
TKA (%)
How do you direct or recruit your patients at the
discharge of orthopedic surgery ward after TKA
(1 possible answer)
<table>
<thead>
<tr>
<th>PMR physicians</th>
<th>Orthopedic surgeons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rather on medical and psychological criteria</td>
<td>66</td>
</tr>
<tr>
<td>Rather on economic and social criteria</td>
<td>3</td>
</tr>
<tr>
<td>According to the usual network</td>
<td>29</td>
</tr>
<tr>
<td>Specific request of the patient or the family</td>
<td>1</td>
</tr>
<tr>
<td>Otherwise</td>
<td>1</td>
</tr>
<tr>
<td>Which main procedure do you use to direct your patients during the post-operative phase?</td>
<td></td>
</tr>
<tr>
<td>Pre- or post-operative surgeon evaluation</td>
<td>65</td>
</tr>
<tr>
<td>Questionnaire filled out by the patient in pre- or post-operative</td>
<td>0</td>
</tr>
<tr>
<td>Pre-operative multidisciplinary evaluation</td>
<td>9</td>
</tr>
<tr>
<td>Pre- or post-operative PMR physician evaluation</td>
<td>18</td>
</tr>
<tr>
<td>Pre- or post-operative evaluation by the welfare officer or the nurse in chief</td>
<td>4</td>
</tr>
<tr>
<td>Physical therapist post-operative evaluation</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
</tr>
</tbody>
</table>

destination (to a rehabilitation ward or directly home). For the
seven other studies the main criterion was the length of stay in
an orthopedic or rehabilitation ward.

The analysis of the literature revealed that patient orienta-
at after THA and TKA depends on multiple factors and does
not allow for differentiating the relative importance of these
criteria according to type of arthroplasty (THA and TKA). In
particular, the length of stay differs between THA and TKA
patients. The way of living (alone or with family, friends or
professional support) plays a significant role in the transfer of
patients. In a practical way, in France, the medical environ-
ment, health resources and limited home accessibility are the
main limitations in returning home directly.

This aspect of the assumption of responsibility for post-
operative care does not appear in the international literature
and might relate to differences among health care systems
[12]. If patient preference is taken into account, it is the most
important factor. This criterion could be probably modified by
multidisciplinary pre-operative rehabilitation aiming to better
inform and educate patients [1,2]. Thus, Oldmeadow et al.
[20] showed that a post-operative-targeted assumption of
responsibility according to the pre-operative RAPT values
increases the proportion of patients returning directly home
and decreases length of hospital stay. No study, in particular
for TKA, investigated the pre-operative clinical state of the
limb operated on. Indeed, the clinical and functional orienta-
tion criteria related to transfer to a rehabilitation ward after
THA and TKA are little studied.

The literature search findings do not agree with those from
clinical practice, in particular for TKA. Indeed, after TKA,
most PMR physicians (66%) and orthopedic surgeons (56%)
direct their patients to a rehabilitation ward according to med-
ical and psychological criteria (Tables 5 and 6). The clinical
practices are different for THA and are closer to those found
in the literature. After THA, orthopedic surgeons take into
account clinical criteria (36%) as well as the request of the
family (33%) (Table 5). However, even for THA, PMR physi-
cians mainly direct their patients according to clinical and psy-
chological criteria (58%). This difference between clinical
practice and literature findings underlines the need for distin-
guishing THA and TKA in future studies.

Concerning comorbidities, the literature analysis revealed
that when they are under control they were not correlated
with a transfer to a rehabilitation ward. However, the impact
of medical comorbidities on disability is predictive of transfer.
Two different studies assessing comorbidities with the ASA
score found comorbidities associated with transfer to a rehabili-
tation service [6,25]. Wasielewski et al. [25] also found a
positive correlation, for 106 TKA patients, between the
KSCS score, medical and musculoskeletal comorbidities and
transfer to a rehabilitation ward. de Pablo et al. [3] also used
the ASA score but did not find any significant correlation;
however, in this study, the pre-operative data were collected
retrospectively. The five other studies taking into account
comorbidities did not find significant correlations. These con-
tradictory results can be explained in part by the evaluation
criteria used to assess comorbidities. The ASA score takes
into account more the impact of comorbidities on disability
(restriction or fitness in everyday life activities) than the
comorbidities themselves. Finally, the literature review does
not allow for knowing whether biological criteria play a role
in patients’ transfer because of a very low number of studies
and an absence of multivariate analysis.

None of these studies evaluate these criteria in improving
the final result of TKA or THA. In addition, evaluation of
French clinical practices do not allow for distinguishing
between transfer to a rehabilitation ward or a continuing care
ward when the patient does not return home. To solve these
problems, the French PMR Federation (FEDMER) proposed
medical, functional and social criteria of assumption of respon-
sibility [5]. However, these criteria were not validated accord-
ing to a scientific procedure and were not published in an
indexed review. The French High Authority of Health (HAS)
also [10] developed guidelines established by formalized con-
sensus, for the need for patients to be transferred to a rehabili-
tation ward after orthopedic surgery to receive physical therapy
care. These guidelines are contestable because of the method
used in their development (absence of systematic analysis of
the literature, choice of the experts) and because of the lack
of precision of the proposed criteria. Lastly, no study has
assessed the impact of these guidelines on the effectiveness
of rehabilitation in terms of recovery of joint range of motion
and functional improvement.

5. Limitations

Our literature analysis shows that the post-operative transfer
of a patient to a rehabilitation ward after THA and TKA is
linked to several interdependent multiple criteria. The scientific
proof level is low for most of the studies analyzed because of
limited subject number, single-center recruitment and retro-
spective analysis. In most of these studies, the analysis is not
by type of arthroplasty. The studies carried out on the French territory do not allow for distinguishing between transfer to a rehabilitation ward or a continuing care unit. Finally, our literature analysis may allow for defining some criteria but does not relate the benefit of the criteria in terms of the effectiveness of arthroplasty.

6. Conclusion

The course of care of a patient after THA and TKA is not well determined and depends on several criteria. Among those, the most significant are older age, disability, living alone and, patient preference. Pre-operative education and understanding the intervention process could modify patient preference and increase the number who return directly home after surgery. Indeed, an evolution of the assumption of responsibility after THA and TKA is an inescapable process in terms of “health economic data”. Patients who could return home directly might be identified, provided that they profit from an adapted assumption of responsibility and good monitoring. The others, older patients or those living alone, could be directed toward a continuing care ward, whereas those with a pre- or post-operative disability could be transferred to a rehabilitation ward. These criteria must be validated by broad multicentric studies of homogeneous cohorts of patients.

7. Clinical practice guidelines

From systematic literature review and collection of French professional practice, we cannot distinguish the patients undergoing THA and TKA who can transfer to a rehabilitation ward. For both types of patients, the main criteria determining transfer are demographic criteria such as older age or female sex; psychosocial and environmental criteria such as living alone, feeling unable to return home directly (pre-operative education could modify this criterion); and surgeon advice based on the pre and post-operative clinical and functional status.

Studies with good methodological quality are urgently needed to evaluate the use of predictive tools such as the RAPT, separating THA and TKA, and using as parameters of assessment functional status and handicap reduction.

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**Matter Claire** (Infirmière).

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Appendix A

A.1. KSCS

<table>
<thead>
<tr>
<th>Class A</th>
<th>Class B</th>
<th>Class C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral arthroplasty</td>
<td>Other joint in need of arthroplasty</td>
<td>Advanced inflammatory arthroplasty</td>
</tr>
<tr>
<td>No significant medical comorbidity</td>
<td>Other unsuccessful or failing arthroplasty</td>
<td>Multiple joints in need of arthroplasty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple unsuccessful or failing arthroplasty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Significant medical comorbidity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Significant psychologic impairment</td>
</tr>
</tbody>
</table>

Appendix B

B.1. Risk assessment and prediction tool (RAPT)

<table>
<thead>
<tr>
<th>What is your age group?</th>
<th>Gender</th>
<th>How far, on average, can you walk?</th>
</tr>
</thead>
<tbody>
<tr>
<td>50–65 years</td>
<td>Male</td>
<td>Two blocks or more (± rests) (a block is 200 m)</td>
</tr>
<tr>
<td>66–75 years</td>
<td>Female</td>
<td>One to two blocks (the shopping center)</td>
</tr>
<tr>
<td>&gt; 75 years</td>
<td></td>
<td>Housebound (most of the time)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Which gait aid do you use? (more often than not)</th>
<th></th>
<th>Do you use community supports (home help, meals-on-wheels district nurse)</th>
<th></th>
<th>Will you live with someone who can care for you after your operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td>None or 1 per week</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Single-point stick</td>
<td></td>
<td>Two or more per week</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Crutches/frame</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Your score (out of 12).

Key: Destination at discharge from acute care predicted by score:

Scores < 6 = Extended rehabilitation.

Score 6–9 = directly home after additional acute intervention.

Scores > 9 = directly home.

Patient’s expectation of discharge destination is also a determinant. The prediction indicated by the score is discussed with the patient and the destination agreed upon.

References


