Preoperative interventions in patients with severe knee osteoarthritis undergoing total knee replacement: neuromuscular training and patient education

Citation for published version (APA):

Document status and date:
Published: 01/01/2015

Document Version:
Publisher's PDF, also known as Version of record

Please check the document version of this publication:
- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

Link to publication

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the “Taverne” license above, please follow below link for the End User Agreement:
www.umib.nl/taverne-license

Take down policy
If you believe that this document breaches copyright please contact us at:
repository@maastrichtuniversity.nl
providing details and we will investigate your claim.

Download date: 22 Aug. 2019
Valorisation

This dissertation generated new knowledge in the field of preoperative interventions in patients with severe knee osteoarthritis and planned total knee replacement. In addition to the scientific value of this thesis, described in Chapters 2-7, this section presents and explains the innovative aspects of the thesis, discusses the findings in the social and economic contexts, reveals the potential for further target groups, and proposes approaches for the transfer into clinical practice.

INNOVATION

Approximately 30% of patients are dissatisfied with regard to pain relief and function following TKR [1-5]. Preoperative education has been proposed as a modality to improve outcomes postoperatively [6, 7]. This intervention offers the opportunity to provide patients with relevant information and to address the realistic expectation of outcomes, since patient expectation is known to have an impact both on functional outcome and quality of life after joint replacement. The authors of a recent review concluded that current evidence is insufficient to recommend preoperative education in routine clinical practice and that further research is required to assess the cost effectiveness and long term patient-reported benefits associated with such intervention [8]. However, in all of the included studies the content of the educational intervention was not evaluated and patients were not asked to comment on whether the content actually met their needs. We have developed and carried out preliminary psychometrical testing on the Knee Osteoarthritis Patient Education Questionnaire (KOPEQ), a new instrument to assess the validity of preoperative patient education interventions, such as the Knee Osteoarthritis Patient Education Intervention (KOPEI) [9]. In our opinion, it is important to embed discussion and exchange of experience in patient education interventions in order to increase understanding and motivation. There is increasing interest in the validation of aspects of patient education interventions but, until now, the focus has been largely on patient information, such as print or audiovisual material [10, 11]. Therefore, the findings presented in this thesis are innovative.
Valorisation

It is conceivable that this new instrument could also be transferrable to patients of other education interventions, e.g. to patients prior to total hip replacement.

SOCIAL AND ECONOMIC RELEVANCE

Between 2002 and 2012 the total number of knee replacements in Switzerland increased by 50%. In 2012, 16'696 persons received a knee replacement, with median hospital charges of around 18’000 Swiss Francs per person [12, 13]. This increase demonstrates the relevance of the topic to society. Prolonged hospitalization, due to decreased physical fitness during the pre-intervention period (as in the case of patients awaiting TKR), increases the economic burden on society. Our findings, however, do not provide a conclusive answer as to whether preoperative exercise has a beneficial impact on postoperative functional outcome [14]. The results were influenced by several limitations, including the relatively small recruited sample size. In addition, due to a change in the reimbursement system in acute care hospitals, a reduction in preoperative waiting-time occurred during the recruitment phase. As a result of our inconclusive evidence on the beneficial effects of preoperative exercise, we are unable to recommend the implementation of preoperative exercise into clinical practice.

Our data are, however, encouraging for the many patients scheduled for unilateral knee replacement who also report pain and functional impairment in the contralateral knee, suggesting that not only the operated knee but also the contralateral knee improves after the intervention. Surgeons should inform patients with bilateral knee OA on the likelihood of recovery of the contralateral knee and also recommend a delay in further surgery on the second knee of at least 3 months after the first surgery. This recommendation is in line with a recent consensus statement from the consensus conference on bilateral total knee arthroplasty group [15].

This thesis did not show a direct impact on the social and economic burden, but it revealed new insights and can be taken as a point of departure for further exploration and assessment in this field of research.

TARGET GROUP

The results reported in this dissertation are of importance to people suffering from severe knee OA prior to replacement surgery. As recommended by clinical guidelines [16, 17], exercise is a core component of knee OA management and different types of exercise (such as strengthening, aerobic and neuromuscular / functional stability training) are recommended. The relatively modest benefits of exercise found to date may be explained by the one-size-fits-all approach to exercise prescription, without taking into account individual characteristics, which is likely to attenuate treatment effects [18].
The neuromuscular intervention used in our RCT (NEMEX-TJR) is feasible and safe and it is likely that people with greater varus malalignment during walking respond best to this neuromuscular program that addresses frontal plane control, functional stability and alignment of the knee in functional upright tasks. This assumption has recently been supported by preliminary findings [19], but further research is needed to confirm whether targeted exercise treatment based on individual characteristics can optimize outcomes in knee OA.

TRANSFER OF KNOWLEDGE

Since exercise is a recommended treatment for people with knee OA [17], we suggest that functional stability exercise, including neuromuscular exercise, is a well-tolerated intervention and that practitioners who already apply this type of exercise should continue to do so. They should be aware, however, that future studies might lead to different results.

Many results (including ours) do not give a conclusive answer to the question of whether additional preoperative exercise has a beneficial effect on postoperative functional outcomes [14, 22, 23]. We therefore cannot recommend preoperative exercise as standard treatment before TKR surgery.

Our results have revealed new and important insights into how education and training services and functioning domains might be linked together by patients [9]. Our results could lead to further research activities, including further validation, translation into other languages and corresponding cross-cultural adaption. Therapeutic validity is not only an issue in therapeutic exercise interventions [24] but also in patient education interventions. Our research contributed to this issue by developing and psychometrically testing a new measure to assess the validity of a preoperative education intervention.

Physical function can be measured either through self-reporting or by systematic observation by clinicians. It seems that only low to moderate correlations can be expected between self-reported and performance-based measures. Patients appear to perceive an improvement in function compared to pre-surgery, even though their capacity to perform a task has not increased in reality. Self-reported measures, such as KOOS and WOMAC, probably best reflect the benefit of TKR three months after surgery.

CONCLUSION

Based on the work in this thesis, we are unable to recommend the implementation of preoperative exercise as a standard treatment in clinical practice. Alongside strengthening and aerobic exercise, functional stability exercise could be applied as a stand-alone intervention or in addition to the other types of exercise, but further research should
Valorisation

explore what types of exercise, at what frequency, intensity and duration is best to help patients with knee OA, targeting the specific individual biomechanical characteristics.

Patient education interventions are recommended [25] and it is hoped that these interventions would include more than just patient information. Their therapeutic validity as well as the outcomes should be equally evaluated.
REFERENCES


