

# Permissive weight bearing in trauma patients with peri- and intra-articular fractures of the lower extremities

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## Study impact

### Main research goal

The main research goal of this thesis was the comprehensive assessment in terms of ADL, quality of life, pain, postoperative complications and costs of permissive weight bearing versus the current standard restricted weight bearing aftercare protocols in surgically treated trauma patient with peri- and/or intra-articular fractures of the lower extremities. Permissive weight bearing (PWB) is effective and cost-effective and can be used as a novel approach in the aftercare treatment in surgically treated trauma patient with peri- and/or intra-articular fractures of the lower extremities. The PWB regimen led to the patients being able to bear full weight on their affected leg much sooner, with improved Activities of Daily Living and quality of life, compared to those who followed the current restricted weight bearing (RWB) regimen. No significant differences between the two treatment regimens were found in either postoperative complication rates or pain levels. Furthermore, total costs were lower in the PWB group in comparison to the RWB group. In terms of cost per improvement in ADL (as measured with the Lower extremity functional scale) the PWB group showed higher effects and lower costs. Looking at the quality of life the PWB group had comparable QALYs to the RWB group while the costs were lower. Therefore, as stated earlier in this thesis, these results show that PWB can be seen as a promising aftercare treatment in surgically treated trauma patient with peri- and/or intra-articular fractures of the lower extremities. This means, the PWB contests the paradigm of the current RWB guidelines, which have remained unchanged for 60 years.

### Social and economic relevance of this thesis

With tighter healthcare budgets and a shortage in hospital and rehabilitation center staff, the societal and economic relevance for an effective and cost-efficient aftercare protocol has become ever more pressing. In the Netherlands, annually, the incidence of peri- and/or intra-articular fractures of the lower extremities is more than 25,000 patients.<sup>1</sup> These patients often suffer from sequelae and need long-term rehabilitation. The current postoperative management in surgically treated trauma patients with peri- and/or intra-articular fractures of the lower extremities is either non-weight bearing or restricted (or partial) weight bearing.<sup>2,3</sup> According to the Arbeitsgemeinschaft für Osteosynthesefragen (AO) Principles of Fracture Management, postoperative management of peri- and/or intra-articular fractures of the lower extremities consist of non-weight bearing for 6-12 weeks, followed by partial weight bearing with a 25% increase in weight every week.<sup>2</sup> Full weight bearing in this method will be reached per protocol after 10-16 weeks post-surgery, but in practice may take significantly more time.<sup>4,5</sup> As described earlier in this thesis, the recommendations for the current

postoperative management in surgically treated trauma patients with peri- and intra-articular fractures of the lower extremities are still more or less the same as they were during the last 60 years, without any source of evidence being given for the advice of restricted weight bearing.<sup>2</sup> Therefore, this thesis has added quality evidence in support of the use of permissive weight bearing in surgically treated trauma patients with peri- and intra-articular fractures of the lower extremities.

The results described in this thesis showed that the patients in the PWB group were bearing full weight 9 weeks earlier than those in the RWB group. The effort to bear weight earlier was not at the expense of longer duration of outpatient physiotherapy. In fact, the RWB group required significantly longer outpatient physiotherapy than the PWB group, viz. 41 versus 25 hours, respectively. Furthermore, significantly more patients in the PWB group completed the rehabilitation within 26 weeks compared to the RWB group, viz. 65.2% versus 34.8%. This means that the patients returned to social life and work much sooner, underpinning the important social relevance of the findings from this thesis. Furthermore, as described in chapter 8, PWB is accompanied by less costs over a period of 26 weeks post-surgery. The total costs per patient, consisting of patient-family expenses, healthcare costs and productivity loss, were €457.51 less in the PWB group. Annually this may result in a total saving of at least €11,437,750 in the Netherlands, a number of considerable economic relevance.

## Target groups

The results in this thesis are promising regarding a novel approach involving permissive weight bearing (PWB) in all fit surgically treated trauma patients with peri- and intra-articular fractures of the lower extremities. As there is at this point sufficient evidence that PWB is in comparison to RWB sufficiently both effective in terms of functional/health-related outcomes and cost-effective, we are advocating that all surgically treated trauma patient with peri- and intra-articular fractures of the lower extremities may be treated with the PWB protocol. The current, non- or restricted weight bearing guidelines should in our opinion be replaced by PWB protocols. To reach out the implementation of the PWB protocol, the surgeons should endorse the PWB protocol. With this thesis, we hope to change the mindset of both orthopedic and trauma surgeons to use the PWB protocol. Furthermore, the physical therapist has to be facilitated in carrying out the PWB protocol as described in chapter 5 by 1) Creating easily understandable therapeutic flow charts for treatment of patients with the PWB protocol 2) Educating junior physical therapists early on in their training in PWB .

## Activities and products

The work in this thesis may result in various activities and products. First and foremost, it will result in the increase of accredited educational activities, both webinars and

seminars as well as chapters in profession books for both orthopedic, trauma surgeons as well as physiotherapists and rehabilitation physicians regarding this topic. Products such as the pressure-measuring insoles can help guide the physical therapists with implementing future permissive weight bearing protocols.

## Innovation

The main innovation of this thesis was that through investigation of various aspects of aftercare, from complications, pain to quality of life and economic burden of PWB versus RWB we have achieved for the first time a clear evidence based indication that PWB aftercare protocols are superior to RWB protocols. Implementation of PWB-based treatment regimen in the rehabilitation community across the world is a challenge that needs to be addressed.

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