



## Introduction

Specialized inpatient rehabilitation at a dedicated rehabilitation facility is known to positively impact outcomes of amputee patients when compared to rehabilitation in general medical or surgical units.<sup>1</sup> For the lower extremity amputee, physical rehabilitation is especially important for maintaining range of motion, improving balance and strength. However, patient confidence is often lacking following an amputation and the fear of falling during activities can often limit the effectiveness of patient's rehabilitation.<sup>2</sup> It is conceivable that supporting the patient's body weight during physical activities could help overcome perceived limitations of low self-confidence, thereby increasing the effectiveness of inpatient rehabilitation. Dynamic body weight support systems utilized during inpatient rehabilitation, such as the one display in Figure 1, could achieve this goal.

## Objective

The objective of this study was to examine and evaluate admission and discharge Functional Independence Measure (FIM) scores for patients with below knee amputations that utilized a dynamic body-weight support system during inpatient rehabilitation and compared them with previously published FIM scores for lower extremity amputee patients that did not utilize a dynamic body-weight support system.

## Methods

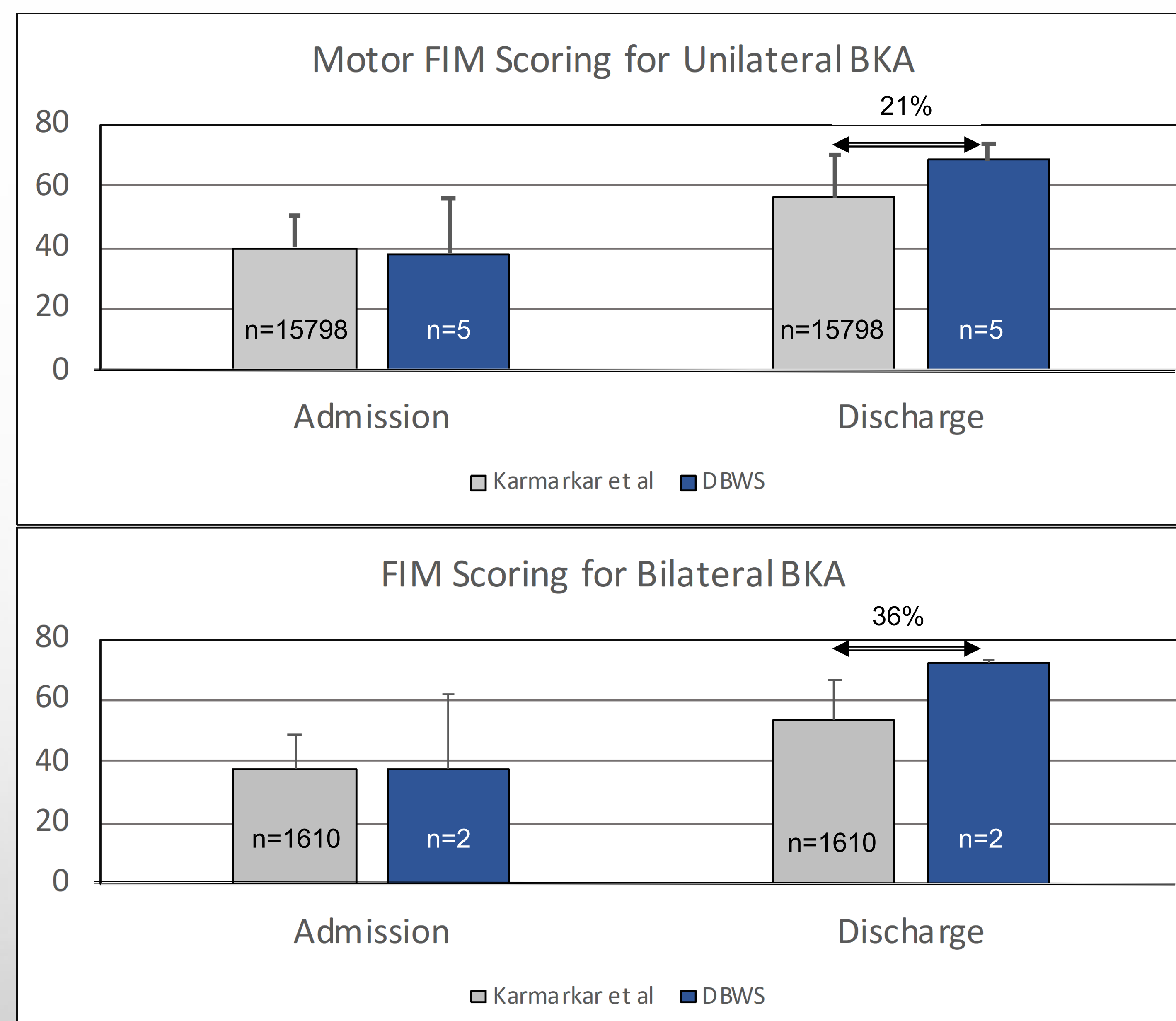
- Admission and discharge FIM motor scores for patients that utilized a dynamic body-weight support system during an inpatient rehabilitation stay were collected:
  - Five unilateral below knee amputees
  - Two bilateral below knee amputees
- Data previously published showing FIM motor scores for new amputees in an inpatient rehabilitation setting were used for comparison.<sup>3</sup>

## Results

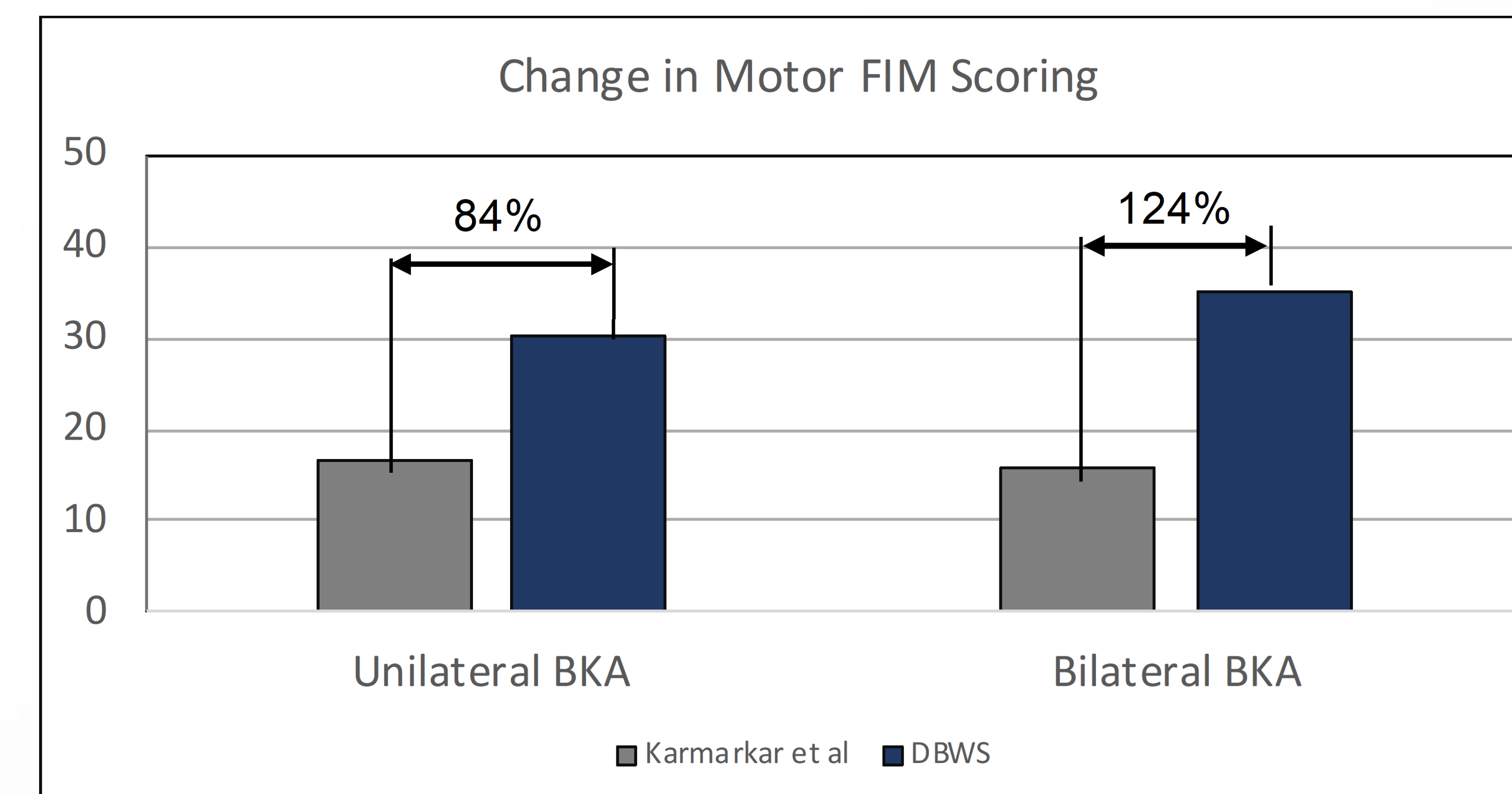
Admission motor FIM scores for patients in this study were not different from historical admission scores, as shown in Figure 2. The patients that utilized a dynamic body-weight support system during inpatient rehabilitation had motor FIM scores at discharge that were 21% and 36% higher than historical counterparts for unilateral BKA and bilateral BKA patients, respectively. Gains in motor FIM score from admission to discharge for those that utilized DBWS were nearly doubled for unilateral BKA patients (84% greater) and more than double for unilateral BKA patients (124% greater), as shown in Figure 3.



**Figure 1.** A bilateral transtibial amputee utilizing a dynamic body-weight support system during prosthetic gait training. The overhead tracking system follows the patient during ambulation while providing dynamic and constant support throughout the exercise activity. Images provided courtesy of Aretech, LLC.



**Figure 2.** Motor FIM scores on admission and at discharge for amputees utilizing dynamic body weight support systems (DBWS) and those that did not (Karmarkar et al.).



**Figure 3.** Total gains in motor FIM scores for unilateral and bilateral BKA patients that utilized DWBS compared to total gains for the same population of patients that did not incorporate DWBS into their inpatient rehabilitation plans.

## Conclusion

Although the data suggests that a dynamic body-weight support system can meaningfully improve rehabilitation performance of below knee amputees, additional prospective studies will be needed to assess the significance of these findings. This case series strongly suggests that the rehabilitation potential of below knee amputees can be maximized with a dynamic body-weight support system.

## References

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2. Pauley T, Devlin M, Heslin K. American journal of physical medicine & rehabilitation. 2006;85(6):521-32.
3. Karmarkar AM, Graham JE, Reistetter TA, Kumar A, Mix JM, Niewczyk P, et al. Rehabilitation Research and Practice. 2014; Article ID 961798, 7 pages.