

Validation testing of a new crutch tip biofeedback device for prescribed lower extremity weight-bearing

Kevin E. Brueilly, PT, Ph.D.; Amanda M. Feller, PT, DPT; Jonathan M. Ahearn, PT, DPT; Jonathan S. Goodwin, PT, DPT, Ph.D.

Abstract

Introduction: Modified weight-bearing recommendations are commonly prescribed after surgical intervention for injuries to the lower extremity to reduce the risk of non-union and delayed healing associated with load bearing through the injured limb and to combat the deleterious effects of immobility. The physical therapist in the acute care setting is likely to encounter these patients for weight-bearing restricted ambulation, and a new device is now available for use in the training of weight-bearing status. The study examines if the Comeback Mobility™ crutch tips reporting weight-bearing on the lower extremity is a valid tool in determining force when compared to the gold-standard force plate measurement of lower extremity weight-bearing.

Review of Literature: It has been shown that patients are not able to adequately learn and adhere to restrictive weight-bearing modifications. This may be due to an inability to provide immediate and ongoing feedback on weight-bearing. The new ComeBack Mobility™ crutch tip system is now available for the acute care physical therapist to utilize in instruction and for patients to continue receiving real-time feedback throughout their rehabilitation process. This study examined the new device to determine its validity in providing weight-bearing data.

Subjects: A sample of convenience of six able-bodied physical therapists was used.

Methods: Each subject performed 30 trials of axillary crutch-assisted weight-bearing ambulation using the new device. The weight-bearing reported by the device was compared to the gold standard of force plate measurement of the weight-bearing utilized.

Results: The new device demonstrated excellent to very good validity in the measurement of 10% and 50% partial-weight-bearing in trials completed.

Discussion and Conclusion: The ComeBack Mobility™ crutch tip system could be useful and should be considered for clinical use as a valid tool in providing auditory feedback for compliance to a prescribed weight-bearing protocol, and extremely useful in the training of patients in the first use of crutches such as prior to discharge from an acute care hospital.

August 2022; A peer-review for journal publication of this manuscript is currently in process