Title: Rehabilitation Progression Using Training Prostheses after Bilateral AKA: A Case Report
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Abstract

Background
Lower extremity amputations can be due to many different causes such as vascular disease, which includes and is not limited to diabetes and peripheral artery disease (PAD). Although most doctors and patients work to prevent an amputation, sometimes an amputation is necessary. Physical therapy is recommended post amputation with the introduction of prosthetic use and functional use of the prosthetics. Those who undergo a bilateral lower extremity amputation require more energy and time to use the prosthetics in a functional way such as ambulating in comparison to those who have a unilateral lower extremity amputation. The patient is given starter prosthetics as a trial to determine if the patient will be successful in using a more advanced prosthetic long term for functional use.

Methods
This case report describes physical therapy interventions for a 72 year old male in rehabilitation in a skilled nursing facility after a bilateral above knee amputation (BAKA) secondary to PAD. At the initial evaluation, the patient was not using his starter prosthetics and was dependent in all transfers and was unable to tolerate static sitting unsupported. Individual physical therapy treatment occurred for 8 weeks with 6-90 minute treatments per week. Early intervention focused on trunk strengthening, postural control, and sitting balance. Rehabilitation was progressed to modified standing activities using the LiteGait and tilt table to increase standing tolerance using bilateral starter prosthetics. Lastly, rehabilitation progressed to ambulation and functional transfers overground with assistance from the LiteGait and a platform walker.

Outcomes
Following the 8 week rehabilitation, the patient achieved all short term goals and continued to make about 75% progress towards meeting his long term goals. His balance grade as indicated on the Functional Balance Grades increased as he was now able to maintain static balance with some challenges. He also improved his score on the Functional Independence Measure. He is currently still receiving physical therapy.

Discussion
There is limited evidence on rehabilitation after BAKA as much of the research is on unilateral amputations. This patient received the higher end of treatment time allotted compared to typical time in physical therapy in a skilled nursing facility. Prior to the patient’s BAKA, the patient used a motorized wheelchair for navigating his environment which resulted in learned non-use of postural musculature required for sitting and standing. The LiteGait and tilt table served as great intervention tools for this patient as we increased time spent in standing. By unloading percentages of the patient’s body weight we were able to maximize more functional activities. Therapy sessions were maximized by focusing on the use of the bilateral lower extremity starter prosthetics in a functional manner as the patient could tolerate. The patient’s tolerance for therapy varied as we increased time spent standing using bilateral lower extremity prosthetics and pre-existing medical co-morbidities. Complaints of increased pressure on bilateral lower extremity residual limbs required rest breaks and shift to different therapeutic exercises at some points during treatment. The patient was introduced to more functional rehabilitation earlier in the rehabilitation process compared to typical post-amputation physical therapy due to financial
restrictions and potential insurance cut-offs. The majority of the intervention was focused on improving strength in a functional manner, which called for innovative therapeutic interventions.

**Keywords**
Bilateral above the knee amputee, skilled nursing facility, LiteGait training, functional intervention and rehabilitation