An Eight-Week Protocol Improving Functional Mobility in Individuals with Lower Limb Loss: A Pilot Study

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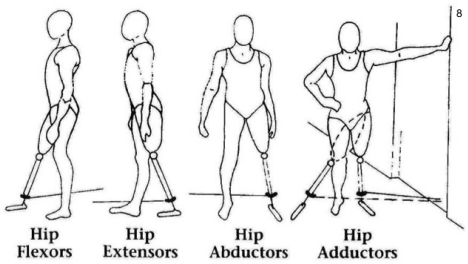
BACKGROUND & INTRODUCTION

Effects of Lower Limb Amputation

- There are at least 2,000,000 individuals living in the United States with an upper or lower limb amputation.[1]
- Lower limb loss is associated with numerous complications which significantly impact quality of life (QOL) and participation in the community including[2]:
  - Pain
  - Osteoarthritis
  - Decreased mobility
  - Cardiovascular disease
  - Muscular atrophy
  - Gait asymmetry
  - Loss of balance
  - Increased falls.

Strength and Balance Training Recommendations

- There is a positive relationship between exercise, functionality, and QOL for lower limb amputees.[1-2,4,7]
- Patient education should be provided throughout all phases of rehabilitation to increase understanding of and participation in physical activity. [1]
- Progressing resistance during open and closed kinetic chain exercises increases muscular strength, improves gait and mobility, and maintains cardiovascular fitness.[1]
- Exercises focusing on strength and endurance of back extensor, abdominal, and hip abductor muscles decreases low back pain and improves balance confidence.[1-4]
- Exercises should be adapted to meet specific needs.[1,3,7]



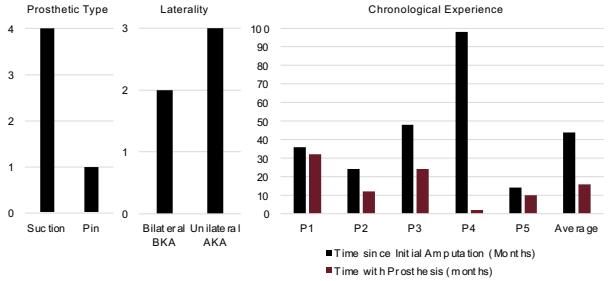
PURPOSE

- The purpose of this study was to investigate the effects of an eight-week exercise program on lower extremity amputees' muscular strength, endurance, gait mechanics, functional mobility, and balance confidence.

METHODOLOGY

Participants

- Through convenience and snowball sampling, this study recruited five individuals with lower limb loss.



Outcome Measures

- Outcome measures utilized to assess change included the Amputee Mobility Predictor (AMPPRO), Patient Specific Functional Scale (PSFS), Activities-specific Balance Confidence Scale (ABC), and 6 Minute Walk Test (6MWT).[5-6]

Interventions

- The Mobile Devices Outcome-Based Rehabilitation Program (MDORP) and previous literature were utilized to provide a framework for the exercise program delivered.[1,3-4,7]

RESULTS

Outcome Measures

	PSFS	ABC Scale	AMPPRO	6MWT
Participant	Change	Change	Change	Change
1	[+] 5	[+] 16.88%	[+] 4	[+] 0:25 [+]24 m
2	[+] 2.33	[+] 1.25%	[+] 8	[-] 3.6 m
3	[+] 0.67	[-] 4.38%	[+] 5	[+]1:15 [-] 12 m
4	[+] 3.66	[+] 7.13%	[+] 2	[+] 18 m
5	[+] 5.33	[+] 61.25%	[+] 4	[+] 48 m

Maroon: meets MDC

- A Wilcoxon Signed Ranks Test was utilized to assess changes in the AMPPRO, PSFS, and ABC Scale over the course of eight weeks.
- The AMPPRO showcased the greatest overall change.
- There were statistically significant differences in both the AMPPRO ($p<.05$) and PSFS ($p<.05$).

DISCUSSION

- Expanding on previous literature, this study provided an individualized and detailed exercise protocol used to strengthen weaker muscle groups in the residual limb.[1,3-4,7]
- Previous studies identified the need for individualized exercises, but did not utilize outcome measures to guide intervention focus.[1]
- Because of their specificity and ability to be meaningful, the AMPPRO and PSFS may be better suited to measure change in strength, balance, and mobility for individuals with lower limb loss.

Limitations

- The lack of statistically significant change in other outcome measures could be attributed to small sample size, low attendance rate, and limited number of reliable and valid outcome measures for the amputee population.

Future Research

- Should:
  - include a larger population size
  - recommend exercises based on the amount of time since amputation
  - validate and establish reliability of outcome measures for individuals with lower limb loss.

CLINICAL RELEVANCE

- Individuals with lower limb loss have a higher incidence of health comorbidities making it necessary to consider a holistic approach.
- Exercises should be tailored to address an individual's deficits in mobility, strength, balance, endurance, and gait to provide individuals with lower limb loss opportunities to improve functional mobility.

CONCLUSION

- Improvements in muscular strength, endurance, gait mechanics, balance confidence and functional mobility were indicated by the AMPPRO, PSFS, ABC Scale, and 6-MWT following an eight-week strength and gait training program for five individuals with lower limb loss.

REFERENCES

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