

Reference

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Prosthetic walking after bilateral transfemoral amputation in a patient with dilated cardiomyopathy: a case report

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Products

3R60, Genium

Major Findings

With bilateral MPK (Genium) compared to nMPK (3R60):

→ MPK reduces cardiac load during physical activity

- 2.4 times longer walking distance in 5min using Genium (caused higher oxygen consumption with MPK than nMPK, but at basically the same heart rate)

→ Patient preferred Genium over 3R60

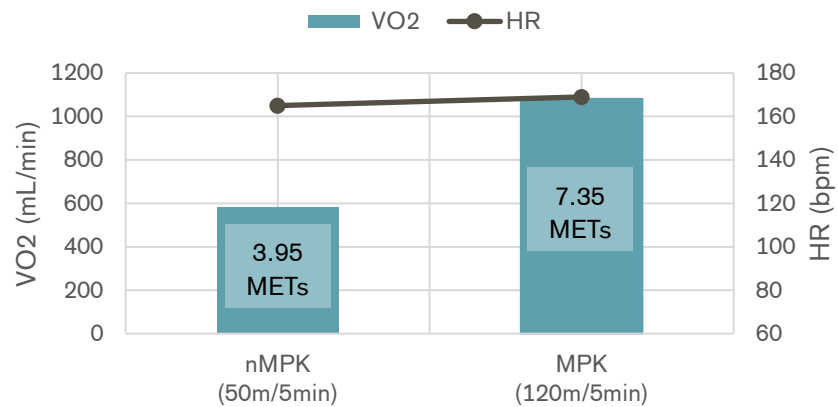


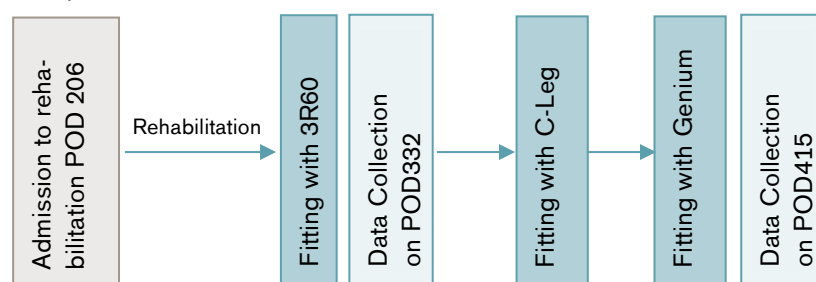
Figure 1. Metabolic Measurements at walk with nMPK and MPK – Velocity of oxygen consumption (VO2) and heart rate (HR) during walking and measured metabolic equivalents (METs) at that time.

Population

Subjects: 1 male subject
 Amputation level: bilateral transfemoral
 Previous prosthetic device: none
 Amputation causes: Rhabdomyolysis followed by cardiac arrest due to dilated cardiomyopathy; patient allowed to exercise at 8 METs maximum
 Mean age: 14 years
 Mean time since amputation: 206 days
 MFCL: n.a.

Study Design

Case Report:



Patient was admitted to the rehabilitation hospital on postoperative day (POD) 206. After residuum compression, a test socket was fitted from POD 230 on. Following (gait) training with stubbies and prostheses without knee joint, prostheses with knee joints were fitted from POD 283 on (3R60, C-Leg, Genium). The patient chose Genium as the most comfortable option for him to walk on POD 372.

Using NMPKs and MPKs, oxygen consumption (VO₂), heart rate (HR) and walking distance were measured for each prosthesis while walking on a 40-m-course in counter-clockwise direction for 5 minutes using a pickup walker. With 3R60 the data collection was on POD 332 and with Genium on POD 415.

Results

Functions and Activities								Participation	Environment
Level walking	Stairs	Ramps, Hills	Uneven ground, Obstacles	Cognitive demand	Metabolic Energy Consumption	Safety	Activity, Mobility, ADLs	Preference, Satisfaction, QoL	Health Economics

Category	Outcomes	Results for Genium (MPK) compared to 3R60 (nMPK)	Sig. ^a
Level Walking	Walking distance in 5 minutes [m]	Higher walking distance with Genium compared to nMPK <ul style="list-style-type: none"> MPK: ~120m nMPK: ~50m 	n.a.
Metabolic Energy Consumption	Oxygen consumption (V̇O ₂) [mL/min]	Higher V̇O ₂ with MPK than with nMPK while walking within 5 min of walking. <ul style="list-style-type: none"> MPK: 1081 mL/min nMPK: 581 mL/min 	n.a.
	Heart rate [bpm]	Similar HR with MPK and nMPK while walking <ul style="list-style-type: none"> MPK: 169 bpm nMPK: 165 bpm 	n.a.
	Metabolic equivalents (METs)	Higher METs with MPK than with nMPK within 5min of walking <ul style="list-style-type: none"> MPK: 7.35 METs nMPK: 3.95 METs 	n.a.

^a no difference (0), positive trend (+), negative trend (-), significant (++/--), not applicable (n.a.)

Author's Conclusion

"Rehabilitation was conducted in a patient with a bilateral transfemoral amputation and DCM [Dilated Cardiomyopathy]. He was able to walk with prostheses. We chose MPK [microprocessor-controlled knee] because of higher VO₂ [oxygen consumption] but lower HR [heart rate] with the similar exercise intensity, indicating reduced cardiac load." (Kanata et al., 2021)

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