Comparative Study of Assisted Ambulation and Perceived Exertion with the Wheeled Knee Walker and Axillary Crutch in Healthy Subjects

KEVIN L. KIRK, DO
DONNA M. LOPEZ, MSN, NP
The San Antonio Orthopedic Group
Burkhart Research Institute for Orthopedics

MAJ BENJAMIN K. KOCHER, PA-C, DSc
Director, US Army-Baylor University Doctor of Science in Orthopaedics Program
San Antonio Military Medical Center

Investigation performed at San Antonio Military Medical Center
DISCLOSURE

Dr. Kirk is a member of the AOFAS, OFAR Managerial Board and a member of the speakers’ bureau for Pharma Pharmaceuticals.

Ms. Lopez and MAJ Kocher do not have any financial disclosures or conflicts of interest. This study did not involve the use of devices or medications requiring FDA approval.

This study was conducted under a protocol reviewed and approved by the Brooke Army Medical Center Institutional Review Board and in accordance with the approved protocol.

Disclaimer: The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.
INTRODUCTION

• Major cause of time lost for military operations.¹

• Foot and ankle injuries during Deployment:
  • 12.3-21.5% of combat injuries.²,³
  • 23% of non-combat injuries.²,³

• Foot surgeries are common after deployment.⁴

• Functional limitations are common after foot and ankle injuries, and often require an assistive device (AD).⁵

• 6.8 million Americans are estimated to use assistive devices.⁷
• Expand clinical knowledge of the Wheeled Knee Walker (WKW) to support the use in patients requiring protected ambulation.

• Evaluate assisted ambulation, perceived exertion, device preference and compare functional measures to Axillary Crutch (AC).
Hypothesis: The Wheeled Knee Walker (WKW) will provide subjects increased ability to ambulate, have a lower perceived exertion and be preferred over the axillary crutch (AC) in healthy subjects.

Null Hypothesis: The WKW will provide patients no difference in ability to ambulate, perceived exertion or preference compared to the AC in healthy subjects.
OUTCOME MEASURES

6 Minute Walk Test (6MWT)\textsuperscript{9}
- Sub maximal functional test.
- Assesses endurance, exercise tolerance and functional capacity.
- The distance traveled in meters over a 6 minute interval.

Self-Selected Walking Velocity (SSWV)\textsuperscript{10}
- Assesses self paced gait velocity.
- Time required to travel a known distance.
- Demonstrated correlation with functional capacity and activities of daily living.

OMNI Rating of Perceived Exertion (RPE)\textsuperscript{11}
STUDY DESIGN

RECRUITMENT

SUBJECT SELECTION & CONSENT

RANDOMIZATION

GROUP 1
AC -> WKW n=12

GROUP 2
WKW -> AC n=12

OUTCOMES
6MWT
SSWV
RPE
Preference

n=12 n=12
RESULTS

• 6MWT
  • 96% of subjects saw a > 100 m increase in distance with use of the WKW.
  • Results suggest the WKW may have clinical benefit of increased ambulation when compared to the AC.

• SSWV
  • SSWV correlates with functional level.
  • SSWV ≥ 0.8 – 1.0 m/s associated with a community ambulator.\(^4\)
  • All subjects using the WKW had SSWV ≥ 1.0 m/s.
  • Results suggest the WKW would facilitate:
    • Community ambulation.
    • Provide SSWV comparative to unassisted ambulation.
RESULTS

• Rate of Perceived Exertion
• Mean values: AC 6.17 and WKW 3.54.
• Data suggests less perceived exertion with the WKW.

87.5% preferred WKW.
• May improve participation in physical activity.
• May improve compliance with care plan.
LIMITATIONS

• Small study in a healthy population.

• Results are only applicable to use on level surfaces and do not consider patient specific factors and living situations.

• Insufficient evidence to draw conclusions on potential cardiac and respiratory effects for consideration in patient populations with coexisting medical conditions.
CONCLUSIONS

• Statistical and clinical differences in function performance measures and perceived exertion.

• The data may assist health care providers in selection of assistive devices when accounting for the patients’ living situation and daily requirements for ambulation.
REFERENCES