

AD-A120 101



TECHNICAL REPORT
NATICK/TR-82/021

Effects of Gender, Load, and Backpack on the Temporal and Kinematic Characteristics of Walking Gait Volume III

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NATICK/TR-82/021	2. GOVT ACCESSION NO. AD-A120101	3. RECIPIENT'S CATALOG NUMBER 1
4. TITLE (and Subtitle) VOLUME III. EFFECTS OF GENDER, LOAD, AND BACKPACK ON THE TEMPORAL AND KINEMATIC CHARACTERISTICS OF WALKING GAIT		5. TYPE OF REPORT & PERIOD COVERED Final Report for Period October 1, 1979 to August 21, 1981
7. AUTHOR(s) Philip E. Martin, M.S. Richard C. Nelson, Ph.D.		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Biomechanics Laboratory The Pennsylvania State University University Park, Pennsylvania 16802		8. CONTRACT OR GRANT NUMBER(s) DAAK60-79-C-0131
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Natick Research and Development Laboratories ATTN: DRDNA-ICCH Natick, Massachusetts 01760		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 6.2, 1L162723AH98AJD05
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE April 1982
		13. NUMBER OF PAGES 78
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) loads load carrying walking males anthropometry military personnel females combative movement exercise frame-pack systems performance field tests		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This study was conducted to determine the effects of loads worn or carried and the type of backpack used on parameters of the walking gait of men and women. Eleven men and eleven women participated in the test, with walking speed controlled at 4 mi/hr, under each of the following load conditions: Load 1 - baseline (shorts, t-shirt, sneakers); Load 2 - fighting gear (utility shirt and trousers, boots, ALICE fighting gear); Load 3 - combat gear (Load 2 plus PASGT helmet, PASGT armor vest, simulated M16 rifle); Load 4-combat gear and 20-lb		

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backpack load (Load 3 plus backpack with 20-lb load); Load 5 - combat gear and 35-lb backpack load (Load 4 plus an additional 15 lb in pack). The men were also tested under a sixth load condition: Load 6 - combat gear and 50-lb backpack load (Load 4 plus an additional 30 lb in pack). The subjects carried loads 4 through 6 using four different backpack systems. Two of these consisted of Army frames equipped with the standard Army pack. The third was an experimental item, a packboard made of rigid aluminum, used with the Army pack. The fourth backpack was a commercially-available, internal frame system. The dependent measures analyzed were stride length, rate, and velocity, single leg contact time, double support time, swing time, and trunk angle. Analyses of the data indicated that there was little difference in the trunk angles maintained by the men and the women. However, the men generally had greater stride lengths and shorter stride rates than the women. There was a tendency for subjects to decrease stride length and increase stride rate as the load was increased. Also, between Loads 4 and 6, there was an increase in forward lean of the body. Few differences in the characteristics of walking gait could be attributed to differences in backpack designs.

PREFACE

This is the third of four volumes comprising the final report of research performed under Contract Number DAAK60-79-C-0131 with the Individual Protection Laboratory, US Army Natick Research and Development Laboratories, Natick, Massachusetts. The work was formulated and directed by Drs. Carolyn K. Benseal and Richard F. Johnson, Human Factors Group, Individual Protection Laboratory. Dr. Benseal was the contract monitor and Dr. Johnson was the alternate.

The authors would like to express their appreciation to several individuals for their assistance and cooperation during this project. Mr. In-Sik Shin, Mr. Wlodzimierz Erdmann, Mr. Li Cheng Zhi, and Ms. Maureen Breckenridge provided valuable assistance during the data collection and data processing portions of the project. Mr. John Palmgren provided technical assistance particularly for the filming procedures used for data collection. Finally, the efforts and cooperation of Major Richard Bartolomea, Marine Instructor Officer for the R.O.T.C. program at The Pennsylvania State University and his staff were responsible for providing the research facility used for the data collection. The quality of the assistance of these individuals was greatly appreciated.



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