



(12) **United States Patent**  
**Frykman et al.**

(10) **Patent No.:** **US 7,455,620 B2**  
(45) **Date of Patent:** **Nov. 25, 2008**

(54) **METHOD FOR INTERPRETING FORCES AND TORQUES EXERTED BY A LEFT AND RIGHT FOOT ON A DUAL-PLATE TREADMILL**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,745,930 A \* 5/1988 Confer ..... 600/592

(75) Inventors: **Peter N. Frykman**, Natick, MA (US);  
**Everett A. Harman**, Natick, MA (US);  
**Michael E. LaFiandra**, Merrimack, NH (US)

(Continued)

FOREIGN PATENT DOCUMENTS

(73) Assignee: **The United States of America as represented by the Secretary of the Army**, Washington, DC (US)

EP 0 603 115 A2 6/1994

(Continued)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 761 days.

OTHER PUBLICATIONS

Belli et al., "A Treadmill Ergometer for Three-dimensional Ground Reaction Forces Measurement During Walking," *Journal of Biomechanics*, 2001, vol. 34, pp. 105-112.

(Continued)

(21) Appl. No.: **10/817,915**

(22) Filed: **Apr. 6, 2004**

*Primary Examiner*—Glenn Richman

(65) **Prior Publication Data**

(74) *Attorney, Agent, or Firm*—Elizabeth Arwine

US 2004/0259690 A1 Dec. 23, 2004

(57) **ABSTRACT**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 10/393,349, filed on Mar. 21, 2003, now Pat. No. 6,878,100.

(60) Provisional application No. 60/368,807, filed on Mar. 21, 2002.

(51) **Int. Cl.**  
**A63B 15/00** (2006.01)

(52) **U.S. Cl.** ..... **482/1; 482/3; 482/8; 482/51; 482/54; 600/592**

(58) **Field of Classification Search** ..... **482/1-9, 482/51-54, 67, 900-902, 74, 100; 119/700; 434/247; 600/592, 595, 547, 300, 587, 594; 601/23, 27-35**

A method for interpreting data representing forces and torques exerted by a right and left foot on a first and second plate treadmill to determine forces and torques exerted on the right and left foot over a specified period of time. A plurality of signals is preferably analyzed to produce data readings from the first and second plates to determine an occurrence of feet contact on the plates and feet departure from the plates. The data from the signals is then separated into a side A dataset and a side B dataset. Each of the datasets is then matched to one of the individual's feet. The resulting determination of forces and torques exerted on the feet provides a more complete analysis of an individual's progress during injury or rehabilitation.

See application file for complete search history.

**10 Claims, 15 Drawing Sheets**

