日常生活用義足と陸上競技用義足の走行比較による中高生義足ユーザーに向けた足部選択およびトレーニング法の提案

国立障害者リハビリテーションセンター学院　徳井亜加根
（共同研究者）同　星野元訓
同　野原耕平
同　梅崎多美
早稲田大学　塩田琴美

Comparison of Running Ability between Daily Use- and Running Specific Prosthesis for the Selection of Prosthetic Foot and Training Methods among Young Users

by

Akane Tokui, Motonori Hoshino,
Kohei Nohara, Tami Umezaki
College of National Rehabilitation Center for Persons with Disabilities
Kotomi Shiota
Organization for University Research Initiatives, Waseda UniversityGifu International Institute of Biotechnology

ABSTRACT

Asymmetry of the body in a unilateral lower limb amputee can be a cause of secondary motor dysfunction such as osteoarthritis. However, effective training methods for prevention of these secondary disorders are not known. The purpose of this study was to propose training methods and the selection of a prosthetic foot for the safe use of running specific prostheses（RSP）. We conducted a 32-week prospective study

to record the changes in physical ability due to training and time differences in the 50-m sprint of a 19-year old unilateral transtibial amputee who aspired to be a sprinter. The training method focused on improving muscle strength, balance, and flexibility. Training for improving the performance of running skills were not conducted the main objective of the study was to improve the symmetry of the subject's body. The subject's 50-m sprint time before and after training changed from 7.99 to 6.81 seconds using C-shaped RSP, and from 8.27 to 6.65 seconds using daily use prosthesis (DUP). As we did not observe any significant differences in time between the use of either DUP or RSP, we postulated that the factor influencing the records was not the type of the prosthetic foot used, but rather muscle strength, balance, and flexibility. Improvement of these physical abilities are also effective in the prevention of sports injuries. Previous studies have reported a higher risk of sports injuries occurring to the intact limb of lower limb amputees rather than to the prosthetic limb or able-bodied limbs. Thus, it is necessary to carefully consider the use of RSP in junior high and high school students during their growth period.

要　旨

本研究は前向き研究として，初めて陸上競技用義足（Carbon fiber running-specific prosthesis，以下 RSP）を装着する下腿切断者 1 名に対し，トレーニング内容，身体機能の変化および走行タイムの記録を行い，足部の選択時期，および安全性に着目したトレーニング法について検討した．結果，走行用の C 型および J 型足部を用いた RSP と日常生活用義足（Daily use prosthesis，以下 DUP）では 50m の走行タイムに違いはなく，トレーニング実施前から 32 週後の走行タイムは C 型 RSP では 7.99 秒から 6.81 秒に，DUP では 8.27 秒から 6.65 秒に向上した．走行タイム向上の要因は筋力およびバランス能力，柔軟性の向上であると考えられ，それらはスポーツ障害の予防にもつながる．RSP 走行は健側下肢に対するスポーツ障害のリスクが高い可能性も指摘されており，特に成長期にある中高生への RSP 使用については検討する必要がある．