

Accepted Manuscript

Review

Alterations of musculoskeletal models for a more accurate estimation of lower limb joint contact forces during normal gait: a systematic review

F. Moissenet, L. Modenese, R. Dumas

PII: S0021-9290(17)30447-5

DOI: <http://dx.doi.org/10.1016/j.jbiomech.2017.08.025>

Reference: BM 8351

To appear in: *Journal of Biomechanics*

Received Date: 23 December 2016

Revised Date: 27 June 2017

Accepted Date: 25 August 2017



Please cite this article as: F. Moissenet, L. Modenese, R. Dumas, Alterations of musculoskeletal models for a more accurate estimation of lower limb joint contact forces during normal gait: a systematic review, *Journal of Biomechanics* (2017), doi: <http://dx.doi.org/10.1016/j.jbiomech.2017.08.025>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Alterations of musculoskeletal models for a more accurate estimation of lower limb joint contact forces during normal gait: a systematic review

F. Moissenet¹, L. Modenese^{2,3}, R. Dumas⁴

¹ Centre National de Rééducation Fonctionnelle et de Réadaptation – Rehazenter, Laboratoire d'Analyse du Mouvement et de la Posture (LAMP), Luxembourg

² INSIGNEO Institute for *in silico* Medicine, University of Sheffield, Sheffield, UK

³ Department of Mechanical Engineering, University of Sheffield, Sheffield, UK

⁴ Univ Lyon, Université Claude Bernard Lyon 1, IFSTTAR, LBMC UMR_T9406, F69622, Lyon, France

Abstract

Musculoskeletal modelling is a methodology used to investigate joint contact forces during a movement. High accuracy in the estimation of the hip or knee joint contact forces can be obtained with subject-specific models. However, construction of subject-specific models remains time consuming and expensive. The purpose of this systematic review of the literature was to identify what alterations can be made on generic (*i.e.* literature-based, without any subject-specific measurement other than body size and weight) musculoskeletal models to obtain a better estimation of the joint contact forces. The impact of these alterations on the accuracy of the estimated joint contact forces were appraised.

The systematic search yielded to 141 articles and 24 papers were included in the review. Different strategies of alterations were found: skeletal and joint model (*e.g.* number of degrees of freedom, knee alignment), muscle model (*e.g.* Hill-type muscle parameters, level of muscular redundancy), and optimisation problem (*e.g.* objective function, design variables, constraints). All these alterations had an impact on joint contact force accuracy but it was not possible to highlight any trend defining which alteration had the largest impact.

Download English Version:

<https://daneshyari.com/en/article/7237135>

Download Persian Version:

<https://daneshyari.com/article/7237135>

[Daneshyari.com](https://daneshyari.com)