Prevention and improvement of existing therapies

Inverse dynamic models were used to conclude from observed motions to forces and moments acting in the spine and at surrounding structures. These loads allow evaluation of the stress conditions in joints, joint cartilage, bone, muscles, tendons, and ligaments. Analyses can be performed for any static and dynamic load scenario during physical training or in daily routine.

The researches of our team aim to conclude from normal as well as from highly demanding daily activities to the loads in the spine. They intend to evolve methods for prevention and improvement of existing therapies.

For optical motion capturing we use the "Vicon" system. Small reflective marker balls were fixed on certain landmarks on the skin of the subjects. During the subject's motion in the laboratory cameras detect the marker positions.

Subsequently, the recorded motions were input into the inverse dynamic models for analysing the resultant forces in all muscles and joints.

Publications

2015
Spinal loads as influenced by external loads: A combined in vivo and in silico investigation. Thomas Zander, Marcel Dreischarf, Hendrik Schmidt, Georg Bergmann, Antonius Rohlmann Journal of Biomechanics 2015; DOI:10.1016/j.jbiomech.2015.01.011, 2.75 Impact Factor
Show abstract

2014
Considerations when loading spinal finite element models with predicted muscle forces from inverse static analyses. Zhu R, Zander T, Dreischarf M, Duda GN, Rohlmann A, Schmidt H Journal of Biomechanics 2013 Apr 26;46(7):1376-8, 2.75 Impact Factor
Show abstract

2013
Lumbar spinal loads vary with body height and weight. Han KS, Rohlmann A, Zander T, Taylor WR Medical Engineering & Physics 2013 Jul;35(7):969-77, 1.84 Impact Factor
Show abstract

2012
An enhanced and validated generic thoraco-lumbar spine model for prediction of muscle forces. Han KS, Zander T, Taylor WR, Rohlmann A Medical Engineering & Physics 2012 Jul;34(6):709-16, 1.84 Impact Factor
Show abstract
Univ.- Prof. Dr. biol. hum. Hendrik Schmidt
Principal Investigator

Barbara Schiller
Office Prof. Hendrik Schmidt

CharitéCentrum für Unfall- und Wiederherstellungschirurgie (CC 9)
Julius Wolff Institut für Biomechanik und Muskuloskeletale Regeneration
Charité Campus Virchow-Klinikum
Augustenburger Platz 1, D-13353 Berlin