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Testing the reliability of symmetry tests before and after lower spine manipulation in healthy athletes

Submission date
28/10/2018

Recruitment status
No longer recruiting

Registration date
30/10/2018

Overall study status
Completed

Last Edited
28/09/2021

Condition category
Musculoskeletal Diseases

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol
In clinical and sports-related contexts, the assess of reliability and measurements errors from biomechanical instruments and observers in physical performance tests, are essential for establishment of protocols in training and rehabilitation programs relative to symmetry. Thus, the aims of this present study was to assess the intra-rater and test-retest reliability of physical performance tests symmetry between lumbar spinal manipulation in athletes.
Assessing the intra-rater and test-retest reliability of physical performance tests by ICC, SEM and MDC, our results demonstrated good reliability scores in terms of relative and absolute statistical reliability.

Background and study aims
Measuring symmetry of movement (how equal the movement is comparing the right and left sides of the body) is useful in healthcare and sports. This study aimed to investigate how similar the symmetry results are for the same person doing the same movement and how similar the symmetry results are for the same person comparing before and after they have had spinal manipulation therapy (SMT). These results will mean that the reliability of the symmetry measuring system can be assessed.

Who can participate?
Athletes aged 18-35 years who have no back problems or other health problems.

What does the study involve?
The participants will stand with their feet on two platforms. Cameras will capture their movements as they stand still, do a free squat and do a countermovement jump (a jump where you bend your knees before springing up). Then a doctor will give SMT to the lower back and the participants will then do the movement test again as before.

What are the possible benefits and risks of participating?
Participants may benefit from improvements in their condition and reliable outcomes analyzed. Participants may experience discomfort during the lumbar SMT intervention.

Where is the study run from?
Biomechanics laboratory, Faculty of Human Kinetics, FMH. University of Lisbon, Portugal

When is the study starting and how long is it expected to run for?
August 2017 to November 2017

Who is funding the study?
The Brazilian Federal Agency for the Support and Evaluation of Graduate Education's Coordination for the Improvement of Higher Education Personnel scheme (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, CAPES)

Who is the main contact?
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Contact information

Type(s)
Scientific

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Additional identifiers

Protocol serial number
N/A

Study information

Scientific Title
Assessing intra-rater and test-retest reliability of physical performance tests symmetry between lumbar spinal manipulation in asymptomatic athletes

Study objectives
The aim of this study was to assess intra-rater and test-retest reliability of symmetry tests between lumbar spinal manipulation in asymptomatic athletes

Ethics approval required
Old ethics approval format

Ethics approval(s)
Ethics Committee of Faculty of Human Kinetics, University of Lisbon, 30/09/2017, FMH 31/2017

Study design

An prospective intra-rater and test-retest reliability study was performed.

Primary study design
Observational

Study type(s)
Screening

Health condition(s) or problem(s) studied
Asymptomatic athletes

Interventions
Participants performed tests while standing on two force platforms (left and right) with a motion-capture system equipped with an optoelectronic system of 15 cameras at 240 Hz placed at or around the centre of the participant's body. For static and motion capture, the marker trajectories were processed using a low-pass Butterworth filter, with a cut-off frequency of 10 Hz, for kinetic and kinematic symmetry parameters. All data processing and model building was performed using Qualisys (Software – C-motion, Göteborg, Sweden), integrated with Visual 3D software (Version 5.01.18, C-Motion, Inc., Germantown, USA).
This study consisted of a single session of data collection capture with each of the 20 asymptomatic individuals performing test-retest physical performance tests (static posture, free squat and countermovement jump) before and after lumbar spinal manipulative therapy (SMT). The participants received 5 min of task training, and performed physical tests before and after lumbar SMT intervention.The pre- and post-treatment phases were conducted with approximately 5 min between tests.
The lumbar SM was performed by a doctor on the participants using specific type of manual SM, the Diversified technique, that aims to correct the lumbar vertebral dysfunctional segments identified in the clinical assessments prior to the intervention. Thus, the athletes were instructed to lay down prone for the spinal motion palpation analysis, to evaluate the presence of dysfunction (asymptomatic), in the lumbar spine. The SM was subsequently performed with the athlete laying sideways while a correction was performed contacting the lumbar, namely on transverse process (mammillary) of the lumbar vertebrae, performing the lumbar roll technique, described by Liekens-Gillet and Bergmann.
For the purpose of this study, the kinetic symmetry was called Symmetry 1, and kinematic symmetry was called Symmetry 2, for easy comprehension. According to the biomechanical literature, this is a good representation that has been elaborated based on kinetic symmetry (force efforts between the lower limbs; ground reaction forces) parameters and kinematic symmetry (segmental organization of the whole body during all cycles of movement, and body orientations relative to connections of joint centre vectors displacements).

Intervention Type
Other

Primary outcome(s)
Symmetry of motion assessed using motion-capture analysis

Key secondary outcome(s))
N/A

Completion date
30/11/2017

Eligibility

Key inclusion criteria
1. Aged 18 to 35 years
2. Asymptomatic
3. Normal clinical health condition related to lumbar spine
4. Athlete from various modalities and sportive levels

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Sex
All

Total final enrolment
20

Key exclusion criteria
1. Low back pain
2. History of body surgery
3. Contraindications of spinal manipulation
4. Any problems preventing participation in the study
5. Recent change to training routine
6. Athletic competition during the study
7. Treated with manual manipulation during the study

Date of first enrolment
30/09/2017

Date of final enrolment
31/10/2017

Locations

Countries of recruitment
Portugal

Study participating centre

Department of Sports and Health, Faculty of Human Kinetics, Laboratory of Biomechanics
Estrada da costa, Cruz Quebrada
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1499-002

Sponsor information

Organisation
Faculty of Human Kinetics, FMH, University of Lisbon

ROR
https://ror.org/01c27hj86

Funder(s)

Funder type
Government

Funder Name
Coordenação de Aperfeiçoamento de Pessoal de Nível Superior

Alternative Name(s)
Brazilian Federal Agency for the Support and Evaluation of Graduate Education, Coordination for the Improvement of Higher Education Personnel, CAPES Foundation, Capes - Ministério da Educação, Coordinación de la formación del personal de nivel superior (Brasil), CAPES

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Brazil

Results and Publications

Individual participant data (IPD) sharing plan
The dataset used and/or analysed during the currently reliability study is available from the corresponding author, Bruno Araújo Procópio de Alvarenga, brunofisioquiro@hotmail.com, on reasonable request.

All participants submitted a signed informed consent form (FMH - institutional consent) that included information about the purpose of the study, its procedures, the participants' rights and welfare, participants' protections and the collection of data for publication.The patient information sheet is not currently available in web format; please use the contact details below to request patient information. Individual data (the biomechanical outcomes of the individual study participants showing outcomes related to performance tests symmetry between therapeutic intervention, in terms of reliability assessment, will be shared starting on 30/10 /2018 upon previous communication and solicitation by responsible study contact personnel, as indicated.
Data sharing is available by request from the corresponding author. All data generated or analysed in this study are included in this submitted material.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Thesis results		15/03/2019	28/09/2021	No	No