Pilot validation study of IMU and markerless method for head and trunk kinematics

Published: 14-02-2022
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The primary objective of this research was to validate head and trunk kinematics calculated from IMU and markerless motion tracking systems against a gold-standard marker-based optical motion capture system (Vicon).

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Joint disorders
Study type	Observational non invasive

Summary

ID

NL-OMON50718

Source
ToetsingOnline

Brief title
Validation of kinematic measurement methods

Condition

- Joint disorders

Synonym
back pain, musculoskeletal pain

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: China Scholarship Council

Intervention

Keyword: kinematics, measurement methods, surgeons, validation

Outcome measures

Primary outcome

Head and trunk kinematics (3D segment angles between pelvis, lumbar-,

thoracic-, cervical spine- and head) calculated based on Vicon, IMU and

DeepLabCut system:

1. Time-3D segment angles relationship

2. Minimum, maximum 3D segment angles

3. Range of 3D segment angles

Secondary outcome

N/A

Study description

Background summary

Surgeons are at high risk for developing musculoskeletal symptoms (MSS), especially neck and lower back pain. The possible physical risk factors of MSS development are: (1) prolonged working in the same position, (2) unfavorable and static working postures, (3) repetitive movements. Therefore, it is necessary to perform a quantitative postural analysis of surgeons in the operating room and it can provide valuable information for ergonomic interventions to reduce the development of MSS. However, it is not practical to use the reflective marker motion capture system in the operating room. Inertial measurement unit (IMU) systems and markerless motion capture systems (DeepLabCut) can be alternative methods to measure the kinematics of surgeons, the IMU sensors can be placed under the gown, and the latter method does not require any attachments on the surgeon.

Study objective

The primary objective of this research was to validate head and trunk

kinematics calculated from IMU and markerless motion tracking systems against a gold-standard marker-based optical motion capture system (Vicon).

Study design

validation study

Study burden and risks

No risks for the participants.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

(1) Aged 18 and older
(2) Able to give written informed consent

Exclusion criteria

(1) Incapacity to follow instructions
(2) History of medical disorder that may affect movement patterns

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	03-05-2022
Enrollment:	10
Type:	Actual

Ethics review

Approved WMO

Date:	14-02-2022
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL79235.042.21