



RESPONSIVENESS OF KINEMATIC ANALYSIS WITH A MOTION CAPTURE CAMERA SYSTEM IN AXIAL SPONDYLOARTHRITIS: A PROTOCOL STUDY

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Abstract

The aim of this study is to document the responsiveness of the 3D motion capture depth camera during the execution of functional tests in Axial Spondyloarthritis. This study is a prospective study. 10 adults who are going to start the treatment will be the total sample. Subjects will perform the tasks in front of a depth camera. The main comparator will be a smartphone placed on the chest of the subject. It will be measured six functional tasks and the timed up and go test. The subject will be measured before the treatment starts and four week later. The responsiveness will be calculated through a Receiver Operating Characteristic curves with the smartphone analysis. The use of a motion capture camera system is proposed as an new examination tool to improve the assessment and the effectiveness of the treatment.

Introduction

Functional measurements offer a more direct and standardized observation of the active capacity of the subject and have already been developed to assess different movements in spondyloarthritis patients reliably.

The aim of this study is to document the responsiveness of the 3D motion capture depth camera during the execution of functional tasks and timed up and go test. It will be used a smartphone as gold standard.

Materials and Methods

This is a protocol of a prospective study. 10 adults who are going to start the treatment will be the total sample. The subjects should be between 18 and 65 years and must be previously diagnosed by a rheumatologist. Subjects who started the treatment with biological agents will be excluded.

Motion capture camera system

A depth camera by PrimeSense was used in this study. This depth camera is based on structured light. The camera will be placed around 22° with respect to the direction of the tested movements. The depth information collected by the camera will be used to derive a representation of the patient's skeleton. This parameterization of the patient's movement will give the inclination angles and angular speed. The 3D positions of the joints labelled Neck and Torso will be used to calculate the angles between them for all the tests. The angles were converted to be able to compare the cinematic variables of the camera with the smartphone.

Smartphone

An iPhone6s will collect the information about mobility angle (degrees) and acceleration along three axis.

Procedure

The treatment will be the standard treatment care with biological agents starting following the first visit to the rheumatologist. Each patient will perform this procedure for each measurement 2 times: during the first visit and 4 weeks later. Subjects will perform all repetitions of functional tests as quickly as possible it is the goal to finish each test safely in 30 seconds. The Timed up and go test will be performed three times. (Figure 1)



Figure 1. Functional tests and Timed up and go test.

Outcomes variables

Two direct variables (time and displacement), two indirect variables (velocity and acceleration) and execution time will be calculated.

Statistical analysis

Receiver operating characteristic (ROC) curves will calculate to evaluate the level of responsiveness of the depth camera compared to the kinematic variables of the smartphone.

Conclusions

This study is designed to measure the capacity of the depth camera to identify potential changes after an intervention. The use of a motion capture camera system is proposed as an new examination tool to improve the assessment and the effectiveness of the treatment in axial spondyloarthritis.

References

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