ANÁLISIS DEL EJE INSTANTÁNEO DE ROTACIÓN DEL MOVIMIENTO DE FLEXO-EXTENSIÓN DEL CUELLO MEDIANTE VIDEO ANÁLISIS: FIABILIDAD Y ANÁLISIS DE ERRORES

ANALYSIS OF THE INSTANTANEUS AXIS OF THE NECK FLEXION-EXTENSION MOVEMENT BY MEANS OF VIDEO ANALYSIS: RELIABILITY AND ERROR ANALYSIS

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RESUMEN

El objetivo del trabajo es evaluar la fiabilidad para medir el eje de rotación instantáneo (EIR) del raquis cervical de sujetos sanos mediante una técnica de video análisis de bajo coste y diseñar una técnica que minimice los errores.

Los datos fueron obtenidos a partir de marcadores técnicos y anatómicos ubicados en 7 sujetos sanos, con tres sesiones experimentales por sujeto, medidas por dos operadores distintos. El movimiento se registró mediante la cámara de vídeo de un smartphone, a 30 fps. Los videos fueron analizados mediante el software libre Tracker, y los cálculos cinemáticos (posiciones, velocidades, aceleraciones y EIR) se realizaron con rutinas de programación en MATLAB. Se realizó un análisis de fiabilidad calculando el coeficiente de correlación intraclase (ICC) y el error estándar medio (SEM) entre operador y entre sesión.

Los valores obtenidos para el SEM e ICC son aceptables y buenos, demostrando la validez del uso de técnicas de bajo coste en aplicaciones biomecánicas, lo que abre posibilidades muy interesantes en campos como la valoración funcional.

ABSTRACT

The objective of this work is to evaluate the reliability of the measurement of the instantaneous axis of rotation (EIR) of the cervical spine by means of a video analysis technique of low cost, as well as to design a technique that minimizes the errors.

The information was obtained from technical and anatomical markers located in 7 healthy subjects, with three experimental sessions for subject, measured by two different operators. The movement registered by means of the video camera of a smartphone, to 30 fps. The videos were analyzed by means of the free software Tracker, and the kinematic calculations (positions, speeds, accelerations and EIR) were realized by proper software developed in MATLAB. A reliability analysis was realized calculating the intraclass correlation coefficient (ICC) and the standard error mean (SEM) between operator and between sessions.

The values obtained for the SEM and ICC are acceptable or good, showing the possibilities of the use of techniques of low cost in biomechanical applications, what opens very interesting possibilities in fields like the functional assessment.

PALABRAS CLAVE

Cinemática del cuello, Eje instantáneo de rotación, Videoanálisis, Fiabilidad.

KEY WORDS

Neck Kinematics, Instantaneous Helical axis, Videoanalisis, Reliability.

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