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IS PAIN AN EDUCATIONAL NEED IN THE BRAZILIAN POPULATION WITH RHEUMATOID ARTHRITIS? A MIXED CROSS-SECTIONAL STUDY

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Background: Rheumatoid arthritis (RA) is one of the most prevalent chronic systemic diseases worldwide. Pain is the primary concern of individuals with RA and may have various etiologies, ranging from nociceptive mechanisms to central processing dysregulation. Recommendations for RA treatment can be divided into pharmacological and non-pharmacological approaches, such as exercise, patient education and self-management strategies. Pain neuroscience education has been shown to provide benefits in pain reduction, disability, catastrophizing, and physical performance in individuals with chronic musculoskeletal pain. However, there is no consensus about the essential knowledge for this population. Therefore, investigating the educational needs of this population is essential for developing patient-centered treatment strategies.
Objectives: To evaluate whether pain is among the health education needs of individuals diagnosed with RA in Brazil.
Methods: A mixed cross-sectional study was conducted by means of an online form, with a convenience sample. Participants were individuals over 18 years of age, with an RA diagnosis, recruited via social media. The form was divided into sections of sociodemographic data and educational needs, including pain, through both open-ended and closed-ended questions. The data were analyzed descriptively and tabulated in Microsoft Excel.
Results: The study included 192 participants diagnosed with RA, 185 females and 7 males, with an average age of 47.7 years. Among the educational needs, the question 'Why do I feel pain?' was the third most relevant, with 72.9% of participants rating it as extremely important, 15.6% as very important, and 11.5% as important. Additionally, it is important to note that the topic of 'pain' also appeared in the qualitative data collected from the open-ended question, where participants were asked about information they considered important to know (e.g., 'How to identify if the pain I feel is from arthritis or another cause' and 'The struggle to prove the chronic pain of rheumatoid arthritis'), highlighting the significance of this information for this population.
Conclusion: Brazilian individuals with RA require information about pain, and this study may contribute to future research focused on developing educational materials tailored to these needs.
Implications: This study highlights the need to incorporate pain-related information into treatment protocols, utilizing educational strategies that aim to support self-management and enhance disease education.
Keywords: Rheumatoid arthritis, Pain, Health education

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PROTOTYPE OF A MEDIAPIPE-BASED PROGRAM TO ENHANCE THE TEACHING OF BIOMECHANICS

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Background: The best way to assess human kinematics is by capturing movements in three dimensions, which is commonly done using an optoelectronic measurement system. However, due to equipment or logistical limitations, only two-dimensional kinematic assessment is performed in practical biomechanics classes in undergraduate and graduate courses. For this reason, practical demonstrations in the classroom by biomechanics professors are limited, especially in universities that do not have access to an optoelectronic measurement system. A program that allows three-dimensional kinematics assessment demonstrations using only a simple camera can be a great improvement in the teaching process.
Objectives: To develop a program to facilitate the practical teaching of kinematics in classrooms.
Methods: A script was prepared in Python using MediaPipe (pose estimation), Matplotlib (three-dimensional graphs), OpenCV (computer vision), NumPy (angle calculations), and Streamlit (data visualization). Using only a cellphone or a webcam with a notebook, the program captures video frames and uses them for kinematic analysis. The main functionality is provided by MediaPipe, a library capable of recognizing a human body in an image or video and detecting 33 three-dimensional landmarks. The script has two modes: live and recorded video. Live mode uses a live camera to capture video frames, recognize the human body, and apply the landmarks, allowing real-time visualization of the body in a three-dimensional perspective. Recorded mode performs the same process but uses pre-recorded videos. The program outputs a video feed (either from a camera or a recorded video) with landmarks overlaid on the body and an X-Y-Z graph representing the body's three-dimensional structure, displayed side by side. Additionally, the program shows joint angles in degrees and angular velocity. A feature to track the linear displacement of a specific joint was included in the X-Y-Z graph.
Results: The program can capture video frames in real time to provide students with a three-dimensional representation of the human body using 33 landmarks. Professors can also use pre-recorded videos to demonstrate three-dimensional kinematic analysis. In both modes, the program allows the visualization of linear and angular segment displacement.
Conclusion: A prototype of a MediaPipe-based program to assist biomechanics professors in practical kinematics classes. The program used only a camera and a laptop, which are commonly used in classes. Future research could explore the use of this type of program in teaching kinematic concepts.
Implications: This study presents a program prototype to improve the tools available for teaching biomechanics to undergraduate and graduate students, which can be used in classrooms.
Keywords: Kinematics, Graduate, Computer vision