

# KINEMATIC STUDY OF THE MOVEMENT ASSOCIATED WITH MICROTOME MANIPULATION AND ITS PATHOLOGIES

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Microtomes are equipment used in Pathological Anatomy for the histological sectioning of samples with very thin thicknesses, usually ranging from 1  $\mu\text{m}$  to 10  $\mu\text{m}$  <sup>[1]</sup>

From an anatomical point of view, the microtomy movement is a repetitive motion that involves the upper limbs, with muscular demands that when repeated exhaustively and regularly can cause muscular-skeletal injuries (MSIs) <sup>[2]</sup>

Specific objectives were defined for this study: a) Surveying and analyzing pathologies associated with the use of the equipment; b) Studying the kinematics of human movement associated with microtome manipulation; c) Analyzing the equipment and proposing modifications to achieve ergonomic use.

Data was collected through questionnaire and recording videos of the kinematic movement of the manipulation of the equipment during actual working tasks. The procedure was explained, and the laboratory technician signed a consent agreement. The laboratory technician had several reference points marked to facilitate the study of the movement, and a system of two cameras able to record at higher speeds was used to capture the movement. Afterwards, the movies' analyses were performed in Kinovea<sup>[3]</sup>, and the trajectories, velocities, and acceleration profiles of the movement were obtained. More movies must be analyzed to obtain more results and start identifying the critical positions of the movement that may be associated to pathologies.

We expect to understand and analyze the pathologies associated with the use of microtomes, as well as to improve the interface of the microtome's drive system with ergonomics criteria without compromising the proper performance of the equipment or compliance with specific standards applicable to these devices.

<sup>1</sup> Garcia del Moral R. Laboratorio Anatomia Patologica. Interamericana, editor. MacGrawHill; 1993.

<sup>2</sup> Arora A, Uparkar SM. Ergonomic risk assessment in pathology laboratory technicians. International Journal of Therapies and Rehabilitation Research, 2015, 4: 3

<sup>3</sup> Charmant, J., & contributors. (2021) Kinovea (Version 0.9.5) [Computer software]. <https://www.kinovea.org>