

# Estimation of Finger Instantaneous Joint Center of Rotation Using CT-Reconstructed Hand Skeleton Motion

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## **ABSTRACT**

The present study estimated instantaneous hand joint centers of rotation (CoR) using 3D reconstructed hand skeleton motions captured from CT scan. We proposed a novel method for estimation of instantaneous joint CoR using the same bone surfaces for different hand postures. Each bone in a template hand posture was registered to the corresponding bone of different hand postures. The registered hand postures (having the same bone surfaces as the template hand posture but different postures) with the template hand posture were then used for estimation of instantaneous joint CoR. The proposed method performed better than the existing methods in estimation of instantaneous joint CoR. Consistency of instantaneous joint CoRs determined in the same rotation angle range was improved by 31.7% to 51.0% in the proposed method. The present study focused on distal interphalangeal (DIP) and proximal interphalangeal (PIP) joints of the index finger of a participant. Joints of the whole hands of more participants will be studied for further generalization of the findings.

Keywords: Finger instantaneous joint center of rotation, CT scan, hand skeleton motion