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AADOCR® American Association for Dental, Oral, and Craniofacial Research

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Automated Detection of TMJ Anterior Disc Displacement Using Deep Learning

Alexandria, VA, USA – A study seeking to develop and validate an automated deep learning system for the diagnosis of Temporomandibular joints articular disc displacement from MRI scans was presented at the 104th General Session of the IADR, which was held in conjunction with the 55th Annual Meeting of the American Association for Dental, Oral, and Craniofacial Research and the 50th Annual Meeting of the Canadian Association for Dental Research on March 25-28, 2026 in San Diego, CA, USA.

Temporomandibular joints articular disc displacement (TMJ ADD), a primary type of temporomandibular disorder (TMD), significantly impairs patients' craniofacial function and quality of life. While MRI is the gold standard for diagnosing ADD, its interpretation can be challenging for non-specialist clinicians, leading to diagnostic inaccuracies. This study aimed to develop and validate an automated deep learning system for the diagnosis of TMJ ADD from MRI scans.

A labeled dataset was compiled from sagittal MRI scans of 190 TMJs, with each joint represented by its clearest open- and closed-mouth image pair. After partitioning the data for training and testing (4:1 ratio), a convolutional neural network with a ResNet backbone was developed. Performance was evaluated using standard metrics (accuracy, F1-score, AUC, Fleiss' κ, and diagnostic time). A comparative study benchmarked the model's standalone performance against 15 clinicians (5 of each: interns, graduates, experts) and also evaluated clinician performance when aided by the model. Investigators concluded at a ResNet-based automated system can enhance the accuracy, efficiency, and consistency of MRI-based diagnosis for TMJ ADD, showing significant potential as a clinical decision support tool.

The abstract, “Automated Detection of TMJ Anterior Disc Displacement Using Deep Learning” was presented by Ruiyang Ren of West China Hospital of Stomatology, Sichuan University, Chengdu, China during the “Clinical Orthodontics II” Oral Session that took place on Friday, March 27, 2026 at 2 p.m. PDT (UTC-7).

About IADR/AADOCR

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