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Development and accuracy of artificial intelligence-generated prediction of facial changes in orthodontic treatment: a scoping review

Key words: facial morphology; soft tissue changes; artificial intelligence; orthodontic treatment

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Research Summary

This scoping review was conducted to outline **the development of AI in terms of predicting soft-tissue changes after orthodontic treatment, as well as to comprehensively evaluate its prediction accuracy.**

We found **a low level of evidence indicating an estimated high overall accuracy of AI-generated prediction, whereas the lower lip and chin seemed to be the least predictable regions. Furthermore, the facial morphology simulated by AI via the fusion of multimodality images was considered to be reasonably true**. Since all of the included non-RCT studies showed a moderate to high risk of bias, more well-designed clinical trials with sufficient sample size are needed in future work.

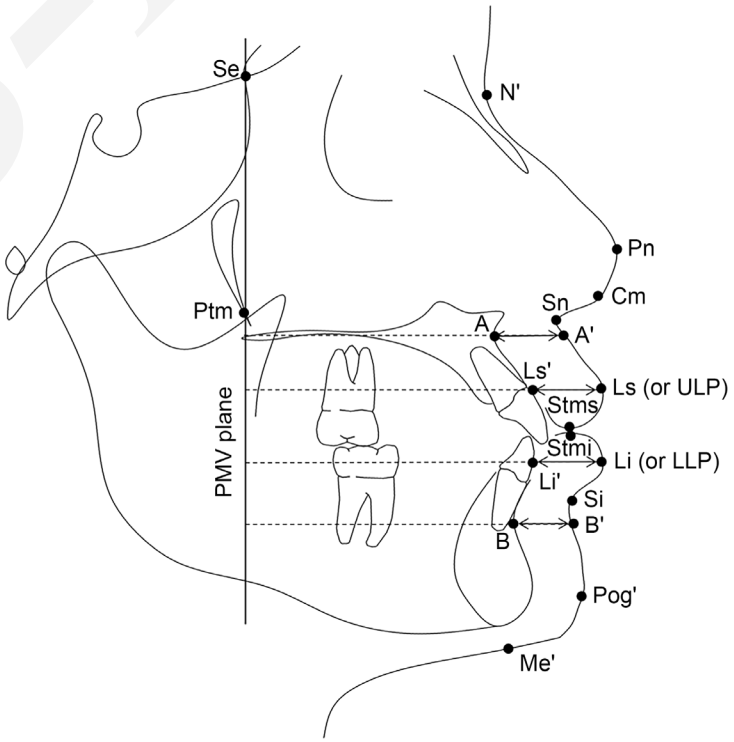


Figure 2

Innovation points

- **All of the four included studies were carried out in Asian countries.**

- **Four types of neural networks, ANNs, DNNs, CNNs, and cGANS, were utilized for soft-tissue prediction and simulation.**

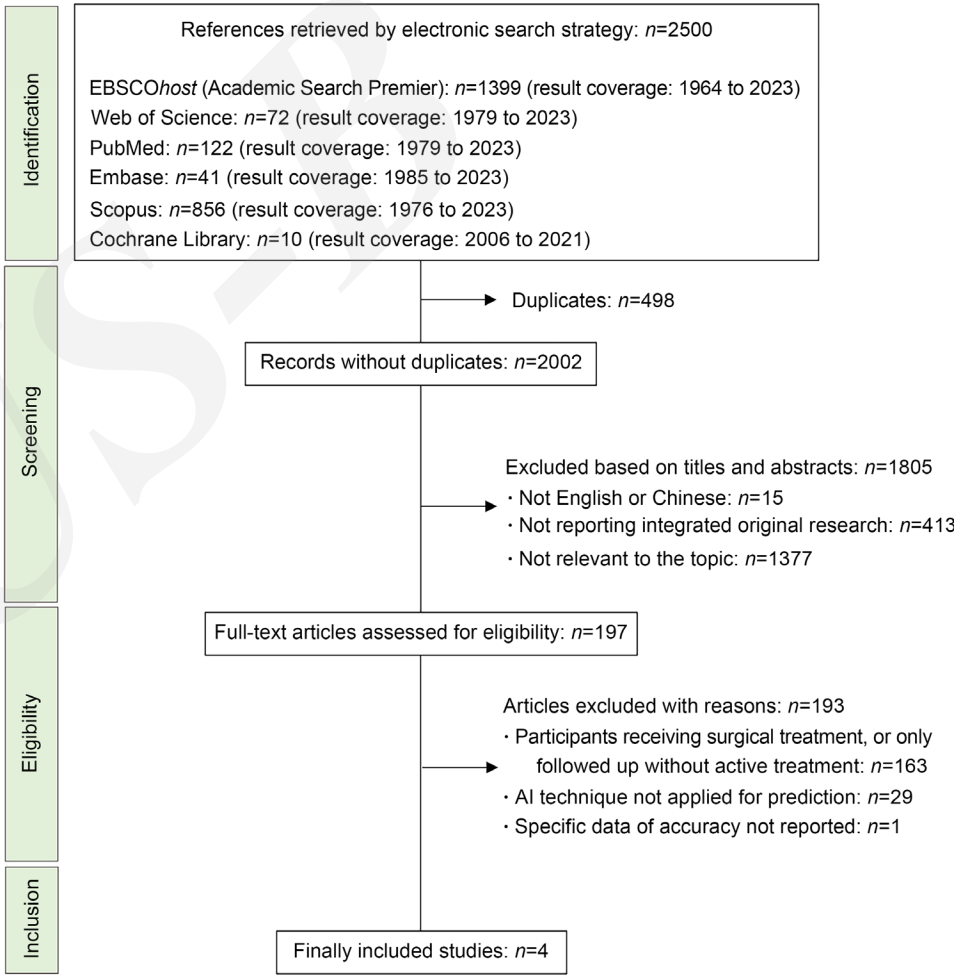


Figure 1

Innovation points

- **Prediction error tended to increase from midface portion to submental region.**

- **The overall accuracy of AI-based prediction system was estimated to be clinically acceptable, whereas the lower lip and chin areas seemed to be less predictable.**

- **The facial morphology simulated by AI via the fusion of multimodality images was considered to be reasonably true.**

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