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bone resorption. Microcomputed tomography and TRAP staining indicated that fisetin-loaded screws preserved bone density, reduced osteoclast numbers, and improved screw stability.

Conclusions: Our findings suggest that sustained fisetin-release Ti6Al4V screws inhibit inflammation and alveolar bone resorption, preventing screw movement, making them a promising strategy for preventing peri-implantitis in orthodontic treatments.

Key Words: Ti6Al4V alloy, bone resorption, fisetin, poly(lactide-co-glycolide), orthodontic mini-screws, peri-implantitis.

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CA4773

Comparative Study Of Automatic Landmarking & Diagnostic Models On Cephalograms

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Aim or purpose: With the application of deep learning technique, the automatic cephalometric analysis has been provided. Although automatic landmarking models for cephalometric analysis have been developed, their accuracy still requires validation, and they depend on the expertise of clinicians to resolve discrepancies between the values. To overcome the problem, the automatic diagnosis model has been noticed. However, there is no direct evidence of the superiority of these two modes. In addition, due to the samples studied in most research from a single center, the generalization ability and transfer ability between the two models need to be studied.

Materials and methods: Based on the same northern Chinese population test set data and the data of the IEEE (Institute of Electrical and Electronics Engineers) 2015 ISBI (International Symposium on Biomedical Imaging) Grand Challenge dataset, we compared the performance, generalization ability, and transfer ability of the proposed two models, respectively.

Results: It showed that the automatic landmarking model outperformed the automatic diagnostic model in both test datasets, with a particularly notable accuracy of 90.80% on the IEEE dataset.

Conclusions: These findings suggest that the automatic diagnosis model can effectively overcome the limitations of the landmarking mode, but the landmarking measurement is still needed as a reference, and the generalization and transfer ability to other populations need to be further improved.

Key Words: Deep learning, Convolutional neural networks, Artificial intelligence, Diagnostic systems, Decision-making.

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CA4780

Lip Curvature Change With Miniscrew Anchorage In Class II Patients

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Aim or purpose: The aim of this study was to assess whether lip curvature flattening occurred in Class II hyper-divergent patients undergoing extraction orthodontic treatment with maximum anchorage and analyze its associated factors.

Materials and methods: Twenty skeletal Class II patients who underwent fixed orthodontic treatment with premolar extraction and maximum anchorage were enrolled. Cephalometric measurements of hard tissue and lip soft tissue were compared statistically ($P < 0.05$) before and after treatment using paired sample T-test. Multiple regression analysis was performed to assess associations between lip curvature changes and corresponding measurements.

Results: The post-treatment lip curvature slightly deepened but was not statistically significant. Stepwise multiple regression analysis produced the following equation:Stepwise multiple regression analysis produced the following equation:①ΔPBL angle=214.26+13.95*ΔANB-2.26*pre.Us-x-1.57*pre.BLLT, ②ΔPBL depth=2.25-0.70*pre.PBL depth-0.23*ΔL1c-x, ③ΔSAU angle=-56.11-1.17*ΔL1/MP+1.41*pre.MP/FH, ④ΔSAU depth=0.04*ΔL1/MP-0.18*ΔL1c-y-0.23*Δ MP/SN-0.43*pre.SAU depth.

Conclusions: No significant difference on lip curvature was observed. This would suggest that even maximum anchorage for premolar extraction patients does not exert negative effect on lip curvature with proper patient selection. Even with the same treatment strategy, there is still significant individual variation in the response of lip curvature to treatment. After treatment, lip curvature changes show high variability and are related to the pre-treatment lip morphology.

Key Words: Lip curvature, Maximum anchorage, Skeletal Class II malocclusion.

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CA4584

Assessment Of Smile Index Variation Across Different Malocclusions

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Aim or purpose: The smile index is a valuable characteristic for comparing smiles between individuals or tracking changes over time in the same person. This study aimed to assess the smile index in untreated patients with different types of malocclusions.

Materials and methods: The study included 60 participants (25 males, 35 females) aged 16 to 35 years, categorized into three groups of 20 participants each, based on the type of malocclusion. Standardized extraoral photographs with a posed smile were taken, and photogrammetric analysis was performed using specialized image analysis software to determine the smile index for each participant. Statistical analysis was conducted using SPSS version 26.0.

Results: The overall mean value was 7.05 ± 2.26mm. For $p > 0.05$, no significant differences were observed between the three classes of malocclusion. The highest average smile index value was observed in Class I (7.44 ± 3.27mm), while the lowest was in Class III (6.83 ± 1.51mm), with $F = 0.441$, $df = 2$, and $p = 0.646$. The smile index for Class II was 6.89 ±1.64mm. The index was significantly higher in males compared to females in Class I ($t(18) = 3.275$, $p = 0.004$). In Class II, the difference was not statistically significant, with females showing a slightly higher value ($t(18) = 0.710$, $p = 0.487$), and in Class III, no significant difference was observed ($t(18) = 0.041$, $p = 0.968$).

Conclusions: Orthodontists should consider smile aesthetics during diagnosis, treatment planning, and the selection of treatment methods before initiating orthodontic therapy.

Key Words: index, mini-esthetics, smile.

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CA4064

Characteristics Of Craniocervical Posture In Skeletal Class II Adolescent Patients

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Aim or purpose: This study aimed to investigate the craniocervical posture of adolescent patients with skeletal class II malocclusion across different vertical facial patterns and provide a reference for treatment.

Materials and methods: According to the inclusion criteria, 34 skeletal class II malocclusion patients (aged 8–15 years) treated in the department between 2022 and 2024 were selected and categorized into low-angle, average-angle, and high-angle groups. Cephalometric radiographs taken in NHP were used to measure and analyze craniocervical postural indicators. Differences in craniocervical posture variables among the three vertical facial patterns were compared.

Results: Head posture was most extended in the low-angle group and most flexed in the high-angle group. Cervical curvature exhibited statistically significant differences among the three groups ($P < 0.05$), being smallest in the low-angle group and largest in the high-angle group.

Conclusions: Significant differences in craniocervical posture were observed among skeletal class II adolescent patients with different vertical facial patterns. The high-angle group exhibited greater head flexion, while the low-angle group displayed more extended head posture. Given that TMD are often associated with head extension, clinicians should pay closer attention to the TMJ in skeletal class II low-angle patients. Additionally, cervical curvature was most pronounced in the high-angle group. Since excessive cervical curvature is commonly seen in OSAHS patients, timely correction of poor cervical posture in skeletal Class II high-angle patients may help prevent OSAHS.

Key Words: skeletal class II malocclusion, vertical facial pattern, craniocervical posture, natural head position.

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CA4416

Dynasmile: Ai-Powered Smile Analysis Software

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Aim or purpose: This study aims to introduce Dynasmile, an AI-driven software solution for automating video-based smile analysis in orthodontics, improving efficiency and accuracy in clinical settings.

Materials and methods: The study employed a video-based smile analysis approach using AI algorithms integrated with Dynasmile software. The system analyzes videos to detect smile intensity and dentofacial landmarks. Approval was obtained from the institutional Ethics Committee. The software utilizes Python and several libraries, including OpenCV and Deepface, operating on an EC2 cloud server to process and analyze data. Dentofacial landmarks were automatically identified, and measurements were made to assess various esthetic parameters of the smile.

Results: Dynasmile significantly reduced the time for video-based smile analysis, completing the process in less than 3.5 minutes. The software accurately detected the highest smile intensity frames and produced reliable dentofacial measurements, consistent with orthodontic evaluations.

Conclusions: Dynasmile represents a breakthrough in automating smile analysis, offering a more efficient, consistent, and clinically viable alternative to traditional manual methods. Its integration of AI not only saves time but also enhances the precision of orthodontic assessments.

Key Words: Smile analysis, Artificial intelligence, Emotion analysis.

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