

Automated Classification of Partially Edentulous Arches Using Artificial Intelligence

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AIM or PURPOSE: The main aim of this study is to use artificial intelligence (AI) techniques, specifically deep learning, for computer-based, automatic detection of Kennedy Classification of partially edentulous arches. Overall, this technique is likely to improve the efficiency, accuracy, and accessibility of dental care while promoting early intervention and supporting research efforts in the field.

MATERIALS and METHOD: The study used an orthopantomography (OPG) dataset obtained from (SZABMU University), Pakistan. This dataset was then subjected to standard deep learning data preprocessing steps, including cleaning, standardization, and annotations, where each object of interest is labelled with its corresponding class and bounding box coordinates. The prepared data was then utilized to train several models using different object detection architectures, hyperparameters, and training techniques. These models were evaluated to select the highest accuracy model, which was then deployed for further testing and validation on unseen data to assess its real-world performance and potential for clinical application.

RESULTS: Overall, the accuracy of all Kennedy classes was high, exceeding 90%, except for class IV due to the scarcity of mandibular arch instances in the dataset.

CONCLUSION(S): The satisfactory results of the model pave the way for further research in leveraging artificial intelligence for the automated detection of Kennedy Classification in partially edentulous arches, promising advancements in dental care, treatment planning and patient satisfaction.

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Clinical comparison of crowns made with two intraoral scanners

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AIM or PURPOSE: Intraoral scanners have become increasingly popular due to their convenience, accuracy and time-saving capabilities. The aim of this study was to compare the clinical outcomes of zirconia crowns made with two different intraoral scanners.

MATERIALS and METHOD: A total number of 12 patients were included in the study. 50 zirconia crowns were made for

upper and lower molars and premolars with chamfer preparation. For every crown the digital impression was taken with two different intraoral scanners Heron IOS 3DISC and Aoralscan 3, by Shining. The zirconia crowns were milled from Zir-Cad prime zirconia blocs (Ivoclar Vivadent, Liechtenstein) and sent to office from try in. The evaluation was done by two prosthodontists with more than 10 years of experience. The specialist which made the comparison was blinded and didn't know which crown was produced from which scanner. For every crown 5-point Likert scale questionnaire was filled about marginal and internal fitting of the crowns, occlusal and approximal contact and overall satisfaction. The crown with the best score was cemented. The data analysis was performed using SPSS statistical software.

RESULTS: There was not significantly different in all evaluated parameters between the two intraoral scanner, marginal fit for Heron vs. Shining was (3.5±1.1 vs. 3.7±0.62, P=0.46); the internal fit (4.1±1.1 vs. 4.2±0.91, P=0.72), occlusal contact (4.6±0.98 vs. 4.5±0.87,P=0.70), approximal contacts (4.3±1.3 vs 4.1±1.1,P=0.77 and overall satisfaction (4.2±0.67 vs. 4.1±1.1, P=0.69).

CONCLUSION(S): Within the limitation of the study we can conclude that both intraoral scanners produce satisfactory clinical outcomes for single crown zirconia restorations.

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Case Study - Accepted: Poster Presentation

Severely damaged vital teeth: the input of ceramic overlay

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INTRODUCTION: The restoration of vital teeth is a frequent task treated by dentists. When the lost dental tissue is important, an intra radicular anchoring is needed to ensure the retention of the coronal filling. In these situations, the overlay seems to be a suitable solution which allow respecting the pulp vitality avoiding, thus, the root canal treatment.

CASE DESCRIPTION: This case report presents a 52 years-old female patient who consulted for the esthetic rehabilitation of her upper premolar. The Clinical examination revealed that the concerned tooth was severely damaged. It was filled by glass ionomer material. Peri apical radiograph showed the absence of a canal filling. The tooth exhibited proper responses to vitality testing. After the elimination of the coronal filling, the margins were supra gingival and a sufficient rounding enamel tissue was noted. Taking into consideration the pulp vitality, it was decided to restore the tooth with a Lithium disilicate overlay.

DISCUSSION: Respecting the pulp vitality preserves undoubtedly its integrity. The overlay is a mini invasive prosthetic solution which respects both the tooth vitality and the therapeutic gradient. Its success depends on the bonding quality and the quantity of the enamel tissue. It could be indicated also for pulpless teeth. Otherwise, the respect of pulp vitality,