

DIFFERENCE IN RETENTION FORCE OF APPROXIMATE GUIDE SURFACES BETWEEN CONVENTIONAL AND CAD/CAM REMOVABLE PARTIAL DENTURES

Blagoja Dashtevski^{1*}, Aneta Mijoska¹, Marjan Petkov¹, Nadica Janeva¹,
Sonja Gegovska-Zajkov², Oliver Zajkov³, Maja Bogdanovski⁴,
Tatjana Arsova⁵, Monika Dashtevska⁶

¹Department for prosthodontics, Faculty of Dentistry, University "St. Cyril and Methodius",
Mother Therese 43, 1000 Skopje, Macedonia

²Faculty of Electrical Engineering and Information Technologies,
Rugjer Boshkovikj 18, 1000 Skopje, Macedonia

³Institute of Physics, Faculty of Natural Sciences and Mathematics,
University "St Cyril and Methodius" Skopje, Arhimedova 3 1000 Skopje, Macedonia

⁴PHO "Molar Dent", John Kennedy 1/11, 1000 Skopje, Macedonia

⁵PHO "Carcev-Cortanoski", Varsavska 6, 1000 Skopje, Macedonia

⁶ATG Medical Innovations Ltd, Mill Street 46, QRM, Mill Street 46, 3105 Qormi, Malta

*e-mail: dasto2000@yahoo.com

Abstract

Effective retention plays an essential role in denture success and the ratio of the dentures' resistance to denture movement towards occlusal direction should be a major consideration. Evaluating and understanding the difference between conventional and Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) systems in terms of the magnitude of the retention force on the approximate surfaces of retention teeth was the aim of this research.

From fifty patients diagnosed with partial edentulousness class II, subclass 1, according to Kennedy classification, twenty fulfilled the inclusion criteria and were used as material for 20 master stone models on which the retention strength measurements of the conventional and CAD/CAM removable partial dentures (RPD) were made. The measurement was made with a DO663i dynamometer on 200 denture extractions on conventional and CAD/CAM manufactured dentures. The results were processed with statistical packages SPSS Statistics 22 and EasyFit 5.5.

The average value of retention force in the conventional model was 0.027739 N, and in the CAD/CAM model 0.04538271 N. This means that in the CAD/CAM model the mean value of this component is 0.01764 N greater than the same component in the conventional method. The mean value of the normal component of the retention force in the CAD/CAM model is about 64% higher than that of the conventional model. Other researches also indicate that conventional dentures are with lower retention and stabilization than dentures manufactured with CAD/CAM procedures as well as a reduction of unwanted rotations in these dentures.

Contemporary CAD/CAM manufacturing of RPD includes precise planning of the retention clasp and guide planes, while framework milling leads to an almost ideal final denture. The superiority of CAD-CAM technologies and the simplicity of the method, undoubtedly give us an opportunity to apply this system in everyday clinical practice.

Key words: CAD-CAM, Guide surfaces, Retention of removable partial dentures.