

# THE ANALYSIS OF REMOVABLE PARTIAL DENTURES WITH CLASPS MADE FROM THERMOPLASTIC AND CHEMOPLASTIC MATERIALS. A BIOMECHANICAL APPROACH OF THE INTERFACE BETWEEN CLASPS AND DENTURE.

M. Negrutiu<sup>1</sup>, C. Sinescu<sup>1</sup>, C. Sticlaru<sup>2</sup>, A. Davidescu<sup>2</sup>, M. Rominu<sup>1</sup>

<sup>1</sup> University of Medicine and Pharmacy "Victor Babes" Timisoara, Romania

<sup>2</sup> Polytechnics University of Timisoara Romania

**INTRODUCTION:** One of the most recent advances in dental technology is the application of nylon-like materials for the fabrication of dental appliances. This material (Flexite, Flexiplast, ValPlast) generally replaces the metal, and the pink acrylic denture material used to build the framework for standard removable partial dentures (RPD) [1]. It is nearly unbreakable, is pink-coloured like gums, can be built quite thin, and can form not only the denture base, but also the clasps as well. Since the clasps are built to curl around the necks of the teeth, they are practically undistinguishable from the gums [2].



Fig.1. The mechanical scanner used in this study.

**METHODS:** The purpose of this study is to analyse the behaviour of removable partial dentures with clasps, by comparing the thermoplastic material to the chemo plastic one. Therefore, numerical simulation analysis method based on ProEngineer and Ansys software was used. The modelling of the removable partial denture with clasps was made using mechanical scanning systems, Micro Scribe G2 (Fig.1). The RPD meshing procedure resulted in 3404 nodes connected in 1578 elements (Fig.2). The loading of the RPD was done with a force of 1200 N on the entire structure.

**RESULTS:** The study points out the tensions appeared in removable partial denture with clasps for each situation that was considered. The maximum equivalent (Von Mises) stress (7,114 Pa) recorded in the chemo plastic RPD was significantly higher compared to those in the

thermoplastic one (5,248Pa) (Fig.3). The total maximum deformation recorded in clasps for Chemo plastic RPD was 0,742 mm, while the thermoplastic one was 0,748 mm.

**DISCUSSION & CONCLUSIONS:** The thermoplastic resins have been used in dentistry for over 50 years and their applications continue to develop. These materials have superior properties and characteristics; therefore they provide excellent esthetics and biocompatibility. As a general conclusion the injection method of the thermoplastic materials brings more advantages in the behavior of the removable partial dentures with clasps, compared with the conventional technology.

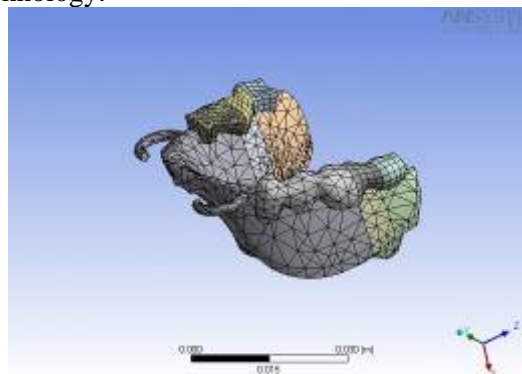


Fig.2. Meshing the injected RPD.

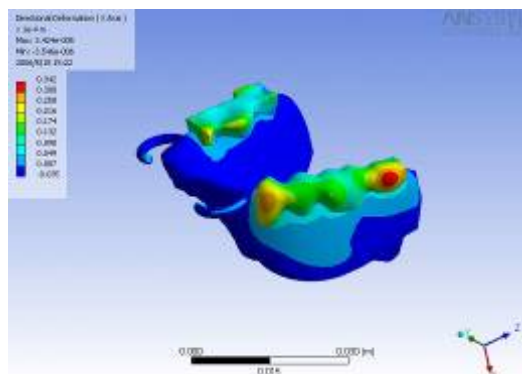


Fig. 3. The tensions in the clasps and in the RPD.

**REFERENCES:** <sup>1</sup> A.E.Amin (1995) *Egypt Dent J* 41(3):1299-1304. <sup>2</sup>J. John, S.A. Gangadhar, I. Shah (2001) *J Prosthet Dent* October.