# ASPECTS IN BIOMATERIALS SELECTION FOR REMOVABLE DENTURES – MARKER OF BIOLOGICAL INTEGRATION

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The number of denture wearers is increasing as the number of elderly people continually growing, and polymethyl methacrylate (PMMA) is still the most frequently used material in denture base fabrication. It appears that the fiber impregnation method could positively affect the acrilic resin base resistance properties, preventing the dentures fracture. The association of acrilates with AM88-Natrium maleate copolymer, metil methacrylate produces positive antiseptic effects.

*Key words:* Non-metallic biomaterials; Removable dentures; Biocompatibility; Polyethylene fibres.

## INTRODUCTION

The proper selection of non-metallic biomaterials used in removable dentures, corroborated with the prosthesis design according to the prosthetic field characteristics, represents a sine-qua-non condition for a successful therapy. Due to the recent increasing concerns in the field of biomaterial research, the market seems to be saturated with a wide range of products addressed to various types of particular situations [1]. For a highly adapted prosthetic appliance, individualised for the needs and requests of the edentulous patients, the practitioner has to make an accurate selection of the existing dental biomaterials. An important aspect that leads to the success in prosthetic therapy is the evaluation of the prosthetic field particularities and the association to the biomaterial properties and the related technologies [2].

## PURPOSE

The aim of this study is to obtain a pertinent analysis of the prosthetic field characteristics – proper selection of dental biomaterials binoma, applied in removable dentures, detailing the multifactorial kaleidoscope that leads to a viable therapeutically solution from the biointegration point of view [3].

## MATERIAL AND METHOD

The study was realised on a representative group of patients, analysing the prosthetic solution particularities and detailing the biomechanical and biological aspects of constituent biomaterials, for each clinical case.

## RESULTS AND DISCUSSIONS

The general health state of patients, the prosthetic field particularities, the biomechanical and biological behaviour of non-metallic biomaterials used in removable dentures have determined the selection of flexible acrylates or acrylates – copolimers and acrylates – reinforcing fibres combinations.

The first clinical case diagnosed with complete maxillary edentation is relevant through the fact that the female patient reported numberless consecutive fractures to the practitioner, needing many repairs. We have to mention that the last two complete removable dentures were reinforced with a metallic net structure.

In this case, the practitioner took the decision to reinforce the future removable denture with polyethylene fibres. There were used Kerr Construct fibers with a 1, 2 and 3 mm thickness. Before preparing the acrylic resin, the fibers were

immersed in a low density polymethyl methacrylate / AM88 copolymer mixture. The AM88 copolymer confers a highly plasticity and a significant adherence. The fibres were selected according to the prosthetic field characteristic features, having a 3 mm thickness and were ordered both longitudinal and transversal positions[4]. First, a layer of acrylic resin is placed followed by the polyethylene fibers and another layer of acrylic resin. A problematic issue of this technique is the discreet movement of the polyethylene fibers during the process. This situation was encountered in the studies of Vallitu in 1994.

The case of the 61 years old patient S. E., diagnosed with complete maxillary edentation and mandibullary partial extended edentation brings into discussion the solving of the often encountered removable acrilic dentures fractures using an increased number of polyethylene reinforcing fibers (Fig. 1).

In this stage, the discreet movement of the fibers was not reported because of the alternative pink and transparent acrylic resin layers, the latter having a higher density than usual (Fig. 2). Proportional to the density of the disposed fibers, a highly resistance of the denture base is obtained, preventing the future possible damages (Fig. 3).

Another case was represented by a 55 years old female patient, diagnosed with bimaxillary complete edentation, inadequately treated. The patient presented oral candidosis. In this case the acrylate was mixed up with AM88-Natrium maleate copolymer, metil methacrylate in proportion of 1:3, having a well known antiseptic action (Fig. 4).

Later on, the acrylate was mixed up with the monomer, molded and then polymerized (Fig. 5).

The association of the classic acrylate with the copolymer leads to the amelioration of the oral candidosis approximately after two weeks (Fig. 6).

Fig. 1. Maxillary prosthetic field. The model of the complete removable denture.


Fig. 2. The insertion of polyetylene fibres – technological aspects.

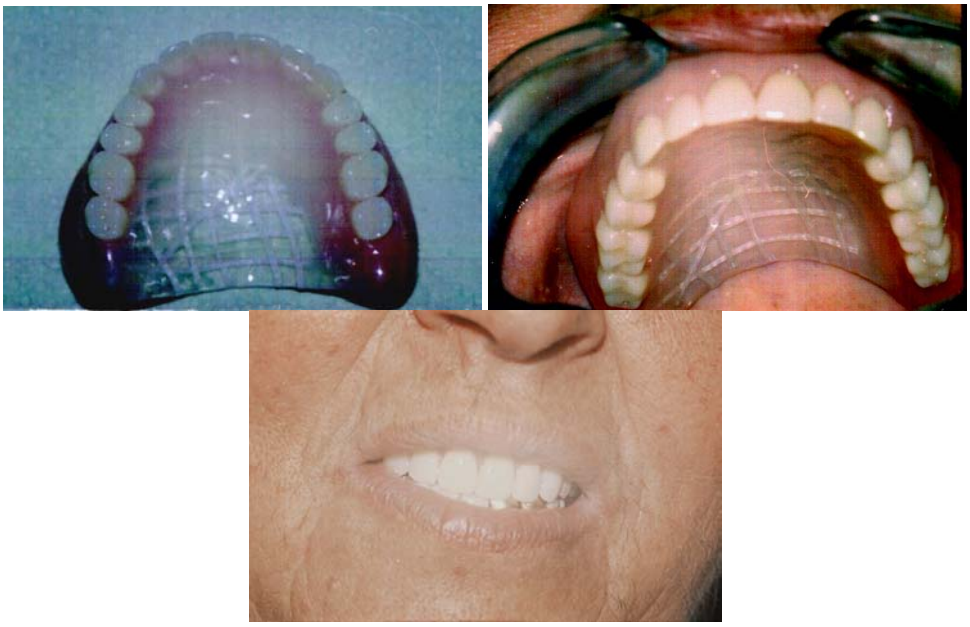

Fig. 3. The final aspect of the complete removable maxillary denture.

Fig. 4. The AM88 component.

Fig. 5. The preparation of the modified acrylate.

Fig. 6. Maxillary and mandibullary prosthetic fields. Final complete removable dentures.

## CONCLUSIONS

Exclusive use of non-metallic type of biomaterial may be a serious error. The therapeutically success depends on clinical and biological individual aspects, the correct selection of biomaterials being a marker of the prosthetic substitute biointegration.

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