

Non-Allergenic Acrylic Dentures with Inserted Capillaries – Materials, Manufacturing Technique and Clinical Application

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Abstract

Prosthetic dentistry is an important branch of dental medicine, whose main goal is the rehabilitation of patients with partial or complete tooth loss. Classic acrylic materials are widely used in the fabrication of dentures, but in certain patients they can cause allergic reactions due to the presence of potentially allergenic components. For this reason, non-allergenic acrylic materials have been developed as a safer alternative with improved biocompatibility and reduced risk of irritation of the oral mucosa.

This paper analyzes the application of non-allergenic acrylic materials in the fabrication of dentures with inserted capillaries, with emphasis on their material characteristics, fabrication technique, and clinical application. A case report is presented in which a denture was made using the material VILLACRYL H PLUS TRANSPARENT from EVERALL 7, a material free of cadmium and other potentially harmful substances. The use of a capillary structure in the acrylic base contributed to a more natural appearance of the gingiva and improved aesthetics. The final result showed a high functional, biological, and aesthetic level, confirming the clinical value of modern non-allergenic prosthetic materials.

Keywords: prosthetic dentistry, non-allergenic acrylic, denture, capillaries, biocompatibility, aesthetics

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I. INTRODUCTION

Prosthetic dentistry is one of the most important branches of dental medicine, whose main goal is the rehabilitation of patients with partial or complete tooth loss. Tooth loss can occur as a result of caries, periodontal disease, trauma, or other pathological conditions. The absence of teeth affects not only chewing function but also speech, aesthetics, and the patient's psychological state. Therefore, prosthetic therapy plays a significant role in restoring the normal function of the oral system and improving patients' quality of life [1].

Modern dentistry uses various types of dentures and materials in order to ensure maximum functionality and aesthetics. Technological development in dental materials enables the creation of dentures that are more durable, more comfortable, and more biologically compatible with the tissues of the oral cavity. In recent decades, special attention has been paid to materials that do not cause allergic reactions, since certain components in classic acrylics can lead to irritation and allergies in sensitive patients [2].

One of the most commonly used materials in denture fabrication is acrylic, which is used to make the denture base. Although acrylics are widely used due to their availability and good mechanical properties, some of them may contain components that cause allergic reactions. For this reason, so-called non-allergenic acrylics have been developed in modern dentistry, which do not contain certain harmful substances such as cadmium and other potentially allergenic components [3].

II. AIM

The aim of this research is to analyze the application of non-allergenic acrylic materials in the fabrication of dental prostheses, with special emphasis on dentures with inserted capillaries. The paper examines the characteristics of non-allergenic materials, their advantages compared to classic acrylics, and their role in improving the biocompatibility and aesthetics of dentures [2].

In addition, the paper aims to demonstrate the importance of modern dental materials in improving prosthetic therapy. Through the analysis of various materials and techniques, it seeks to show how the use of non-allergenic acrylics can contribute to improving patient comfort and health [3].

Special attention is devoted to the technique of inserting capillaries into the acrylic base of the denture. This technique enables the creation of dentures with a natural gingival appearance and improved aesthetics, which represents a significant advantage in modern dental practice [4].

III. CASE REPORT

This case study presents a specific example of the fabrication of a non-allergenic dental prosthesis with inserted capillaries. The aim is to show the entire process of denture fabrication, from clinical preparation and laboratory production to the final application in the patient. The use of non-allergenic acrylic materials and the aesthetic capillary technique enables the creation of a denture that is functional, biocompatible, and aesthetically acceptable [4].

In this particular case, the non-allergenic acrylic material VILLACRYL H PLUS TRANSPARENT from the manufacturer EVERALL 7 was used, which does not contain cadmium or other potentially allergenic components. This material is especially suitable for patients with sensitive oral mucosa or a previous history of allergic reactions to dental materials [3].



[Figure 1 – Villacryl H Plus]

The patient presented with significant tooth loss in the upper and lower jaw, which led to impaired chewing function and aesthetic problems. The absence of teeth affected proper occlusion and jaw stability, which is a common problem in patients with long-term tooth loss [1]. In addition to the functional problems, the patient also expressed dissatisfaction with the appearance of the smile. In such cases, prosthetic rehabilitation plays an important role in improving the patient's quality of life, since a properly made denture can significantly improve aesthetics and self-confidence [5].

Given the sensitivity of the oral mucosa, a non-allergenic acrylic was chosen as the material for fabricating the denture. This material provides a high level of biocompatibility and significantly reduces the risk of allergic reactions [3].

IV. MATERIALS AND METHODS

The first step in the process of fabricating the denture is taking a precise impression of the patient's jaws. This impression is used to make a plaster model, which represents an accurate reproduction of the anatomical structures of the oral cavity. The plaster model serves as the basis for the subsequent laboratory fabrication of the denture [2].



[Figure 2 – manufacturing process / impression / modeling]

The next phase is modeling the denture base under laboratory conditions. In this phase, the dental technician forms the basic shape of the denture and prepares the structure into which the artificial teeth will later be placed. Precision at this stage is of great importance, since proper adaptation of the denture to the oral tissues ensures stability and comfort when worn [4].



[Figure 3 – base modeling]

During laboratory fabrication, a non-allergenic acrylic material is used that provides good mechanical stability and high biocompatibility. This material does not contain cadmium or other potentially harmful substances, which makes it suitable for long-term use in the oral environment [3].

One of the most important aesthetic stages in denture fabrication is the insertion of capillaries into the acrylic base. In this technique, thin red fibers are placed within the acrylic material in order to imitate the natural vascular structure of the gingiva [4].

The capillaries are arranged within the acrylic mass in a way that creates a natural visual effect. This technique requires great precision and experience on the part of the dental technician, since improper placement of the capillaries can disrupt the aesthetic appearance of the denture [5].

This is followed by the placement of the artificial teeth. This phase is important for establishing proper occlusion and functionality of the denture. Tooth position is determined according to the patient's anatomical characteristics and the aesthetic parameters of the smile [6].



[Figure 4 – placement of artificial teeth / plaster model]

The teeth are placed on the plaster model, which allows precise control of occlusion and denture stability. In this phase, the dental technician checks the position of each tooth in order to ensure proper chewing function [7].

After completion of all laboratory phases, the denture undergoes final processing and polishing. In this phase, all surface irregularities of the denture are removed, creating a smooth and glossy surface [8].



[Figure 5 – final processing / denture]

V. RESULTS

The final result of the denture fabrication shows a construction that provides good functionality, stability, and aesthetics. The denture enables proper chewing function and significantly improves the aesthetics of the patient's smile [5].



[Figure 6 – final result]

Thanks to the use of non-allergenic acrylic, the denture is biocompatible and does not cause irritation of the oral mucosa. This allows the patient to use the denture without discomfort and without the risk of allergic reactions [3].

In addition, the capillary insertion technique contributes to creating a natural gingival appearance. This improves the aesthetics of the denture and increases patient satisfaction with the final result [4].

VI. DISCUSSION

Prosthetic dentistry is an important branch of dental medicine that plays a significant role in the rehabilitation of patients with partial or complete tooth loss. Tooth loss can lead to serious functional and aesthetic problems, such as impaired chewing function, speech problems, and reduced self-confidence in patients. For this reason, properly made dental prostheses are of great importance in restoring the normal function of the oral system and improving patients' quality of life [5].

Modern dentistry uses various materials for denture fabrication, with acrylics being among the most commonly used materials. They provide good mechanical stability, easy processing, and satisfactory aesthetic results. However, certain components in classic acrylic materials can cause allergic reactions in sensitive patients, which represents an important challenge in prosthetic dentistry [3].

For this reason, non-allergenic acrylic materials have been developed in recent years, formulated so as not to contain potentially harmful substances such as cadmium. These materials provide better biocompatibility and significantly reduce the risk of allergic reactions in the oral environment. Their use is especially important for patients with sensitive oral mucosa or a history of allergies [2].

In addition to biocompatibility, modern prosthetic dentistry also strives to improve the aesthetics of dentures. The technique of inserting capillaries into the acrylic base represents a modern approach that enables the creation of dentures with a natural gingival appearance. This technique imitates the natural vascular structure of soft tissues, which significantly improves the aesthetics of the denture and increases patient satisfaction [4].

The paper also analyzed the role of dental materials produced by the company EVERALL 7, one of the world's leading manufacturers of dental materials. This company's materials are characterized by high quality, good biocompatibility, and precision in laboratory processing. These characteristics enable the fabrication of dentures that are functional, aesthetically acceptable, and safe for patients [3].

The case study presented in this paper shows the entire process of fabricating a non-allergenic denture with inserted capillaries. Through analysis of the laboratory process and the final result, it can be concluded that the use of non-allergenic acrylic combined with modern aesthetic techniques enables the creation of dentures with a high level of functionality and aesthetics [4].

VII. CONCLUSION

Based on the analysis in this paper, it can be concluded that the application of non-allergenic acrylic materials represents an important step in modern prosthetic dentistry. These materials not only reduce the risk of allergic reactions but also enable better aesthetics and comfort for patients [3].

Prosthetic dentistry plays a significant role in the rehabilitation of patients with tooth loss, and modern materials and techniques enable the improvement of functional and visual results. The capillary insertion technique additionally contributes to a natural appearance of the denture and greater patient satisfaction [4]. With the further development of dental materials and techniques, additional improvement of prosthetic therapy and an increase in the quality of dental care is expected.

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