Biographical Principles of the AcryLock Attachments Use in Contemporary Prosthetic Dentistry

SUMMARY

Introduction. There are many choices and different protocols when determining treatment of partially edentulous patients. In this article we are reviewing the dental treatment throughout the use of partial dentures with AcryLock attachments in patients who previously have been treated with different types of fixed-mobile appliances.

Material and Methods. We have accomplished fixed-mobile dental appliances with the use of AcryLock attachments in 7 patients who previously have worn appliances with Lecodent attachments. Comparative analysis has been carried out with the methods used in biophysics. The patients have been followed-up for a year.

Results. After the fixed-mobile prosthetic rehabilitation has been accomplished with the use of attachments from the AcryLock system, exceptional functional and aesthetic results have been noticed.

Conclusion. The AcryLock attachments serve the patient extremely well as a treatment modality option with removable partial dentures for several reasons. Primarily, they are designed very close to the abutment tooth centre, allowing the direction of the force vectors straight down along the long axis of the tooth. Attachments shown in this survey illustrate good functional and aesthetic aspects. Consequently, it is realistic to expect greater longevity in the use of these elements, in comparison to the previous methods in treatment of partially edentulous patients.

Keywords: Partial Dentures; Attachments; AcryLock

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ORIGINAL PAPER (OP)

Introduction

There are many possibilities for the selection of different protocols to determine the treatment plan for partially edentulous patients. In this article, the dental treatment has been reviewed through the application of partial dentures with attachments in patients who were previously treated with other kinds of fixed-mobile allowances. Partial dentures throughout the application of attachments are categorized as a culmination of knowledge and art in dental removable prosthetics. Primarily, they seem very complex, but attachments bond the fixed and the mobile part of the allowance in a simple manner in an incredibly functional whole (Fig. 1).

Figure 1. The metal skeleton of a lower partial denture, with a green patrice on the left side of the patient’s fixed-mobile construction
A huge variety exists in partial dentures with attachments, not only in shape but also in the way of manufacturing, the material from which they are developed and, certainly, the indications. They belong to the group of complex partial dentures. Attachments represent polyvalent precision combining elements who serve to combine (attach) the fixed with the mobile part of complex fixed-mobile appliances. They have become from the need to hide the visible retention elements of removable partial dentures with which their aesthetic value has extremely increased.

Attachments in most of the cases consist of 2 basic parts:
- Patrix, the primary or male part;
- Matrix, the secondary or female part.

The parts of the attachments are constructed in a manner that, with their combining, a functional whole is accomplished of the attachment system and dental appliances. With the use of attachments in partial dentures, one part is incorporated in the fixed and the other in the mobile dental appliance.

In this article attachments are being reviewed from the group of vertical slide attachments. They are represented by a system of double elements for retention, or cylinder assembly in a miniature shape.

That system is consisted of:
1. Patrix, primary or inner part of the system, or positive;
2. Matrix, secondary or outer part of the system, or negative.

From the industrially produces sliders, in this article the emphasis will be given on the AcryLock slide attachments. They are made out of plastics, which burns out with no residual parts. The size of the non-residual burnout patrix is 0.04 mm to ensure a defined dimension for the plastic matrix after preparation and polishing. This slider consists of patrix and matrix. The system is specific because it consists of an extra-coronary part of the crown, which is consisted of a guide and a patrix. The guide is applied to the approximal side of the wax model of the application crown (special purpose crown) in the 0 position of the paralelometer. The role of the guide is for the patrix to be on an acceptable distance from the interdental papilla. On the guide then the patrix is applied and in accordance with the position and shape of the alveolar reef, it is positioned. A few millings are possible on the guide and the patrix with the purpose of improving the adaptation to the interdental papilla and the alveolar reef. The patrix with the wax is tied to the guide and together with the wax model on the fixed construction with specific laboratory procedures is replaced with precious or base alloys.

The matrix of the Acrylock attachments is made out of hard plastics and with the responding instrument is placed in the house of the metal skeleton of the partial denture.

The matrices are available in 3 different sizes for setting different withdrawal forces: (1) green matrix - normal friction; (2) yellow matrix - medium friction (Fig. 2); (3) red matrix - high friction.

Figure 2. Presentation of a fixed and mobile part of a prosthetic restoration with yellow matrices

The new matrix design with a single retention point allows the matrix to be easily exchanged without time-consuming reduction and fitting of the friction insert. Only alloys with a 0.2 proof stress of over 500 N/mm² should be used to ensure stability.

The complexity with designing fixed-mobile dental appliances throughout the use of AcryLock attachments should be analyzed with the methods of biophysics.

With the help of these useful methods, the forces of the chewing pressure (while using these attachments) are directed down the long axis of the tooth, minimizing the torque and the lateral forces, and therefore improving the chances for success of the restoration.

Material and Method

Complex fixed-mobile restorations have been accomplished with the application of Acrylock attachments in 7 patients who have previously been treated with different types of treatment modalities. In this article a review has been made by representing characteristic cases that have been treated with paying meticulous attention to details. The patients have been treated with these appliances and with the methods of biophysics in the clinic for removable dental prosthetics.
Before beginning with the prosthetic approach, the patients needed pre-prosthetic preparation due to the presence of mouth and periodontal diseases, and also at the clinic for oral surgery. With the team approach, the rest of the teeth were prepared for further development of application crowns, use of the AcryLock attachments and the development of the skeletal partial denture.

**Presentation of cases**

The first patient was completely edentulous in the upper jaw and partially (subtotal) edentulous in the lower jaw. This patient has worn total acrylic denture in the upper jaw, and a bridge with Lecodent bars and a lower skeletal denture. Both dentures needed to be replaced with new prosthetic restorations. New total prosthesis was made in the upper jaw; in the lower jaw, 2 remaining canines were endodontically treated and the prosthetic preparation impression was taken for the production of a new dental bridge with the elements of the AcryLock attachments (Fig. 3). The patrrix is incorporated in the bridge construction while the matrix is applied in the lower skeletal prosthesis (Figs. 4 and 5).

The second patient previously possessed a dental bridge construction with attachments of the type Lecodent, and a skeletal denture in the upper jaw. As local conditions enabled construction of fixed-mobile restorations with the system of AcryLock attachments (Fig. 6), it was performed as well (Figs. 7 and 8).

The third patient came to the clinic for removable dental prosthetics, with worn out fixed-mobile dental appliances having Lecodent bars that needed to be replaced. The upper left premolar had to be extracted; furthermore, the supporting tissue complex had to be treated for the presence of periodontal pockets. The upper right canine was suitably treated endodontically and enhanced with metal posts and cores (Fig. 9).

Our patients were followed in a period of time of one year in which many aspects were notified concerning the choice of these attachments in the complete prosthetic rehabilitation.
Results and Discussion

In patients who previously worn fixed-mobile dental appliances with bars of the Lecodent type, comparative analysis was carried out throughout the methods of the biophysics. This method emphasizes the meaning of the vectors that are gained when a force acts along the teeth, or, in these cases, along the teeth covered with dental crowns. That force is represented schematically with a vector that touches the tooth and divides in a vertical and in a horizontal component. The closer the direction of the vectors along the long axis of the tooth, the better they are from the aspect of minimizing the harmful lateral forces that would devastate the entire final restoration. The vertical forces physiologically burden the teeth optimally.
when acting along their long vertical axis. Horizontal forces, while they are in the physiological values, are neutralized with the compensatory mechanism. If they overcome the individual tolerance of the teeth, traumatic forces prevail and in the process of bone remodelling there is a predomination of degradation processes.

Our experience is that teeth can react painfully when forces of 20 N act in horizontal direction, while in vertical forces may cause pain in the apical region with intensity of over 200 N. All of these facts should be considered while making a treatment plan and choosing attachments. In attachments from the type AcryLock there is a higher “verticalisation” in directing the forces of the chew pressure in comparison with sliders like Lecodent.

After the successfully accomplished fixed-mobile prosthetic rehabilitation throughout the use of attachments of the system AcryLock, exceptional functional and aesthetic results were notified. Concerning the functional aspect, subjective approach should be taken into consideration (surveys taken from the patients at the regular controls); methods from the biophysics should be used as an objective method.

Our patients in the period of time of a year responded positively and in comparison they accept the AcryLock devices rather than the old ones (Lecodent bars). The patients stated that they feel the new skeletal devices to be more stable than the old ones and they felt safer while talking and using them in the act of mastication. Patients also accept the new therapy plan from the aesthetic point of view.

Throughout the measures of the biophysics, the functional value could be proved in addition to the axial transmission of the chew pressure, with minimizing lateral forces to the periodontium of the supportive teeth.

With analysis of the vectors of the forces schematically shown as a comparative method by analyzing the Lecodent with the AcryLock attachments; using AcryLock attachments there was a higher vertical transmission of chewing forces, since they are referred as vertical sliders. In Lecodent bars, there is a minimal tendency of anterior-posterior moves on the removable dentures, especially if distal teeth are missing, and because they are horizontal sliders.

**Conclusion**

The functional and the aesthetic demands that are expected from the dentists can be pleased with a suitable choice of materials, correct applications of procedures, as well as the construction with strict holding on to the biophysical principles. Attachments from the type of AcryLock shown in this article throughout the case of studies illustrate that they efficiently serve patients from aspect of function and aesthetics.

Primarily, they are designed very close to the centre of the teeth carriers of the dental bridge construction, which enables the direction of the vector forces along the vertical long axis of the tooth. From the results which we have come to, it is realistic to expect longevity in the use of these elements, in comparison to the previous methods of treatment of partially edentulous patients.

**References**


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