

Mandibular Overdenture - Two Clinical Concepts

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Abstract: *Introduction: After the complete loss of teeth multiple changes in the entire body will happen. The literature shows great interest in the dental rehabilitation options for these patients. Material and Method: there have been selected patients with complete edentulism and removable implant overdentures. Thirteen patients were included and reevaluated at 1, 6, 12 months. Changes and incidences were reported. Results: there were caps change for the locator systems and hyperplasia cases in the same system users. Conclusions: Both systems are reliable but the bar system requires less maintenance visits.*

Keywords: overdenture, bars, locator system

1. Introduction

Complete edentulism induces multiple changes in the entire body, from physiognomic alterations consisting of an aging facial appearance with deepened perioral grooves and diminished vermilion border to speech and digestive disorders. The inability to triturate food determines an incomplete oral digestion phase and consequently, impossible nutrient absorption. The younger the completely edentulous patient, the higher is the bone resorption rate. The number of people who retain their natural teeth until an advanced age is increasing [1]; nevertheless, many elderly people have extensive tooth loss. The literature shows great interest in the impact of these medical procedures and medical devices on quality of life [1]. Young adults almost always want fixed restorations, unlike elderly patients who, if they previously wore removable prostheses, more easily accept this type of restoration until it no longer provides masticatory efficiency and comfort. The rehabilitation possibilities differ greatly depending on the patient's available bone and financial possibilities, and the clinical technical stages are interrelated. In this paper, we aim to compare three types of treatment for completely edentulous mandibles, their challenges, clinical steps and final outcome.

2. Material and Method

The study included 13 patients with complete maxillary and mandibular edentulism. The dental restorations provided were supported by 2 or 4 endosseous implants. The restorations were placed after a period of at least 3 months from dental implant placement, in the following stages.

Two-implant overdenture

A preliminary alginate impression was taken with a stock tray, followed by a functional custom impression that recorded each detail of the prosthetic field and was taken with an open tray including the transfer devices for the two implants.

Determining the intermaxillary relations using wax rims, and establishing VDO and tooth position. In the laboratory, the metal framework, and the wax up were made and tried in the patient's oral cavity. After the try-in the necessary adjustments were made and the acrylic

denture was made on the metal framework. The two-implant overdenture was placed on a mixed muco-osseous and implant support. Locator attachments were applied to the implants, and subsequently, the male part of the attachments was fixed to the denture base. The denture fit was rechecked using polyvinyl siloxane materials, until the passive mobile mucosa at the periphery of the prosthetic field was completely pressure-free. The occlusal adjustment of the restoration was carried out according to the balanced occlusion principle.

Complications and complaints were evaluated at 1, 6, 12 months after the procedure.

Four-implant overdenture

Like in the previous case, a custom tray was made to take a polyether (Impregum) impression with the open-tray transfer devices. The intermaxillary relations were determined with wax rims that were used like in the case of two-implant restoration.

After casting the models, the technician scanned and designed the future restoration. When the bars were ready, they were tried in the oral cavity along with the metallic framework. At this trial stage, all components of the future restoration were verified: the adjustment of the abutments and implants, the adjustment of the bars to the metal framework, the shape, size, color of the teeth, static and dynamic occlusion according to the balanced occlusion principle. The bars of the overdenture were made of metal alloy (SLM), and the framework was cast. Any existing incongruences were corrected at this stage.

After the resin of the restoration was polymerized, the restoration was processed and polished so that it could be placed in the patient's mouth by the doctor, who rechecked the adjustment of the overdenture to the bars, as well as static and dynamic occlusion.

3. Results

Table 1 synthesizes the main incidents that occurred after 1, 6 and 12 months from the placement of the restorations. During the follow-up period, there were no major complications in any patient. No fractures of the dentures were reported. No patient reported loosening of the attachment ball. Retention loss occurred in one patient with locator attachments after 3 months, while the rest

needed replacement of the male parts of the attachments after 1 year. In the case of three patients, gingival hyperplasia was observed around the attachments 6 months after placement of the restorations. In the case of these patients, gingivectomy and immediate placement of the abutments and restorations was performed for correct tissue modeling. In one patient, 6 months after restoration placement, the Teflon fitting became perforated and moved to the subgingival portion of the abutment. No loosening of the attachment bar occurred during the survey period. No implant was lost and there were no signs of periimplantitis.

4. Discussions

The resistance of overdenture restorations is satisfactory, due to the metal framework that provides the necessary resistance, and the mixed implant-mucosal support ensures the retention needed for the daily functions of the dental maxillary system.

The advantages of using overdenture restorations are: better biocompatibility of the materials used, no need for time-consuming and expensive surgical interventions with a risk of failure, a significant reduction of the base thickness so that taste changes are minimized, low risk of fracture of the restoration due to the metal framework, the possibility of subsequent chairside and laboratory adjustments. Being removable restorations, these can be designed so as to provide upper lip fullness by extension and thickening of the prosthesis saddle margin.

The disadvantages of these restorations are: the fact that they must be removed for cleaning after each meal, the fittings of the attachments can wear out leading to excessive mobility of the restoration which makes it difficult to use, changes in the color of the resins of the restorations, the need for their lining which may occur after a certain time period because of the mixed implant-mucosal support.

Two- or four-implant overdentures are superior to conventional restoration with complete acrylic dentures [2]. Patients have an improvement in their quality of life using this type of restoration, while the costs of prosthetic rehabilitation increase. On the other hand, soft tissue rehabilitation is aesthetically better, given that the lips and

cheeks are supported correctly. Conventional removable dentures require a longer adaptation time period and, frequently, adjustments in order to obtain satisfactory results for the patient [3]. Bar attachments require fewer repair procedures than locator attachments both in this study and other literature studies [4], so that patients' visits to the doctor are less frequent and maintenance costs are lower. Fixed implant-supported overdentures often require additional surgeries to augment the muco-osseous support of the patient; they are expensive and frequently prolong the duration of treatment. Existing studies show that there are no major differences regarding the transmission of forces between fixed and removable implant-supported overdentures [5].

5. Conclusions

Despite the limitations of this study, it can be concluded that four-implant overdenture with bar attachments is better accepted by patients than two-implant overdenture with locator attachments.

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Table 1: Removable Overdentures and major Incidences

| Number | Patient | Dental arch | Implant Position | Attachment | Antagonists | Complications | Gingival hypertrophy |
|--------|---------|-------------|------------------|------------|-------------|---------------|----------------------|
| 1 | F/46 | maxillary | 13, 23 | locator | NT | Cap change | - |
| 2 | F/56 | maxillary | 13,23 | locator | RPD | Cap change | Present |
| 3 | F/42 | mandible | 33,43 | locator | CD | Cap change | Present |
| 4 | M/46 | mandible | 33,43 | locator | RPD | - | |
| 5 | M/50 | mandible | 31,33,41,43 | bar | CD | - | |
| 6 | M/60 | maxillary | 12,13,21,23 | bar | NT | - | |
| 7 | M/69 | mandible | 33,43 | locator | CD | - | |
| 8 | M/62 | mandible | 33,43 | locator | FPD | Cap change | |
| 9 | F/65 | mandible | 33,43 | locator | RPD | Cap change | Present |
| 10 | M/42 | maxillary | 13,23 | locator | RPD | Cap change | |
| 11 | F/50 | maxillary | 13,27 | locator | NT | Cap change | |
| 12 | F/50 | maxillary | 11,13,22,23 | bar | IOD | - | |
| 13 | F/50 | mandible | 31,33,42,43 | bar | IOD | - | |

NT-natural teeth, RPD-removable partial denture, CD- complete denture, FPD fixed partial denture, IOD implant overdenture



Figure 1. A. Bar attachments, B. Metallic framework, C. Mock up



Figure 2 Ball attachments and metallic framework for the locator system