Immediate denture fabrication: a clinical report

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Summary

The aim of the present clinical report was to describe the use of a patient's extensive fixed prosthesis, where the supporting teeth were hopeless, for fabricating an interim immediate complete denture. The present procedure was used to replicate the vertical dimension, phonetic and aesthetic of the existing fixed prostheses as part of an immediate denture and a final complete denture.

Key words: immediate complete denture, dental prosthesis, vertical dimension.

Introduction

The immediate denture is a dental prosthesis constructed to replace the lost dentition, associated structures of the maxillae and mandible and inserted immediately following removal of the remaining teeth. Generally, two types of immediate dentures are described in the literature: conventional immediate dentures and interim immediate dentures (1). In the traditional type, the interim prosthesis is fabricated to immediately place after the extraction of natural teeth and can be used as the definitive or long-term prosthesis. The interim type is used for a short time after tooth extraction. After the achievement of healing period, the immediate denture may be relined or replaced with the newly fabricated final denture (2). It was reported that the interim immediate denture show numerous advantages as preservation of facial appearance and height, muscular tone, phonetic and reduction of post-extraction pain (3).
Several procedures have been described in the literature in order to construct an intermediate or transitional prosthesis, to reduce the time required for its fabrication and to provide a fast and economical service (4-7). Khan et al. (1992) fabricated an immediate transitional complete denture in one appointment using self polymerizing, tooth-colored acrylic, and visible light-cured resins (8); however, multiple extractions performed in the same appointment may be traumatic, complicating the adaptation of the patient to the newly fabricated denture (1). In a report, a speedy economical interim immediate denture using a vacuum-forming machine without conventional laboratory procedures was also reported (9). A less traumatic immediate complete denture placement was evaluated in another clinical study, where the remaining teeth were cut off the gingival margins instead of extracting them at the time of prosthesis insertion, performing the placement procedures in a clean, blood-free environment, whereas the roots were extracted at a later time (10).
The treatment outcome is not always predictable as the prostheses cannot be completely assessed before achievement (11). One of the most important issues to be considered in immediate denture fabrication may be the difficulty to assess the occlusal vertical dimension (OVD) and centric relation after extraction of the posterior teeth.
Indeed in a clinical report, Gilboa et al (2009) performed a procedure to fabricate an immediate complete overdenture using several teeth retained an interim provisional fixed partial denture until the complete denture was finished. In this procedure the posterior occlusion was maintained during the healing period and the trauma of multiple extractions at one visit was avoided (12).
Recently, Gooya et al. (2013) described the use of a patient's fixed prosthesis for fabricating, in one appointment, an interim immediate partial denture, where three remaining teeth were maintained to preserve OVD and retentive clasps were used to improve temporary prosthesis retention. The Authors concluded that in this procedure the occlusion, OVD, and facial support was maintained during the healing period (1).
The purpose of this report was to describe a technique for fabrication of an interim immediate denture using patient's current fixed partial denture, preserving patient original information: phonetic, esthetic, facial height and OVD.

Clinical report

A 67-year-old woman with a fixed partial maxillary prosthesis extended from the upper second right premolar

Figure 1. Initial clinical examination of the patient with a fixed denture from the second upper right premolar to first left molar.

and first left molar was evaluated for the treatment. The patient presented no significant medical history but was a heavy smoker and no occlusal or temporo-mandibular disease. Clinical examination and radiographic assessment (Figs. 1, 2) revealed an unrestored mouth with generalized severe chronic periodontitis of the teeth supporting fixed prosthesis, that were considered hopeless. Therefore, the operator decided to use the patient's current prosthesis for the fabrication of an interim immediate denture. The patient, who signed the informed consent, accepted a treatment plan for an immediate maxillary denture.

It was proceeded to register the face bow, record rim to duplicate the patient original maxilla-mandibular relationship, and take an irreversible hydrocolloid impression (Kromopan, LASCOD S.p.A, Siesto Fiorentino, Italy). Stone casts were poured and mounted on a

Figure 2. Radiographic evaluation of the residual teeth.

medium value articulator (Sam 2P, SAM, Präzisionstechnik GmbH, Fussbergstrasse, Gauting, Germany). The wax up anatomic corrections were made to give a pleasant tooth arrangement.
The casts were then duplicated with an alginate impression material (Kromopan, LASCOD S.p.A, Siesto Fiorentino, Italy). Self polymerizing resin (Palavit 55, Kulzer GMBH & co, Wehrheim, Germany), was prepared in a shade that matches the patient dentition and poured into maxillary dental arch impression (8) (Fig. 3), polymerized, polished and then finished. The acrylic resin arch was reseated in the impression, and the maxillary cast poured in dental stone. The resin plaque was build up applying to the entire maxillary cast a pink self-ploymerizing resin (Paladur, Kulzer, Wehrheim, Germany) and its monomer was alternatively added to have the entire denture base. The maxillary denture was separated from the cast, finished and polished, obtaining so the provisional total denture (Fig. 4).
The OVD was performed doing the vertical measurement of the face between any two arbitrary selected points that are conventionally located one above and one below the oral cavity in the midline with a black pen. Then, the teeth were extracted leaving in situ only the roots of the left and right canines which would help to prevent the bone resorption and to offer more retention to the prostheses. The prosthesis was emptied a little and tried in the patient's mouth to observe the occlusal contacts and if the OVD was equivalent to the original one taken before. The pressure areas were detected and occlusion adjusted. When the occlusal overload was present, it was proceed in empting it further.
Then, a hard denture reline material (Tokuso Rebase, J. Morita, USA, Inc, Irvine, California, USA) was used to rebase the prostheses, inviting the patient to close in maximum occlusion obtaining the same level of the OVD tattoo. Thus, the prosthesis was slightly emptied in correspondence of the post extractive sites and relined with a sofreliner material (Sofreliner Tough, J. Morita USA, Inc, Irvine, California, USA) to obtain more stability and durability during tissue healing. After 15 days, the material was eliminated and replaced with a new one. The alveolar resorption was periodically monitored and the prostheses relined after an adequate healing period.
After one month, this prostheses was used as a customized individual tray to make the border moulding and take the final impression with a polyvinyl siloxane material (Dimension Penta H Quick Tray, ESPE Ameri-

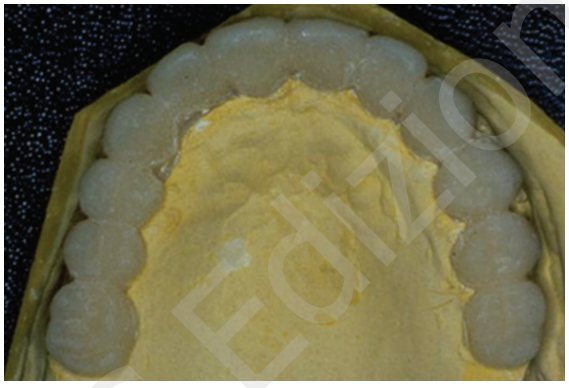

Figure 3. Maxillary acrylic resin arch powered in dental stone.

Figure 4. Provisional immediate denture.

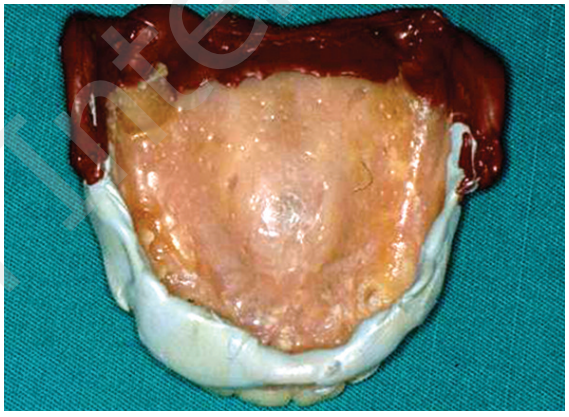

Figure 5. Provisional immediate denture used as a customized individual tray.

Figure 6. Registrations of the face bow and the record rim using the actual immediate denture.

Figure 7. Final total denture.

ca, Norristown, Pennsylvania, USA) (Fig. 5). The registrations of the face bow and the record rim were performed using the actual immediate denture (Fig. 6). The impression was poured in dental cast and mounted on the articulator with the prosthesis. The permanent total denture was fabricated using the classical technique but using patient's original OVD, occlusion, phonetic and esthetic. At subsequent appointments, the teeth trial-in was directly performed and the final total prostheses was delivered (Fig.7).

Discussion

The conventional immediate denture treatment requires a series of appointments to perform the standard procedures; indeed, after the extraction of remaining teeth and the any necessary adjunct surgery, the denture is placed, tested for areas of excessive pressure, and adjusted (12). Actually, when a conventional complete denture is fabricated, there is generally a period from several weeks to months of edentulism for healing after teeth extraction (13).
There is diminished predictability in a combined surgical and prosthodontic visit: surgery is performed, and difficulties with extractions, bleeding, and /or pain control may be encountered; moreover, the appointments can become prolonged and stressful for both patients and dentist.
In addition, the interim immediate denture is used in order to preserve the esthetic, mastication, and the occlusal support (1). The procedure performed in this clinical report described an immediate denture fabrication technique, preserving much information as possible from the patient's original situation. Furthermore, reducing the number of traditional technique visits, a complete denture was delivered after the extraction of teeth and the patient received the final new denture without the additional trauma of the surgery.
During the mounting on the articulator in maximum intercocclusion position, the patient has to wait to have his prostheses. In the initial period that the denture is worn, it will not reset on extraction sites or surgical wounds. The functional advantages included the possibility to perform the denture adjustments, the use of pressure–indicating materials in a blood-free field and the preservation of the original occlusal relationships and OVD.
When a procedure for fabricating conventional immediate denture was performed, careful evaluation of the vertical dimension of occlusion, centric relation and the placement of the teeth are essential factors for the success of the treatment (14).
In the present report, the OVD is not modified but it is preserved the original one.
It is almost well known that the maintenance of the original OVD and centric relation is fundamental for the success total removable prosthesis. Gooya et al. (2013) suggested in a recent report to carefully select artificial teeth with the same cuspal inclination which, helps to match cuspal inclination with anterior and posterior guidance and make an acceptable occlusal scheme (1). Whilst, in the present report anatomic wax up corrections were made to give a pleasant tooth arrangement and maintain their height and dimensions in order to do not change the patient's appearance and function.
In addition, the immediate denture made following the described technique could be easily used to transfer the record rim, face bow and take the final impression (since it could be used as custom made impression tray), for the final denture construction reducing time, visits and costs. Also to verify the integrity of the occlusal relationship the casts are not hand articulated in maximum intercuspal position as described recently (15), but mounted in a medium value articulator. The contraindications to this treatment procedure include the presence of symptomatic teeth or acute root infections and in case of complete edentulous patients.
The present clinical report presents a treatment procedure that makes immediate denture placement more predictable and less stressful. The delivery of the prosthesis is less traumatic because extractions are deferred. It provides greater control over the prosthodontic aspects, and the convenience of performing the placement procedure in a clean, blood-free environment.
The procedure described, replicating the vertical dimension, phonetic and aesthetic of the existing fixed prostheses of patient, can be used to fabricated the interim immediate denture and a final complete denture. In addition, the complete removable prostheses obtained with this procedure can be used as a custom tray for the final denture fabrication.
However, considering the introduction and successful outcome of dental implants, further clinical studies could be needed to evaluate the use of present technique to fabricate a removable implant supported provisional prostheses. A fixed or removable implant-retained denture should be favored as the final treatment of edentulous patients.

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