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REVIEW ARTICLE

Failing Dentition: Is Tissue-supported Immediate Denture fading as a Treatment Option?

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ABSTRACT

Immediate denture is an age-old treatment protocol by which we can rehabilitate a patient with a failing dentition. This study reviews various techniques and procedures used in the fabrication and also enumerates the various and distinguished advantages of the tissue-supported immediate denture. Through this study the authors wish to emphasize on this particular treatment plan given its many advantages which can help the less-privileged patients who cannot afford the expensive treatments like implants.

Keywords: Alveolar bone, Esthetics, Immediate dentures.

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INTRODUCTION

A failing dentition poses a challenge to the dentist as well as the patient. From the patient's perspective, the main concern would be the psychological trauma of having to go through an edentulous period. For the dentist though it is a dilemma of the various treatment options available to rehabilitate the patient. With the advancements in the field of prosthodontics, now we have advanced treatment protocols like dental implants, but a vast majority of the population worldwide unfortunately cannot benefit from implant therapy because of financial constraints as the cost factor of this treatment option is still relatively high. Nevertheless, we have the tissue-supported immediate denture treatment option which is very much in the reach of almost every individual with a failing dentition.

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An immediate denture is any removable dental prosthesis fabricated for immediate placement following the removal of a natural tooth/teeth.[1] The first reference to immediate dentures was by (1860).[2] Since then, the immediate denture has come a long way with various techniques and materials being used to make it a successful and satisfying treatment protocol.

Standard (1958)[3] stated that the immediate denture treatment protocol should be a routine treatment protocol given its many advantages,[4-15] the main being psychological satisfaction. When some anterior teeth are present, the dentist is in a better position to select the artificial teeth. The main advantage, however, for the dentists is the ability to control the ridge form which helps in rapid healing. He described a technique where the polished surface of the labial flange of the upper denture could be placed in the same original position as the original mucosal position by modifying. After the preliminary impression and the vertical dimensions and occlusion determination, the cast is modified by drawing three lines on the cast. The 1st line is on the gingival margin of all the teeth, the 2nd line is 2 mm above the first line, and the 3rd is drawn at the beginning of the gingival undercut. After which, alternate teeth are arranged. The tooth to be replaced is cut at the 1st line, then the cast is trimmed till the 2nd line giving a palatal bevel. After the teeth arrangement, the record base is removed and the cast is trimmed to the 3rd line gingival bevel creating a smooth well-rounded ridge. The trial base is returned to the cast and the labial flange is waxed up. The author claims that preparation of the cast in this way helps the insertion of the complete denture and requires minimum alveoloplasty. The author also claims that the normal profile, lip contour, and expression of the patient are retained by this technique.

Blank[16] evaluated various impression materials for making the impression for immediate dentures in detail and stated that irreversible hydrocolloid is the ideal impression material for impression making in case of immediate dentures. He explained a systemic technique of making the impression for immediate upper denture. The rim lock tray is used for the primary impression and the author advocates the molding of green stick compound into the palatal part of the tray if the vault of the palate is high. The impression is made using irreversible

hydrocolloid. The author emphasizes on the proper and meticulous handling of irreversible hydrocolloid. The impression is beaded and boxed using "Paddle–Grip Wax" technique wherein the beading wax is placed on a paddle to level the tray. The gap between the paddle and the beading wax is filled with a layer of boxing wax and the impression is boxed using boxing wax, and a thick mix of dental stone is flown into the impression using a strong vibrator. Once the cast is ready, the final impression is made using the special tray using the irreversible hydrocolloid and boxing of this impression is done using the same technique as explained before. The technique explained by the author for the boxing of the impression is easy and time saving. Accurate reproduction of the land area can be achieved by this technique.

Heartwell and Salisbury[4] evaluated immediate denture treatment protocol and stated that the immediate denture patients show a high incidence of unhealthy oral tissues with generalized hyperemia, loss of bone support, and inflammatory hyperplasia. The authors suggested that the immediate dentures should be termed as transitory or temporary denture. The authors elaborated the requirements of the immediate denture protocol that should be satisfied.

- The immediate denture should be compatible with oral environment.
- It should function harmoniously with activities like speech, respiration, and deglutition.
- It should restore the masticatory efficiency.
- It should address the esthetics.
- It should preserve the remaining oral tissues.

The authors emphasize that the diagnosis[9,14,15,17-19] phase of immediate denture is of paramount importance. They state that the advantages of immediate dentures exceed than the disadvantages. The advantages being

- The immediate denture acts as a bandage for the healing sockets.
- It helps the patients regain their speech, deglutition, and mastication sooner.
- Teeth are replaced immediately.
- The patient can continue with his or business with minimum interference.
- Psychological benefits because it eliminates the edentulous period.
- The bone is re-contoured by the immediate dentures.[20-24]

The maintenance of correct vertical dimension of occlusion is an essential factor in the success or the acceptability of any denture.[9,10-14,24,25] Consideration must be given to the anatomy, physiology, histology, and the mechanical factors while arranging the artificial teeth. If the existing teeth are not esthetically sound, then it is not necessary that it has to be reproduced. The authors emphasize on the observations made by Lytle,[26] which showed that degenerative changes occur in the bone when the pressure is applied on the extracted sockets through the dentures. The authors also throw light on the investigations done by Campbell[27] which states that there is loss of alveolar bone in denture patients than the non-denture patients, especially in the mandibular arch and he relates partly to the fact the placement of artificial teeth in the mandibular arch because the forces are directed toward the alveolar ridge. Also the resorption is more in the mandibular region because the forces applied are continuous due to gravity unlike the maxillary denture where it is intermittent. The authors summarize that the immediate denture treatment can be advantageous provided care is taken during the diagnosis phase.

Lutes et al[28] stated that the impression procedures for the fabrication of the immediate dentures are complicated by the presence of the natural teeth and presented an impression procedure which would accurately record the shape of both anterior and posterior sections for making a master cast for immediate denture. After the primary impression was made the spacer for the fabrication special tray is altered in the spacer and tray is adapted till the incisal edges of the anterior teeth. Border molding the secondary impression was made using the zinc oxide impression material of the edentulous area. The impression of the anterior dentulous portion was made with plaster, which is removed carefully in two sections and are assembled with the rest of the impression outside the mouth and the cast is poured with dental stone. The authors claimed that their technique provided the same border accuracy that could be achieved in an impression of an edentulous is sets mouth as well the comfort and the esthetics of the patient.

Campagna[29] described in detail an impression technique for the immediate denture fabrication. In his technique the preliminary impression is made with the reversible hydrocolloid in a stock tray. The secondary impression is a dual-impression technique where the impression of the edentulous portion is made with the rubber base material for it is easier to tease it out of the undercuts. Impression of the remaining teeth is made with alginate and the relation between the dentulous and edentulous portion is builtup. The author has explained in detail the specifications for the fabrication of the special tray[17] and the border molding procedure. The author assures the same degree of accuracy of the borders of the dentulous and edentulous region using this technique. However, the question remains that the author has mentioned that rubber base material was used for the secondary impression while the photograph has been shown that of zinc oxide eugenol. This leads to a bit of confusion as to which material has been used and also it has not been mentioned as to which rubber base material has been used.

Javid et al[30] described a split tray two-step impression technique in that the impression of the dentulous and the edentulous parts were made with different trays and assembled so that the impression is retrieved into as a single unit. The author stated that this was an easy technique to obtain an accurate impression of the tissue, teeth peripheral extent, and the thickness.

Bolouri[31] stated that there are two common errors during the fabrication of the immediate dentures, that is, the displacement of the upper lip and the presence of deep undercuts. The special tray is fabricated with window in the dentulous portion of the arch and a sectional tray is fabricated, and this tray is approximated with the edentulous tray and the impression is retrieved as a single unit. He concluded that this technique was useful for the patients with labially proclined teeth and the distortion of the impression during the removal was reduced to a great extent.

Cupero[32] described his technique of making the impression of the edentulous portion of the arch using a special tray fabricated on the edentulous portion of the arch. With this in place, the impression of the dentulous portion is made using the rimlock tray with alginate, and both the impressions are retrieved as a single unit with the stock tray picking up the first one.

Grandos[33] described a technique for an immediate denture fabrication which could be completed in two visits. Preliminary impression was made from irreversible hydrocolloid, cast poured in stone, and the posterior extension marked on the stone. The anterior teeth are cut off from the cast and replaced with the artificial teeth. The palatal and the posterior portions waxed up like final denture. Two sprues were attached to the posterior end of the cast, and floss tied to the sprues and to the rest of the cast. The cast is hung in a rubber bowl using the ting edge of the floss, sticky wax, and the tongue blade. Reversible Hydrocolloid poured into the bowl with the cast hung in it and left to set. Once set, it is cut in the middle and the cast is retrieved using the floss. The wax is boiled out. The posterior teeth are cut off and cold cure tooth-colored acrylic poured. The two halves of the reversible hydrocolloid approximated and the cold cure resin poured to form the denture base. The author claimed that this technique reduced the chair side time and improved esthetics and required no remount procedures because the existing occlusion is used. Although a quick technique, the precision of the borders acquired would be questionable because the final denture is fabricated using the preliminary impression.

Beaumont[34] described a sectional impression technique and stated that this technique could be applied in the Kennedy's class I situation. The technique differed from other in that two special trays were fabricated, the first on the edentulous region and the second tray fabricated on the first one with spacer and wax cut out for the stoppers sandwiched in between the two trays. The impression of edentulous portion is made using zinc oxide eugenol and the dentulous portion made using irreversible hydrocolloid. The technique described had many advantages like the ability to reproduce the supporting structures distal to the dentition, shaping of the borders including the Posterior palatal seal, and also the fact that both the impressions retrieved together made the accuracy achievable.

Garver[5] in his article described a surgical technique for the retention of vital submucosal roots for a patient to be treated with immediate dentures and concluded that careful attention to the surgical procedures given to the soft tissues above the submucosal roots are vital for the success of the immediate dentures, and also the immediate dentures placed on the submucosal roots help in preventing postoperative complications and the authors in concordance with the other long-term studies claimed that this technique is favorable for alveolar ridge preservation.[19]

Beaumont[35] in his article addressed the problem of anterior trial which often is not done in the immediate denture patients. He described an anterior esthetic trial technique wherein tooth forms and the occlusion rims are waxed up after the jaw relation. The cast is duplicated and a vacuum-formed plastic template is fabricated. Autopolymerizing resin is mixed and cured in the vacuum-formed sheet and cured on the master cast on the well-adapted trial base. He quoted that the possibility of demonstrating the postoperative esthetics before the extraction can tremendously reduce the patient anxiety.

Samant[36] described a technique for the emergency replacement of the anterior teeth after traumatic injury or emergency dental procedures in which an immediate prosthesis can be made on the same visit replacing the tooth to be extracted using the composite resins of a shade similar to that of the patients natural teeth. The teeth designated for extraction are extracted conservatively minimizing the trauma to the soft tissues. The roots of the extracted teeth are cut away using the rotary instruments and the root canals are opened, cleaned, and sealed with resin. The tooth crown that has to be replaced and the adjacent abutment teeth are etched on the lingual side and bonding agent applied. A rope of composite resin of the appropriate shade is placed in the edentulous area and in the lingual area on the adjacent teeth. The crown to be replaced is positioned in the edentulous area labial to the composite resin and cured. The technique described by the author is innovative and time saving and can be easily performed in the clinical setup. The technique has an advantage of psychological satisfaction to the patient where esthetics are rebuilt in a single clinic visit. However,

the technique is suitable only when two or three teeth are to be replaced.

Gardner et al[37] described a labial sectional impression technique for immediate denture and claimed that their technique had an advantage of recording the labial vestibule in a relaxed state and also stated that using this technique the two part impressions can be taken out at once without distortion. The authors have made a note on the other materials like dental plaster[28] and modeling plastic[18] that have been used for the impression of the anterior dentulous portion and a brief note on the dual-impression technique made and proposed by Campagna.[29]

Goldstein[38] described a two-stage immediate denture impression technique that could prevent the accidental extraction of the extremely mobile teeth in the dental arch. Preliminary impression is made using a disposable plastic tray with holes placed directly on the incisal and occlusal surfaces of the mobile teeth. Once the impression material has set, an amalgam condenser is positioned on the incisal edges or the occlusal surfaces of the mobile teeth so that they are pushed into their sockets minimizing the risk of their accidental extraction. The author recommends a two-piece secondary impression technique when the teeth are mobile. An acrylic custom tray is fabricated with finger rests and undercuts aiding the retention for the second stage. The edentulous area is border-molded and impression-made. The undercuts on the teeth are blocked and a large tray is selected with holes to accommodate the amalgam condensers while the impression is being retrieved. The technique described by the authors is a very sensible one considering the use of a condenser which is easily available in the clinical setup to prevent the extraction of the mobile teeth.

Afarulla Khan[39] explained the fabrication of interim immediate denture fabrication in a single patient visit. After the preliminary impression made in irreversible hydrocolloid, the teeth portion of the impression is poured with tooth-colored self-cure acrylic and the remaining portion of the impression is poured with dental stone. Once the cast is retrieved the remaining portion of the denture is fabricated with visible light cured resin. The technique explained is simple and not time-consuming unlike the other techniques, but the accuracy of the denture fit could be questionable as the denture is fabricated using the preliminary impression.

van Waas et al[6] in their controlled clinical trial on patients requiring immediate dentures were treated with overdentures with or without magnetic attachments and patients were evaluated for 4.5 years. The authors' opinion on this clinical trial was that the mandibular overdenture therapy is indicated in border line situations because there is about 50% of reduction in bone loss in the mandibular arch.

Shor et al[8] in their case report have compiled the rehabilitation of a patient with immediate denture. In this technique the authors have described a technique of a patient having mutiliated dentition with upper immediate denture and a lower immediate partial denture. The technique varies with others in that they have incorporated fabrication of two record bases: One for the centric relation registration and another for the esthetic analysis. Relining of the dentures was also done before insertion which aids in retention and healing of the tissue surface.

Phoenix[7] in his article introduced the concept, spatial modeling, which is used to plan and execute a series of cast modifications for the immediate denture fabrication. He compared the two cast modification techniques proposed by Standard (1958)[40] and Jerbi[41] and detailed the cast modification procedure. The author claimed that the model supported the predictive cast modification technique and minimizes the necessity for osseous recontouring in case of immediate denture cases with clinical efficiency.

Massad and Cagna[42] presented a case report describing the rehabilitation of a patient with an immediate denture using an impression technique utilizing a special impression tray made up of "clear polystyrene-based polymer." The material can be adapted to accommodate the existing anatomic contours and also the trays can be trimmed where it impinges on the tissues. Since the impression technique described requires repeated placement, the authors fabricated the tray stops using high-viscosity vinyl polysiloxane (VPS) material. Border molding and final impressions have to be made using the low-viscosity and high-viscosity VPS materials respectively. The technique advocated is innovative and uses the modern impression materials which record details accurately. The transparent and the adaptable tray is a definite advantage considering the technical difficulties in the impression procedure. The authors have cited several advantages of the treatment protocol and also have recommended the need for a continued innovation in this section of prosthodontics to help serve mankind better.

Caputi et al[43] in their case report described a relatively easy technique of fabricating an immediate denture and also a final denture using the patients with existing fixed dental prosthesis (FDP) where the supporting teeth were considered hopeless. The impression of the existing FDP and arch is made with alginate and tooth-colored self-cure acrylic is poured into the impression in place of the teeth. A cast is obtained and the denture base is fabricated using the pink self-cure acrylic. Soft tissue reliner is used which helps in stabilizing the denture as well as helps in the healing process. After a period of 30 days, when there is satisfactory healing of the alveolar ridge, the complete dentures are to be fabricated in the

conventional manner. The vertical dimension, esthetics, and phonetics are to be replicated from the immediate denture. The technique described is simple and replicates the required parameters which the patient is satisfied with from the existing FDP and also gives an adaptive period for the patient allowing a smooth transition from a FDP when replacement is for the oral health reasons other than esthetics, phonetics, and vertical dimension.

DISCUSSION

Immediate denture is a challenging treatment protocol which needs extra skill and attention for it to be successful. Literature has it that there are various advantages of this very treatment protocol. However, if attention is not given then there could be serious problems in the prosthesis delivered and this might hamper the patients trust and faith in the overall prosthetic treatment procedures. There have been various impression procedure mentioned in the literature to make the impression procedure accurate and easy keeping in mind the teeth present and also the hard and soft tissue undercuts. Also the fact that the try in cannot be performed makes this treatment procedure very challenging. There have been various procedures mentioned in the literature to either make use of the existing natural teeth or select the shade using the extracted teeth to provide the patient with esthetically pleasing prosthesis. The postoperative or postprosthetic care is equally essential for the treatment to be successful. Hence it becomes mandatory that the patient follows all the instructions and home care protocols meticulously and show up for the postinsertion follow-ups.

CONCLUSION

Immediate dentures serve many purposes, the most important of which is to be able to provide denture replacements for patients without having them to be without teeth for any length of time. With a sound knowledge, meticulous diagnosis, and treatment plan, the century-old immediate denture treatment protocol still proves to be one of the highly specialized and satisfying treatment option for patients with failing dentition, especially for those with poor physical health and financial constraints.

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