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CASE REPORT

A TECHNIQUE FOR FABRICATION OF CUSTOM-MADE PORCELAIN DENTURE TEETH

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SUMMARY

Partial or complete dentures are more commonly constructed for the elderly group of the population. Artificial teeth fabricated from acrylic resin or porcelain are widely used in these dentures. The biggest disadvantage of acrylic denture teeth is that wear resistance is not as good as porcelain teeth. The amount of wear depends on how much you grind, how strong is your bite, and if the denture teeth are opposing natural teeth, denture teeth, crowns, bridges or if implants are involved. The advantages of porcelain teeth are that they look better than acrylic teeth. If you have crowns and bridges next to your missing teeth and if you make the adjacent denture teeth with the same material (i.e. porcelain), the teeth will match a lot better. The present case report is about a patient seeking removable prostheses with opposing metal ceramic fixed partial dentures and limited inter-arch space. The patient was treated by fabricating customized porcelain teeth for his/her removable dentures. Selection of this technique improved the patient's esthetics and avoided the wear of the artificial and opposing fixed partial denture teeth.

Keywords: *Removable prosthesis, dentures, porcelain teeth, acrylic teeth, denture teeth*

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INTRODUCTION

A diverse approach from traditional modalities available in dentistry can solve patient's problem to a greater extent, thereby adding to his well-being and comfort.[1] Teeth used in removable partial dentures are available as porcelain, methacrylate resin or modified methacrylate. Porcelain denture teeth are manufactured and supplied as individual or complete sets of teeth. They have better esthetics and color stability and abrasion resistance in comparison to the resin teeth.[2] Porcelain teeth are attached to the denture base mechanically by pins or diatoric holes; also they are difficult to grind to adjust occlusal surface which make them difficult to use in situation of limited arch spaces.[3,4]

Wear changes in the occlusal surface of the denture wearing patient is a known fact. Wear resistance is a limitation of artificial denture teeth. Improving the wear resistance of conventional artificial denture teeth is of value to prosthodontic patients. The need to change the dentures on an increased frequency ask a call for lateral thinking.[5] This calls for the change in approach and technique. Frequent need for change of denture teeth due to excessive wear results in loss of masticatory efficiency, function, aesthetics, and comfort. A good wear resistance is important for denture teeth to avoid the loss of vertical dimension of occlusion and decreased chewing efficacy caused by excessive wear of the denture teeth.[6]

Resin denture teeth are easily adjusted and chemically bonded to the denture base but they have low abrasion resistance.[7] The wear of resin denture teeth are increased when occluding with ceramic crowns or fixed dental prosthesis.[8] Several in-vivo studies found that combination of porcelain to porcelain denture teeth have best wear resistance in comparison to different combination.[9] Feldspathic porcelains in metal ceramic crowns will cause more wear on resin acrylic denture teeth.[10]

The purpose of this case report is to describe procedures related to fabrication of custom-made porcelain denture teeth from Lithium disilicate ceramics. The fabricated teeth not only improved the esthetics by matching the shade with existing ceramic restorations but also eliminated the need for grinding/adjustment of the commercially available preformed porcelain denture teeth.

CASE REPORT

A 53 years old female patient with no remarkable med-

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ical history presented with missing maxillary posterior teeth. The patient was seeking for replacement of the missing posterior teeth with a maxillary removable partial denture (RPD). However, the patient was not willing for any metal component of the RPD (Metal clasps) visible in her esthetic zone (anterior teeth) of the mouth. Taking that into consideration, a RPD was planned with intra-coronal attachments (PT Snap Dental Precision Attachment, Cendres+Métaux, Rue de Boujean 122, 2501 Biel-Bienne, Switzerland). One crucial restorative issue was that the fixed partial denture would result in greater wear on the recently constructed opposing RPD with acrylic teeth, which was made up of metal ceramic fixed dental prosthesis. The consideration was discussed with the patient and with mutual understanding and consent the decision to use porcelain denture teeth was taken. However, due to the limited inter-arch space and the need for adjusting the porcelain denture teeth for creating space for PT attachment, stock porcelain denture teeth could not be used. An alternate plan of using pressed lithium disilicate for the fabrication of denture teeth was made. After fabricating the metal framework, a maxillary- mandibular jaw relation records were made for mounting the maxillary and mandibular casts on Hanau Wide view articulator (Hanau™ Wide-Vue, Hanau, Australia). Acrylic denture teeth were modified to properly fit the RPD and to have proper occlusal contact (Figure 1a). Using a wax injector, acrylic denture teeth were duplicated in wax and mechanical retention feature (i.e. diatoric and grooves within the intaglio surface of teeth wax up) were created (Figure 1b). Wax patterns (Figure 2a) were invested, and pressed according to the manufacturer's directions using IPS e.max Press LT A2; (Ivoclar Vivadent, AG Schaan, Liechtenstein). Any positive nodules on the pressed crowns from the investing procedure were removed with a diamond rotary instrument under a microscope (magnification ×10). The crowns were glazed after finishing. The custom-made porcelain teeth were now ready to be used with maxillary RPD (Figure 2b). The custom made porcelain teeth were then arranged and waxed up to the denture framework. The occlusion was checked with mounted casts and after the verification of optimal occlusion, the RPD was processed and the custom made porcelain teeth were attached to the framework with pink color acrylic denture base. The denture was then tried in the patient's mouth (Figure 3a, b) and after necessary occlusal adjustments the denture was delivered to the patient (Figure 4a, b).

DISCUSSION

The dentists, are always faced with the problem of replacing the natural teeth with artificial ones.[11] The selection and replacement of the optimal artificial teeth is a challenging task which requires consideration from biological and mechanical aspects.[12] Esthetic replacement and physiological teeth arrangement from functional point of view makes the removable dentures biologically compatible, desirable and enhance the psychological confidence of the patient.[13]

The technique described in the present case report is helpful since porcelain denture teeth comes in standardized shapes and shades which will not be useful in this case due to great amount of grinding required to accommodate the space for the male part of the intra-coronal attachments and the limited inter-arch space.[14] If resin denture teeth were used an increase of wear on the teeth caused by the opposing metal ceramic fixed dental prosthesis would be inevitable, which not only would have affected the masticatory performance but also compromised the esthetics.[15] Another advantage of the presented technique is the personalized staining and characterization of the fabricated porcelain denture teeth which results in better shade matching. Other techniques that may be used to solve issue of increased wear on resin denture teeth when opposed by metal ceramic fixed dental prosthesis is by using cast gold occlusal surfaces as described by Imbery et al.,[16] but

Fig 1a: After making jaw relationship records, an acrylic denture tooth was modified to properly fit the RPD.; b: Acrylic denture teeth were duplicated in wax and sprued

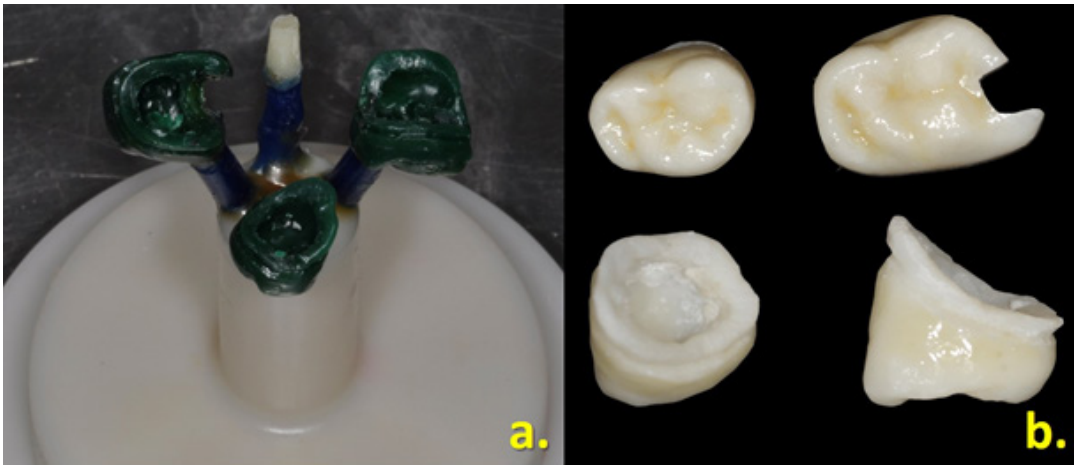

Fig 2a: Waxed up teeth sprued and invested.; b: Emax pressed ceramic crowns with diatoric and grooves for mechanical retention after finishing, polishing and glazing

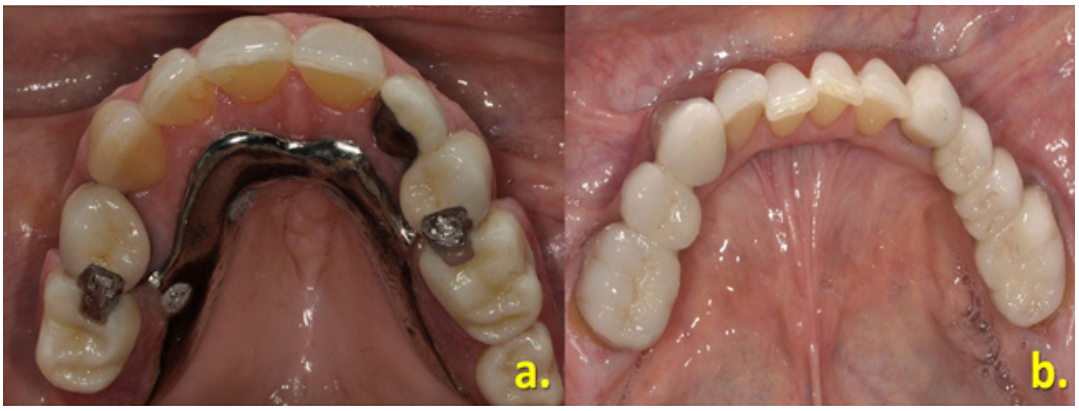

Fig 3a: Occlusal view of Maxillary RPD after insertion.; b: Occlusal view of the mandibular arch after placement of the ceramic crowns.

Fig 4a: Left side occlusion after the placement of the final restorations.; b: Right side occlusion after the placement of the final restorations

this was opposed by the patient for esthetic reasons. Using porcelain facing that is cemented directly to the framework has several disadvantages; cross bite occlusion in the patient mouth may cause debonding of the facing, it is difficult to obtain satisfactory occlusion with this technique, lack of adequate contours for better functional support for the cheek and the display of metal margin.[17]

In addition to being more aesthetically pleasing than acrylic teeth, the current method is practical and financially viable, requiring less laboratory work and supplies and can be completed in a reasonable amount of time. However, for the best occlusion and aesthetics, the process is quite sensitive and demands a high level of competence.

CONCLUSION

This study presented a technique for creating personalized porcelain denture teeth that improved shade matching and occlusal contacts while requiring less grinding. It is suitable for the patients who are partially edentulous, have limited inter-arch space and opposed metal ceramic fixed partial dentures.

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