

Esthetic Rehabilitation with 3d Printed Photo Polymerizing Resin Pattern: A Case Report

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ABSTRACT

Background: Different digital tools have been used in clinical practice to assist in the planning and rehabilitation of patients. Some applications (apps) and software programs used in esthetic planning allow simulation of the smile design, improving communication between patients and professionals. Nonetheless, they are usually difficult to use, time-consuming, unattractive to present to the patient, and complicated to link with the 3D workflow. This article presents a new 3D digital smile design app for esthetic planning, smile simulation, chairside 3D virtual wax pattern, and trial restoration performed with portable devices.

Keywords: Esthetic Rehabilitation, 3d Printed, Photo Polymerizing Resin.

INTRODUCTION

There are varied options for restoring a missing tooth, among this metal-ceramic restorations are still the most widely used options for fabricating fixed partial dentures. Porcelain fused to metal restorations has been considered the gold standard in prosthetic dentistry for a long time because of its good mechanical properties^{1,2}. Metal ceramic FPD's are preferred because of their superiority in the survival rate. Moreover, a statistical analysis among patients has shown no significant difference in esthetic between metal-ceramic and zirconia. To date, metal-ceramic seems to remain the reference standard for multiunit tooth-supported posterior FDP³. In this case report, we have used CAD/CAM 3D printed photo polymerizing resin for fabrication of wax pattern as it is more accurate than conventional wax patterns in terms of marginal and internal fit⁴.

CASE REPORT

The patient reported a chief complaint of dirt and mobile tooth in relation to the lower anterior. The patient has no past medical and dental history.

Intraoral examination reveals poor oral hygiene and grade 3 mobility in relation to 31, 32, 41, and 42 (figure 1). Because of poor prognosis, complete scaling was done followed by the extraction in relation to 31, 32, 41, and 42 (figure 2). Radiographic examination of abutment teeth has mild bone resorption and has well-implanted teeth with no peri-apical pathology. Intentional root canal treatment was done in relation to 33, 34, 35, 43, 44, and 45. Alginate impressions were made and then poured to get study casts and a mock preparation done for provisional restoration. Tooth preparation was done in relation to 33, 34, 35, 43, 44, and 45. A 2 mm of incisal and occlusal reduction and axial taper of about six degrees was given during crown preparation. Abutment teeth were prepared with a chamfer finish line with an equigingival finish margin for better esthetics. Due care was taken to preserve the teeth adjacent to the abutment and to provide enough space for the restorative material. The margins were smoothened and every sharp angle was removed and tooth preparation edges were rounded. Provisional restoration was given to get a good emergence profile for which conical

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pontic design was given. Provisional restoration was fabricated with heat cure acrylic resin as it has good fracture resistance and esthetics (figure 3). After one week of healing period checked for satisfactory healing. Then gingival retraction cord impregnated with local anesthesia is placed with the help of the fischer's cord packer by using a single cord technique. Impression was made using putty and light body (addition silicone) using the double stage putty wash technique. An alginate impression was made for opposing dentition. We have chosen modified ridge lap pontic for better esthetics and to maintain oral hygiene. Has patient belongs to order 6 according to Atwood's classification, we have decided to give gingival porcelain to enhance the emergence profile for better esthetics. Impressions were sent to the laboratory. There, the master cast was poured using die stone (Type IV). Then the master cast was scanned and 3D printed photo polymerizing pattern was fabricated. The framework was casted using the conventional lost wax technique. The marginal fit was thoroughly assessed clinically and enough space for appropriate thickness for porcelain build-up was also verified. Occlusion was verified and adjusted in intercuspatal position and in excursive position to allow functional anterior guidance and canine guidance during eccentric movements. After final occlusal adjustments, the prostheses were finally stained and glazing was done to mimic in harmoniously with the surrounding dentition (figure 4). The patient was happy with the esthetically pleasing results.



Fig 1: Pre- Operative View

DISCUSSION

Pjetursson et al. in their systematic review has reported an estimate of a 5-year survival rate of implant-supported FDPs that are fabricated using

metal ceramic¹. In most clinical situations for many reasons, metal-ceramic is preferred as they are superior in strength to other ceramic restorations and has long-term durability. They are esthetic in the case of thick gingival biotype⁵. According to Nicolaisen et.al, there was no statistical difference between functional and esthetic after insertion of metal-ceramic FPD⁶.



Fig 2: Post Extraction View



Fig 3: Provisional Restoration



Fig 4: Postoperative –Frontal View

In this case report for better marginal adaptation and internal fit, we have fabricated the wax pattern using CAD/CAM 3D printing. By application of CAD/CAM technique for wax pattern fabrication, there was a significantly increased retention when compared to conventional wax-up method⁷.

Moreover, 3D printing of wax patterns is more accurate than conventional hand-formed wax patterns and milling production of wax patterns. So in this case report, we have achieved a good clinical outcome which has given good functional as well as esthetic results.

CONCLUSION

As far as long-span FPD's are considered for better marginal adaptation and internal fit it is better to fabricate a 3D printed photo polymerizing resin pattern for metal-ceramic restoration which has a good survival rate, durability, and esthetics.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interest regarding this article.

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