

## Splinting of periodontally weakened teeth with aesthetic replacement of missing teeth: A case series.

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### Abstract

Replacement of missing anterior teeth, lost due to chronic periodontitis is very challenging to the dentists due to the poor support of the abutment teeth where conventional modalities like removable partial dentures (RPDs) or fixed prosthesis cannot be fabricated. Stainless steel wire reinforced composite splint is a viable treatment modality with the use of acrylic tooth as pontic provides both the aesthetic and functional purpose of stabilizing the adjacent mobile teeth. This treatment option is economical, fast, and easy to perform chairside technique. This case series presents three cases of missing mandibular anterior teeth with periodontally compromised abutments which were replaced with acrylic teeth as pontic using stainless steel wire reinforced composite splints.

**Key words:** Acrylic tooth pontic, aesthetics, composite splint, periodontitis, stainless steel wire.

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### Introduction

Periodontal disease leads to the destruction of periodontal tissues, loss of attachment and alveolar bone loss.<sup>[1]</sup> This can lead to increase tooth mobility and progression of the disease can eventually cause tooth loss. The periodontally weakened teeth may not be able to bear the normal occlusal load and an altered occlusal relationship may lead to redirection of masticatory forces.<sup>[2]</sup> Which in turn detrimentally affect the periodontium of the other teeth. Splinting is a viable treatment option to restore the normal health of the periodontium of periodontally weakened teeth which subsequently contributes in restoring the normal occlusal relationship and adapt the occlusal load. Tooth loss due to periodontal diseases as well as some cases of pathological migration, diastema in maxillary and mandibular anterior region might be an aesthetic concern for the patients. The

remaining teeth might be also periodontally compromised and needs immediate attention.

Tooth loss and compromised periodontal health of abutment teeth is a concern for both clinicians and patients. Replacement of missing teeth having adjacent periodontally compromised teeth excludes the removable or fixed partial denture treatment options. Immediate chair side tooth replacement methods like use of extracted teeth, acrylic resin denture teeth as pontic with or without resin composite or wire reinforcement splinting are other treatment strategies.<sup>[3]</sup> Wire-reinforced composite splints are used to stabilize periodontally weakened teeth and natural or acrylic teeth can be used to replace the missing teeth with the aim of enhance the aesthetics with immediate effect. The splint also helps to stabilize the pontic.

The present case series presents three case reports with an aim to replace the lost teeth in mandibular anterior region and stabilize the periodontally weakened remaining teeth.

## Case reports

### Case 1:

A 38-years-old male patient reported to the department of dentistry with a chief complains of mobile teeth in lower front teeth region. Clinical examination revealed grade III mobility in mandibular left central incisor (31) and right central incisor (41) and grade I mobility in mandibular right lateral incisor (42) and left lateral incisor (32) (according to the Miller's index for tooth mobility). Radiographic examination revealed moderate bone loss in mandibular anterior teeth region (Figure.1). Patient gave no history of systemic disease and personal history suggested that he was a chronic paan chewer for last 10 years with 5 paan per day. Non-surgical periodontal therapy was planned followed by extraction of mandibular left central incisor and right central incisor (Figure. 2). Immediate post extraction patient demanded restoration of lost teeth.

Prosthodontist was then consulted and replacement option was planned keeping in mind the patient's concern regarding the aesthetic as well as preservation of periodontally compromised teeth adjacent to replacement area. The treatment plan was to use acrylic teeth as pontic along with stainless steel wire reinforced composite splint. This was considered as a temporary treatment strategy and patient was explained about the benefits of treatment and further treatment needs. Once the periodontally compromised teeth were stable and mobility was absent the patient was planned to be referred to Prosthodontist for permanent treatment.

The acrylic pontics replacing 31 and 41 were shade matched, trimmed and fixed with 0.7mm, 22-gauge stainless steel wire using flowable composite. Then the pre-fabricated stainless steel wire reinforced splint along with acrylic pontics was fixed over the middle third area of lingual aspect of the mandibular anterior teeth extending from 33 and 43 regions (Figure. 3). Occlusal adjustments were done and in next appointment after 48 hours cured composite finishing and polishing was performed.

### Splint placement protocol

The abutment teeth were rinsed, dried and etched with 37% phosphoric acid for 30 seconds (Dentsply, USA). The area was again rinsed with normal water and dried leaving an etched surface on enamel. Following the application of bonding agent (Prime and Bond NT, Dentsply, USA) on all the prepared abutments on lingual and proximal surfaces and cured with light polymerizing unit at 420mw/cm<sup>2</sup>, [Woodpecker LED-E, Woodpecker Medical Instrument Co., Guilin, China] for 30 seconds. In next step previously shade matched and trimmed acrylic teeth were fixed to the 0.7 mm, 22-gauge stainless steel wire using flowable composite resin and cured.

A thin layer of flowable composite (TetricN-Flow, Ivoclar) was applied to the lingual surface of the abutments and the pre-fabricated splint was carefully placed just above the cingulum and cured with the same light cure unit. Then composite resin was again applied over the wire and cured again. Final finishing and polishing of composite done after 48 hours.

Patients were followed up after 6 months and mobility in abutment teeth were assessed after splint removal. No mobility was observed. Post 6 months intraoral periapical radiograph showed satisfactory healing of the extraction

socket and signs of periodontal health around the roots of the abutment teeth (Figure. 4). The patients were instructed to visit a prosthodontist for further treatment.

### Case 2:

A 32-years-old male patient reported to the dept. of dentistry with a chief complain of loose, dirty and missing teeth associated with the lower front teeth region. Clinical examination revealed missing mandibular left central incisor (31). Grade II mobility in mandibular right central incisor (41) and grade I mobility in mandibular left and right lateral incisors (32,42) (according to the Miller's index for tooth mobility) (Figure. 5). Radiographic examination revealed moderate bone loss in mandibular anterior teeth region. Patient's medical history was non-contributory and personal history suggested that he was a chronic tobacco chewer for last 7 years. Scaling and root planing were performed using hand instruments and ultrasonic devices.

After phase I therapy, stainless steel wire reinforced composite splint with replacement of missing teeth with acrylic tooth pontic was planned as the adjacent teeth were periodontally compromised and the patient was very much concerned about aesthetic like the previously described case.

The acrylic pontic replacing 31 was shade matched, trimmed and fixed to prefabricated 0.7 mm, 22-gaugestainless steel wire splint by using flowable composite resin. Then this prefabricated splint with acrylic pontic was fixed over lingual aspect of mandibular anterior teeth extending from mandibular left canine (33) to right canine (43) (Figure. 6). Patient was checked for traumatic bite and occlusal adjustments were done. Oral hygiene instructions were given. Patient was recalled after 2 days for finishing and polishing of the cured composite.

### Case 3:

A 28 years-old female patient reported to the deptt. of dentistry with a chief complain of dirty and teeth and unpleasant looks. Clinical examination revealed mandibular left central incisor (31) was missing. Grade II mobility found in mandibular right central incisor (41) and left lateral incisor (32) and grade I mobility found in mandibular right lateral incisor (42) (according to the Miller's index for tooth mobility) (Figure. 7). Radiographic examination revealed moderate bone loss in mandibular anterior teeth region. Patient had no systemic disease and no oral deleterious habit.

The same treatment procedure was followed as the previously described cases (Figure. 8).

### Post operative instructions

Patients were instructed to brush twice daily with soft bristle toothbrushes and dentifrices, use of inter dental aids where needed. Initially, patients were advised to visit the department every 3 weeks (first two months) for oral hygiene reinforcement and report immediately in case of breakage of splints.

### Discussion:

This case series describes the replacement of missing mandibular anterior teeth with acrylic pontics and its stabilization with stainless steel wire reinforced composite splint over periodontally compromised abutments. Wire-reinforced composite splint with acrylic pontic can be considered conservative approaches for replacing missing anterior tooth in certain unfavourable clinical conditions. This technique requires minimal or no preparation on the middle of the palatal/lingual surfaces. The retention is based on the proper placement of wires and careful bonding procedure. Debonding incidence is minimal when the



placement of the splint and curing is done under sterile condition without saliva contamination. This is a single appointment, low cost, and less invasive technique. Also, if any repair is required, it is easy and cost effective.

Occlusal relationship, aesthetic details are clinically satisfactory. All-ceramic, porcelain fused to metal (PFM) and composite resin pontic can also be used with stainless steel wire reinforced composite resin splint.<sup>[4]</sup> All-ceramic and PFM pontics were not taken into consideration for above cases as they were expensive. The aesthetic outcomes are excellent when natural teeth are used as pontic, but since in some patient teeth are also decayed, it is not feasible in all cases.<sup>[5]</sup> Stainless steel wire splint was used as compared to fibre splint due to cost effectiveness and studies have suggested the incidence of debonding of fibre from the teeth is a bit higher.<sup>[6]</sup> The advantages of this technique, it is an affordable, easy application technique, the splint can be easily removed when no longer required, minimal tooth preparation is required, re-bonding can be done easily. Oral hygiene maintenance by the patient is also easy.

Tooth splinting is a treatment option for mobile teeth which are not hopeless and conservative management can be done. The main objective of splinting is to provide a healthy environment for functional restoration of lost periodontal tissues.<sup>[7]</sup> Provisional splints can be used for a certain time frame whereas definitive splints can be placed after completion of periodontal therapy and for occlusal stability are indicated for a limited time period. Treatment planning is essential before initiating splint therapy.

The primary concern for the patients described in this case series are mobile teeth causing difficulty in chewing and missing teeth

hampering aesthetic. Replacement of teeth with periodontally compromised abutments is challenging and requires long term treatment planning. Patient education is essential for successful treatment outcome and their expectations should be considered with functional stability. Oral hygiene maintenance and avoiding heavy biting pressure on the splinted teeth are the basic instructions patient needs to follow.

Case reports have suggested use of various treatment strategies like fibre-reinforced splints with natural tooth pontic, use of polyethylene fibre reinforced fixed dental prostheses.<sup>[3,6,8]</sup> A case report by Rauch *et al.* suggested use of glass prepreg fibre and an artificial denture tooth luted to the splint and found functional and esthetical stability after 22 months follow up.<sup>[9]</sup> Another case report by Matioli *et al.* on use of direct fibre-reinforced fixed splint showed as minimal invasive technique for replacing missing anterior teeth. However, it was expensive and showed some soft tissue changes led to unaesthetic appearance on long term follow up.<sup>[10]</sup> Liu *et al.* did a retro perspective study on combined splinting restorations in the aesthetic zone of periodontally compromised patients and found this minimally invasive treatment showed some degree of stabilization of periodontally weakened teeth.<sup>[11]</sup>

No analytical studies are present to compare or analyse the benefits of replacement of missing teeth with acrylic teeth and stabilization of periodontally weakened abutment with wire-reinforced splints. Long-term follow up is needed to evaluate beneficial outcomes of various treatment strategies used for immediate replacement of missing teeth in aesthetic zone and stabilization of periodontally compromised abutments.

## Conclusion

Tooth mobility might be present due to pathological conditions involving periodontal or underlying bony structures. Proper diagnosis and treatment planning is required to treat periodontally compromised mobile teeth. In this present case series wire reinforced composite splint was advised with acrylic pontic and tooth replacement strategy. This treatment provided satisfactory clinical outcomes and can be used as a provisional treatment plan. The replacement of missing teeth with acrylic teeth was well accepted by the patient both aesthetically and economically.

## Consent

All authors declared that written informed consent was obtained from the patient for publication of this case series and accompanying images.

## Ethical approval

Not applicable.

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**FIGURES**

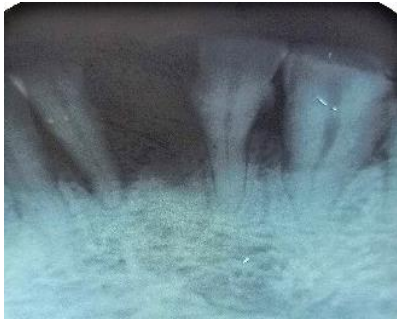


Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8