

ANTERIOR SPRING CANTILEVER FIXED PARTIAL DENTURE: A SIMPLE SOLUTION TO A COMPLEX PROSTHODONTIC DILEMMA

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ABSTRACT

Drifting of teeth into the edentulous area may reduce the available pontic space; whereas a diastema existing before an extraction may result in excessive mesio-distal width to the pontic space. Besides other indications, the spring cantilever bridge can solve the difficult clinical problem of providing diastema on either side of a pontic. Unlike the conventional bridges, it has a somewhat controversial design in that the anterior pontic is connected to its retainer on a posterior abutment by a relatively long flexible palatal bar. The spring cantilever may be cast from sprue wax that is circular in cross section or shaped from platinum-gold-palladium (Pt-Au-Pd) alloy wire. This article describes the procedure for the fabrication of a spring cantilever fixed partial denture to restore an excessively wide anterior edentulous space.

Key words: Anterior Edentulous Space, Diastema, Palatal bar, Spring Cantilever Fixed Partial Denture.

INTRODUCTION

A variety of factors affecting esthetics may motivate a patient to seek prosthodontic treatment.^[1] The spring cantilever bridge has a somewhat different design from other conventional bridges. Instead of being directly connected to its retainer(s) as in fixed-fixed, fixed-movable or cantilever bridges, it comprises of a pontic which is connected to its retainer by a relatively long flexible palatal connector bar.

In short, the spring bridge resembles the cantilever bridge in that it is fixed on only one end; therefore the name 'spring cantilever bridge'. The spring bridge is essentially tissue-supported but abutment tooth-retained. Thus, forces of mastication

acting on the pontic are absorbed by the supporting palatal mucoperiosteum and completely dissipated before they reach the abutment tooth which merely acts to retain the bridge in place.^[2]

CASE REPORT

A 41-year-old female patient reported to the Department of Prosthodontics, with a chief complaint of replacement of missing teeth in upper right front region. On oral examination right maxillary central incisor was missing and the edentulous space was large (Fig.1).



Fig 1: Preoperative

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A conventional fixed partial denture could not be planned since the space was large and existing spaces between her anterior teeth was to be maintained. A single tooth implant was a viable alternative as it would allow a restoration maintaining both the mesial and distal diastema. However, an implant would entail surgery, more time required for permanent restoration and a more expensive treatment.^[3] But the patient was not willing for surgery for implant placement and wanted bloodless procedure and immediate fixed alternative for the central incisors. Another conservative treatment was restoration with the help of removable partial denture. But the patient was neither willing for implant placement as it would entail surgery nor removable partial denture and wanted a fixed alternative for her missing teeth. There were only two treatment options left: 1) a loop connector fixed partial denture and 2) a spring cantilever (which is in fact a variation of loop connector). Therefore, it was decided to fabricate a spring cantilever fixed partial denture with the right central incisor as pontic and the right canine as the abutment teeth, maintaining diastema between the pontic and the retainers.^[4]

PROCEDURE

Tooth preparation was done with right canine, with sub gingival finish line (Fig 2). Retraction procedures were carried out with gingival retraction cord (000 Knit Trax, Pascal International Inc. USA) and a polyvinyl siloxanes (Aquasil Soft Putty and Aquasil ultra LV, Dentsply, Germany) impression was made using the putty relined technique^[5] in a stock impression tray.^[6]



Fig 2: Tooth preparation after retraction

Provisional restorations were fabricated with a tooth colored self-cure acrylic resin (DPI self-cure tooth molding powder, Burmah trading Co, Mumbai, India) and cemented. Two sets of cast were poured, one for laboratory procedures and one for mounting respectively. Wax pattern for metal copings were fabricated using blue inlay wax and The palatal spring cantilever connecting the pontic to the retainers on the right central incisor and the right canine were made with round 14 gauge wax on the working casts and were checked on the mounted casts in the articulator (Fig. 3).



Figure 3: Wax pattern with spring loop

The wax patterns were cast and copings were finished. Copings were tried in the patients mouth (Fig. 4).



Figure 4: Metal copings trial

Ceramic buildup was completed and the bridge was cemented using glass-ionomer luting cement (GC, GOLD LABEL, GC Corp, Tokyo, Japan) (Fig. 5, 6).

Care was taken to keep the spring away from the rugae. Ceramic buildup done for right central incisor and canine. Prior to final cementation, the spring cantilever connectors were polished to high shine



Figure 5: Palatal view



Figure 6: Postoperative view

DISCUSSION

The spring bridge is a controversial prosthesis in that an area of mucosa is

permanently covered by the rather long flexible palatal bar, when judiciously indicated and well maintained, it can provide many years of continued service functionally and aesthetically. The palatal connector in spring cantilever fixed partial denture is a type of loop connector. However, the connector here is a long, thin and resilient bar, closely adapted to the palate so that it is partly supported by soft tissue.^[7] It connects the pontic to a posterior tooth or teeth requiring full coverage crowns. Although in a rare instance healthy and sound, posterior teeth have been used as abutments to replace a maxillary anterior tooth with diastema, using a resin bonded spring cantilever fixed partial denture.^[8] The long palatal connector in spring cantilever fixed partial denture may deform, if thin, and produce coronal displacement of the pontic; it may interfere with speech and is often poorly tolerated.^[9] When a diastema is required on either side of the pontic, the spring bridge is the answer as its retainer is placed on a posterior abutment and not connected to the adjacent teeth. The spring bridge can also be indicated if the adjacent teeth to the edentulous anterior space are not suitable as abutments; such as (a) small conical peg-shaped clinical crowns providing reduced retention, (b) small root surface area and/or poor periodontal condition rendering them incapable of carrying the extra load, (c) good sound adjacent anterior teeth which are not justifiable to be mutilated. The spring bridge is not indicated in the lower jaw as the mucosa here is thinner, the shape of the jaw will have the bar coming close to the gingival margins, the bar will not be supported by the mucosal tissue as the bite is generally reverse and there is a greater

tendency for calculus formation. The advantages of a spring bridge include: (a) readily achieved aesthetics, (b) relatively short clinical chairside time, (c) provision of diastema on either side of the pontic, (d) usually only one posterior abutment is required to support the bridge and (e) the flexible palatal bar acting as a shock absorber reduces the chances of pontic ceramic from fracturing.

CONCLUSION

Although they are rarely used, spring cantilever are sometimes required when an existing diastema is to be maintained in a planned fixed prosthesis, as in the above case. A spring cantilever connector FPD offers a simple solution to a prosthodontic dilemma involving an anterior edentulous space, albeit with the maintenance of the slight diastema.

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