Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Case Report

Diastema characterization in a class 1 malocclusion with deep bite using double loop connector – Clinical report

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ABSTRACT:
Diastema or spaces between natural teeth are actually a method of nature's compensation to overcome the discrepancy between the two hard tissues – bone and natural teeth. In prosthodontic dentistry, while fabricating a fixed prosthesis, it has been recommended that the spaces between the natural teeth should be duplicated in the prosthesis to avoid esthetic failures. We present a case of a young male patient who presented with a kennedy class 3 partially edentulous situation of the maxillary arch with a missing maxillary left central incisor missing. The main feature of the prosthetic rehabilitation included restoring the partial edentulous space between the two abutments that was excessive and warranted the use of a loop connector to connect the pontic and the retainer. A thick wax sprue former was used to fabricate the loop connector which was placed towards the palatal side of the crowns rather than the proximal surfaces. A three unit porcelain fused to metal bridge using loop connector allowed incorporation of diastema between the components of the fixed partial denture. The patient was highly satisfied with the outcome of the prosthesis.
Key words: fixed partial denture, connector, retainer, metal ceramic.

Received: November 22, 2020 Accepted: December 27, 2020

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This article may be cited as: Malesh K, John J. Diastema characterization in a class 1 malocclusion with deep bite using double loop connector – Clinical report. J Adv Med Dent Scie Res 2021;9(1):40-42.

INTRODUCTION

Face or countenance, is a generator of multiple human expressions which is perhaps why it contains most of the sensory organs within the human body. For a maxillofacial dentist it is also an artistic blend of infinite lines and planes that are used as a reference landmark to accomplish various dental treatments. [1] While teeth have been considered generally as an important component of facial esthetics, it is not uncommon for them to present with spaces (diastema) in between them thus impairing esthetics. [2] Functionally in terms of mastication, the anterior teeth play an important role in the protection of natural teeth through anterior guidance. In fact, the evolution of occlusal concepts in terms of their biological and mechanical functioning is better understood now, which in turn has resulted an increase in the scope of applied sciences recently. [3] All natural teeth including its surrounding structures are in a state of proportion, that makes them look good. An unusually wide or large fixed partial denture has been stated to not only affect the natural appearance but also affect normal occlusal function. [4,5] Such clinical complexities occur when there is a generalized spacing of the anterior teeth. A common form observed in patients with bimaxillary protrusion. Replacing a natural tooth in presence of generalized spacing, compromises the proportioning features of artificial restorations, which is why it has been stated that one should incorporate the diastema within the prosthesis rather than try to compensate the same by increasing tooth proportions. Missing tooth/teeth in the presence of spacing is easily accomplished with an implant supported single crown prosthesis, [6] while also being conservative procedure in terms of natural tooth reduction or preparation. While cases of replacing a lost tooth with a fixed partial denture using a loop connector have been reported, there are very less reports that have mentioned the fabrication of a loop connector on a flared (proclined) maxillary anterior teeth. We present one such unique case of replacing a maxillary left central incisor on abutment teeth that were proclined.

CASE REPORT

A young male patient aged 28 years reported to the department of prosthodontics for replacement of a missing maxillary left central incisor. The tooth was lost as a result of traumatic injury 2 years back. Patients social, medical, drug history were non relevant to the future treatment plans, except the patient would not be able to afford expensive dental treatments. Extra oral examination showed a moderate bimaxillary protrusion with other extra oral features being within normal limits. Intra oral examination disclosed a kennedy class 3 partial dentulous situation of the maxillary arch with left maxillary central incisor missing. Other significant features included a generalized anterior spacing and generalized staining of the teeth **(Fig 1)**. The spacing was also present in the anterior mandibular teeth. Spacing was also accompanied with flaring of maxillary central and lateral incisors. Flaring of the teeth resulted in increased overjet and decreased overbite. Treatment options presented to the patient included an implant supported single tooth restoration for missing left central incisor, a modified three unit fixed partial denture (porcelain fused to metal) or a cast partial/ treatment partial/interim partial denture. The patient consented for a three unit fixed partial denture. Routine clinical procedures included the diagnostic impression making with irreversible hydrocolloid (CA 37; Cavex, Haarlem, Holland) followed by a diagnostic mounting on a semi adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla) using a face bow (Whip Mix) and interocclusal records (Metrowax; Metrodent Ltd, Huddersfield, West Yorkshire, UK). A diagnostic wax up was first done to evaluate the need of endodontic treatment and/or post core correction of flared maxillary central incisors. Maxillary left central incisor and the maxillary left canine were used as abutment teeth to retain a pontic. The diastema between the teeth within the fixed partial denture was incorporated by connecting the pontic to the retainers using a loop connector. The loop connection was effectively achieved by using a sprue former pattern wax (Bego) (round) and was connected to respective retainers on the lingual aspect. The wax pattern was cast into base metal alloy (Wiron 99; Bego, Bremen, Germany) and the metal framework was then tried in the patient's mouth **(Fig 2 and 3)**. After necessary corrections on the metal framework, the porcelain was fired to the metal and later tried in the patient mouth. After necessary porcelain correction in terms of anterior guidance, the porcelain fused to metal three unit fixed partial denture was glazed and cemented in place using a polycarboxylate cement **(Fig 4)**. The patient was put on a regular follow up protocol for a period of one year. The patient was satisfied with treatment outcome.

Figure 1: Intra oral view of kennedy class 3 partial dentulous situation with maxillary left central incisor missing.

Figure 2: Cast metal framework trial (labial aspect)

Figure 3: Cast metal framework trial showing the loop connectors on the palatal surface

Figure 4: Finished three unit fixed partial denture using a loop connector cemented in place. Note the diastema incorporated within the partial denture and the adjacent tooth.

DISCUSSION

A Kennedy class 3 partial edentulous situation that was successfully restored with a three unit fixed partial denture has been described in this clinical report. The unique feature being the design of the prosthesis that incorporated two loop connectors. Another feature of the report being that the retainer inclination was not changed, although both abutments had a moderate proclination. Patient history revealed that the loss of teeth was due to trauma which substantiates the previous evidence that depicts 80% of the maxillary central incisors being susceptible to traumatic tooth loss. [7] Although implant serves as the treatment of choice for single missing natural teeth, [8] it has been stated that many patients do not opt for such simple choices because of financial or medical reasons. [9,10] however, even if implant supported restoration would have been considered in this case, it was still imperative to maintain the existing midline diastema after final restoration. While midline diastema has been termed as a clinical condition presenting as a space between natural teeth (high labial frenum being one of the predisposing causes), the spacing between other teeth was as a result of bimaxillary protrusion which has been found to be more among the south Indian population. [11] The use of metal, ceramic in restoration of missing natural teeth with a fixed partial denture has been there since 1970,[12] and it continues to dominate the major restorative practice because of its flexibility in allowing different metal designs which can be customized to individual patient's occlusion. Base metal alloys used in fixed partial denture can be customized to any shape even that of thin sections, since it has a high modulus of elasticity. [13]

Partial edentulous situations exist in infinite combinations (more than 60000 estimated), [14] and most of the partial edentulous situations are not ideal in terms of the adjacent abutment and the opposing dentition. There has been an increase in the number of cases reportedly treated with loop connector fixed partial denture and range from simple to complex. [15-17] One of the reasons for such increased reporting has been attributed to a better clinical examination of occlusion. In most of the cases a static and dynamic clinical evaluation of occlusion is recommended. [18] On the contrary, the use of all ceramics does not provide such design flexibility nor does it allow incorporation of such connectors. [19]

CONCLUSION

Use of loop connector allows a dental clinician to incorporate diastema within a fixed partial denture which otherwise would look disproportionate, if conventional proximal connectors are used.

ACKNOWLEDGEMENT

The authors would like to acknowledge the effort of dental technician of the department of prosthodontics for his timely effort.

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