



Resin bonded fixed partial denture as treatment option for midline spacing in mandibular anteriors: A case report

Kashish Mangal¹✉, Mithilesh M. Dhamande², Seema Sathe³, Ruchika R. Mandhane⁴, Rupali M. Patel⁵, Pragati Goyal⁶

¹BDS, Post Graduate, Department of Prosthodontics and Crown & Bridge, Sharad Pawar Dental College & Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University) Sawangi (Meghe) Wardha, India; Email: kashishmangal24@gmail.com

²MDS, MPhil (HPE), Reader, Department of Prosthodontics and Crown & Bridge, Sharad Pawar Dental College & Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University) Sawangi (Meghe) Wardha, India; Email: miths_d@rediffmail.com

³MDS, Professor & Head, Department of Prosthodontics and Crown & Bridge, Sharad Pawar Dental College & Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University) Sawangi (Meghe) Wardha, India; Email: seemasathe2011@gmail.com

⁴BDS, Post Graduate, Department of Prosthodontics and Crown & Bridge, Sharad Pawar Dental College & Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University) Sawangi (Meghe) Wardha, India; Email: mandhaneruchika15@gmail.com

⁵BDS, Post Graduate, Department of Prosthodontics and Crown & Bridge, Sharad Pawar Dental College & Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University) Sawangi (Meghe) Wardha, India; Email: drrupalipatel4@gmail.com

⁶BDS, Post Graduate, Department of Prosthodontics and Crown & Bridge, Sharad Pawar Dental College & Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University) Sawangi (Meghe) Wardha, India; Email: pragatigoyal91@gmail.com

✉Corresponding author

Dr. Kashish Mangal

A-62,63, New Pali Road, Jodhpur, Rajasthan, India- 342001

+91-789-131-0202

kashishmangal24@gmail.com

Article History

Received: 10 June 2020

Reviewed: 12/June/2020 to 20/July/2020

Accepted: 20 July 2020

E-publication: 27 July 2020

P-Publication: September - October 2020

Citation

Kashish Mangal, Mithilesh M. Dhamande, Seema Sathe, Ruchika R. Mandhane, Rupali M. Patel, Pragati Goyal. Resin bonded fixed partial denture as treatment option for midline spacing in mandibular anteriors: A case report. *Medical Science*, 2020, 24(105), 2963-2967

Publication License

This work is licensed under a Creative Commons Attribution 4.0 International License.

General Note

 Article is recommended to print as color digital version in recycled paper.

ABSTRACT

The benefits of conservative dentistry have been realised and practiced by the dentists predominantly in the recent times. A constant choice of least invasive treatment modality in relative comparison to other invasive procedures has gradually shifted the dynamics of dental treatment modality. In a similar approach, the following case report presents rehabilitation of a young patient presenting with mandibular diastema using resin bonded fixed partial denture, with a detailed description on the clinical procedures associated.

Keywords: diastema; adhesive; resin bonded; anterior edentulism; fixed partial denture

1. INTRODUCTION

MM Devan's famous dictum about preservation of what remains being more important than replacement of what's missing has guided dentists throughout decades (Gada et al., 2016). The current tide of conservative dentistry in all aspects of dental science has led to emergence of newer innovations in techniques and technology as well as resurgence of older employed modalities with or without modifications. With this school of thought for preservation and conservatism, different treatment options are now being considered during planning of dental prosthetic replacement for any patient.

Depending on the case, the dentist has a huge array of options ranging from removable to fix. One such preferred conservative treatment option is resin bonded fixed dental prosthesis (FDPs). First reported evidence of resin bonded FDPs dates back to 1970s when Dr. Rochette described the use of a cast metal framework for splinting of periodontally weakened anterior teeth. In practice since last 40 years, resin bonded FDPs can be defined as an FDP fixed to primarily enamel surface of the tooth surfaces adjacent to the edentulous space. To assist in retention, the aforementioned surfaces are etched which creates micro porosities and thus create micro retention between the prosthesis and enamel surface. The initial designs for partial coverage lingual retainer, also known as Rochette Bridge, comprised of perforations. These helped in creating a mechanical lock between the tooth surface and the resin luting cement which escaped through these perforations (Ferro, 2017; Lally, 2012). The following case report displays use of resin bonded FDP for the rehabilitation of a midline spacing between mandibular anteriors of the patient.

2. CASE REPORT

A 27-year-old male student reported in the Department of Prosthodontics and Crown & Bridge with the chief complaint of midline spacing present between his lower front teeth (Fig 1). On clinical examination (Pisulkar et al., 2019), an idiopathic mesiodistal spacing of 5mm could be seen between 31 and 41. When evaluated radiographically, no pathological lesion was found. A set of maxillary and mandibular diagnostic impression was made in irreversible hydrocolloid and casts in Type III dental stone were poured and retrieved. To comprehend the treatment options and convey the same to the patient, a diagnostic wax-up was carried out. Considering the reduced mesiodistal space, the treatment options presented to the patient were-

Removable single tooth partial denture

Full coverage 3 unit FDP

Resin-bonded FDP

Patient was informed about all the pros and cons of all the treatment options, and after a well understood and informed consent, resin bonded FDP was chosen as the treatment option owing to its conservative approach and promising results.

Preparation of abutment teeth

For enhancing the retention of the resin bonded FDP, retentive grooves were planned. To assess their appropriate location, occlusal contacts in centric and eccentric movements were marked. Then grooves were strategically placed on adjacent abutment teeth that are 31 and 41. On the lingual surfaces of these teeth, with the help of a small round bur, two grooves were placed on mesiolingual

and distolingual aspect of the tooth. Utmost care was taken to maintain a conservative preparation restricting to only enamel layer. To ensure this, new tungsten carbide burs with suitable dimensions were selected (Shillingburg et al., 2012).

Additionally, grooves were made along the interproximal surfaces, adjacent to the edentulous space, on both the abutment teeth. These were made using the same round bur, directed incisogingivally. Special care was given to ensure parallelism of both the surfaces.

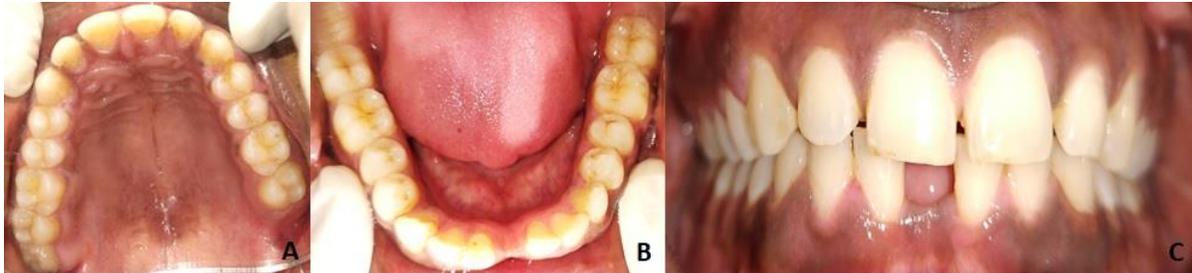


Figure 1 A) Maxillary arch; B) Mandibular arch; C) In occlusion

Final Impression & cast

A single step double mix elastomeric impression was made of the mandibular arch to record all the fine details of the prepared abutment teeth. After spraying debubbler on the impression, cast was poured in type IV (die stone) gypsum product.

Laboratory Steps

Wax-up for a modified ridge lap pontic was designed, which was then invested and casted in cobalt chromium alloy. The metal framework was then tried in the patient to check for centric and eccentric contacts (Fig 2). Speech and fit of the prosthesis was verified. When all the necessary adjustments were done, the pontic was layered with ceramic and fired in the furnace followed by glazing and polishing. Following this, the intaglio surface of the metallic wings of resin bonded FDP were airborne particle-abraded using 0.05mm sized alumina particles. The surface was then conditioned using a single liquid primer for enhanced retention.



Figure 2 A) Try in; B) Bonded prosthesis in place

Bonding

The final finished prosthesis was again re-checked for fit, esthetics and function along with the patient's satisfaction. After receiving patient's consent, bonding procedure was initiated. Initially the enamel on the lingual surface was etched for 30 seconds using 37% phosphoric acid and then rinsed thoroughly and dried. Under complete isolation, the FDP was cemented using adhesive dual polymerising resin cement (Panavia). The resin bonded FDP was held in place on the abutment teeth with firm pressure. The excess cement was removed with the help of probe and the restoration was light cured.

On completion of bonding, final checks for interference and centric contacts were made and necessary minor modifications were done. It was ensured that pontic has a centric stop and stayed out of contact in excursive movements. The abutment teeth had normal contacts on centric and eccentric movements with the opposing teeth (Fig 3).

**Figure 3**

A) Pre-operative;

B) Post-operative

Maintenance and Follow-up

Patient was instructed to maintain meticulous oral hygiene. The patient was called for follow-up visit after 24 hours, 3 days, 7 days and then on monthly basis. After 6 months of follow-up, patient was very satisfied with the prosthesis without any complications.

3. DISCUSSION

In cases where natural midline spacing is present, various treatment options can be suggested. One of this is fixed orthodontic treatment to close the space and align the teeth properly. The patient here refused for the same because of the longer duration of the procedure. Other option is the space closure using direct composite restoration including the adjacent teeth. Even though composites in dentistry have advanced with the introduction of nanocomposites (Panchbhai, 2019; Panchbhai, 2019), this option was not opted for because of the relatively larger edentulous space which would make the sustenance and longevity of composite restoration compromised. The deciding factor for resin bonded FDP over full coverage FDP was the conservative approach that resin bonded FDP offered.

Alsharbaty MHM et al. did a similar treatment in 2018 where a missing mandibular anterior was replaced using resin bonded FDP (Alsharbaty, 2017). Despite the acknowledged advantages of resin bonded FDP, their application as a long term treatment modality remains questionable because of heterogeneous data with varying factors. This makes it difficult to highlight the reasons for promising outcomes of resin bonded FDP. Some of the systematic reviews comparing the 5-year survival rates of resin bonded FDP (87.7%) (Pjetursson et al., 2008), conventional bridges (90%) (Pjetursson et al., 2007) and implant retained prosthesis (94.5%) have yielded in relatively favourable results.

Resin bonded prosthesis hold a huge array of benefits as a treatment option majorly encompassing the fact that it is less invasive and relatively reversible modality with little or no tooth preparation requirements. Patient compliance is better because of reduced treatment time. Like the two sides of a coin, resin bonded FDP has a negative facet of few disadvantages as well. The most prominent and frequently encountered is its high rate of debonding, as compared to conventional FDP. To combat this, surface treatment was done on the prosthesis as well as on the enamel surface of the abutment teeth. This ensured an increased surface bonding area for mechanical retention. The abrasion using alumina coats the intaglio surface with a layer of alumina particle which enhances the retention with phosphate based adhesive systems like Panavia. To ensure longevity of the prosthesis, only centric contacts were permitted and eccentric contacts were relieved. Along with this, the metal wings of this prosthesis can lead to an esthetic challenge if extended up to the incisal edge of the incisors. Though this can be managed by ensuring proper extensions of the prosthesis as was done while designing the resin bonded FDP for the current case.

4. CONCLUSION

Despite of the comparative survival rates, resin bonded FDP is a viable treatment modality. To ensure a successful prognosis, appropriate case selection is imperative. To counter the disadvantages of debonding, adequate preparation of abutment teeth as presented in this article is indispensable. In order to aid the bonding, surface treatments like air abrasion and usage of adhesive cement helps synergistically. It is advisable to provide the patients with a night guard if they give history of parafunctional habits so that occlusal forces can be moderated. All of these factors assist in producing a successful treatment.

Funding

This research received no external funding.

Conflict of Interest

The authors declare that they have no conflict of interest.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. Alsharbaty MH. Resin Bonded Fixed Partial Denture is an Alternative Conservative Treatment in Anterior Short Span for a Medically Compromised Patient: A Clinical Report. *J Clin Case Rep.* 2017;7: 954
2. Ferro KJ. The glossary of prosthodontic terms 9. *J Prosthodont;* 2017
3. Gada VH, Bhandari AJ, Gangadhar SA, Tambe S, Dhope SV, Toshniwal DG. A maxillary conventional complete denture opposing a bar retained mandibular overdenture: a case report. *Pravara Med Rev.* 2016;8; 22-6
4. Lally U. Resin-bonded fixed partial dentures past and present – an overview. *J Ir Dent Assoc;* 2012; 58:294–300.
5. Panchbhai A. Nanocomposites: Past, present, and future of dentistry. In: *Applications of Nanocomposite Materials in Dentistry.* 2019: 181–90.
6. Panchbhai A. Nanotechnology in dentistry. In: *Applications of Nanocomposite Materials in Dentistry.* 2019: 191–203.
7. Pisulkar SK, Agrawal R, Belkhode V, Nimonkar S, Borle A, Godbole SR. Perception of buccal corridor space on smile aesthetics among specialty dentist and layperson. *J Int Soc Prev Community Dent;* 2019: 499-04
8. Pjetursson BE, Brägger U, Lang NP, Zwahlen M. Comparison of survival and complication rates of tooth-supported fixed dental prostheses (FDPs) and implant-supported FDPs and single crowns (SCs). *Clin Oral Implants Res.* 2007; 18:97–113.
9. Pjetursson BE, Tan WC, Tan K, Brägger U, Zwahlen M, Lang NP. A systematic review of the survival and complication rates of resin-bonded bridges after an observation period of at least 5 years. *Clin Oral Implants Res.* 2008; 19:131–41.
10. Shillingburg HT, Sather DA, Wilson EL, Cain JR, Mitchell DL, Blanco LJ, Kessler JC. *Fundamentals of Fixed Prosthodontics: Fourth Edition.* 4th ed. Illinois: IL; Quintessence Publishing Co; 2012