Journal of Dentistry Indonesia

Volume 29 | Number 2 Article 11

8-31-2022

Critical Evaluation of Failed Maxillary Resin Bonded: A Case Study

Yew Hin Beh
Department of Restorative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia, dr.yhbeh@gmail.com

Azirrawani Ariffin
Prosthodontic Unit, School of Dental Sciences, Universiti Sains Malaysia, Kota Bharu, Malaysia; Hospital Universiti Sains Malaysia, Kota Bharu, Malaysia, wani@usm.my

Recommended Citation

Beh, Y., & Ariffin, A. Critical Evaluation of Failed Maxillary Resin Bonded: A Case Study. J Dent Indones. 2022;29(2): 147-153

Critical Evaluation of Failed Maxillary Resin Bonded: A Case Study

Cover Page Footnote

ACKNOWLEDGEMENT The authors truly appreciate the consent given by the patient for all information disclosure, including clinical information and clinical images for publication in this journal. CONFLICT OF INTEREST The authors declared that they have no conflict of interest.

Journal of Dentistry Indonesia 2022, Vol. 29, No. 2, 147-153
doi: 10.14693/jdi.v29i2.1269

CASE REPORT

Critical Evaluation of Failed Maxillary Resin Bonded Bridge: A Case Study

Yew Hin Beh[1], Azirrawani Ariffin[*2,3]

[1]Department of Restorative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia
[2]Prosthodontic Unit, School of Dental Sciences, Universiti Sains Malaysia, Kota Bharu, Malaysia
[2]Hospital Universiti Sains Malaysia, Kota Bharu, Malaysia
**Correspondence e-mail to: wani@usm.my*

ABSTRACT

Resin bonded bridge (RBB) is a conservative, medium to long-term restoration of missing teeth. A high rate of debonding was the main limitation in a clinically demanding situation. **Objective:** To highlight the critical evaluation in identifying the contributing factors leading to the failure of RBBs and avoiding as well as controlling such factors optimally prior to providing further rehabilitative treatment. **Case report:** This case illustrates a young patient who received resin bonded bridges to replace her missing lateral incisors. Unfortunately, she had issues with bridge debonding, in which one of the abutment teeth was extracted due to caries under the retainer. The patient was then treated with multiple cantilever bridges to restore the missing dentition after optimising the risk factors. **Conclusion:** With an improved understanding and material advancement, RBB survival tends to be longer nowadays. As it was conservative, in the incidence of failure, other treatment options remain open. However, each failed case should undergo a critical evaluation of the failing aetiology and its mechanism to prevent future occurrences.

Key words: dental caries, open bite, resin bonded bridge, survival rate

How to cite this article: Beh YH, Ariffin A. Critical evaluation of failed maxillary resin bonded bridge: A case study. J Dent Indones. 2022;29(2):147-153

INTRODUCTION

Anterior resin bonded bridge (RBB) is a conservative fixed partial denture (FPD) option for replacing missing anterior dentition.[1,2] This option was traditionally recognised as a short to medium-term solution in the anterior dentition due to high technical complications.[3,4] However, with the advancement of bonding systems and survival enhancing preparation design,[5-7] it is now becoming recognised as a treatment option for a longer term.[4,5,8]

Conventional FPD restorations require extensive tooth preparations on the abutments. Loss of vitality of the abutment tooth retaining a conventional FPD was up to 32.5%.[9] One of the reasons for this loss was the extra removal of abutment tooth structure to ensure a single path of restoration insert. In contrast to RBB, the loss of vitality of the abutment tooth was negligible.[1,4] This was primarily contributed by the nature of abutment preparation which was confined to enamel,[7,10,11] or no preparation at all.[10]

RBB is easy to fabricate; hence, it requires shorter chair side time and is affordable. Moreover, anaesthesia is not often needed.[2,7] Patient satisfaction towards RBB is high, and the oral health-related quality of life (OHRQoL) is comparable to an implant-retained single crown.[10,12]

Systematic review and meta-analysis reported a 5-year survival of RBB ranging between 84% and 92%.[3,4,6] Using strict criteria, an estimated 5-year success rate of metal-ceramic RBB and non-metal RBB of 88% and 84% respectively.[8] These studies showed that RBB is surviving well in addition to the minimal biological cost. Therefore, RBB is a valid first-line treatment for replacing missing teeth in suitable cases considering its minimal invasiveness with success and survival rate comparable to conventional tooth or implant-supported prosthesis.[4,5,8] Further, it can potentially serve as an interim or transitional means of replacement for a few years as other treatment options remain open

upon failure. However, each of the failed restorations should have been evaluated critically to identify the contributing factors leading to its failure to avoid and control such factors optimally prior to providing further treatment. This would promote restoration longevity, and at the same time, improve the patient's motivation and engagement with the home care regime and, finally, the OHRQoL. This report illustrates the management of a case with failing maxillary anterior RBB reconstructions.

CASE REPORT

A 35-year-old lady with no significant morbidity besides obesity was referred to the prosthodontic postgraduate clinic for further management of failing resin bonded bridge (RBB) replacing missing maxillary laterals which were constructed by an undergraduate student around eight years ago. Since then, she had never attended any regular maintenance review until the first incidence of RBB debonding. She was concerned with the frequent dislodgements of the maxillary left RBB and wished to have fixed dental prostheses replacement. Note that her teeth were extracted due to caries.

The retainers on RBB replacing tooth 22 (RBB-22) had multiple debonding episodes three years after cementation and once in an average of a 6-month period after each recementation. Although the RBB replacing tooth 12 (RBB-12) had no known history of debonding, the distal retainer was sectioned two years ago due to the presence of secondary caries and resorted to the extraction of the abutment tooth 13. Since then, she has been on temporary acrylic removable partial denture (RPD). Both RBBs were of fixed-fixed design. She denied bruxism but has a habit of chewing hard food especially bones between meals.

Clinical examination revealed a significant anterior open bite of 5 mm with an average smile line and evidence of tongue thrusting (Figure 1). Salivary flow and quality are optimal clinically. Intraorally, oral hygiene was fair with no deep periodontal pocket but several bleeding sites were observed. There was also mild crowding on the maxillary anterior segment with 2 mm median diastema. She has a skeletal class I and a molar class I relationship. Anterior dentition was free of protrusive guidance with contacts only on the second molar bilaterally. There were teeth contacts from the upper and lower second premolar to the second molar upon right excursion with contralateral contacts on the upper and the lower second premolar to second molar. On the left excursion, teeth contacts were appreciated on the maxillary first premolar to the second molar contacting the mandibular second premolar to the second molar with contralateral contacts on the maxillary and mandibular first and second molar. Both RBBs were intact upon examination and were not aesthetically acceptable due to the sighted metal retainers and greyish shadow on tooth 11. The retainer for RBB-12 was cantilevered from abutment tooth 11, while RBB-22 was askew with thick, excess cement on both retainers (teeth 21 and 23). Basic periodontal examination scored 1 for all sextants except maxillary anterior sextant, which scored 2. The plaque score was 35%.

A diagnosis of maxillary partial edentulism with failing RBB-12 and RBB-22 was made. Based on the clinical findings and risk assessment, she was categorised into the high caries risk group. The patient's aesthetic expectation of the treatment outcome was average.

Following a thorough discussion, the treatment approaches were directed towards controlling risk factors, reducing the amount of open bite, median diastema closure, and replacement of missing teeth with multiple conventional cantilever bridges. The treatment plan was formulated into several phases and the patient consented to the treatments.

Stabilisation phase
1. Meticulous oral hygiene instruction and coaching.
2. Dietary analysis, advice and counselling session including habits of chewing hard food after meal.
3. Counselling session related to tongue thrusting.
4. Periodontal and fluoride therapies.

Restorative phase
- Metal-ceramic cantilever bridge from abutment tooth 14 to replace 13 (CB, 14-13).
- Lithium disilicate (IPS e.max, Ivoclar, Liechtenstein) cantilever bridge with abutment teeth 11 (CB, 11-12) and 21 (CB, 21-22) to replace 12 and 22 respectively.

Maintenance phase
- Routine review six-monthly.
- Fluoride therapy six-monthly.

The first phase of treatment aimed to stabilise all associated risk factors. The patient was made aware of the role of diet in caries formation and the impact of non-nutritional habits of chewing hard food between meals. Prior to counselling, a three-day diet recall was undertaken (Table 1). Oral hygiene coaching was conducted in a designated oral health education facility with an on-the-spot demonstration. After several reviews, the patient was motivated and able to attain a good plaque score of less than 15% on several occasions with a two-week gap in between. She was well motivated to proceed to the next phase.

In this case, the construction of another RBB would still satisfy her average aesthetic expectation but it would not address her recurrent dislodgements with the previously cemented RBBs. Hence, a conventional bridge option was deemed more suitable for long-term

Table 1. Three-day diet recall indicated a high frequency of sugary drinks and food intake. This dietary habit has taken a toll on both dental health and obesity. An asterisk (*) indicates high sugar-containing food or drinks.

	Day 1		Day 2		Day 3
Morning	*1 cup of coffee with sweetened creamer and sugar 1 plate Fried noodles *1 cup of tea with sugar (morning snack) *2-3 pieces local dessert (high sugar content)(morning snack)	Morning	*1 cup of coffee with sweetened creamer and sugar 2 buns without filling *1 cup of tea with sugar (morning snack) *2-3 pieces local dessert (high sugar content)(morning snack)	Morning	*1 cup of coffee with sweetened creamer and sugar 1 bowl of local coconut rice with sides *1 cup of tea with sugar (morning snack) *2-3 pieces local dessert (high sugar content)(morning snack)
Afternoon	1 bowl white rice Few pieces of fried chicken Generous amount of vegetables *1 glass of rose flavoured syrup *1 cup of tea with sugar (evening snack) Few pieces fried banana (evening snack)	Afternoon	1 bowl white rice ¼ roasted chicken Generous amount of vegetables *1 glass of rose flavoured syrup *1 cup of tea with sugar (evening snack) *few pieces of cookies	Afternoon	1 bowl white rice Few pieces of beef in gravy Generous amount of vegetables *1 glass of rose flavoured syrup *1 cup of tea with sugar (evening snack) 2 pieces of curry puff (evening snack)
Evening	1 bowl white rice Few pieces of chicken Generous amount of vegetables *1 cup of malt chocolate drinks with sugar	Evening	1 bowl white rice Few pieces of beef in gravy Generous amount of vegetables *1 glass of blackcurrant flavoured drink with sugar	Evening	1 bowl white rice Few pieces of beef in gravy Generous amount of vegetables *1 glass of blackcurrant flavoured drink with sugar

option. In addition, the previous abutment tooth 23 was no more utilised as abutment since the tooth was sound.

A diagnostic wax-up was carried out on the study models in the planning stage (Figure 3a), taking into consideration to eliminate the median diastema and reducing the anterior open bite while maintaining the present occlusion. Considering a non-significant occlusal force and superior aesthetics for maxillary incisors, lithium disilicate was chosen. On the contrary, taking into consideration the location of the abutment on 14, metal-ceramic was a more relevant option.

After the removal of RBB-12 and RBB-22 (Figure 2), the teeth were left to rehydrate for some time before shade taking was done. Then, followed by tooth preparation (Figure 3b). Tooth preparation was conducted on the abutment teeth with the dimension based on the final restorative materials. A double retraction cord (Ultrapak, Ultradent Products Inc., USA) technique was employed along with 15.5% ferric sulphate (Astringedent, Ultradent Products Inc., USA) for chemo-mechanical gingival retraction. The impression was taken using a single-step dual viscosity light body and heavy body polyvinylsiloxane (Examix, GC America Inc, US) on a custom tray (Trayplast, Vertex Dental, Netherlands). It was sent to the in-house dental laboratory for further processing.

Upon completion of the bridges, a try-in procedure was carried out to verify marginal adaptation, aesthetics and occlusion. The patient consented for the bridges to be cemented (Figure 4). The intaglio surface of the metal-ceramic bridge was sandblasted using 50µm alumina. For lithium disilicate bridges, 9% hydrofluoric acid etch for 90 seconds was applied and a thin layer of silane was applied, allowing air dried for at least 60 seconds (Porcelain etch and silane, Ultradent Product Inc., USA). All bridges were cemented using dual-cure, self-adhesive resin cement Rely X U200 (3M ESPE, US) of A2 shade (Figure 5a).

The patient then proceeded to the maintenance phase treatments involving long-term continuous review with motivational support, preventive and maintenance therapy (Figure 5b).

DISCUSSION

This case represents an example that illustrate several parameters that need to be considered when managing a failing or failed RBB. The proposed step-by-step systematic approach as presented in Figure 6 was applied to identify the root cause of the problem. Understanding the causes will help to address and manage the contributing factors more effectively and may further improve the longevity of the teeth as well as the proposed prosthesis.

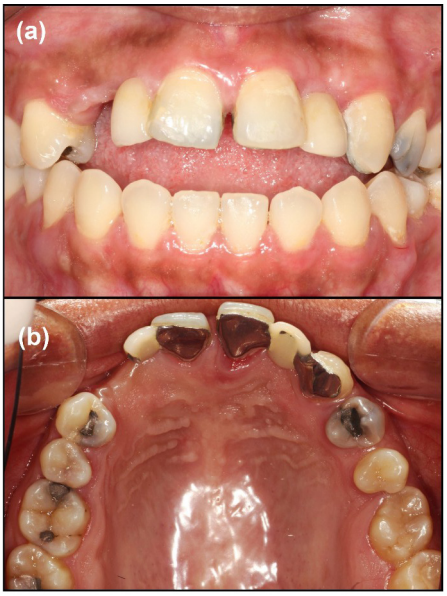

Figure 1. The initial presentation. (a) Note the significant anterior open bite and tongue thrusting. The presence of maxillary median diastema with part of the RBB retainer is shown with the greyish appearance of tooth 11 due to the metal retainer on the RBB-12. RBB-22 retainer on tooth 23 shows a significant distortion and thick luting cement. (b) Maxillary occlusal view showing RBB-12 and RBB-22 *in-situ*.

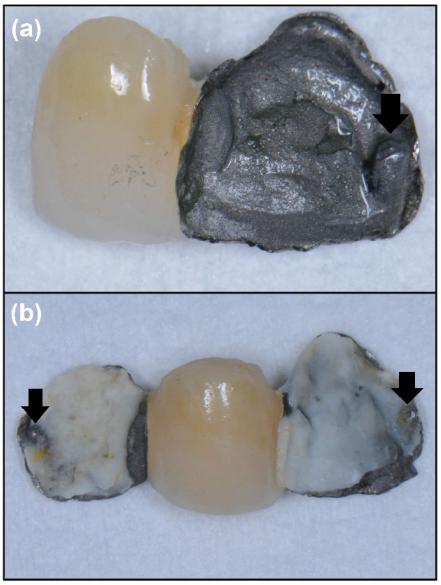

Figure 2. Close-up view of RBB-12 and RBB-22 after removal. (a) RBB-12. No residual cement was noted on the retainer indicating strong adhesion at the cement-tooth interface. A retentive groove was evident (black arrow) on the mesial aspect. (b) RBB-22. Residual and thick cement was present on both retainers, indicating failure at the cement-tooth interface contributed by excessively thick cement or distorted framework resulting in poor fitting after multiple debonding and recementation. A retentive groove was also evident (black arrow).

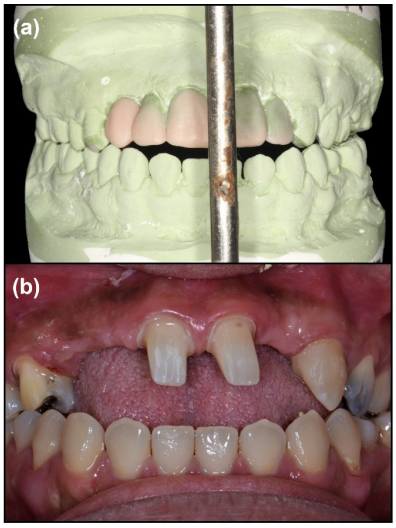

Figure 3. (a) Diagnostic wax-up. (b) Tooth preparation with minimal incisal reduction while maintaining the pre-existing long axes of teeth 11 and 21 to minimise tooth structure removal.

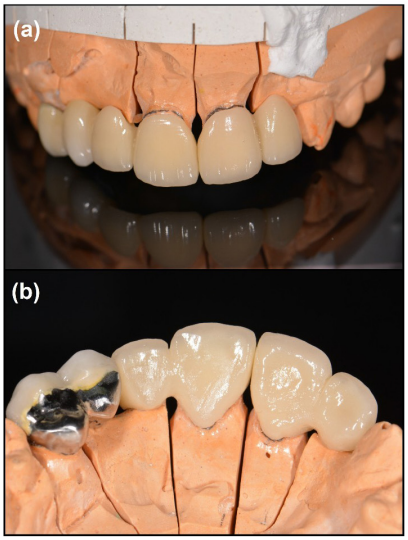

Figure 4. Completed prostheses ready for cementation.

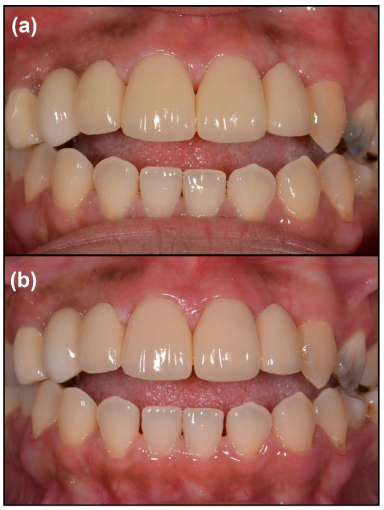

Figure 5. (a) Immediately after cementation. (b) 22-month review. Optimal gingival health and oral hygiene were restored.

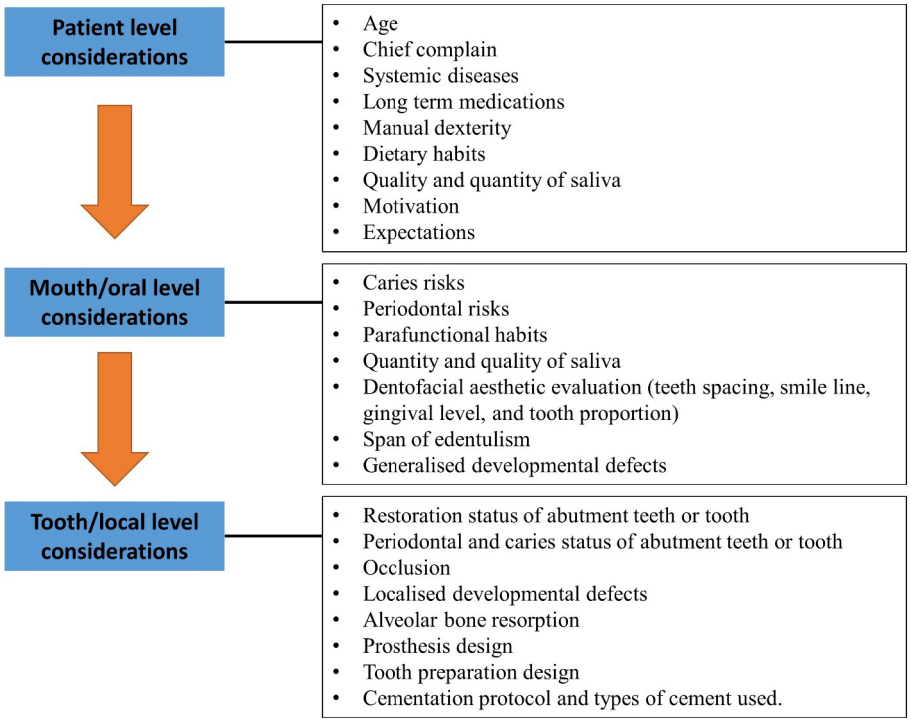

Figure 6. Proposed guidelines on the flow of assessments of failing RBB. This guide could also assist during treatment planning for RBB.

Patient or systemic level considerations

This process was initiated at the patient level. Patient selection plays a significant role in determining the success and survival of the treatment.[3,7] Systemic diseases, poor manual dexterity, poor saliva quality and quantity as well as the age of the patient shall be taken into consideration.[7] Any systemic conditions and medications that impair salivary function were looked into and investigated when indicated. In the present case, poor dietary habits with increased amount and frequency of fermentable carbohydrate intake significantly increased caries susceptibility. The patient's motivation, in this case, was hugely important and needed to be evaluated from the outset when she walked into the practice. Due to poor awareness and lack of motivation, the patient failed to regularly attend a dental maintenance programme preventing early detection of complications, for instance, secondary caries leading to extraction of one of the abutment teeth.

In addition, the aesthetic expectation of the patient is to be considered as well. It is difficult to define and measure the threshold for aesthetics due to perceptional differences. Most often, the benchmark was based on the patient's level of aesthetic expectation. In this case, the construction of another RBB would still satisfy her average aesthetic expectation but it would not address the recurrent dislodgements she encountered with the previously cemented RBBs.

Mouth or oral level considerations

At this level, the oral region as a whole is taken into account. An open bite anteriorly seems favourable for RBB reconstruction as masticatory forces were not considerably high. Nevertheless, in this case, it does not hold true. What seemed reasonably straight forward with a good prognosis in this uneventful case turned out quite the reverse. The non-nutritional habit of chewing hard food, especially bones, in between meals was not well controlled, and the patient was unaware of the risks related to such a habit. This had caused unpredictable forces applied to the prostheses, which subsequently resulted in frequent debonding. This information was not easily retrieved from the patient, as she might have thought it was irrelevant to the dental treatment. Accordingly, clinicians need to be more specific in probing for such information since it is often overlooked and unrecognised. The patient strongly denied bruxism, and no evidence of pathological tooth wear was observed clinically.

Caries risk is another significant point to consider as 30% caries incidence in fixed-fixed RBB design has been reported.[1] However, the risk of caries on abutment was low, around 1.5%-1.7% in 5-year[3,4] especially with a cantilever design.[11] In this instance, debonding of one of the retainers impeded plaque control hence the development of caries while the other retainer remained intact.[7] The patient could hardly notice if her RBB was failing, which made it even more disappointing.

Therefore, the importance of the maintenance review cannot be overemphasised.[10] Upon reflection, perhaps the need for more frequent maintenance reviews for RBB cases should be undertaken, especially for patients in this category. Despite that, disease control should always be implemented in treatment planning, caries risk assessment, and dietary analysis to comply with the current guidelines.[7,13] It was also unknown in this case whether the dislodgement of the retainer on tooth 13 subsequently caused the secondary caries formation underneath or vice versa. With a strict maintenance regime, it is hopeful that the problems associated with such design can be detected at the early stage, hence lengthening not just the longevity of the prosthesis but the abutment tooth as well.

Likewise, the presence of diastema or multiple spacing resulted in less-than-ideal aesthetics, especially when using metal-ceramic RBBs. The metal retainer was noticeable proximally through the dental spacing, which impaired its appearance. Furthermore, light transmission across the translucent zone of the incisor abutment teeth was hindered by metal retainers, hence appearing grey. This can be overcome by limiting the retainers to 2 mm below the incisal edge, though the enamel surface coverage may be suboptimal. Opaque luting cement and usage of zirconia framework would have prevented the dark shadow and would be beneficial for future cases with diastema, though the teeth would look rather opaque.[10] Even though aesthetic perception is an individual preference, patients should be aware of such risks before embarking on the treatment.

Tooth or local level considerations

Both abutment teeth and prosthesis design were evaluated. The periodontal health of the abutment contributed to the suitability of the tooth as an abutment and determined the prosthesis design. Active periodontal disease contraindicates any prosthetic rehabilitation unless justified. The proposed abutment tooth with a large restoration, crowded or worn dentition as such, may not be suitable for RBB as the suboptimal enamel surface for bonding[2,7] The same issue for the microdontic abutment tooth. In this case, the retainer coverage was evaluated for its adequacy and ended short of the incisal edge. Further extension of the connector coverage to the incisal edge might have helped in improving the retention of the prosthesis while taking advantage of the existing anterior open bite. Although this approach might compromise the aesthetics as discussed prior, with the correct choice and application of resin luting cement, it would help to scale down this issue.

RBB-22 had significant episodes of debonding on both retainers. Besides contributed by the patient's habit, prosthesis design plays a role. Single retainer RBB was shown to contribute positively to its survival.[1,3,4,10,11] This was not surprising as the 5-year success rate of RBB with a fixed-fixed design is only 10% compared to 100% for a cantilever design.[1] Each tooth has its specific path of movements when directed to occlusal forces, better known as differential tooth movements. In a fixed-fixed design, the mismatch of the abutments' differential movements resulted in shearing stress transmitted to the cement lute. When these shear forces exceed the adhesive forces, debonding occurs. A cantilever design should be considered as the default design for RBB unless indicated otherwise.[1,7,8]

With the incorporation of a retentive preparation, the survival of cantilever anterior RBB could be up to 98% within 5-years.[5,6] However, abutment preparation with grooves and rest seat was arguably destructive.[4,10] Contrarily, when the proposed abutment has been restored previously, it is more reasonable to incorporate retentive features in the preparation. In addition, roughening the outer aprismatic enamel may improve bonding to resin cement.[6] In this case, recementation of debonded RBB was not recommended unless the aetiological factor for the dislodgment was identified and managed before recementation.[1,3,7] Failure to reposition the connector wing accurately indicating framework distortion, hence, contraindicated its recementation.

Phosphate monomer containing resin cement has been proven to improve the longevity of RBB,[1,5-7,10] for example, Panavia (Kuraray, Japan).[14] Both metal and zirconia-based retainer should preferably be treated with airborne-particle abrasion with 50µm alumina or tribo-chemical treatment to create micromechanical retention.[11,14,15] With a combination of both phosphate-containing resin cement and retainer surface treatment, the bonding of the retainer is more predictable. Unlike the macro-mechanical retention in conventional cantilever bridge, where the adhesive protocol can be simplified by the utilisation of self-adhesive resin cement. However, prosthesis surface treatment is still essential for predictable prosthesis retention.

All in all, these factors must be considered when deciding on a treatment plan for a patient. Often, the clinicians become too attached to the evidence element and overlook the value of simpler options such as RBB due to its shorter lifespan. Perhaps, another valid question to be answered is; whether the longevity of restoration or longevity of dentition of the concern? RBB can add value to the abutment as it can prolong its lifespan if undergoing proper maintenance. Even when RBB fails, other FPD options remain open in accordance with the concept of postponing the vicious cycle of restorative treatment. This case represents an example of this. In this case, each factor that could negatively impact restoration survival was evaluated and managed accordingly to ensure the survival of future restoration. Now, conventional fixed partial denture (FPD) was justifiable, and the decision to incorporate cantilever design given non-significant occlusal forces and avoidance of long-span FPD

was applicable.[16] With the existing occlusal scheme, the macro-mechanically retained lithium disilicate cantilever bridges were adequately retained and bonded with self-adhesive resin cement in addition to hydrofluoric etch and silane application on the intaglio surface. The cantilever design was also easier for home care and maintenance.[1] Should the conventional FPD work have been undertaken in place of the RBB at the start of the treatment, the lifespan of the abutment teeth would have been even shortened.

CONCLUSION

Conservative treatment options should always be recommended as a treatment of choice when indicated, which may prevent limited options when one treatment fails. All contributing factors leading to failed restoration should be managed before the provision of further treatments.

ACKNOWLEDGMENT

The authors truly appreciate the consent given by the patient for all information disclosure, including clinical information and clinical images for publication in this journal.

CONFLICT OF INTEREST

The authors declared that they have no conflict of interest.

REFERENCES

1. Botelho MG, Chan AW, Leung NC, Lam WY. Long-term evaluation of cantilevered versus fixed-fixed resin-bonded fixed partial dentures for missing maxillary incisors. J Dent. 2016; 45:59-66.
2. Gulati JS, Tabiat-Pour S, Watkins S, Banerjee A. Resin-bonded bridges–the problem or the solution? Part 1: Assessment and design. Dent Update. 2016; 43(6):506-21.
3. 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(2):131-41.
4. Thoma DS, Sailer I, Ioannidis A, Zwahlen M, Makarov N, Pjetursson BE. A systematic review of the survival and complication rates of resin-bonded fixed dental prostheses after a mean observation period of at least 5 years. Clin Oral Implants Res. 2017; 28(11):1421-32.
5. Abuzar M, Locke J, Burt G, Clausen G, Escobar K. Longevity of anterior resin-bonded bridges: Survival rates of two tooth preparation designs. Aust Dent J. 2018; 63(3):279-84.
6. Balasubramaniam GR. Predictability of resin bonded bridges - A systematic review. Br Dent J. 2017; 222(11):849-58.
7. Durey K, Nixon P, Robinson S, Chan M-Y. Resin bonded bridges: Techniques for success. Br Dent J. 2011; 211(3):113-8.
8. Alraheam IA, Ngoc CN, Wiesen CA, Donovan TE. Five year success rate of resin bonded fixed partial dentures: A systematic review. J Esthet Restor Dent. 2019; 31(1):40-50.
9. Cheung G, Lai S, Ng R. Fate of vital pulps beneath a metal ceramic crown or a bridge retainer. Int Endod J. 2005; 38(8):521-30.
10. Djemal S, Setchell D, King P, Wickens J. Long term survival characteristics of 832 resin retained bridges and splints provided in a post graduate teaching hospital between 1978 and 1993. J Oral Rehabil. 1999; 26(4):302-20.
11. Mourshed B, Samran A, Alfagih A, Samran A, Abdulrab S, Kern M. Anterior cantilever resin-bonded fixed dental prostheses: A review of the literature. J Prosthodont. 2018; 27(3):266-75.
12. Lam WYH, McGrath CPJ, Botelho MG. Impact of complications of single tooth restorations on oral health-related quality of life. Clin Oral Implants Res. 2014; 25(1):67-73.
13. Pitts NB, Ismail AI, Martignon S, Ekstrand K, Douglas G, Longbottom C. Iccms™ guide for practitioners and educators. 2014.
14. Gulati JS, Tabiat-Pour S, Watkins S, Banerjee A. Resin-bonded bridges–the problem or the solution? Part 2: Practical techniques. Dent Update. 2016; 43(7):608-16.
15. Quigley NP, Loo DSS, Choy C, Ha WN. Clinical efficacy of methods for bonding to zirconia: A systematic review. J Prosthet Dent. 2020; 125(2):231-40.
16. Sharma A, Rahul GR, Poduval ST, Shetty K. Assessment of various factors for feasibility of fixed cantilever bridge: A review study. ISRN Dent. 2012; 2012:259891.

(Received June 24, 2021; Accepted August 2, 2022)