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Resin Bonded Zirconia Bridge: Case Report Follow Up of 7 Years

Houda Moussaoui, Abdallah Mouhibi, Meriem Oualla, and Abderrahman Andoh

ABSTRACT

Edentulousness is a very common pathology that is defined by the absence of permanent teeth.

Conventional bridges are considered the standard treatment for single missing teeth with a good clinical outcome, but it is an invasive treatment.

The introduction of new ceramic materials becomes a useful treatment option for premolar and molar replacement, and high demand of conservative restoration with metal free materials has become more important for both, clinicians and patients.

The present article is a case report that present a patient who was treated by a resin-bonded zirconia bridge showing a follow up of seven years.

Keywords: Bridge, esthetic, follow up, resin bonded, zirconia.

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H. Moussaoui
Department of Fixed Prosthodontic, University Hassan II, Morocco.
(e-mail: houdamoussaoui@gmail.com)
A. Mouhibi*
Department of Fixed Prosthodontic, University Hassan II, Morocco.
(e-mail: moouhibi.odontology@gmail.com)
M. Oualla
Department of Fixed Prosthodontic, University Hassan II, Morocco.
(e-mail: meriemoualla@gmail.com)
A. Andoh
Department of Fixed Prosthodontic University Hassan II, Morocco.
(e-mail: prosthodontic.cctd@gmail.com)

****Corresponding Author***

I. Introduction

Edentulousness is a very common pathology that is defined by the absence of a permanent tooth (unitary edentulousness), of several (partial edentulousness) or of all permanent teeth (total edentulousness) in an arch (out wisdom tooth).

The consequences depend on the location and extension.

The main situations leading to the loss of a tooth are coronary, radicular or corono-root caries, loss of periodontal support (bone loss), trauma, abscess of endodontic and / or periodontal origin requiring avulsion.

For several decades, the prevalence of tooth lessness and the incidence of lost teeth have been decreasing thanks to improved hygiene techniques and better prevention. However, these values increase with age (aging of the population). Socioeconomic and individual factors (smoking, hygiene, education) play a major role in risk exposure and in the use of care. The percentage of adults with missing teeth that are not replaced varies from 21 to 43% depending on the socio-professional category.

Conventional crown-retained fixed dental prostheses and dental implants have been considered the standard treatment for single missing premolars and molars with a good clinical outcome [1], [2].

Both treatment options, however, have clinical drawbacks. When teeth are prepared for crowns, approximately 63–73% of the coronal tooth structure is removed [3]. Therefore, a considerable risk to pulp vitality and irreversible pulp injury due to this invasive preparation is present [4], [5]. Therefore, it seems desirable to adjust the design of abutment preparation to avoid the extensive loss of tooth structure for posterior fixed dental prostheses (fdps) as an alternative to dental implants.

The present article is a case report that present a patient who was treated by resin bonded zirconia bridge showing a follow up of six years.

II. Case Report

Mr B.M referred to the department of fixed prosthesis-occlusodontics of the dental center of university hospital Ibn Rochd in Casablanca, Morocco, in 2015. Extraoral examination showed good muscle tone with no disorder in the temporomandibular joint. Endo-oral examination showed good oral hygiene, with a mouth opening amplitude of 44 mm. Periodontal examination showed no abnormalities.

The occluso-functional examination revealed a 4 mm overlap and a 3 mm overjet, right-angle class cl II canine and molar and left side cl I canine and molar (Fig. 1, 2, 3).

In dynamics, the patient has a canine guidance on the working side and a disocclusion on the non-working side.

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Fig. 1: Frontal intra-oral view.

Fig. 2 and 3: Lateral intra-oral views.

Fig. 4: Dental preparation.

Fig. 5: The impression made in one step with silicones.

Fig.6: Resin bonded zirconia bridge

The radiological examination shows a radiolucency on the mesial side of the 25, away from the pulp.

Therapeutic project:

The patient refuses orthodontic treatment and any surgery related to implantology and is seeking a cosmetic restoration.

We opted to make a zirconia bonded bridge.

The prosthetic phase starts by the preparation of the abutment teeth support of the bonded ceramic bridge (23 and 25). The preparation is essentially on enamel and consists of a reduction of 0.6 mm, then the peripheral preparation.

25: in the form of an occlusal trench whose depth is 1 mm and it continues on the distal side to the edentulous with a palatal finishing line without touching the marginal ridge and including the palatal cusp (onlay preparation)

23: realization of the grooves on the palatal face to improve the stabilization and the retention and proximal faces, while maintaining contact points (Fig. 4).

We took the impression in one step so as to obtain a faithful reproduction of the prepared dental abutments: 23 and 25 as well as their relationship with neighboring teeth, edentulous areas and gingival tissue. This technique uses two silicones of different viscosities (silicone A) (Fig.5). The impression is then sent to the prosthesis laboratory to be cast with extrahard plaster in order to give a working model and realize the ceramic frame.

We also proceeded to the choice of the shade and tried to integrate the prosthesis shade to the remaining teeth and to the patient's face. The chosen shade was A3 in cervical and A2 in occlusal (Vita classical tooth guide).

Then, we tried the biscuit and the final bridge after glazing (Fig. 6).

The final step is bonding, we used "multilink n" that offers resistance to impact, mechanical fatigue and biocompatibility.

We started by cleaning the abutment teeth then etching of the surface of the email and dentine, the period of this phase is 15 to 60 seconds with phosphoric acid. It provides a characteristic chalky white surface, followed by rinsing for 20 seconds then by drying. Pretreatment of the bridge surface was made by silane Monobond N, followed by preparation of dental surfaces with adhesive then the multilink n adhesive was applied at the fins. Finally, we put the bridge in place, exert a continuous pressure throughout the setting of the material, eliminate the excess and in the end check the static and dynamic occlusion of the dental surfaces. Multilink N is subject to an inhibition phenomenon by oxygen. To avoid this effect, it is advisable to cover the edges of the restoration with

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a glycerin gel (eg liquid strip) immediately after the removal of excess bond, then rinse after thorough curing (Fig. 7).

The patient presented to the clinic for control after six months and then every year for seven years. The endo-oral examination shows the absence of disconnection or fracture (Fig. 8 and 9). The Xray shows no pathology (Fig.10).

Fig. 7. Bonding of the RFDP.

FIG. 8 AND 9. CONTROL OF THE RFDP AFTER 7 YEARS.

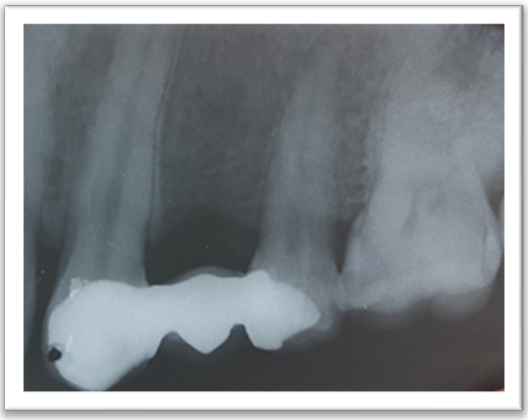

Fig. 10. Radiography of the RFDP.

III. DISCUSSION

A design with a box-shaped preparation with recovering the lingual cuspidal and a lingual retainer wing to support the RBFPD (resin bonded fixed partial denture) was used in this clinical case. This design is relatively minimal invasive, especially for abutments with existing defects/fillings. The first promising results with onlay-shaped retainers for metal-ceramic RBFPDs in the posterior region were shown through implementing bonding procedures [6]. However, the demand of metal free materials has become more important for both, clinicians and patients.

With the introduction of high-strength ceramic materials, all ceramic systems may become a useful treatment option for premolar and molar replacement.

For a valid clinical application of all-ceramic materials for RBFPDs, long-term data are necessary. The clinical outcome of all-ceramic RBFPDs has been investigated in different studies [7], [8]. Laboratory investigations are also available. Data showed that RBFDPs are inferior to conventional FDPs in term of clinical outcome [11].

In order to improve the results of the RBFPD, various proposals for material and framework design have been published [10], [13], [16], [17]. In laboratory studies, zirconia-based RBFPDs showed significantly higher fracture strength than RBFPDs made from lithium disilicate ceramic [17], [18].

In 2006, [16] described a framework design for zirconia RBFPDs with additional retainer wings and shallow inlays. However, one laboratory study on RBFPDs zirconia showed promising results for replacing single premolars with the inlay design seems to have no significant influence on the fracture strength of these restorations [19].

The modified design of the framework (zirconia framework with additional wings) provides higher fracture strength than lithium-disilicate [20], [21]. The maximized bonding area and minimized torsion forces on the onlay-retainers leaded to no clinical failures within the three years [20].

Reference [22] reported a 5-year cumulative survival rate for RBFPD with this modified design of 96%. Currently, a systematic review reported that RBFPDs are a viable treatment option for replacing a posterior missing tooth. Appropriate case selection, abutment preparation, bonding procedures and dental material may be decisive for clinical success [23].

Reference [24], in a case study comparing implant crown (csi) and cantilevered bridges (rb), showed no significant difference in survival with the rate of 82.1% at 10 years. On the other hand, whether overall, concerning the infrastructure or the prosthesis, the success rate of cantilevered bridges is essential [25].

IV. CONCLUSION

All-ceramic resin bonded bridges have demonstrated excellent clinical results in terms of durability, performance, aesthetics and functionality, whether in zirconia ceramic.

It offers a new alternative to implantology and metal ceramic bonded bridge.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

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