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REVIEW ARTICLE

SINGLE DENTAL RESTORATION BY RESIN BONDED BRIDGE: DECISION CRITERIA AND SUCCESS FACTORS.

I. Boujoual¹, A. El yamani² and A. Andoh¹.

1. Department of Fixed Prosthodontics, Faculty of Dentistry Hassan II University, Casablanca, Morocco.
2. Department of Fixed Prosthodontics, Faculty of Dentistry of Rabat Mohammed V University, Rabat, Morocco.

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Abstract

This paper aims to review the place of the resin bonded bridge in the restoration of a single tooth missing, this long advocated therapy, is still a conservative, aesthetic and fast solution to replace the missing of a tooth, when setting an implant is impossible because of the age of the patient, or because of medical (general health), psychological, anatomical (unfavourable bone quality), or financial restriction. In this work we will highlight the decision criteria of indicating or not a resin bonded bridge, we'll review its advantages and inconvenients before ending with the principles of preparation and the bonding method.

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Introduction:

Single tooth missing may be due to agensis, trauma, carious or periodontal pathology. It has aesthetic, psychological and functional repercussions. (13,9, 15,16)

The therapeutic approach varies between implant fixed prosthesis, (7,8) bridge and bonded bridge. Numerous factors influence the choice of the appropriate prosthetic solution among which we mention; the condition of the adjacent teeth, the toothless space, the age of the patient, the mesiodistal width of the abutment teeth... (17,14)

The evolution of materials and laboratory technologies has led to a gain in therapeutic solutions, which can vary from implant placement to the use of the removable prosthesis according to the clinical context.

However, the indications and limitations of each technique must be respected.

The most recent advances in prosthetic therapy mean a radical change in concepts: more respect for the tissue economy and aesthetic imperatives, but also a limitation of the complexity of prosthetic treatments and their long-term involvement. This development has encouraged the application of adhesive and conservative solutions to the case of single edentations, this is the case of restoration by resin bonded bridge.

The advent of new generation ceramics combined with current adhesion techniques have made it possible to make all-ceramic resin bonded bridges with satisfactory clinical performance and good mechanical characteristics. (3)

Corresponding Author: Boujoual imane

Address:-Department of Fixed Prosthodontics, Faculty of Dentistry Hassan II University, Casablanca, Morocco. imaneboujoual@gmail.com

Decision criteria:**The abutment teeth:**

Must be healthy or minimally damaged with sufficient enamel surface needed for bonding. They must also be in a good position, and of a favorable form.

The anterior abutment teeth must be of sufficient height so that the metal frame is at a distance from the free edge. (at least 2 mm). Which limits it for short teeth. (12)

Edentation:

The width of the edentation must correspond to the width of the absent tooth.

The periodontium:

the periodontium of the abutment teeth must be healthy, without mobility or inflammation.

Occlusion:

It is imperative to carefully check the interocclusal relationship, the anterior guidance and the possible points of interference in lateral movements, in order to minimize the solicitations of the bonded bridge. The interocclusal space must be favorable (sufficient thickness of the framework, little or no occlusal contacts directly on the framework and possibility of making rather high connections).

Advantages:

1. Tissue saving: minimally invasive dental preparation. (2)
2. Low cost compared to the implant solution. (9, 10)
3. Low treatment's duration;
4. Aesthetic ± pleasing;
5. Biocompatibility by respect of pulpal vitality and preservation of the marginal periodontium (supra-gingival limit).

Disadvantages:

1. Less aesthetic predictability compared to conventional bridges. (1,2)
2. Operator-dependent technique.
3. Very variable success rate ranging from 63% to 99% for 5 years (Pjetursson et al 2008).
4. Limitations in terms of indications. (available enamel, width of space to be filled, parafunctions, mobility of the abutment teeth)

This therapeutic modality, long regarded as a temporary solution, testified to its reliability. This technique is not only interesting for its low cost, but also for its biological and aesthetic reliability.

Principles of preparation:

The configuration of the preparations depends largely on the occlusal context and the position of the tooth to be replaced. While keeping in mind the biological, mechanical and aesthetic principles:

Biological Imperatives:

The preparation must be the minimally invasive possible to preserve pulp vitality, while providing a minimum thickness of 0.3 to 0.4 mm to ensure the insertion of the metal framework.

The cervical limits must be supragingival (at 1mm of marginal gingiva).

Mechanical requirements:**-Retention:**

It is given by the preparation of the proximal faces of the teeth along the axis of insertion, as well as by the retention accessories: it is about the proximal grooves or boxes or the use of cingulum pits of a depth inferior or equal at 2 mm

Support:

Provided by the flat bottoms.

Stabilization:

It is offered by the belting of more than 180 °, however the aesthetic requirement decreases the necessity to realize it and imposes preparations ending before the vestibulo-proximal angles, in this case the stabilization is going to be reinforced by the proximal grooves or boxes. (10)

Alternative Designs:

Cantilevered design for anterior regions:

The use of a single retainer design to support a single pontic may be a good alternative, especially when using all-ceramic resin bonded bridge.

Aesthetic Requirements:

1. At the level of the incisors it must interfere as little as possible with the areas of high transparency and therefore remains at a distance from the free edge (2 mm).
2. At the proximal level the preparation must stop before the contact points so that the metal is not visible. (3, 14)

Protocol of bonding:

The bonding stage is crucial in the success of bonded bridge therapy; there are two main families of bonding products specific to bonded bridges:

These are self-polymerizable cements with adhesive potential

1. Anaerobic MDP adhesives (based on methacryloxydecathyl hydroxy-phosphate)
2. 4-Meta bonding (methacryloxyethyl trimellitate anhydride (5)

With a clear superiority of 4-Meta cement; the authors currently recommend both for their high adhesion and for their ability to absorb viscoelastic stress, it is the property of resilience and flexibility.

A prior realization of surface treatment of the intaglio is necessary, different methods are possible:

1. Acid etching
2. Electrolyte etching
3. Laser etching
4. Sandblasting with aluminum oxide
5. Tribochemical treatment (reactive silica deposit)

However, given the adhesive potential of currently available adhesives, the simple sandblasting with aluminum oxide is currently the only pretreatment recommended for metal bonding (Barrack 1993b, Schwarting 1993, Botelho 1999, Barber & Preston 2008, Dündbar and 2010).

After isolation of the operative field, the teeth are cleaned with wet pumice or by abrasion and then etched with 37% phosphoric acid for 30s on the enamel and 15s at the dentinal areas.

The prosthetic intaglios is treated by silica deposition either by pyrolysis or by reactive sandblasting, (what is called tribo-chemical treatment), and this compared to all other treatments of metal surfaces (simple sandblasting, etching electrolytic, electro-deposition of tin, etc.). Moulin et al. (6, 10) have particularly demonstrated the superiority of the tribochemical treatment both in terms of adhesion and resistance to hydrolysis on different types of alloys. This treatment can be done in the laboratory thanks to the Rocatec® system or directly to the chair with the CoJet System®.

The tribo-chemical treatment must be followed by the application of a silane.

A delay of 5 minutes between the deposition of silane and the application of the resin cement is imperative.

The treatment of the prosthetic surface can therefore be performed after fitting and decontamination of the metal surfaces by washing with a solvent (eg acetone), taking care to place the treated bridge away from contamination.

After mixing the monomer with the activator according to the manufacturer's recommendations this mixture is applied by brush on the treated prosthetic surface which will be inserted in the preparations. The assembly is maintained for 10 minutes under digital pressure.

The elimination of the biggest excess must be done when the cement is in elasto-plastic phase with a cotton ball impregnated with alcohol. The rest of the excesses after taking, 15 minutes, with a blade or curette type CK6. (10)

Only the occlusion is set in the pose session. Joint finishing will be done in a later session with a red ring olive mill mounted on a red ring contra-angle and a brown rubber tip mounted on a blue contra-angle. The direction of rotation of the cutter must make it possible to crush the seal and thus to go from the metal towards the tooth.

Particularity of the “all-ceramic” resin bonded bridges:

Following the recent developments in technology, various ceramic materials have been used to fabricate all-ceramic resin bonded bridges including zirconia, glass-reinforced, alumina-based ceramics, and lithium disilicate glass ceramics. The advantages associated with these prostheses are the improvement of the aesthetics (no dark appearance of the frame) and the desire for metal-free restorations for a better biocompatibility, the design of these restoration can be conventional resin bonded bridge (2 retainers), in this case both abutments should have the same mobility, otherwise the weakest may detach from the enamel, compromising the entire restoration, or cantilevered which eliminates the differential bond strength due to different size and mobility of abutments. This second option is becoming an attractive procedure and shows a good survival rates. Moreover, the ceramic materials are less resistant and so it requires more thickness at the connexions to strengthen the framework. Finally, the bonding methods are almost the same as metal, vitreous ceramics such as IPS e-max are etchable and more favourable to bonding, conversely polycrystalline ceramics such as zirconia require a reactive surface treatment such as tribochemical treatment followed by the use of MDP monomer based cements. (4)

Conclusion:

In cases of single tooth missing, the main decision factors in the choice of therapy are: aesthetics, tissue economy, periodontal and occlusal integration, in addition to the durability of the restoration.

In the case of dyschromic or damaged abutment teeth, the conventional approach will be used, in the opposite case two prosthetic solutions are possible: the implant solution (6) or the bonded bridge solution; it is used whenever the patient refuses surgery, or when his age or anatomy (quality and quantity of the bone) (11) does not allow it. Based on these findings, we can say that the resin-bonded bridge is always an indication and is no longer considered as a provisional approach but a therapeutic in its own right.

Table 1:-Indications of resin bonded bridge

Teeth	Normoposition Favorable form Healthy or slightly damaged
Edentation	Width of edentation=width of the missing tooth
Parodontium	Absence of mobility
Occlusion	Absence of tight occlusion Absence of parafunction

Table 2: Decision criteria compared to conventional bridges.

Criteria	Resin bonded bridge	Conventional bridge
Pulp vitality	+	+/-
Abutment teeth	healthy or slightly damaged	carious, dyschromic ...
Quality of enamel	Good	Doesn't matter
Endentation	One tooth Two mandibular incisors	Single or plural

References:-

1. BjÖrn U. Zachrisson, Marco R;Sverker Toreskog ; Congenitally missing maxillary lateral incisors: Canine substitution *Am J Orthod Dentofacial Orthop* 2011;139: 435-44
2. Christian Bühler-Frey; Carlo P. Marinello ; Quelle est la place des ponts adhésifs métallo-céramiques à l'époque du tout céramique et de l'implantologie? *Rev Mens Suisse Odontostomatol* Vol. 121 7/8/2011
3. Didier DIETSCHI ; JM. DIETSCHI ; JP.SCHATZ : Remplacement des dents dans le secteur esthétique : modalités conservatrices et prothétiques adhésives : *Réalités Cliniques* Vol. 10 N° 1 1999 27-41
4. Edward E. Hill: Decision-Making for Treatment Planning a Cantilevered Fixed Partial Denture *Compend Contin Educ Dent.* 2009 Nov-Dec;30(9):580-5
5. GREGGORY A. KINZER , VINCENT O. KOKICH. MANAGING CONGENITALLY MISSING LATERAL INCISORS. PART III: SINGLE-TOOTH IMPLANTS ; *JOURNAL OF ESTHETIC AND RESTORATIVE DENTISTRY* VOL 17, ISSUE 4, P 202–210, JULY 2005
6. J. COLAT PARRROS ; JL. ARDOUIN G. BUSSAC JF.CARLIER ;B.TAVERNIER ;P. QUINQUIS REMPLACEMENT D'UNE INCISIVE MAXILLAIRE PAR TECHNIQUE IMPLANTO-PORTÉE. ADF PROTHÈSE FIXÉE ; *QUINTESSENCE* 2003 [HTTP://WWW.ADF.ASSO.FR/FR/ESPACE-FORMATION/PUBLICATIONS/QUINTESSENCE/DETAIL/597?VIEW=QUINTESSENCE](http://www.adf.asso.fr/fr/espace-formation/publications/quintessence/detail/597?view=quintessence)
7. Jason Yee ;M Ali Darendeliler;Dan Vicker; Michael Dineen ; Missing Maxillary Lateral Incisors *Australian society of orthodontists* 4-2006
8. Ken Hemmings ;Zoe Harrington; Replacement of Missing Teeth with Fixed Protheses; *Dental Update – April 2004 : 31 . P 137-141*
9. Laurent Morgon ;philipe B ;Hervé P ; Les agénésies dentaires dans notre pratique quotidienne *Information Dentaire n° 4 du 26 janvier 2000*
10. Lucile DAHAN : Le point sur les bridges collés, Académie de Dentisterie Adhésive d'Ile de France p 60 http://addaidf.free.fr/wa_files/article_20Dahan.pdf
11. Mithridate Davarpanah,Serge Szmukler- Moncle ; Manuel d'implantologie Clinique : Concepts, protocoles et innovations récentes 2° edition cdp 2008
12. S. Viennot, G. Malquarti, Y. Allard, C. Pirel : différents types de bridges ; *EMC (Elsevier SAS, Paris), Odontologie, 23-270-A-20, 2005.*
13. Sergio R, Alan J. N;Masayuki H A Multidisciplinary Approach to Single-Tooth Replacement ; *Quintessence of dental technology* 2004
14. Soualhi H. ,Amal EL Yamani, Jamal El bernoussi : Édentement unitaire : réhabilitation par bridge collé; *Actual. Odonto-Stomatol.* Juin 2010;N ° 250:163-173
15. Teresa Pinho Maxillary Lateral Incisor Agenesis (MLIA) Teresa Pinho (2011). Maxillary Lateral Incisor Agenesis (MLIA), Principles in Contemporary Orthodontics, Dr.Silvano Naretto (Ed. ISBN: 978-953-307-687-4, InTech), <http://www.intechopen.com/books/principles-in-contemporary-orthodontics/maxillary-lateral-incisor-agenesismlia>
16. Umut Cakan, B.Demiralp, M.Aksu,T.Taner . Correction de l'absence congénitale d'une incisive latérale par une prothèse partielle fixe non métallique liée à la résine : une étude de cas *Journal de l'association dentaire canadienne* Sept 2009, Vol. 75, No 7
17. Vincent O. Kokich, Jr.Greggory A. Kinzer, Jim Janakievskic ; Congenitally missing maxillary lateral incisors: Restorative replacement . *Am J Orthod Dentofacial Orthop* April 2011 ;Issue 4 Vol 139: 434-45