Pink -white esthetics- a brief review & case report of gingival porcelain on fixed partial denture prosthesis.

Aditya Banik[1], Jayanta Bhattacharyya[2], Samiran Das[3], Soumitra Ghosh[3], Preeti Goel[3]
[1]Post graduate student, Dept. Of prosthodontics and crown & bridge, Guru nanak institute of dental sciences and research.
[2]Principal and head, Dept. Of prosthodontics and crown & bridge, Guru nanak institute of dental sciences and research.
[3]Professor, Dept. Of prosthodontics and crown & bridge, Guru nanak institute of dental sciences and research.

Abstract
Traumatic extraction, long standing edentulousness or congenital defects are some of the most common reasons behind gingival and underlying bony defects that present with compromised aesthetics. The management of such defects is mostly done using periodontal and surgical therapies which have their own added disadvantages like, morbidity at the donor site and unpredictability of the outcome. This article reviews and presents a case report of a method of overcoming this problem with a common material mostly used in all fixed partial dentures i.e., porcelain. Gingival Porcelain is easily constructed over a fixed partial denture and offers a much more practical solution to optimize the aesthetics and functional outcome in indicated situations while permitting hygiene maintenance of the prosthesis and the supporting tissues beneath it.

Keyword: Aesthetics, Gingival masking, Gingival porcelain, Gingival veneers, Gingival porcelain.

Address of correspondence: Dr Aditya banik, Top floors, 177 Canal street, Sreebhumi, Kolkata 700048, West Bengal, India. Email id: addychat@gmail.com Phone number: 7406670297. **DOI:** 10.5281/zenodo.5205422
Submitted: 27-Jul-2021 **Revised**: 4-Aug-2021 **Accepted:** 7-Aug-2021 **Published:**15-Aug-2021
Bibliographic details: Journal of Orofacial Rehabilitation Vol. 1(2), Aug 2021, pp. 120-125.

Introduction

The preservation and further reproduction of an ideal mucogingival aesthetics can be difficult to achieve from both a surgical and prosthetic point of view. An increase in patient's awareness about gingival display and smile aesthetics has resulted in advances in both surgical and prosthetic techniques.[1,2]
Surgical techniques advocated for recreating gingival architecture around localised ridge or alveolar defects are technique-sensitive and may require a graft from an additional surgical site which leads to additional morbidity.[3]
In case when there are long span edentulous spaces present with marked vertical and horizontal defects, bone grafting may be the only choice remaining to support implant rehabilitation especially in the anterior region.[4] In patients where the defect is localised, unsuccessful periodontal therapy may lead to the loss of the interdental papillae which may often lead to even more unaesthetic smile.[5] In patients with 'high smile line' exposing differing lengths of teeth, surgical or periodontal correction can be extremely challenging.
Where there is vertical soft tissue loss in edentulous spaces, a variety of surgical techniques have been advocated to increase soft tissue volume before the provision of a definitive prosthesis. These techniques are primarily designed to improve the emergence profile of the pontic but consideration of the morbidity of a second surgical site and the cost needs to be worked out.[6,7]
This paper reviews a commonly used contemporary technique available in the prosthetic management of soft tissue aesthetics and discusses its advantages, disadvantages and presents a case of fixed partial denture therapy with gingival porcelain.

Review:

Where teeth are replaced using a fixed denture prosthesis or by implant therapy, the creation of harmonious gingival levels between edentulous spaces and abutments can be sometimes difficult especially in the aesthetic zone. Achieving an ideal gingival level may not be required in patients presenting with low smile line, in unaesthetic zones and where gingival aesthetics themselves is not a prime concern for the patient.[8]

Implant prosthesis placement in aesthetic zone where inadequate underlying tissue is present can result in change in axis, incorrect crown height proportion and inverted smile lines thus in such cases augmentation or periodontal surgeries are primarily indicated.[9]

Commonly employed surgical techniques include distraction osteogenesis and/or the use of onlay bone grafts and connective tissue roll grafts to increase soft tissue volume may also suffice. As mentioned, these procedures carry significant morbidity and may not always provide the ideal topography for pontic emergence in the aesthetic zone thus they should be carried out only when they are primarily indicated.[10]

Where marked localised vertical defects in edentulous spaces are present, gingivally coloured materials can be used in the provision of fixed bridgework to improve vertical and horizontal pontic proportions to mask or hide the defect, though patients who have undergone surgical procedures to improve soft tissue topography may still require the use of gingivally coloured porcelain to optimise aesthetics of the final restoration.[11] The various limitations of adjunctive surgical procedures should be always kept in mind and incorporation of gingival masking for better aesthetics in the final restoration should be considered at the planning stage itself.[12] This planning can range from a diagnostic wax-up to CT scanning for prospective gingival and tooth restorations. It is also to be kept in mind that due to the disadvantages of repeated firing cycles of the porcelain in implant prosthesis with crown height space more than 15mm a hybrid prosthesis can be employed which basically involves a screw-retained partial implant bridge providing the white aesthetics and a gingival base made of ceramics, which is covered with an acrylic or composite overlay to create the final pink contours.[13] The reduction in morbidity, time and the cost for patients when provided with gingival porcelain as opposed to bone grafting is considered advantageous and more acceptable to patients undergoing rehabilitation in the aesthetic zone.[14] Other benefits of using ridge lap pontic with gingival porcelain is that it aids in lip support and phonetics.[15]

In few cases, multiple implants using gingival coloured porcelain can also provide the appearance of interdental papillae. In patients with a high smile line, the junction of the gingivally coloured porcelain with the natural gingival tissue may be noticeable, which may not be acceptable for the aesthetically aware patient, thus a proper moulding of temporary material can be done to obtain the final required contour.[16] Mild corrections in the cervical region of the pontic can be corrected by slightly increasing the bulk of gingivally coloured porcelain which may provide an extensive ridge lap and cause difficulty in cleaning. Thus, these difficulties should be identified and addressed before the planning of the definitive restoration construction by a laboratory technical staff and should be thoroughly discussed with the patient.[17]

The advantages of using gingival porcelain:

- Prosthesis is fixed thus it is always stable.
- Prosthetic material (glazed porcelain) stains less.

- Minimal wear, with no danger of damage or loss of the surrounding tissues.
- Prosthesis not subjected to ingestion or inhalation.

The disadvantages of using gingival porcelain can be:

- If further recession occurs around the abutment or there is more recession under the pontic, the fixed prosthesis may need to be completely changed.
- Extensive oral hygiene maintenance instructions required thus increasing patient's compliance.
- Technique sensitivity of the ceramic work.

A strict digital photography protocol is paramount for a successful gingival shade selection or communication. A correct colour/shade tab for a successful aesthetic restoration is a mandatory requirement. The middle one-third to the apical region of the underlying ridge is taken as a representative for shade selection. Though many clinical setups do not have a readily available gingival shade tab, a clear photograph taken under the correct shade matching environment can be used for gingival shade selection at a later laboratory setup.[18]

A need for soft tissue conditioning should also be evaluated when the wax-up is created. Based on the extent of the area to be conditioned, the corresponding steps should be carried out before or during the surgical and provisional phase and refined when seating the final bridge.[19]

During seating of the prosthesis, a transient blanching of the gingiva may occur. The intensity varies depending on the extension over the tissue and thus conditioning is required. The design of the pontics and the gingival biotype of the patient should be thoroughly examined. The excess of pressure should be reduced by reshaping the gingival porcelain part or even by modifying the soft tissue with diamond burs, electrosurgery or diode laser.[20]

The main goal is to create a comfortable, healthy and cleansable interface while maintaining high aesthetics. The hygiene and maintenance procedures should be carefully explained to the patient as they are paramount for the long-term success of the restoration. Follow-up appointments should be scheduled in advance and the first recall appointment should be scheduled within three months after insertion.

Case report:

A 45 year old patient came to the department of Prosthodontics and Crown & Bridge, Guru Nanak Institute of Dental Sciences & Research with a chief complaint of missing upper front teeth region since last 3 years. Patient gave a past history of road traffic accident three years back when he lost his tooth. On clinical examination it was found 21 was missing with a Seibert class III defect in the same region. Patient did not agree on having any of soft tissue surgeries and augmentation. Thus, it was planned to go for a porcelain fused to metal three unit bridge with gingival porcelain masking on the pontic to cover for the ridge defect portion.

After the patient's oral prophylaxis was done, diagnostic models of both arches were made. A facebow and a centric record was made and the models were mounted on a semi-adjustable articulator (Hanau wide vue). A diagnostic wax-up (Type I inlay wax, MDM Corp, India) was made along with a temporary bridge using tooth coloured self-cure acrylic (SC 10, DPI). Tooth preparation on 11,22 was done to receive all ceramic bridge following all the required parameters and principles with a radial shoulder finish line. Final impression was made using dual stage putty wash impression after adequate

gingival retraction and isolation (Zhermack, Germany). Digital photograph (Canon EOS 2000D) was taken for later selection of gingival shade and the tooth shade selection was done following which the temporary bridge was luted.

The middle portion of the ridge defect area from the photo taken was used for the gingival shade, which was found to be G3. After the metal try-in, porcelain was added according to tooth shade selected, final to which a gingival porcelain was added under the pontic. Modified ridge lap type of pontic was given. The bridge was tried in, glazed, checked for consent and luted using Type I GIC (GC, Fuji). Patient was explained and instructed to follow regular oral hygiene instructions.

Discussion

Gingival defects can be treated with either surgical or prosthetic approach. A properly done successful surgical technique mimics the original tissue contours, but the surgical costs, healing time, discomfort and unpredictability of the outcome and the technique sensitivity makes this choice unpopular. Rather, prosthetic replacement with gingival masking using acrylics, composite resins, porcelains and silicones, is a more predictable approach to replace lost tissue architecture and enhance aesthetics.[20] Ideal tissue contours for a patient can be moulded, waxed, processed and then coloured to match the surrounding tissue. The patient need not have any additional surgeries and receives an aesthetically pleasing and functional restoration. It is possible to show the patient a waxed-up result or ask for a try-in of temporary prosthesis directly in the mouth before treatment is initiated.[21]

Several materials are available for the fabrication of gingival veneer, ranging from silicone to composites to porcelain and even zirconia and all have their specific advantages and disadvantages and should be carefully selected on a case to case basis. A fixed prosthesis using porcelain veneer gives the patient significant comfort and peace of mind, as well as self-confidence (because the prosthesis is always present). However, its application may be limited to certain clinical situations where oral hygiene is manageable, the desired aesthetic result is achievable or when a fixed prosthesis is already planned for the immediate area. With a removable prosthesis, the main advantage is that hygiene maintenance is very effective. It is easier to create an ideal contour with prosthodontic materials, and missing tissue can be replaced without disturbing the other orofacial structures and is a non-invasive treatment option. Therefore, the use of gingival veneer is a quick, simple, and inexpensive option for restoring lost gingival tissues.[22]

Conclusion

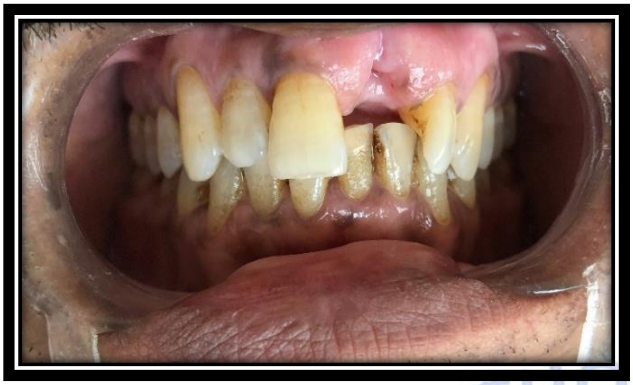
The prosthetic restoration of the pink aesthetics offers a reliable and consistent alternative to resolving cases with uncertain surgical outcome or cases in which patients do not want to undergo regenerative surgical procedures and understanding of the indications and procedures involved in this particular technique will help in a proper case selection.

References

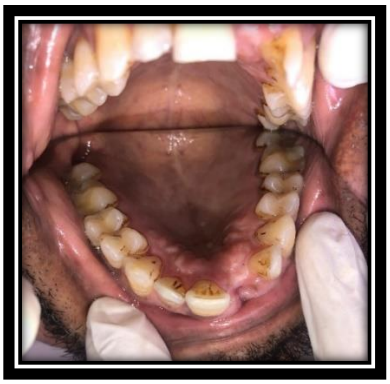
1. Işiksal E, Hazar S, Akyalçin S. Smile aesthetics: perception and comparison of treated and untreated smiles. Am J Orthod Dentofacial Orthop 2006; 129: 8–16.
2. LaVacca M I, Tarnow D P, Cisneros G J. Interdental papilla length and the perception of aesthetics. Pract Proced Aesthet Dent 2005; 17: 405–412.
3. Wennström J L, Pini Prato G P. Mucogingival therapy. In Lindhe J, Karring T, Lang N Clinical periodontology and implant dentistry. 3rd

ed. pp 550–596. Copenhagen: Munksgaard, 1997.
4. Boronat A, Carrillo C, Penarrocha M, Pennarocha M. Dental implants placed simultaneously with bone grafts in horizontal defects: a clinical retrospective study with 37 patients. Int J Oral Maxillofac Implants 2010; 25: 189–196.
5. Clark D. "Restoratively driven papilla regeneration: correcting the dreaded 'black triangle'". Tex Dent J 2008; 125: 1112–1115.
6. Capri D, Albehbehani Y, Smukler H. Augmentation of an anterior edentulous ridge for fixed prosthodontics with combined use of orthodontics and surgery: a clinical report. J Prosthet Dent 2003; 90: 111–115.
7. Breault L G, Shakespeare R C, Fowler E B. Enhanced fixed prosthetics with a connective tissue ridge augmentation. Gen Dent 1999; 47: 618–622.
8. Hannon SM, Colvin CJ, Zurek DJ. Selective use of gingival-toned ceramics: Case reports. Quintessence Int 1994; 25:233-8.
9. Alani A, Maglad A, Nohl F. The prosthetic management of gingival aesthetics. Br Dent J. 2011 Jan 22;21:63-9.
10. Roccuzzo M, Gaudioso L, Bunino M, Dalmasso P. Surgical treatment of buccal soft tissue recessions around single implants: 1-year results from a prospective pilot study. *Clin Oral Implants Res.* 2014; 25:641–6.
11. Oates TW, Robinson M, Gunsolley JC. Surgical therapies for the treatment of gingival recession. A systematic review. *Ann Periodontol.* 2003; 8:303–20.
12. Morgano SM, Verde MA, Haddad MJ. A fixed-detachable implant-supported prosthesis retained with precision attachments. *J Prosthet Dent.* 1993; 70:438–42.
13. Ankli, Viviane et al. "Gingival Veneer Used as Prosthetic Solution for Esthetic-Compromised Malpositioned Dental Implant." *Contemporary clinical dentistry* vol. 9,1 (2018): 123-127.
14. Brygider RM. Precision attachment-retained gingival veneers for fixed implant prostheses. *J Prosthet Dent.* 1991; 65:118–22.
15. Parel SM, Balshi TJ, Sullivan DY, Cardenas ER. Gingival augmentation for osseointegrated implant prostheses. *J Prosthet Dent.* 1986; 56:208–11.
16. Choudhari P, Pillai A, Zade R, Amirishetty R, Shetty S. Gingival veneer: A novel technique of masking gingival recession. *J Clin Diagn Res.* 2015;9: ZD12–4.
17. Arvalho W, Barboza EP, Gouvea CV. The use of porcelain laminate veneers and a removable gingival prosthesis for a periodontally compromised patient: A clinical report. *J Prosthet Dent.* 2005; 93:315–7.
18. Coachman C, Calamita M. The reconstruction of pink and white aesthetics. Int Dent SA 2010; 12:88-93.
19. Barzzilay I, Tamblyn. Gingival prosthesis- A review. Journal of the Canadian dental association 2003;69:74-8.
20. Shah A. Gingival veneer: Non –Invasive approach in the management of lost interdental papilla. Int J Dent Case Reports 2012;2:54-8.
21. Gopakumar A, Sood B. Conservative management of gingival recession: The gingival veneer. *J Esthet Restor Dent.* 2012; 24:385–93.
22. Carvalho W, Barboza EP, Gouvea CV. The use of porcelain laminate veneers and a removable gingival prosthesis for a periodontally compromised patient: a clinical report. J Prosthet Dent. 2005 Apr;93:315-7.

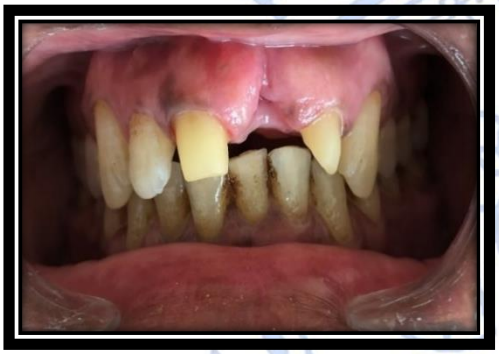
PHOTOGRAPHS



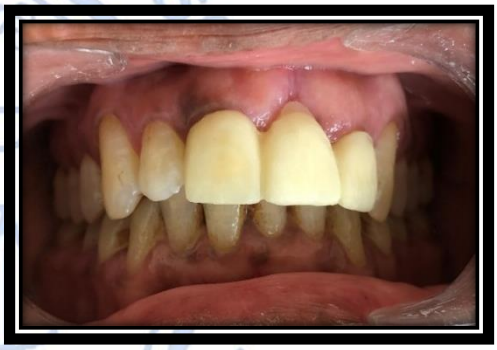
Pre-operative Frontal View, 11 missing with localized residual ridge defect. (Seibert's class III)



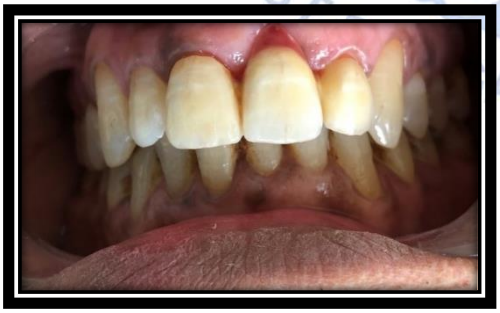
Pre-operative Occlusal View



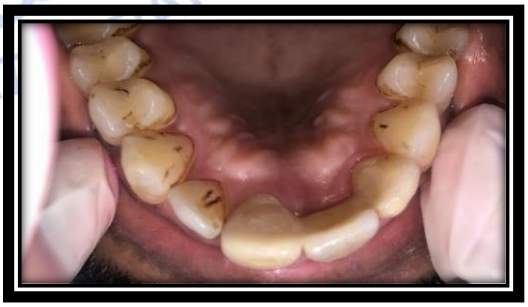
Tooth preparation to receive PFM bridge in frontal View



Provisional prosthesis given using tooth colored acrylic



Post-operative PFM bridge restoration with gingival porcelain masking the defect area



Post-operative occlusal view