



ALL ABOUT DENTAL PONTICS: BRIDGING THE GAP - A REVIEW

Mulla Anam Nagib¹, Agarwal Abhinav¹, Ahmad Naeem^{2*}, Gaur Abhishek²,
Pandey Kaushik³, Ali Mariyam⁴

¹Post- Graduate student, ²Reader, ³Senior Lecturer, ⁴Professor & HOD, Department of Prosthodontics, CPGIDS, Lucknow, Uttar Pradesh, India.

ABSTRACT

Pontics is an artificial tooth of a fixed partial denture that replaces the missing tooth, restores its function and appearance and occupies the space of the missing tooth. It is the raison d'être of the fixed partial denture. The word pontic is derived from the Latin word "PONS", which means bridge. Mere replacement of tooth does not serve the purpose of pontics, because a pontic should be in harmony with adjacent teeth. Placing an exact anatomic replica is hygienically unmanageable as gingival surface of the pontic is not accessible to the patient to maintain efficient hygiene. In the present article, a review is presented on pontic designing with emphasis on esthetics, function, ease of cleansing, maintenance of healthy tissue & Patient comfort.

Keywords: Pontics, Tooth, Abutment, Fixed, Restoration.

Access this article online

Home page:

<http://journalofscience.net//>

DOI:

<http://dx.doi.org/10.21276/jos.2017.7.8.5>

Quick Response
code



Received:25.06.17

Revised:12.07.17

Accepted:15.07.17

Corresponding Author

Naeem Ahmad

Reader, Department of Prosthodontics, CPGIDS, Lucknow

Email:- naeem_bds@yahoo.co.in

INTRODUCTION

According to GPT1999-an artificial tooth on a fixed partial denture that replaces a missing natural tooth restores its function, and usually space previously occupied by the clinical crown. Acc to Tylmann –pontic is the suspended member of a fixed partial denture. it replaces the lost natural tooth, restores function ,and occupies the space of the missing tooth.

Review of literature: An extensive research was done in pubmed and science direct data bases on All about DentalPontics: Bridging the gap using following meshwords like pontics, tooth, abutment, fixed,

restorationfrom the year 1970 till 2004 and 195 articles were found out of which 09 articles were review as per relevance for the present research paper.

Silness J. (1970) [1] did an investigation to evaluate the effect on the periodontal conditions of fixed unilateral bridges which had been in the mouth since 1 to 3 years. It was concluded that periodontal health conditions were better in the individuals who had been instructed to practice oral hygiene measures as compared to the non instructed individuals. In areas with crown margins below the gingival crest more severe gingivitis was registered then in the control areas.

Hirsh berg S. M. (1972) [2] did a study on the relationship of oral hygiene to embrasure and pontic design. He concluded that oral hygiene exerts a more important influence on the health of the gingiva and mucosa adjacent to fixed prostheses than does the height of the embrasure. Poor oral hygiene causes inflammation of the interdental gingiva and mucosa and filling in of the embrasures.

Perel M.L. (1972) [3] proposed an improved design for sanitary pontics, which incorporated the sound principles of mechanical strength and established on environment conducive to maintenance periodontal health.

Abrams H., Kopezyk R.A. and Kaplan A.L. (1987) [4] did a study on incidence of anterior ridge deformities in partially edentulous patients. Random samples of 416 diagnostic casts were evaluated out of which a total of 408 cast showed deformities. The most prevalent defect was the class III or continuation labiolingual and apico-coronal type of deformity.

Chowhan M. (2004) [5] did a study on use of natural tooth pontic fixed partial denture using resin composite reinforced glass fillers. He concluded that the teeth of using patients own natural tooth has pontic in a resin composite reinforced glass fibre frame work in a conservative esthetic cost effective and practical alternative to the conventional metal ceramic fixed partial denture. However the procedure is highly technique sensitive.

Clayton J.A. and Green E. (1970) [6] did a study on roughness of pontic material and dental plaque & concluded that the surface roughness of the sample pontics showed no significant difference between polished acrylic resin or polished cast gold sample. Clinical tests showed that plaque formation occurred on the polished surfaces of all the three type of pontics constructed. Therefore pontic surfaces which are as "smooth as possible" (approximately 1 µinch) must be cleaned regularly to prevent the accumulation of dental plaque.

Ideal requirements of pontics: Smooth surfaced and convex in all directions, easily cleansable, pinpoint pressure free contact on the ridge, no irritation to the gingival tissues, facilitate plaque control, emergence profile, strength and longevity, be esthetic, restore function, no abutment overloading & color stable.

Functions of pontics:*Mastication* - Pontic provides a hard surfaces against the opposing teeth by which food can be chewed .in case of missing tooth there will not be any hard resistance to opposing teeth to facilitate mastication, because of which large pieces of food may be lodged in the edentulous area between the abutment teeth. Hence pontic provides resistance to opposing tooth when food is chewed. During mastication, if food accumulates in the edentulous area, it will be difficult for either tongue or check to remove the accumulated food. A pontic prevents such accumulation and helps in continuation of chewing.

Speech - Space created by loss of tooth alters the pattern airflow, making the normal speech difficult. A pontic restricts the airflow through an edentulous area to aid in reestablishment of normal speech.

Esthetics -Dental esthetics affects the personnel appearance the presence of full complement of teeth are necessary for individuals self image. Pontics fill in the empty space that would be observed during smiling and talking and provides support for the lips and check to allow

normal speech. There by pontic improves the personnel appearance. *Maintenance of tooth relationship* - When missing teeth are not replaced immediately, there will be chances of movement of adjacent teeth to the edentulous area. The teeth can move facio-lingually or rotate as they move out of their position. The tooth posterior to missing tooth can assume an anteriorly tipped position. The tooth anterior to missing tooth can also drift distally to edentulous area .at the same time the opposing can also supra-erupt to the edentulous area. These abnormally positioned teeth often act as occlusal interferences and are subjected to excessive occlusal forces due to loss of proximal contact. Such occlusal abnormalities can result in excessive tooth mobility or TMJ disturbances. In addition the periodontal health of the adjacent and opposing teeth is compromised as there will be difficulty in cleaning all the surfaces of the malpositioned teeth. Pontics maintain the integrity of dental arches by preventing the movement of adjacent and opposing teeth.

Pretreatment assessment: Before initiating the treatment of missing teeth, one should analyze the pontic space in order to enhance the success of fixed partial denture.

Pontic space: Any movement of adjacent and opposing teeth can reduce the pontic space and its fabrication becomes complicated. Any reduction in Mesio-distal and occluso-cervical space has to be analyzed. In case of reduced pontic space, following treatment options have to be considered with the help of diagnostic waxing procedures; Orthodontic repositioning, Small pontics but small pontics are unaesthetic and they tend to trap food and difficult to clean, the proximal contours of adjacent teeth can be increased by providing individual crowns & in case of no functional or esthetic deficit the space can be maintained without prosthodontic intervention.

Residual ridge contour: An ideal ridge should have smooth regular surface of attached gingiva with adequate width and height for pontic placement. It should be free of frenal attachment and must sustain the appearance of interdental papilla. Ideal ridge contour vary with the type of pontic to be used. For modified ridge lap: the ridge should be convex facio-lingually and should be slightly concave mesio-distally. For ovate pontic: the ridge should be wider facio-lingually.

CLASSIFICATION:

Depending on shape of surface contacting the ridge (TYLMANN): [7] sanitary, Modified sanitary, Spheroidal, Saddle, Ridge lap, Modified ridge lap & ovate.

According to Dr. Sonmith Singh based on the shape of the surface contacting the ridge (FAMDENT 2002) [8]: Saddle, Modified saddle, Ridge lap, Modified ridge lap,

Lap facing, Spheroidal, Modified spheroidal, Egg/bullet or heart shaped, Sanitary, modified sanitary & Bar shaped.

According to ROSENSTIEL [9], depending on mucosal contact

A. mucosal contact -Ridge lap, conical, Modified ridge lap, ovate

B. No mucosal contact - Sanitary (hygienic), Modified sanitary

According to the form (Johnston) – Sanitary or hygienic, Anatomic type

Based on materials used – Metal, Metal and porcelain, Metal and resin

Prefabricated pontics - Flat back, Trupontic, Long pin facing, Pontips, Reverse pin facings

Saddle or ridge lap pontics: The pontics derives its name because of its shape .it overlaps both the buccal and lingual aspects of the ridge; hence it is called as ridge lap. It replaces all contours of a missing tooth. It forms a large Concave contact with ridge. A contact with ridge that extends beyond the midline of the edentulous ridge, or a sharp angle at the linguo gingival aspect of the tissue contact, constitutes a ridge lap. Saddle pontic simulates the emergence profile of the missing tooth .it should not displace the soft tissues or cause the blanching, but it should make a snug contact.

Advantages: As the emergence profile of a pontic simulates with the adjacent natural tooth, it is esthetically superior.

Disadvantages: As the gingival surface of the pontic is not accessible to the patient, it is difficult to clean. This pontics should be avoided as far as possible as gingival surface of the pontic is in contact with the ridge. it may cause tissue inflammation.

Modified ridge lap - Design: This pontic has combined features of saddle and sanitary pontics, so it has both combined features of esthetics and easy cleansing. It is called modified ridge lap because gingival aspect of the pontic overlaps only on the buccal aspect of the ridge, i.e ridge lap is modified. The pontic remains clear on the lingual aspect of the ridge, while facially it is in contact with the ridge and hence simulates the emergence profile of the adjacent teeth. To enable optimal plaque control, the gingival surface of the pontic should have no depression or hollow. It should be as convex as possible from mesial to distal .greater the convexity, easier will be the cleaning. When viewed from the gingival aspect, the tissue contact should resemble a letter “T” whose vertical arms ends at the crest of the ridge. The modified ridge lap is the most common form of ridge lap that is used in areas that have high visibility.

Advantages: Modified ridge lap has good esthetics when compared with sanitary pontic. Lingually the pontic does not make any contact with gingival tissue and contacting

surface is convex. This enables the patient to maintain the hygiene.

Disadvantages: Hygiene is inferior to sanitary

Sanitary or hygienic: Sanitary pontic is called so because this design allows easy cleansing, as tissue surface of the pontic remains clear of the residual ridge. In the past years the sanitary pontic was the name given to the prefabricated convex facing with a slot back used for mandibular pontics **Design** - This design makes no contact with residual ridge and there is least chances of inflammation. Occluso- gingival thickness of the pontic should be greater than 3mm and there should be adequate space under it to facilitate cleansing. The hygienic pontic is frequently made in all convex configuration both facio-lingually and mesio-distally.

Two configurations of the sanitary pontic:

Fish belly design: the under surface of the pontic should be rounded without angles for easier cleansing/flossing, as it is difficult to get floss to pass over a flat under surface evenly. This round design is called as “fish belly design”

Perel pontic, arc shaped FPD, modified sanitary pontic: this is an alternative design in which there is a mesiodistal concavity. The under surface is convex faciolingually.it gives a configuration of the hyperbolic paraboloid. This design provides an added strength to the connectors and at the same time allows space for easier cleansing. An esthetic version can also be created by veneering with porcelain on only those parts that are visible i.e occlusal and occlusal half of the pontic.

Advantages: Good access for oral hygiene, least tissue inflammation. **Disadvantages:** Poor aesthetics

Conical pontic: Synonyms; egg shaped, bullet shaped and heart shaped. This design is related to the “sanitary dummy” described by tinker in1918. **Design:** The conical pontic is rounded with a small tip in relation to overall size of the pontic.it should be made as convex as possible, with only one point contact at the center of the ridge. The facial and lingual contours are dependent on the width of the residual ridge is knife edged residual ridge requires a flatter contours with a narrow tissue contact area. **Advantages:** Good access for the oral hygiene. **Disadvantages:** Poor esthetics.

Ovate pontic: Ovate pontic is one of the most esthetically appealing designs. **Design:** Convex tissue surface of ovate pontic resides with in the ridge, which appears as the pontic is emerging from the ridge .the tissue contacting surface of the pontic is bluntly rounded and is set into the concavity within the ridge.

Preparation of ridge during extraction: Socket preservation techniques should be performed at the time of extraction to create the tissue recess on order to simulate the emergence profile of the ovate pontic. Here the

abutment teeth are prepared before the extraction and a provisional FPD is fabricated on the cast by scraping the tooth to be extracted. The provisional restoration should be placed immediately after the extraction of the tooth such that pontic should extend one quarter into the socket immediately after the extraction. The provisional restoration acts as a template for the healing of the ridge.

Preparing the preexisting residual ridge: For preexisting residual ridge, soft tissue surgical augmentation is required, an adequate volume of ridge tissue is established, a socket depression is sculptured into the ridge with surgical diamonds or the electro-surgery. Careful attention is given to the pontic design of provisional restoration, so that the healing of the ridge takes place with provisional restoration as a template.

Advantages: Emergence profile of a pontic simulates with that of the adjacent natural teeth, pleasing appearance, broad convex geometry is stronger than modified ridge lap pontic and because the unsupported thin porcelain that exists at a gingival facial extent of the pontic is eliminated. As tissue surface is convex in all directions, it is accessible to the dental floss.

Disadvantages: Requires the surgical preparation, though it can be flossed, meticulous oral hygiene is required to prevent tissue inflammation resulting from large area of tissue contact.

Optimal Pontic Design:

Biological considerations - The pontic design should follow certain biologic considerations for maintenance and preservation of residual ridge, abutment and opposing teeth and supporting tissues following considerations should be followed in order to preserve the tissues. There should be a Pressure free contact between ridge and pontic to prevent the ulceration. The above mentioned fact has to be evaluated during try-in stage, if there is any pressure area it has to trim accordingly. The pressure area has to be identified with pressure indicating paste. Contact should be passive and on the keratinized attached tissue. If it is on the movable mucosa some ulceration may be seen as a result of normal movement of the mucosa. Toxins released by the microbial plaque can cause irritation and subsequent inflammation of tissue and calculus formation. So gingival surface of the pontic should be devoid of any depressions or concavities, instead it should be convex. When there is a passive contact, the gingival surface of the pontic may not be accessible to bristles of tooth brush; hence patients should be educated about the efficient oral hygiene procedures. This can be accomplished by using proxy brushes, pipe cleansers; superfloss. Gingival embrasure around the pontic should be wide enough to permit oral hygiene aids. Prevention is the best solution for controlling the tissue irritation. Reducing the bucco-lingual width by 30% reduces the occlusal forces and reduces the loading on the abutment teeth. But narrowing the occlusal table may

impede the development of harmonious and stable occlusal relationship. This can act as malposed tooth, can cause difficulties in plaque control and may not provide proper check support. For these reasons pontic with normal occlusal width (at least on the occlusal third) are generally recommended. If residual ridge is collapsed buccolingually, reducing the pontic width is desired, there by lessening the lingual contour and facilitating the plaque control measures.

Mechanical considerations: Long span FPD's are particularly susceptible for mechanical failures, because there is significant flexing from high occlusal forces and because the displacement effects increase with the cube of span length. Therefore the likely forces on the pontic should be properly evaluated and pontic should be designed accordingly. Extension of ceramic on occlusal surfaces has to be reviewed as metal ceramic bridge is more susceptible to fracture when compared with all metal bridge in case of high occlusal forces. A frame work should provide uniform veneer of porcelain, approximately 1.2mm. Excessive thickness of porcelain leads to inadequate support and may lead to fracture (fracture of porcelain in the cervical region of anterior pontic due to inadequate support).cut back technique should be used to avoid discrepancies. Metal surfaces to be veneered should be smooth and free of voids. Surface irregularities will cause incomplete wetting by the porcelain slurry, leading to voids at the porcelain metal interface that reduce the bond strength and increase the chances of mechanical fracture. Sharp angles in the veneering area would concentrate stresses and they should be avoided in order to prevent the fracture. Special attention has to be given at the metal ceramic junction. Any deformity at the metal ceramic junction can lead to chipping of porcelain. For this reason, occlusal centric contacts must be placed at least 1.5mm away from the junction.

Esthetic considerations - The patient will evaluate the result of any restoration by the way how it looks, especially in case of anterior teeth. An esthetically successful pontic will replicate the form, contours, incisal edge, gingival embrasure and color of the adjacent teeth. The Pontic simulation to natural tooth is most challenging at pontic tissue interface, this is because one has to compromise for the anatomic changes that occur after the extraction. This cannot be accomplished by nearly duplicating the facial contour of the missing tooth, because after the tooth has removed, the alveolar bone undergoes resorption and remodeling. So, if original contour is followed, the pontic will look unnaturally long.

Modified ridge lap is recommended for most of the anterior situations, as it compensates for the loss of the bucco-lingual width in residual ridge .rather than emerging from the crest of the ridge as natural tooth, the cervical part of the pontic sits in front of the ridge, covering any

abnormal morphology resulting from the tooth loss. If pontic is poorly adapted to the residual ridge, there will be an unnatural shadow in cervical area that looks odd and spoils the illusion of a natural tooth.

Ovate pontics is recommended when appearance is utmost concern, the ovate pontic can provide an appearance at gingival interface that is virtually indistinguishable from a natural tooth.

Basic principles of pontic design: [8]

Occlusal surface: within the boundaries of the lines connecting buccal and lingual surfaces of abutment teeth.

Buccal, lingual or palatal surfaces: should lie in same plane as the surfaces of adjacent teeth.

Angle of contact: junction of pontic with gingiva should be as wide as possible.

Area of contact: should be as minimal as possible.

Mucosal contact: should be either convex or flat.

Embrasures: should be as wide as possible.

Post insertion hygiene: The mesial, distal and lingual gingival Embrasures of the pontic should be wide open to allow the patient easy access for cleaning. The contour between pontic and tissue must allow the passage for floss from one retainer to the retainer. After FPD is inserted, teach the patient about maintaining hygiene particularly on the undersurface of the pontic with dental floss. Other aids for maintaining the hygiene are interproximal brushes and pipe cleansers. Home care has to be evaluated at each appointment and reinforce the necessity of good oral hygiene along with the skills to accomplish it. [9,10]

Conclusion: Any tooth that replaces missing tooth should be esthetically and biologically in harmony with the orofacial tissues, otherwise a mere replacement of tooth does not serve the purpose of the pontic. Hence it is essential for the dentist and laboratory technician to follow the basic principles behind pontic selection and fabrication.

Source of support: Nil

Conflict of Interest: None

REFERENCES

1. Silness L. Bhatia HL. Tissue changes under acrylic and porcelain pontics. *J. Dental. Research*, 37, 1958, 66-7.
2. Hirsh K, Kopczyk RA. Incidence of anterior ridge deformities in partially edentulous patients. *J.P.D.* 57, 1987, 191-4.
3. Perel P. Pontics for gold acrylic resin fixed partial dentures. *J.P.D.* 14, 1992, 347-8.
4. Abrams S. Fundamentals of fixed prosthodontics. 3rd Edt, 2004, 28-9.
5. Chowhan M. Natural tooth pontic fixed partial denture using resin composite reinforced glass fillers. *Quintessence International*. 35, 2004, 549-53.
6. Clayton JA (1970) Green E. Roughness of pontic material and dental plaque. *J.P.D.* 23, 1970, 407-11.
7. Tillman, Johnson. Pontic design and localized ridge augmentation in fixed prosthodontics. *DCNA*, 1992, 591-605.
8. Sonmish S. Stress and deflection of three different pontic designs". Ppt. Fandent show, LA, 2002.
9. Rosenstiel. Tissue changes beneath fixed partial denture. *J.P.D.* 16, 1962, 937-45.
10. Hirshberg SM. The relationship of oral hygiene to embrasure and pontic design. *J.P.D.* 27, 1972, 26-38.

Cite this article:

Mulla Anam Nagib, Agarwal Abhinav, Ahmad Naeem, Gaur Abhishek, Pandey Kaushik, Ali Mariyam (2017) All About Dental Pontics: Bridging The Gap - A Review. *Journal of Science*. 7(8): 294-298.

DOI: <http://dx.doi.org/10.21276/jos.2017.7.8.6>



Attribution-NonCommercial-NoDerivatives 4.0 International