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Research Article

**PONTIC DESIGN OF ANTERIOR TEETH**

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**Abstract****Introduction:**

Replacing lost teeth has always been a challenging task in fixed prosthodontics regarding aesthetics thus a pontic should be designed to provide functional and aesthetic replacement of missing teeth. Anterior bridge design varies and depends on size, shape, position, the shade of pontic and emergence profile from soft tissue. Hygienic pontic, Ridge lap/saddle pontic, modified ridge lap, Ovate pontic, Modified ovate pontic are the commonly used pontic in the anterior region. Many designs have been attempted to create a pontic design that is both natural and hygienic. The design of ovate pontic is proven to achieve both the goals.

**The aim of the work:**

The study aimed to assess the knowledge of pontic design selection by aesthetic, function, ease of cleaning, maintenance of healthy tissue on edentulous ridge and patients comfort.

**Methodology:**

The review is a comprehensive study of PUBMED, MEDLINE, and, EMBASE from the year 1972 to 2017. The search terms used were: Aesthetic restoration, ovate pontic, modified ovate pontic, gingival profile

**Conclusion:**

Clinical success of fixed partial denture depends on the pontic design, and hence the selection of pontic design plays a major role in the outcome of treatment. At present, there is a different pontic design available. The matter of choice vary and highly dependent on patient preferences and operator skills. The clinical circumstances require infinite variation. An ovate pontic can provide a highly aesthetic result and natural looking tooth replacement in anterior bridgework provided by sufficient amount of soft and hard tissue. For a successful aesthetic outcome, communication between patient, clinician and technician and maintenance of good oral hygiene for long-term is essential.

**Keywords:** Aesthetic restoration, ovate pontic, modified ovate pontic, gingival profile.

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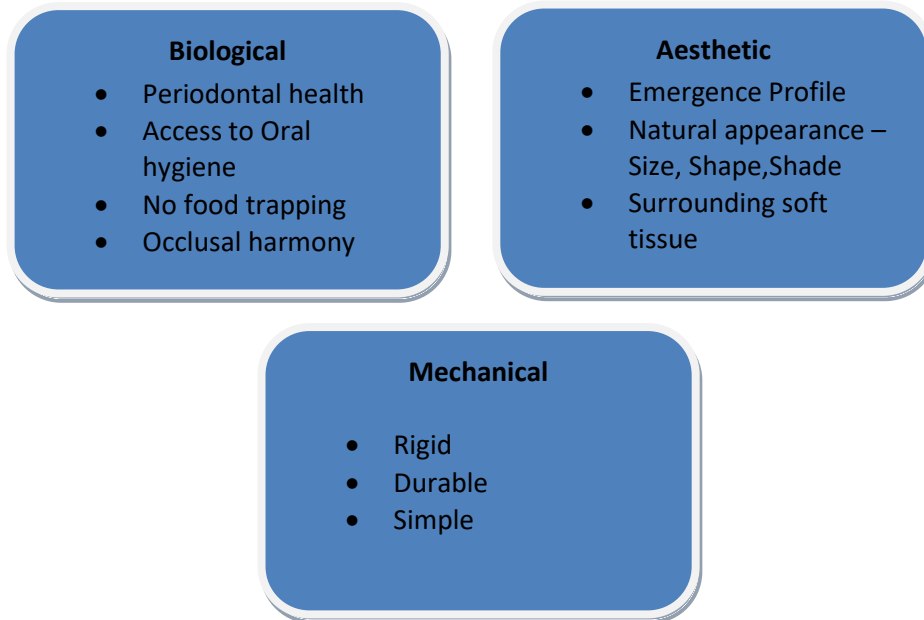


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**INTRODUCTION:**

The dental arch is in the state of dynamic equilibrium with teeth supporting each other. The structural integrity of dental arch disrupts when the tooth is lost. Therefore realignment of artificial teeth is done

in a way until a new state of equilibrium is achieved. A fixed partial denture is the choice of treatment. The main component of a fixed partial denture is 'pontic' or the artificial tooth. The word pontic is derived from Latin 'pons' meaning bridge. [1]

**METHODOLOGY:**

- **Data Sources and Search terms**

The review is a comprehensive study of PUBMED, MEDLINE, and, EMBASE from the year 1972 to 2017. The search terms used were: Aesthetic restoration, ovate pontic, modified ovate pontic, gingival profile

- **Data Extraction**

Two reviewers have independently reviewed the studies, abstracted data, and disagreements were resolved by consensus. Studies were evaluated for quality and a review protocol was followed throughout.

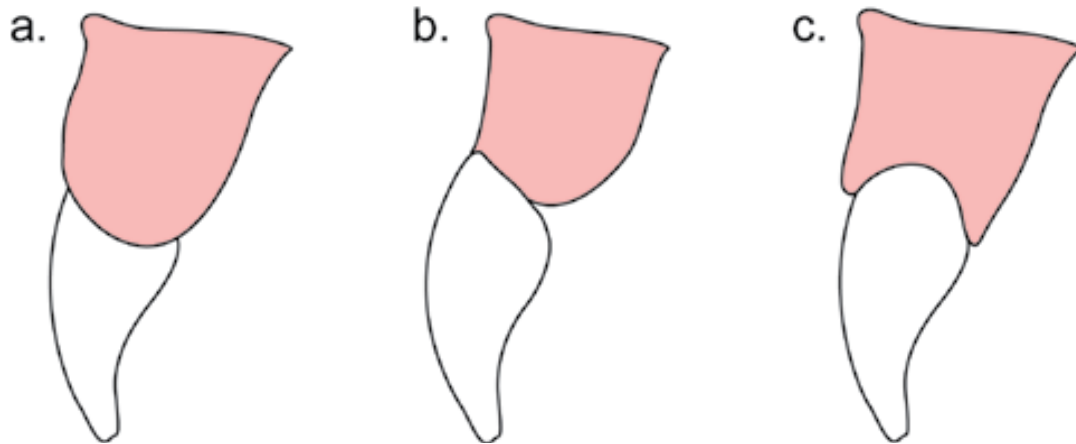
The study was approved by the ethical board of King Abdulaziz University Hospital

**PERIODONTAL CONSIDERATION:**

Plaque is a risk factor in the development of caries and periodontal disease.[3,4] There is the increased potential of accumulation in a fixed prosthesis with a decrease in access to oral hygiene, imposes a high risk of caries and periodontal disease. Often subgingival margin of bridge retainer leads to plaque accumulation and subsequent gingival and mucosal inflammation.[5-7] Supragingival margin, correct emergence profile, good marginal fit, minimal contact and pressure on mucosa, smooth pontic surface are some important design feature for pontic to avoid plaque accumulation and mucosal inflammation. [8-10]

**The Design in Anterior Maxillary Region**

- The Hygienic pontic
- The Ridge lap/ saddle pontic
- The Modified ridge lap
- The Ovate pontic
- The Modified ovate pontic



The figure 2: shows the three most commonly used pontic design in the anterior region (A) Ridge lap/saddle pontic (B) Modified Ridge lap (C) Ovate pontic [2]

#### The Hygienic pontic:

Commonly referred to as ‘wash-through’ pontic since the design offers the most appropriate method to avoid gingival inflammation and mucosal contact. Despite its name, the space present can accumulate some plaque and food debris with an added disadvantage of not being aesthetic. Therefore this design is largely historical regarding the anterior region and presently proven to be a better option in the posterior region. [2]

#### The Ridge lap/saddle pontic:

This design sits over the alveolar ridge and makes concave contact with mucosal surface both buccally and lingually. [20]

Advantages:

- Good aesthetics
- Emergence profile

Disadvantages:

- Not compatible with periodontal health
- The large concavity of pontic cannot be cleaned by flossing.

Hence it is largely not recommended for bridgework.



A



B

Figure 3: (A, B) showing inflamed and ulcerated mucosa in failing saddle bridge [2]

**The modified ridge lap pontic:**

To overcome the drawbacks of ridge lap pontic a modified design of pontic which incorporates features of both hygienic pontic and ridge lap pontic which makes the pontic design hygienic and compatible with periodontal health. Stein investigated the different pontic design, and they are on surrounding mucosa and found a modified ridge to be compatible both regarding aesthetic and mucosal health. [9] The optimal plaque control is achieved by making the gingival surface as convex as possible with from mesial to distal with no hollow or depression.

Advantages:

- Good aesthetics
- The convex surface is readily accessible for cleaning with floss
- Mechanically durable

Disadvantages:

- When aesthetic demands are high such as high smile line and implant provision, an alternate approach would be required. [9]

**The Ovate Pontic:**

An Ovate pontic design can be defined as one which has an increased amount of mucosal contact and applies light pressure to underlying mucosa to improve aesthetics. [11] The issue of emergence profile aesthetic has been resolved using this pontic design. The convex tissue surface of ovate pontic resides within the ridge, appears as a pontic is emerging from the ridge. The contact point is bluntly rounded and set into concavity within the ridge. Silliness et al. investigated the effects of oral hygiene measures such as interdental brushes and flossing on mucosal and gingival health, and the research shows that gingival and mucosal health can be well maintained despite of contact and pressure of pontic if the oral hygiene is maintained properly and

regularly. The key to the biological success of this pontic design is adequate plaque control. [12]

**ADVANTAGES :**

- Excellent aesthetic especially emergence profile
- The convex surface of pontic for easy passage of floss
- Reduced occurrence of 'black triangles'
- Mechanically durable

**DISADVANTAGES:**

- Need of sufficient faciolingual and apicocoronal height to incorporate pontic within ridge.
- Contraindicated in Knife-edge ridges.
- Surgical augmentation is required if faciolingual and apicoincisal height is inadequate. [12]

**Development of Ovate pontic recipient site :**

When a tooth has extracted the recession of interproximal papilla takes place along with the collapse of buccal bone which makes it difficult to restore missing teeth aesthetically thus preserving interproximal tissue post extraction is important.<sup>[9,13]</sup>

The development of recipient sites can be done by:

- Gingivoplasty using high-speed rotary instruments.
- Long-term use of provision restoration
- Electrosurgery

Gingivoplasty using high-speed rotary instruments :

The timing of gingivoplasty varies from before impression taking to immediately before fitting definitive restoration. If the former is chosen a provisional restoration must be created to maintain the shape [14,15]

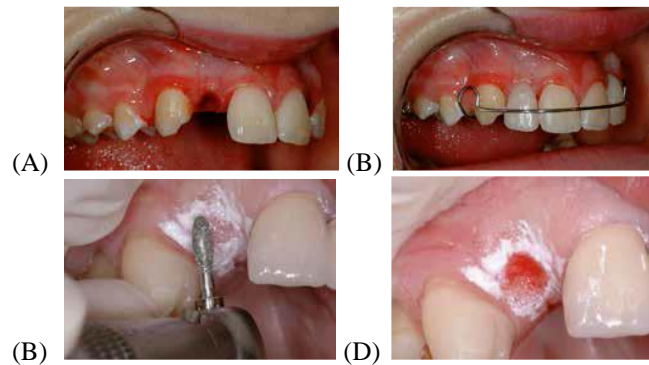


Figure 4: (A-B) showing site preparation prior to impression to taking (C-D) Prior to fitting of definitive restoration. [2]

**Long-term use of provisional restoration:**

After final tooth preparation, an alginate impression is made, and the cast is poured. The tooth to be extracted is scored off the cast making 3mm depression, simulating post-extraction socket. A provisional restoration is made, keeping contact surface of pontic highly polished to not irritate

underlying mucosa. A provisional fixed partial denture is inserted on the prepared tooth with pontic submerging 2-3mm into socket creating a depression on 1-1.5mm once the tissue heals. With subsequent luting of provisional restoration of up to 3 months the definitive fixed partial denture is inserted. [16]

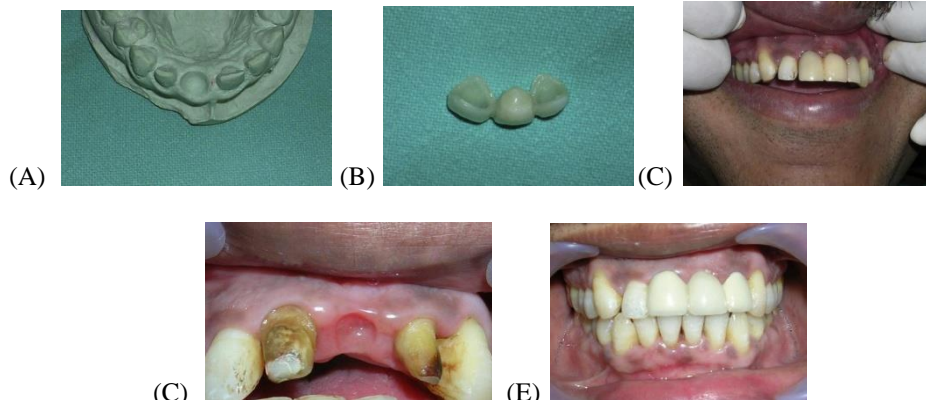


Figure 5: showing (A-E) showing ovate recipient site preparation using provisional restoration. [16]

**Electrosurgery:**

Electrosurgery should be used with caution, as prolonged tissue contact will cause excessive tissue loss, especially if the mucosa is thin.



Figure 6: mucosa with tissue loss [2]

**The Modified Ovate Pontic**

Chiun-Lin Steven improvises the design of ovate pontic. The major difference between ovate and modified pontic is that the height of contour is more labially placed to support soft tissue and the tissue surface is less convex compared to ovate pontic design which makes it more easy to clean. Compare to ovate pontic; the modified ovate pontic does not require much faciolingual thickness to create an emergence profile. [17]

The height of contour at tissue surface is 1-1.5mm apical and palatal to the labial gingival margin. Dental floss can push the labial gingival margin away

and cleanse the tissue surface.

**Advantage:**

- Excellent aesthetic since it produces good emergence profile
- Ease of cleaning
- Little or no ridge augmentation required
- Effective air seal eliminates air and saliva leakage
- Minimization of 'black triangles' between teeth

**Disadvantage:**

- It may leave a shadow in apical area of the



tooth at the gingival margin in case of class-

I defects and high smile line. [19]



Figure showing (A) Ovate pontic and Modified Ovate pontic (B) Intaglio surface of modified ovate pontic (C) Final Prosthesis. [18]

### CONCLUSION:

The most integral part of fixed partial denture is pontic. There are a variety of designs available, but aesthetics, functional and hygienic requirement of a tooth in fixed partial denture can be achieved using ovate and modified ovate pontic in the anterior region. Selection of pontic should be done only after the evaluation of the pontic space, ridge condition and shape, retainers to be used, occlusion and oral hygiene habits of patient and clinician skills for a better outcome of treatment. The final success of prosthesis majorly depends on oral hygiene practices of the patient.

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