#### PONTIC

T.P.C.T.S





# Learning Objectives

T.P.C.T'S

By the end of this lecture student will know about an artificial tooth on FPD that replaces the missing natural tooth and restores its function. And various types of pontics





 By the end of this session the student would know the defination, classification and principles of pontic designing.







• The pontic, or artificial tooth, is the raison d'etre of a fixed partial denture.

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• Its name is derived from the bridge.

Latin *pons*, meaning

- It is not a simple replacement, because placing an exact anatomic replica of the tooth in the space would be hygienically unmanageable.
- The design of the prosthetic tooth will be dictated by esthetics, function, ease of cleaning, maintenance of healthy tissue on the edentulous ridge, and patient comfort.





T.P.C.T 'S

DEFINITION, (GPT - 7)

AN ARTIFICIAL TOOTH ON A FPD THAT REPLACES A MISSING NATURAL TEETH, RESTORES FUNCTION, & USUALLY FILLS THE SPACE PREVIOUSLY OCCUPIED BY THE CLINICAL CROWN.











### REQUIREMENT

The requirements of a pontic are to:

- 1. Restore function.
- 2. Provide esthetics and comfort.
- 3. Be biologically acceptable.
- 4. Permit effective oral hygiene.
- 5. Preserve underlying residual mucosa
- 6. Adequate strength
- 7. Colour stability
- 8. Non irritant
- 9. Do not over load the abutment tooth

These requirements form the basis for the design of pontics.





# T.P.C.T'S PRINCIPLES OF PONTIC DESIGN 1. Cleans 2. Appearance 3. Strength





PRINCIPLE CONSIDERATIONS IN PONTIC DESIGNING

- Biological consideration
- Esthetic consideration
- Mechanical Consideration





# BIOLOGICAL CONSIDERATION

• The biologic principles of pontic design pertain to the maintenance and preservation of the residual ridge, abutment and opposing teeth, and supporting tissue.





#### T.P.C.T '

## RIDGE CONTACTENTAL

- Pressure free contact between the pontic and the underlying tissues is indicated to prevent ulceration and inflammation of the soft tissues.
- If any blanching of the soft tissue is observed at try-in, the pressure area should be identified with a disclosing medium (i.e., pressure-indicating paste) and the pontic re contoured until tissue contact is entirely passive.











 This passive contact should occur exclusively on keratinized attached tissue.

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• When a pontic rests on mucosa, some ulceration may appear as a result of the normal movement of the mucosa in contact with the pontic.





## ORAL HYGIENE CONSIDERATIONS

- The chief cause of ridge irritation is the toxins released from microbial plaque, which accumulate between the gingival surface of the pontic and the residual ridge, causing tissue inflammation and calculus formation.
- Patients must be taught efficient oral hygiene techniques, with particular emphasis on cleaning the gingival surface of the pontic.























Fig 26-8 Floss is fed through the gingival embrasure and run under the pontics and connectors by the patient. If the space is tight, a monofilament floss threader can be used.

Fig 26-9 Interproximal brushes are excellent for cleaning the gingival embrasures around pontics.

tic narrower by a set percentage (eg. 10% per pontic). Doing so does not alter the plaque index.<sup>1</sup> Narrowing the pontic is not practical if an effort is being made to maintain occlusal contacts on cusps or in fessae.

Pontic Designs

There are several designs evailable for our use in situations requiring pontics in the fabrication of fixed partial dentures. These include: saddle (ridge lap), modified ridge lap, hygienic, conical, ovate, prefabricated pontic facings, and metal-ceramic pontics.







# PONTIC MATERIAL

- Any material chosen to fabricate the pontic should provide good esthetic results where needed; biocompatibility, rigidity, and strength to withstand occlusal forces; and longevity.
- FPDs should be made as rigid as possible, because any flexure during mastication or Para function may cause pressure on the gingiva and cause fractures of the veneering material.





### Metal ceramic pontics are stiffer and withstand occlusal forces better if they are made fairly thick





• Occlusal contacts should not fall on the junction between metal and porcelain during centric or eccentric tooth contacts, nor should a metal ceramic junction occur in contact with the residual ridge on the gingival surface of the pontic.





OCCLUSAL FORCES

 Potentially harmful forces are more likely to encounter if an FPD is loaded by an accidental biting on a hard object or Para functional activities like bruxism rather than by chewing food of uniform consistency.





These forces are not reduced by narrowing the occlusal table

- Narrowing the occlusal table may impede or even preclude the development of harmonious and stable occlusal relationship.
- For these reasons pontic with normal occlusal width of at least on the occlusal third are generally recommended





## MECHANICAL CONSIDERATIONS

- Mechanical problems may be caused by improper choice of materials, poor framework design, poor tooth preparation, or poor occlusion.
- These factors can lead to fracture of the prosthesis or displacement of the retainers.
- Long-span posterior FPDs are particularly susceptible to mechanical problems.









# Failure of a long span metal ceramic FPD due to high stress





A strong all-metal pontic may be needed in high-stress situations rather than a metal-ceramic pontic which would be more susceptible to fracture.





# AVAILABLE PONTIC MATERIALS

- Some fixed partial dentures are fabricated entirely of metal, porcelain, or acrylic resin, but most use a combination of metal and porcelain.
- Acrylic resin veneered pontics have had limited acceptance because of their reduced durability (wear and discoloration).





Metal-ceramic Pontics. Most pontics are fabricated by the metal-ceramic technique. A well fabricated metal-ceramic pontic is strong, easy to keep clean, and looks natural.





## ESTHETIC CONSIDERATIONS

• No matter how well biologic and mechanical principles have been followed during fabrication, the patient will evaluate the result by how it looks, especially when anterior teeth have been replaced.

P.U.T'S

• Many esthetic considerations that pertain to single crowns also apply to the pontic. Several problems unique to the pontic may be encountered when attempting to achieve a natural appearance.







## THE GINGIVAL INTERFACE

• An esthetically successful pontic SHOULD replicate the form, contours, incisal edge, gingival and incisal embrasures, and color of adjacent teeth.

P.U.T 's

• The pontics simulation of a natural tooth is most often betrayed at the tissue-pontic interface.









#### <u>SOFT TISSUES</u>

#### A -Mucosal contact

- ridge lap/saddle
- modified ridge lap

BASED ON REL

- ovate
- conical

#### **B- No Mucosal contact**

- sanitary (hygienic)
  - modified sanitary(hygienic)





# I BASED ON MATERIALS, USED

#### A - Metallic

- Gold alloys
- Nickel chromium alloy

#### **B - Non Metallic**

- Acrylic
- Porcelain
- **C Combination**-alloys with acrylic or porcelain





## III PRE FABRICATEDITAL PONTICS

- Trupontic
- Interchangeable facing
- Pin facing
- Modified pin facing
- Reverse pin facing
- Harmony facing
- Porcelain fused to metal







## PRE TREATMENT ASSESMENT •PONTIC SPACE. •TISSUE CONTACT. POSTINSERTION HYGIENE.



T.P.C.T

### PONTIC SPACE

- •One function of an FPD is to prevent tilting or drifting of the adjacent teeth into the edentulous space.
- If such movement has already occurred, the space available for the pontic may be reduced and its fabrication complicated.





• At this point, creating an acceptable appearance without orthodontic repositioning of the abutment teeth is often impossible particularly if esthetic is important.

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• When orthodontic repositioning is not possible, increasing the proximal contours of the adjacent teeth may be better than making an FPD with under sized pontics





### TISSUE CONTACT

- The extent and shape of the pontic contact with the ridge is very important.
- Excessive tissue contact has been cited as a major factor in the failure of fixed partial dentures.
- The area of contact between the pontic and the ridge should be small and the portion of the pontic touching the ridge should be as convex as possible.




T.P.C.T '

## Post insertion Hygiene

- Mesial distal and lingual gingival embrasure of the pontic should be wide open to allow the patient easy access for cleaning
- The contact between the pontic and tissue must allow the passage of floss from one retainer to the other





•Even the smoothest pontic surface must be cleaned well and often to prevent the accumulation of plaque.

T.P.C.T'S

•If cleaning is not done at frequent, regular intervals, the tissue around the pontic will become inflamed.





# •Success of the FPD depends on the pontic design.

DESIGN





# Pontic Designs ENTAL

There are several designs available for use in the fabrication of FPDs.They are: Hygienic, Saddle (Ridge Lap), Modified Ridge Lap, Conical, Ovate, **Prefabricated Pontic Facings**, & **Metal- Ceramic Pontics.** 





in situations requiring pontics

## Sanitary or Hygienic Pontic

T.P.C.T'S

- The term hygienic is used to describe pontics that have no contact with the edentulous ridge.
- As its name implies, the primary design feature of the sanitary pontic allows easy cleaning, because its tissue surface remains clear of the residual ridge.

#### 

Pontic designs are classified into two general groups: those that contact the oral mucosa and those that do not (Box 20-1). There are several classifications within these groups, based on the shape of the gingival side of the pontic. Pontic selection depends primarily on esthetics and oral hygiene. In the anterior region, where esthetics is a concern, the pontic should be well adapted to the tissue to make it appear that it emerges from the gingiva. Conversely, in the posterior regions (mandibular premolar and molar areas), esthetics can be compromised in the interest of designs that are more amenable to oral hygigen. The advantages and disadvantages of the various pontic designs are summarized in Table 20-1.

PONTIC DESIGN CLASSIFICATION BOX 20

B No mucosal contact

(hygienic)

1. Sanitary (hygienic

2. Modified sanitary

A. Mucosal contact

1. Ridge lap

3. Ovate

4. Conica

2 Modified ridge lan

#### SANITARY OR HYGIENIC PONTIC

As its name implies, the primary design feature of the sanitary pontic allows easy cleaning, because its tissue surface remains clear of the residual ridge (Fig. 20-10). This hygienic design permits easier



**Fig. 20-10.** A "hygienic" or "sanitary" pontic replacing a mandibular molar where there has been considerable

Pontic Design		Recommended Location	Advantages	Disadvantages
Sanitary/hygienic		Posterior mandible	Good access for oral hygiene	Poor esthetics
Saddle-ridge-lap	R	Not recommended	Esthetic	Not amenable to oral hygiene
Conical	8	Molars without esthetic requirements	Good access for oral hygiene	Poor esthetics
Modified ridge-lap	K	High esthetic requirement (i.e., onterior teeth and premolars, some maxillary malars)	Good esthetics	Moderately easy to clean
Ovate	X	Maxillary incisors cuspids and premolars	Superior esthetics Negligible food entrapment Ease of cleaning	Requires surgical preparation







• This hygienic design permits easier plaque control by allowing gauze strips and other cleaning devices to be passed under the pontic and seesawed in shoe-shine fashion.





#### • The hygienic pontic is used in the nonappearance zone, particularly for replacing mandibular first molars. It restores occlusal function and stabilizes adjacent and opposing teeth. If there is no requirement for esthetics, it can be made entirely of metal.

T.P.C.T'S





•The occlusogingival thickness of the pontic should be no less than 3.0 mm. and there should be adequate space under it to facilitate cleaning. The hygienic pontic is frequently made overall-convex configuration, faciolingually and mesiodistally





• Making the undersurface of the pontic round without angles allows for easier flossing. The round design has been described as a "fish belly".

T.P.C.T'S













- Its <u>disadvantages</u> include entrapment of food particles, which may lead to tongue habits that may annoy the patient.
- The hygienic pontic is the least "tooth like" design and is therefore reserved for teeth seldom displayed during function (i.e., the mandibular molars).





An alternative design, in which the pontic is made in the form of a concave archway mesiodistally. The undersurface of the pontic is convex faciolingually, giving the tissuefacing surface of the pontic the configuration of a hyperbolic paraboloid.

T.P.C.T'S

There is added bulk for strength in the connectors, and access for cleaning is good. An esthetic version of this pontic can be created by veneering with porcelain those parts of the pontic that are likely to be visible.













### This design has been called an "arcfixed partial denture"

.P.C.T'S

a "modified sanitary pontic", or simply

"Perel pontic".



a



## SADDLE OR RIDGE LAP PONTIC

- This pontic looks most like a tooth, replacing all the contours of the missing tooth.
- It forms a large concave contact with the ridge, obliterating the facial, lingual, and proximal embrasures.

#### PONTIC CLASSIFICATION

Murosal contact

2. Modified ridge lap

1. Ridge lap

3. Ovate

4. Conica

T.P.C.T'S

Pontic designs are classified into two general groups: those that contact the oral muccos and those that do not (Box 20-1). There are several classifications within these groups, based on the shape of the gingival side of the pontic. Pontic selection depends primarily on esthetics and oral hygiene. In the anterior region, where esthetics is a concern, the pontic should be well adapted to the tissue to make it appear that it emerges from the gingiva. Conversely, in the posterior regions (mandibular premolar and molar areas), esthetics can be compromised in the interest of designs that are more amenable to oral hygiene. The advantages and disadvantages of the various pontic designs are summarized in Table 20-1.

PONTIC DESIGN CLASSIFICATION BOX 20-1

B No mucosal contact

(hygienic)

1. Sanitary (hygienic)

2. Modified sanitary



As its name implies, the primary design feature of the sanitary pontic allows easy cleaning, because its tissue surface remains clear of the residual ridge (Fig. 20-10). This hygienic design permits easier



Fig. 20-10. A "hygienic" or "sanitary" pontic replacing a mandibular molar where there has been considerable bone loss.







• It is also called a ridge lap, because it overlaps the facial and lingual aspects of the ridge.

P.C.T'S

• A contact with the ridge that extends beyond the midline of the edentulous ridge, or a sharp angle at the linguogingival aspect of the tissue contact, constitutes a ridge lap





 This design has long been recognized as being unclean and uncleanable and it still is.

P.C.T'S

- The saddle causes tissue inflammation, and it should not be used.
- This design deficiency has been shown to result in tissue inflammation









## MODIFIED RIDGE LAP PONTIC

• The modified ridge lap pontic combines the best features of the hygienic and saddle pontic designs, combining esthetics with easy cleaning.

2' T. J. 9. T

• This design gives the illusion of a tooth, but it possesses all or nearly all convex surfaces for ease of cleaning









FPD completely seated



• The lingual surface should have a slight deflective contour to prevent food impaction and minimize plaque accumulation.

T.P.C.T'S





Ridge contact must extend no farther lingually than the midline of the edentulous ridge, even on posterior teeth.

P.U.T'S

• The contour of the-tissue-contacting area of the pontic should be convex.





# CONICAL PONTICENTAL

- Often ,called egg-shaped, bullet-shaped, or heart-shaped, the conical pontic is easy for the patient to keep it clean.
- Its use is limited to replacement of teeth over thin ridges in the nonappearance zone.













• It should be made as convex as possible with only one point of contact at the center of the residual ridge.

T.P.C.T'S

• The conical pontic is rounded and cleanable, but the tip is small in relation to the overall size of the pontic. It is well suited for use on a thin mandibular ridge.





• When used with a broad, flat ridge, the resulting large triangular embrasure spaces around the tissue contact have a tendency to collect debris.

T.P.C.T'S







### A: correctly with a thin ridge B :incorrectly with broad flat ridge





# OVATE PONTIC SENTAL

• The ovate pontic is a round-end design currently in use where esthetics is a primary concern. .











#### FPD partially seated



• The ovate pontic is the most esthetically appealing pontic design. Its convex tissue surface resides in a soft tissue depression or hollow in the residual ridge, which makes it appear that a tooth is literally emerging from the gingiva.

T.P.C.T'S

• The tissue-contacting segment of the ovate pontic is bluntly rounded, and it is set into a concavity in the ridge.





The concavity can be created by placement of a provisional fixed partial denture with the pontic extending onequarter of the way into the socket immediately after extraction of the tooth.

T.P.C.T'S





The ovate pontics Advantage includes its pleasing appearance and its strength.

- It is easily flossed.
- In addition, its recessed form is not susceptible to food impaction.
- The broad convex geometry is stronger than that of the modified ridge lap pontic.

.P.C.T'S





#### Disadvantages

 Because the tissue surface of the pontic is convex in all dimensions, it is accessible to dental floss; however, meticulous oral hygiene is necessary to prevent tissue inflammation resulting from the large area of tissue contact.

T.P.C.T'S

• Other disadvantage include the need for surgical tissue management.





**Prefabricated Pontic Facings** 

- At one time, preformed porcelain facings were popular for fabricating pontics.
- They required adaptation to a specific edentulous space, after which they were reglazed.












### ALL METAL

- ADVANTAGES
  PROCEDURE
- DISADVANTAGES
- INDICATION MOLARS
- CONTRAINDICATIONS
  WHERE
  ESTHETICS



T.P.C.T'S

STRENGTH, EASY

**NON ESTHETIC** 

MANDIBULAR





- Saddle/ridge lap
- **Advantages** 
  - **Disadvantages**

- **Esthetics** Indications
- Poor oral hygiene Contra indications
- - Not recommended
- **Materials** 
  - Not recommended
  - Not applicable





# Sanitary/hygienic 🛇

- Location
- **Advantages** hygiene
- **Disadvantages**
- Indications impaired oral hygiene



**Materials** 

Good access for oral

Posterior mandible

T.P.C.T'S

Poor esthetics

All metal

Non esthetics zones&



# Modified ridge lap

- Location
- Advantages
- Disadvantages
- Indications
- Contra indications
- •
- Materials



High esthetic

- Good esthetics, easy to clean
- Area with esthetic concern
- Where minimal esthetic concern exist
- Metal ceramic, all ceramic



### <u>Conical</u>

- Location
- Advantages
- Disadvantages
- Indications
- Contra indicat



### **Materials**

T.P.C.T'S **Molars without esthetics Good** accesses For oral hygiene **Poor** esthetics **Posteriors Poor oral hygiene** All metals, metal ceramics, all resin



- Location •
- Advantages
- Disadvantages •
- Indications • line
- Contra indications **>** Un willingness •

Materials



Superior esthetics, ease of cleaning

T.P.C.T'S

- Requires surgical preparation
- Optimal esthetics, high
  - - for surgery
- Metal ceramic,
  - all resins



smile





### CONCLUSION

 There are various types of pontics. Selection of pontics depends on the requirements of patient and tissue contacts







## Take home message

• Selection of pontic design as per given clinical situation is important.

T.P.C.T'S

• Biologic, mechanical and esthetic considerations all play important role in pontic design.





# PROBABLE SAQS AND LAQS

- LAQs
- Define pontics and classify them
- What are the pontics give requirements of pontics and classify them?

- SAQs
- Describe pontics with the help of diagram
- Selection of pontics



