

CHAPTER 8

PROSTHETIC TEETH

DEFINITION

PROSTHETIC TEETH are the artificial substitutes for the missing natural teeth.

FUNCTIONS

The functions of prosthetic teeth are to:

1. Restore the esthetic, phonetic and masticatory functions of the missing natural teeth.
2. Transmit forces to the denture base through which they may be distributed by the prosthesis to all teeth and tissues contacted by rigid parts of the denture.
3. Maintain the integrity of the arch by supplying missing proximal contacts.
4. Maintain the position of opposing teeth by supplying missing incisal and occlusal contacts.

DESIRABLE CHARACTERISTICS

The desirable characteristics specific for prosthetic teeth are:

1. Have the color (shade), translucency, size, shape, and characterization similar to the natural teeth they replace.
2. Be easily shaped with conventional dental burs.
3. Be easily characterized with conventional dental stains.

4. Have a hardness and abrasion resistance similar to the opposing enamel or dental material.
5. Chemically bond to the denture base material or RPD alloy to which they are attached.
6. Be resistant to staining by oral fluids and microorganisms
7. Be chemically inert.
8. Be odorless and tasteless and not pick up odors or tastes from oral fluids.
9. Have a surface which is dense to avoid harboring oral fluids and microorganisms.
10. Be capable of being cleaned by customary oral hygiene technics and materials.
11. Be of low initial cost and inexpensively repaired or replaced.
12. Be capable of being repaired and replaced by customary dental technics and materials.
13. Be strong enough to resist the forces which will be applied.
14. Not soften or warp in hot water or conventional denture cleansing solutions.

TYPES

There are seven types of prosthetic teeth: (1) denture teeth, (2) tube teeth, (3) processed plastic teeth, (4) facings, (5) custom-made facings, (6) metal reinforced denture teeth, and (7) metal pontics.

DENTURE TEETH

DENTURE TEETH are commercially available prosthetic teeth (Fig. 8-1). There are several manufacturers of

denture teeth. Denture teeth are made of plastic and porcelain.

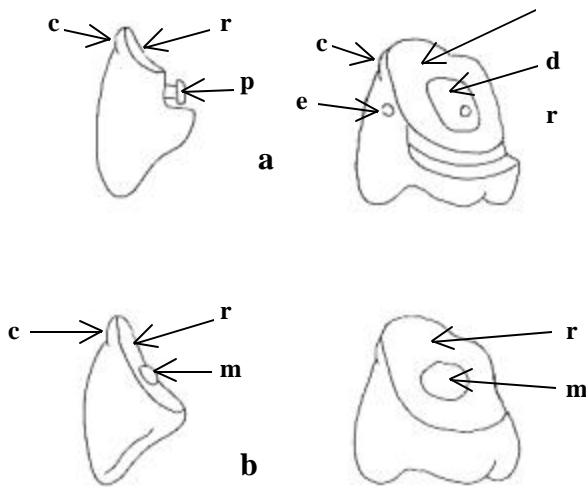


Fig. 8-1. Denture teeth, a) porcelain, b) plastic, c) collar, d) diatoric, e) air escape hole, m) remains of plastic injection space, p) retentive pin, r) ridge lap area

The most frequently used prosthetic teeth on a RPD are denture teeth attached to the framework with a processed plastic base (Figure 8-2).

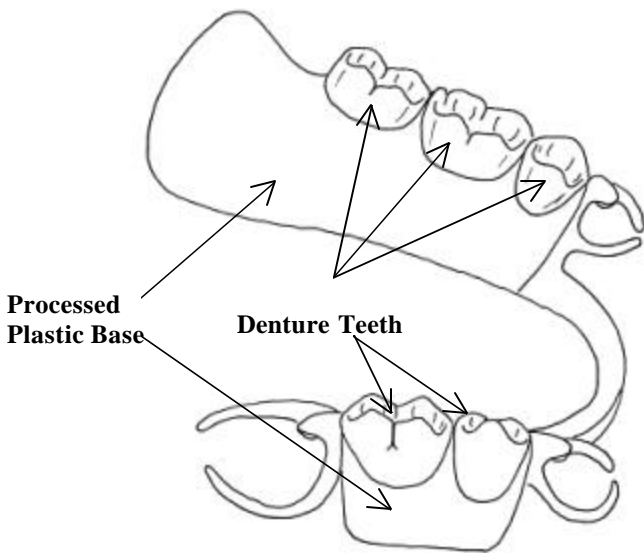


Fig. 8-2 Denture teeth attached to a RPD framework with a processed plastic base

INDICATIONS:

1. When a processed plastic base will be used to attach the prosthetic teeth to the framework.

CONTRAINDICATIONS:

1. Where there is insufficient space occlusal/incisal-gingival or mesiodistally for a denture tooth-plastic base combination.
 - a) Less than 5 mm between the occlusal plane and the edentulous ridge.
 - b) Single tooth edentulous space.
2. Where protrusive or lateral occlusal guidance will be on the prosthetic teeth.
3. When available denture teeth do not satisfy esthetic or occlusal requirements. In these situations a custom made prosthetic tooth is necessary.

ADVANTAGES:

1. Denture teeth are prefabricated by several manufactures.
2. There is a large selection of shades, sizes, and shapes. An acceptable denture tooth can usually be found.
3. Available in plastic and porcelain.
4. Can be easily adjusted (particularly plastic) to fit the framework, available space, existing occlusion, and desired size and shape of the tooth.
5. There is great flexibility of arrangement of denture teeth.

6. The denture tooth arrangement can be tried in the patient's mouth to preview the esthetics of the completed denture.
7. Replacement of denture teeth on a processed plastic base is fairly easy and rather inexpensive.

DISADVANTAGES:

1. Plastic and porcelain denture teeth may fracture where as metal prosthetic teeth will not.
2. Plastic denture teeth are not as abrasion resistant as metal prosthetic teeth.
3. Cannot be used in small spaces, or where occlusal guidance will be on the prosthetic tooth.

PORCELAIN DENTURE TEETH

Porcelain denture teeth have the following advantages in comparison to plastic denture teeth:

1. More esthetic.
2. More dense surface which is hard, abrasive, resistant, less prone to stains and easier to clean.

Porcelain denture teeth have the following disadvantages in comparison to plastic denture teeth:

1. Harder therefore transmit more force.
2. More abrasive, particularly when the glaze is broken. Should be used opposing porcelain surfaces only.
3. More brittle. More apt to crack, chip and fracture.

4. Adjusting (grinding) to fit the framework and opposing occlusion is more difficult.

5. Do not chemically bond with plastic. Must be mechanically attached to the denture base. The retentive pins and diatorics limit the amount of tooth modification which can be done. The tooth-base interface will eventually stain because of the ingress of bacteria and fluids into the space.
6. An objectionable "clacking" noise may be heard when porcelain teeth occlude with enamel, cast metal or porcelain surfaces of opposing teeth.

PLASTIC DENTURE TEETH

Plastic denture teeth have the following advantages in comparison to porcelain denture teeth:

1. Easier to adjust to fit the framework, space limitations and existing occlusion.
2. Chemically bond with plastic making a one piece denture tooth-plastic base combination.
3. Softer so forces are dampened.
4. Will not abrade opposing enamel, amalgam, or cast metal restorations.
5. Can be restored with cast metal occlusal surfaces and amalgam restorations.
6. Less noise from tooth contact.

7. Can be custom “stained” to match the color and characterization of the natural teeth.

Plastic denture teeth have the following disadvantages in comparison to porcelain denture teeth:

1. Less hard. Will have more occlusal wear and may be abraded by brushing with an abrasive cleaner.
2. Less esthetic.
3. Surface is more porous and will stain easier.
4. More difficult to remove wax from tooth during the wax-up of the denture.
5. More difficult to finish and polish denture.

THE CHOICE OF PORCELAIN OR PLASTIC DENTURE TEETH

Plastic denture teeth are used on RPDs almost exclusively because the available space precludes the use of porcelain denture teeth. The esthetics of plastic denture teeth is acceptable and their advantages far outweigh their disadvantages. The Portrait IPN teeth by Dentsply have greatly improved esthetic characteristics.

TUBE TEETH

TUBE TEETH are denture teeth with a post hole extending occlusally (incisal) from the ridge lap area. They are cemented onto a corresponding post on the framework (Figure 8-3).

INDICATIONS:

1. Single tooth edentulous spaces which preclude the use of a processed plastic base.

2. Short (occlusal/incisal-cervical) edentulous spaces in conjunction with a metal base. The tube tooth will be cemented to the post, not attached by a processed plastic base.

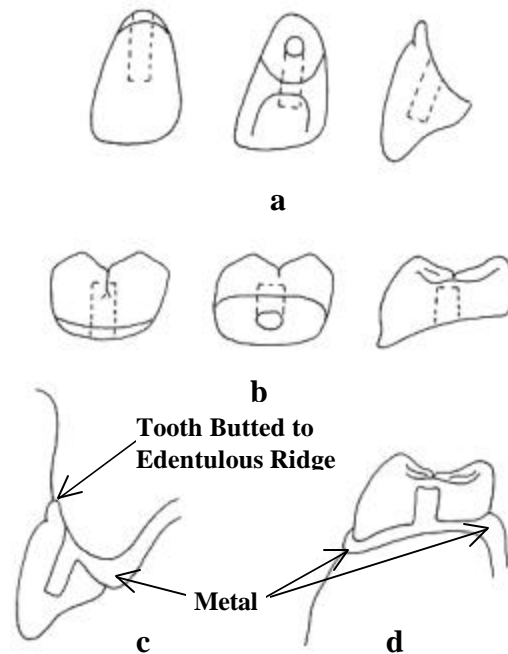


Fig. 8-3 Tube teeth; a) anterior, b) posterior, c) anterior tube teeth are usually butted to the edentulous ridge, d) posterior tube teeth usually have a metal facial and lingual finish lines

CONTRAINDICATIONS:

1. Where a denture tooth-processed plastic base may be used.
2. Where the occlusion must be on metal.
3. Where the space is too narrow or too short for a denture tooth. A metal pontic, custom made facing, or processed plastic tooth is used in these situations.

ADVANTAGES:

1. Constructed from denture teeth with all the advantages related to their selection and modification.
2. Fairly easy to replace.

DISADVANTAGES:

1. Same esthetics limitations as denture teeth with the additional problem of the effect of the post on the tooth shade.
2. Subject to fracture.
3. No wax try-in possible to preview the esthetics of the completed denture.
4. No chemical bond between the tube tooth and the framework. The 4-Meta luting cements show promise when bonding denture teeth to the metal framework.
5. No plastic denture base used.
6. Tube teeth are frequently butted to the ridge which is a time consuming laboratory step.

PROCESSED PLASTIC TEETH

PROCESSED PLASTIC TEETH are custom made prosthetic teeth processed from tooth colored heat polymerized acrylic resin. They are attached to the framework by retentive mesh, loops, beads, or posts. They may be used with or without a processed plastic base.

INDICATIONS:

1. A posterior edentulous space which is too small occlusal/incisal- cervically or mesiodistally for a denture tooth.
2. Where available denture teeth do not satisfy the esthetic or size requirements.

CONTRAINDICATIONS:

1. Where a simpler prosthetic tooth-denture base combination may be used.
2. As anterior prosthetic teeth (custom facings are used because of superior esthetics).

ADVANTAGES:

1. Can be utilized in very small spaces.

DISADVANTAGES:

1. Difficult to obtain esthetic shade match with processed plastic teeth.
2. Processed plastic teeth abrade more than commercial available denture teeth.
3. A wax try-in is not possible.

FACINGS

FACINGS used on RPDs are manufactured prosthetic teeth consisting of two parts: a veneer of tooth colored porcelain or plastic (the **FACING**) and a **BACKING** made of a plastic material (Fig. 8-4). The backing is incorporated into the wax-up of the framework. The facing and backing are related by a slot and groove. The facing is cemented onto the framework with a dental adhesive.

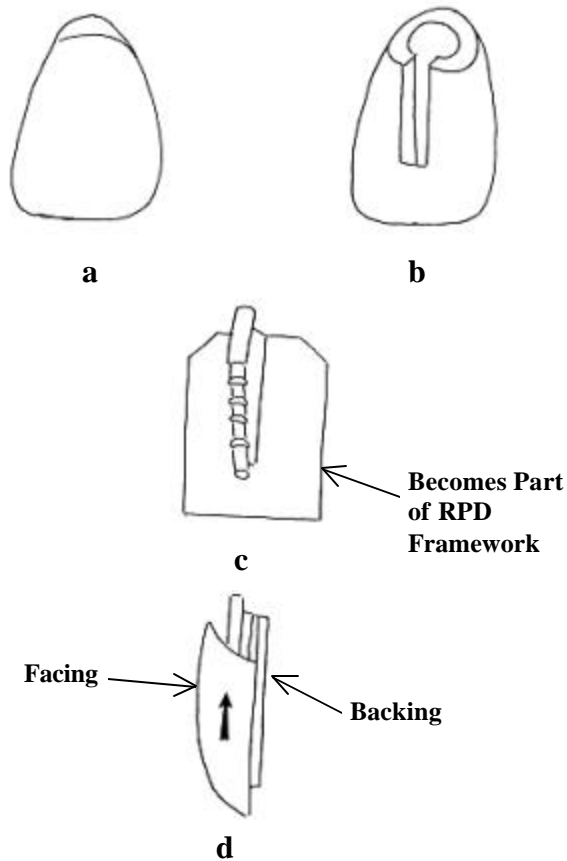


Fig. 8-4 A slot-backed facing (Steele's Flatback Facing, the Columbus Dental Manufacturing Co., Columbus, Ohio 43206), a) facial view of facing, b) lingual view of facing, c) backing, d) the facing slid onto backing

Because of their many disadvantages and the advent of custom made facings using light-cured composite resin materials, the use of commercially purchased facings is being phased out of RPD prosthodontics.

INDICATIONS:

1. Single tooth edentulous spaces.
2. Where protrusive or lateral occlusal guidance must be on the prosthetic teeth. The occlusal guidance is placed on the metal (backing) of the facing thus protecting the facial veneer from occlusal forces.

CONTRAINDICATIONS:

1. Where a simpler prosthetic tooth-denture base combination can be used.

ADVANTAGES:

1. Fairly esthetic.
2. Fairly simple to use and replace.

DISADVANTAGES:

1. Not as esthetic as denture teeth because the backing shows through the veneer.
2. A wax try-in is difficult.
3. If occlusion is placed on the backing the refractory cast must be mounted on an articulator so the occlusion can be developed in the wax pattern for the framework.
4. Limited selection of sizes, shapes, and shades.
5. Selection more difficult than for denture teeth because there is no mold guide. Selection is made from mold chart with sizes indicated.
6. More difficult to obtain than denture teeth.
7. Subject to fracture (particularly porcelain).

CUSTOM MADE FACINGS

CUSTOM MADE FACINGS are prosthetic teeth consisting of a veneer of tooth colored plastic processed directly to the RPD framework. (The lost wax technic is not used as it is for processed plastic teeth). A heat or light-activated cross-linked acrylic resin copolymer (Targis System) is used for the tooth colored veneer. With skill

and experience, various shades can be blended and the contours developed with an esthetic result that is at least equal to that of denture teeth. The plastic veneer is retained on the framework mechanically by retentive loops, beads or posts and/or adhesive bonding^{1,2}.

INDICATIONS:

1. Single tooth edentulous space.
2. An edentulous space which is too small occlusal/incisal-cervically or mesiodistally for a denture tooth.
3. Where protrusive or lateral occlusal guidance must be on the prosthetic tooth. The occlusal guidance is placed on the metal of the framework thus protecting the plastic veneer from occlusal forces.
4. Where available denture teeth do not satisfy the esthetics or size requirements.

CONTRAINDICATIONS:

1. Where a denture tooth-processed plastic base can be used.

ADVANTAGES:

1. Excellent esthetic result is possible.
2. Fairly easy to construct and replace.

DISADVANTAGES:

1. Requires special equipment and training.
2. No wax try-in is possible.

3. If occlusion is placed on the framework the refractory cast must be mounted on an articulator so the occlusion can be developed in the wax pattern for the framework.

METAL REINFORCED DENTURE TEETH

METAL REINFORCED DENTURE TEETH are prosthetic teeth constructed from denture teeth. The facial portion of a denture tooth attached to the framework with a tooth-colored resin. Retentive loops, beads, or posts are used to mechanically attach the tooth to the framework. The tooth may also be adhesively bonded to the framework.^{1,2}

INDICATIONS:

1. Where protrusive or lateral occlusal guidance must be on the prosthetic teeth. The occlusal guidance is placed on the metal of the framework thus protecting the facial veneer from occlusal forces.

CONTRAINDICATIONS:

1. Where a denture tooth-processed plastic base may be used.

ADVANTAGES:

1. There are a large number of shades, sizes, and shapes to select from since they are made from denture teeth.
2. Fairly esthetic.
3. Fairly easy to construct and replace.

DISADVANTAGES:

1. Not as esthetics as the denture tooth-processed base combination because the framework may show through the veneer of the denture tooth.
2. The refractory cast must be mounted in an articulator to develop the occlusion on the framework pattern.
2. All the disadvantages of metal such as hardness, wear of opposing teeth and tooth materials, etc.
3. May require that the refractory cast be mounted in an articulator to develop the occlusion of the pontic.
4. No wax try-in possible.

METAL PONTICS

METAL PONTICS are posterior prosthetic teeth cast as part of the RPD framework. They may be veneered with a tooth-colored acrylic resin to improve esthetics.

INDICATIONS:

1. A posterior edentulous space which is extremely small mesiodistally or occlusocervically.

CONTRAINDICATIONS:

1. Anterior edentulous spaces.
2. Where a simpler or more esthetic type prosthetic tooth may be used.

ADVANTAGES:

1. Can be used where other prosthetic teeth can not.
2. Have all the advantages of cast metal such as permanence of form, wear resistance, dense surface, etc.

DISADVANTAGES:

1. Not as esthetics as other types of prosthetic teeth even when veneered with tooth colored plastic.

REFERENCES

1. Jacobson T E, Chang J C, Keri P P, Watanbe L G. Bond strength of 4 META acrylic resin denture base to cobalt chromium alloy. J Prosthet Dent 1988; 60:570-576.
2. Barzilay I, Myers M L, Cooper L B, Graser G N. Mechanical and chemical retention of laboratory cured composite to metal surfaces. J Prosthet Dent 1988; 59:131-137.