IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 11 Ver. 5 (November. 2018), PP 60-64
www.iosrjournals.org

Review Article on Connectors in Fixed Partial Dentures

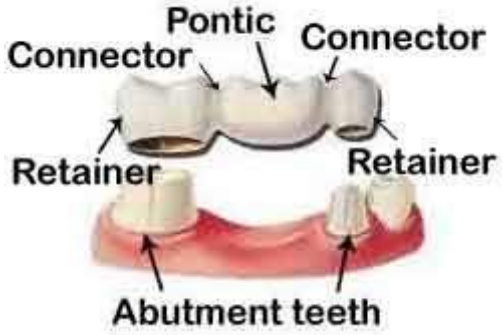
Dr. T.JeyanthiKumari MDS[1], Dr.K.Vinayagavel MDS[2],
Dr. C. Sabarigirinathan MDS Phd[3],Dr. Francilin F[4],Dr.Deepiha D [5], Dr. SaravanapriyaM[6] ,Dr.AryaSukumaran[7] ,Dr.Periyasamy S[8]
1. Senior assistant professor,2. Professor,3.Professor and HOD 4,5,6,7,8, Pg students, Department of Prosthodontics, TNGDCH, Chennai.
Corresponding Author: Dr. T.JeyanthiKumari MDS

Abstract: *Connectors are those parts of a fixed partial denture (FPD) or splint that join the individual retainers and pontics together .usually this is accomplished with rigid connectors and non rigid connectors.*
Keywords: *connectors, fixed partial denture, fabrication techniques , rigid connector , non rigid connector*

Date of Submission: 08-11-2018 Date of acceptance:21-11-2018

I. Introduction:

Connectors in fixed prosthodontics,the portion of the fixed partial denture that unites the retainers and pontic . Rigid connectors are the portion of fixed partial denture that joins the individual retainer and pontic together as complete restoration. Any connectors that permit limited movements between,otherwise independent members of the fixed partial denture.



CLASSIFICATION OF CONNECTORS:
1. RIGID CONNECTOR:
   A: cast connector
   B: soldered connector
   C: welded connector
2. NON RIGID CONNECTOR:
   A:dovetail or key-key ways
   B: split pontic
   C: cross-pin and wing

RIGID CONNECTORS:
A cast ,soldered ,or fused union between the retainers and pontic. Rigid connections in metal can be made by the following:
1. casting
2. soldering
3. welding

CAST CONNECTORS:

Cast connectors are shaped in wax as part of a multi unit wax pattern . Advantages of the cast connector are it is a convenient method and it minimizes the numbers of steps involved in laboratory fabrication.

Disadvantage is that the fit of the individual retainers may be adversely affected because distortion more easily results when a multiunit wax pattern is removed from the die system

SOLDERED CONNECTORS:

Soldered connector in metal can be made by intermediate metal alloy whose melting temperature is lower than the parent metal. The parts being joined are not melted during soldering but must be thoroughlywettable by liquefied solder

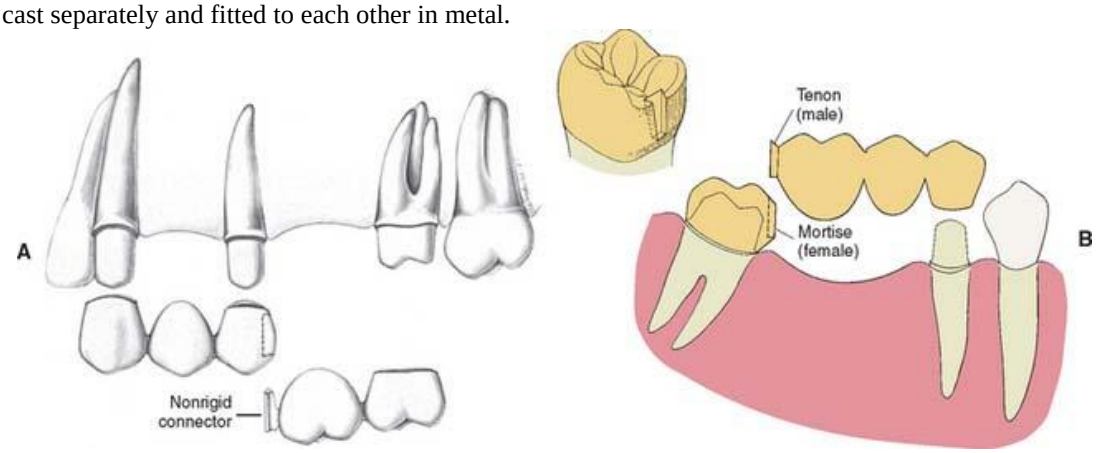
WELDING:

Welding is another method of rigidly joining metal parts . Here the connection is created by melting adjacent surfaces with heat or pressure. In individual metal working ,a distinction is made between soldering in which the filler ,metal has a melting point below 450 ^{o}c (824 F) and brazing in which the filler has a melting point above 450^{0} C(842 F)

NON RIGID CONNECTORS:

Non rigid connectors are indicated to relieve the stress which is associated with pier abutments. It relieves stress at midspan on long pontics and tilted abutment cases. Non rigid connectors are indicated when it is not possible to prepare two abutments for an FPD with a common path of placement. In the mandibular arch,non rigid connectors are indicated when a complex FPD consists of anterior and posterior segments.

Non rigid connectors are fabricated through incorporation of prefabricated inserts in the wax pattern or through custom milling procedures after the first casting have been obtained. The second part is then custom fitted to the milled retainer and cast. They are often made with prefabricated plastic patterns. the retainers are then cast separately and fitted to each other in metal.



TYPES OF NON RIGID CONNECTORS:

1. dovetail (key – keyways)
2. splitpontic (connectors inside the pontic)
3. cross pin and wing
4. loop connector

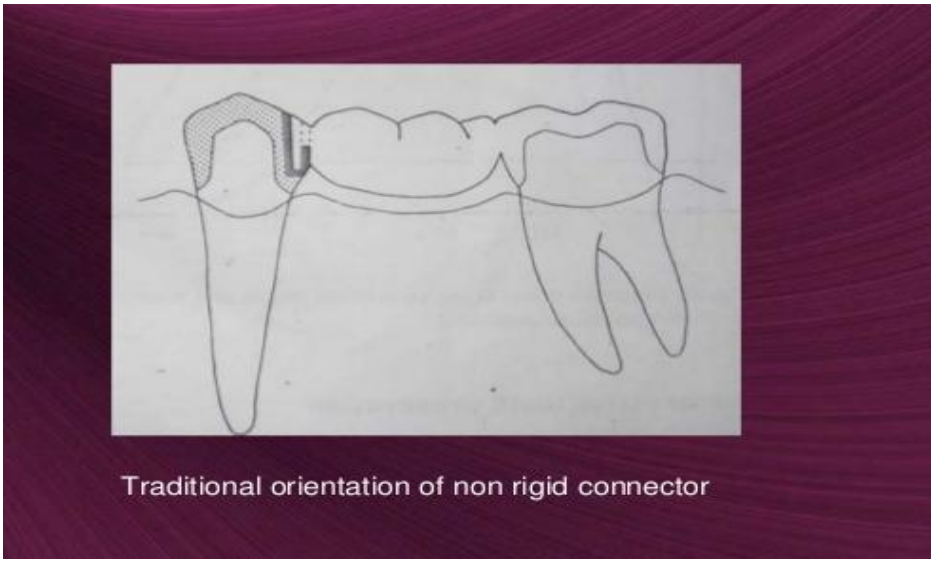
DOVETAIL:

When a fixed partial dentureis fabricated with a non rigid connector, it is necessary to align the path of insertion of the key way with that of the distal abutment. This technique is best suited for relieving stress at midspan on long pontics

SPLIT PONTIC:
This is an attachment that is placed entirely within the pontic . It is particularly useful in tilted abutment cases where the use of a conventional dovetail would necessitate the preparation of a very drastic box in the distal aspect of the pier abutment
CROSS – PIN AND WING:
The cross pin and wing are the working elements of a two piece pontic system that allows the two segments to be rigidly fixed after the retainers have been cemented on their respective abutment preperations
LOOP CONNECTOR
In a **loop connector fixed partial denture**, the **connector** consists of a **loop** on the lingual aspect of the prosthesis that connects adjacent retainers and/or pontic. The **loop** may be cast from sprue wax that is circular in cross section or shaped from platinum-gold-palladium (Pt-Au-Pd) alloy wire.

Designing of connectors

The size, shape and position of the connectors will all determine the influence the success of the fixed partial denture. Connectors must be sufficiently large to prevent distortion or fracture of the bridge during function. But too large and bulky connectors will interfere with effective plaque control and lead to periodontal problems over time. Hence adequate access must be made to be available for the access of the oral hygiene aids cervical to the connector. Inciso-cervically bulky connectors will adversely affect this access. Large and inappropriately shaped connectors will also lead to metal exposure and compromised aesthetics of the restoration.



- Hygiene considerations:

Mesio-distally the connectors must produce a smooth transition from one component to the other. Tissue surface of the connectors must be highly polished and curved facio-lingually to facilitate cleansing and to thereby prevent plaque accumulation. The connectors should occupy the normal anatomic inter-proximal contact areas because encroaching into the buccal, lingual, incisal and gingival embrasures can result in restricted access to the plaque control measures. Too large, bulky connection will interfere with efficient plaque control measures. Hence, inciso-cervically connectors should not be bulky

- Biologic considerations

The pulp size and crown height are the limiting factors for the placement of non-rigid connectors as the pre-fabricated patterns require the preparation of box in the retainers. Since ideal thickness of the box in difficult to achieve, a 3 to 4 mm vertical height of the box is considered adequate and recommended by most of the manufacturers of the plastic patterns. However to improve the aesthetics without compromising on the hygiene considerations, connectors in the anterior region are placed slightly towards the lingual side.

- Mechanical considerations:

The bucco-lingual cross section of the connector must have an elliptical shape. This is considered to be the strongest shape for the connection if the major axis of the ellipse parallels the direction of the applied force.[11] This might not be possible to achieve in all cases due to anatomical factors. Due to space constraints, most of the connectors have their greatest dimension perpendicular to the direction of the applied force which thereby results in a weak connection.

- Aesthetic considerations

Large inappropriately designed connectors will lead to metal exposure and compromised aesthetics.Connectors should occupy the normal anatomic inter-proximal contact areas. Slight lingual placement can improve the aesthetics

II. Techniques Of Fabrication

Cast connectors

Connectors are waxed on the master cast before investing the wax pattern. Because of the presence of the connections, the pattern cannot be gripped on removal. Hence, these types of connectors must be restricted to full veneer retainers that can be gripped bucco-lingually. Although the cast connectors are less time consuming than the soldered type, the accuracy and fit of the assembly can be affected.

Soldered connectors

In this type of connection, the wax patters are fabricated similar to the cast connectors and then units are sectioned with a thin ribbon saw or a thin business card in to individual units before investing. By this method, the joint surfaces created will be parallel, flat and have a controlled distance that allows accurate soldering with minimum distortion.

All metal FPD's

The cast metal units are assembled on the master cast or in the patient's mouth. Occlusal index is made over the master cast with auto-polymerizing resin or plaster. In the patient's mouth the index can be made with putty. The index along with the units is removed and inspected. The index along with the units is boxed and invested. The index is separated from the investment carefully. Anti-flux and flux application and placement is followed by the placement of the investment on furnace. Pre-heating is done and then placement of solder on lingual notch is done followed by heating the alloy in flame. The solder alloy is made to flow from the lingual to the buccal notch. The investment is remove from the furnace and recovery of the framework is done.

Metal ceramic FPD's

In pre-ceramic soldering, the components are assembled and soldered as done for all metal units. A high fusion solder is used to prevent thermal distortion of the connection during porcelain firing. The disadvantages of this method are contouring the proximal areas during porcelain application can be very difficult and a diamond disc is required for this. High gold alloy can sag as their melting range is almost similar to that of high fusion solders. The joint surface will have lower tensile strength than in comparison with post-ceramic soldering. Post-ceramic soldering is indicated in cases of complex FPD's with combined gold alloy units and metal ceramic units as the gold alloy will sag if high fusion pre-ceramic soldering is done and also during porcelain firing

Non-rigid connectors

The parts of the non-rigid connectors incorporated in the wax pattern include mortise (female component) that is prepared within the retainer and tenon (male component) that is attached to pontic. Mortise is usually placed in the distal aspect of a retainer. They are aligned in such a way that both are parallel to the path of placement & withdrawal with a surveyor. Mortise is prepared free-hand or with a precision milling machine. Pre-fabricated plastic patterns for mortise and tenon are available. Another method consists of embedding a special mandrel into the wax pattern and the retainer can be cast with refinement of the mortise as needed. Tenon is then fabricated and attached to the pontic

III. Conclusion :

Connectors are the most smallest and also the most carefully designed components in a FPD as their position and design determine the success of the prosthesis. Based on the clinical conditions and prosthetic requirements, different types of connectors are available to make a choice. A choice between soldered and cast connection is dependent on the length of the span and operator's preference.

Reference:

[1]. Byrne G. et al. : The fit of fixed partial dentures with laser soldering, J. Prosthet. Dent. 68: 428, 1991.
[2]. Donna L. Dixon, Larry C. Breeding and Terry J. Lindquist. : A comparison of linear dimensional stability and tensile strength of different soldering index materials, J. Prosthet. Dent. 67: 726-729, 1992.
[3]. Fehling et al. : Cast connectors, an alternate to soldering, J. Prosthet. Dent 55: 195, 1986.
[4]. Fischman. : Influence of fixed splints on mandible flexion, J. Prosthet. Dent. 35: 643, 1976.
[5]. Gegouff and Rosenstiel. : A comparison between soldered and cast connectors in fixed partial dentures, J. Prosthet. Dent. 62: 292, 1989.

Dr. T.JeyanthiKumari MDS, "Review Article on Connectors in Fixed Partial Dentures. " IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 11, 2018, pp 60-64.