CASE REPORT

Management of Adverse Tissue Response to Faulty Pontic Design- A Case Report

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Abstract
Tooth loss in the aesthetic zone of the anterior region can be due to trauma, periodontal disease or endodontic failure, and is a catastrophic event for a patient. The provision of fixed prosthodontic restorations that meets the patient's functional and aesthetic demands can be challenging, especially in the anterior maxilla. The selection of an appropriate pontic design requires careful evaluation. Application of any pontic design arbitrarily can lead to adverse effects on underlying oral tissues. This case report describes the management of a case of maxillary anterior fixed partial denture with faulty pontic design, exerting pressure on the tissues and having inadequate surface finish, which led to inflammation and hyperplasia in the tissues underlying pontic leading to failure of prosthesis.

Key Words: Hyperplastic Gingival Tissue, Pontic, Faulty prosthesis.

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Introduction-

Longevity in fixed prosthodontics is not only dependent upon the precision and skill with which the work is carried out, but also to a large degree upon a proper assessment and diagnosis and the utilization and implementation of valid principles of design[1].The selection of an appropriate pontic design requires careful evaluation. Factors such as esthetics, oral hygiene, and the size and shape of the edentulous space contribute significantly to pontic design. "To apply a particular pontic design arbitirarily is to disregard the work to date which appears to emphasize the individuality of each pontic design". Adverse tissue reaction in form of ulceration, inflammation, or hyperplasia is seen in response to faulty pontic design. Pontic design, surface finish, and the ability to maintain a hygiene state are more significant factors affecting tissue response. The amount of retained plaque in contact with the soft tissue is the primary factor causing adverse tissue response.[2,3]
This case report describes the management of a case of maxillary anterior fixed partial denture with faulty pontic design, exerting pressure on the tissues and having inadequate surface finish, which led to inflammation and hyperplasia in the tissues underlying pontic leading to failure of prosthesis.

Case report-

A 42 year old male patient reported to the Department of Prosthodontics with the complaint of pain underneath an existing fixed partial denture with respect to missing right maxillary lateral incisor. Right maxillary central incisor and canine were the abutments (Fig. 1). Dental history revealed that the fixed partial denture was cemented 6 months back.

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(Fig 1. Faulty Prosthesis with plaque accumulation around & beneath pontic surface.)

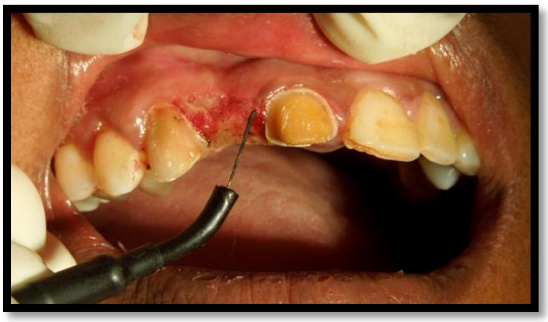
On examination the periodontal status of the abutment teeth was found to be healthy. The mucosa beneath the pontic was inflamed and tender. There was no significant finding in the radiographic examination of the abutments. Thus it was decided to remove the fixed partial denture to complete the examination. After removal of the fixed partial denture, the mucosa beneath the lateral incisor pontic was found to be red, inflamed and painful. The underlying soft tissues were hyperplastic (Fig. 2). On evaluation of the fixed partial denture, the pontic surface was found to be rough with plaque accumulation. Pontic design used was saddle, with positive contact with the ridge.

(Fig 2. After faulty FPD removal, inflamed hyperplasic ginigival tissue seen.)

Clinical procedure

The patient was advised to remain without FPD for few days. Once the inflammation in the pontic region subsided, the patient was referred to Department of Periodontics for removal of hyperplastic tissue in that region. The hyperplastic tissue was excised andelectrocautery done(Fig. 3,4). After healing of the tissues (Fig. 5), the tooth preparation on the right maxillary central incisor and canine abutments was modified and impressions made. Provisional restoration was cemented.

(Fig 3. Showing excision of the hyperplastic tissue.)



(Fig 4. Electrocautery done to contour the tissue surface and to aid in blood coagulation.

(Fig 5. After healing of gingival tissues.)

Metal ceramics definitive restorations were planned withmodified ridge lap pontic design having passive contact and tissue

surface of pontic with glazed ceramic (Fig. 6). Definitive fixed partial denture was first cemented using a provisional cement for one week. The patient was educated regarding maintainenceof proper oral hygiene with fixed partial denture. After one week, the patient reported with no complaints.

(Fig 6. Metal Ceramic fixed prosthesis with modified ridge lap pontic design.)

The fixed partial denture was removed and underlying tissues were examined for any evidence of pressure and redness. The tissues were found to be healthy. At this time the fixed partial denture was cemented with glass ionomer cement (Fig. 7). The importance for adequate oral hygiene was again emphasized.

(Fig 7. Prosthesis cemented in patient's mouth.)

Discussion-

An alteration of the functional and environmental demands, directed on the teeth and ridge areas accompanies the insertion of a fixed prosthesis.In a fixed partial denture, the teeth are mechanically unified by the pontic. The ridge area is covered by the body of the pontic, and the entire prosthesis is affected by any factor acting on any part of the restoration. Subsequently, the pontic assumes the role of an integral dynamic component of the over all prosthesis and cannot be considered as a lifeless insert of gold, porcelain, or acrylic resin.Different studies on the pontic design disclosed that pontic design, surface finish, and the ability to maintain a hygiene state are more significant factors affecting tissue response.[3,4,5,6]

In the present case the inflammation and hyperplasia of the tissues under pontic was due to improper design and finish of the tissue surface of the pontic. The source of the inflammation and hyperplasia is "traumatic- frictional" stimuli. There is an invasion of the tissue by bacterial toxins due to the stasis of food coupled with the trauma produced by mastication. Also, pernicious tongue habits commonly found in patients with edentulous regions create a frictional irritant.[4,7]

It has been found that a more natural pontic contour and tissue contact would accentuate the potential for tissue pathology. A successful artificial tooth replacement is characterized by a healthy tissue response with the appearance of a lack of contact between the residual ridge and under surface of the pontic. Therefore attaining positive pontic to ridge pressure should be avoided. Passive contact without tissue blanching during seating is desirable. Esthetic demands often necessitate ridge contact in the maxillary arch. Modifications of the full ridge lap to a minimal contact(modified ridge lap) eliminates adverse tissue response.[2,4,8]

Further, among different materials use for fabrication of tissue surface of Pontics, glazed ceramic is considered the best for the health of the underlying tissues.[3,4]

The following specifications are advocated for the design of pontics-

Posterior pontic design- A correctly designed posterior pontic should have the following characteristics:

- All surfaces should be convex, smooth, and properly finished.
- Contact with the buccal contiguous slope should be minimal (pinpoint) and pressure- free. (modified ridge lap)
- The occlusal table must be in functional harmony with the occlusion of the teeth.
- The buccal and lingual shunting mechanism should conform to those of the adjacent teeth.
- The overall length of buccal surface should be equal to that of the adjacent abutments.

Anterior pontic design – a correctly designed anterior pontic should have the following charecteristics:

- All surfaces should be convex, smooth, and properly finished.
- Contact with the labial mucosa should be minimal (pin point) and pressure free (lap facing). Esthetics may require a long area of contact to prevent the "black space" appearance if the residual ridge is excessively resorbed.
- The lingual contour should be in harmony with adjacent teeth or pontics.[4]

Conclusion

The replacement of a missing tooth is a compromise at best, and must be accepted as such by both the patient and dentist. The restoration of missing or lost components is not a regrowth but merely an artificial means for supplanting nature in an altered environment. The dentist should not attempt to duplicate nature exactly, but should attempt to support it by supplying a prosthesis based on sound biomechanical principles. Designs that allow easy plaque control are especially important to a pontic's long term success. Minimizing tissue contact by maximizing the convexity of the pontic's gingival surface is essential. Special consideration is also needed to create a design that combines easy maintenance with natural appearance and adequate mechanical strength.

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