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Hemisection - A Battle to Win Furcation Defect-Case Report

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Furcation defects present the greatest challenge to the success of periodontal therapy. A higher risk of tooth loss has been observed in multirooted teeth with furcation involvement, regardless of the treatment modality employed. The objectives of periodontal therapy in multirooted teeth with furcation involvement are arresting disease progression and maintaining the teeth in health and function. It can be done by eliminating the microbial plaque from the surfaces of the root complex, and then by establishing an anatomy that facilitates proper self performed plaque removal. Few procedures like regenerative therapy might be considered the ideal treatment for furcation but maxillary molars with degree II interproximal furcation, as well as all degree III furcationinvolved molars, are generally not suitable for regenerative therapy thus differenttreatment strategies (such as resective) have to be employed to eliminate or manage furcation defects.[1]

Anatomic and vascular interconnections of periodontium and endodontiuminfluence each other during function therefore, should be considered as a biological unit. The main pathways involved in the development of endodontic periodontal lesions are the dentinal tubules, the lateral and accessory canals, and the apical foramen or foramina.Radiographic and clinical findings can help the clinician to identify the aetiology and diagnose the furcation involved tooth.[2]

Management of periodontally and endodontically compromised molars with extensive decay and bone loss is challenging and is limited to dental extraction and replacement with implants. But when extraction is not accepted by patient, few other treatment options like hemisection and root resection can be advised.

The treatment may involve combination of restorative, endodontic and periodontic dentistry to retain the tooth in whole or in part. Thus tooth resection procedures are used of which Hemisectionis a conservative way of preserving tooth. Hemisection or root amputation are synonymous for root sectioning or bisection and is a treatment modality allowing preservation of the tooth structure, alveolar bone. It is also cost effective over other treatment options for patients.[3]

Periodontal treatment of a furcation defect should never be done without a proper endodontic diagnosis because endodontic infectionscan influence periodontal health that is whenthe noxaeof degenerated pulp involve thesupporting periodontium, rapid inflammatory responses, characterized by bone loss,tooth mobility, and/or sinus tract formation,might develop.[2]

Hemisection denotes removal or separation of root with its accompanying crown portion of multi rooted teeth.

Weine F has listed the following indications for root resection.[4]

Periodontal indications:
1.Multirooted teeth with severe vertical bone loss involving only one root.
2. Through and through furcation involvement.
3.Unfavorable proximity of the adjacent teeth roots, which prevents adequate hygiene maintenance in the proximal areas
4. Exposure of root due to dehiscence.

Endodontic and restorative indications:
1. Prosthetic failure of abutments in a splint.
2. Endodontic failure of a single root in a multirooted tooth.
3. Vertical fracture of one of the roots.
4. Severe tooth destruction due to furcation or subgingival caries, injuryand large root perforations during endodontic therapy.

Contraindications
a. Strong adjacent teeth if available for bridge abutments as alternative to hemisection
b. Presence of inoperable canals in root which is to be retained
c. Fused roots making separation impossible

CASE REPORT:

A female patient aged 47years diagnosed with generalised chronic periodontitis clinically showed grade II furcation involvement in relation to 46. No

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mobility was observed but had a pocket depth on 10mm in distobuccal surface. Radiographically it revealed severe bone loss involving distal root of 46.
Oral prophylaxis of all the teeth was done followed by full mouth flap surgery.
Prognosis was good in relation to 46, so treatment option offurcation involving teeth was planned with hemisection.
Root canal treatment was performed for 46 prior to the hemisection procedure.

Procedure:

After local anaesthesia with 2% lignocaine solution, full thickness mucoperiosteal flap was raised irt 46. Tooth was sectioned vertically involving furcation into 2 parts using diamond cutting burs. Distal root along with crown part was extracted. 47 was also extracted as it was grade II mobile.

Flap was closed and secured with interrupted sutures. After 1 week suture removal was done. After 3 months the area was assessed clinically and radiographically. There was no pocket and bone support was adequate and hence impression for prosthesis was made. Metal ceramic long span restoration from 45-48 was fabricated taking 45, 46, 48 teeth as abutment.

Figure 1: Grade 2 furcation involvement

Figure 2: Deep periodontal pocket distal to 46

Figure 3: severe bone loss involving distal root

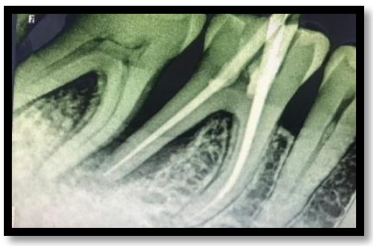

Figure 4: Master cones during RCT

Figure 5: RCT completed

Figure 6: Sectioning of tooth

Figure 7: Tooth sectioned through furcation

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Figure 8: Distal tooth fragment removed

Figure 9: Removed fragment

Figure 9: good bone support after 3 months

Figure 10: prosthesis

DISCUSSION:

Objective of hemisection is to facilitate maintenance, to prevent further attachment loss and also to obliterate furcation[5]

Hemisection of mandibular molar may be viable treatment modality in cases where one root has poor prognosis, and the other is healthy and can act as abutment. the dental specialist faces a challenge for thetreatment, management, and long-term retention of such mandibular molar teeth .[5]

The decision of hemisecting the tooth should be based on the extent and pattern of bone loss, root trunk and root length, ability to eliminate the osseous defects and endodontic- restorative

consideration.When choosing to treat furcation by hemisection, morphology, clinical length, and shape of the roots should be thoroughly evaluated.[6]

It is important to consider the divergence of the roots while making a case selection. Affected teeth with wide roots facilitate the clinicians to carry out root resection. Teeth with close roots or fused roots are not good choices to receive hemisection therapy.[6]

In the present case, the above mentioned indications for case selection in performing hemisection was optimum as the roots were not closely approximated or fused. The tooth has to be treated endodontically before hemisection. In situations when resection periodontal therapy is decided, initiation of conventional endodontic treatment before therapy gives successful results.

After hemisectiontooth requires a restoration to function independently or to serve

as an abutment for a splint or bridge. Sometimes restoration can contribute to periodontal destruction, if the margins are defective or if non-occlusal surfaces do not have physiologic form. Improper occlusion may convert acceptable forces into destructive forces and predispose the tooth to

trauma from occlusion and ultimate failure of hemisection.[7]

According to **Shin-Young Park**, resected molars used as intermediate abutments of a fixed bridge, had a higher survival rate. It might be because the occlusal loads on the intermediate abutment are smaller than on terminal abutments and single abutments. Occlusal forces have a significant in the long term success of the fixed bridge, and root fractures were reported in resected molars subjected to higher occlusal loads. And hence, in this case a long span bridge was given involving 44,45 as abutment teeth[8].

Bhuler had observed 32% failure rate in hemisection cases due to endodontic pathology and root fracture while long term studies showed greater success rates.[5]

In the present case, 2 years follow up showed hemisectioned tooth a healthy periodontium and no peri apical pathology.

Thus, the hemisection can be considered as an effective and conservative treatment against extraction of the tooth with extensive caries.

CONCLUSION:

Hemisection can be considered as another weapon in the arsenal of the dental surgeon, determined to retain and not remove the natural teeth. Advances in endodontics, periodontics and restorative dentistry made hemisection as a conservative and successful.

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