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MANAGEMENT OF FURCATION INVOLVEMENT - CASE SERIES

Dental Science

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ABSTRACT

Aim: To update and compare the various treatment modalities for management of furcation involvement.
Background: Furcation involvement due to its complex anatomic morphology has been a clinical dilemma in periodontal therapy. Earlier, some studies have recommended extraction of furcation involved tooth due to its unpredictable prognosis. Further research in this field have shown that furcation involvement can be successfully treated with regenerative and resective procedures.
Case Description: In the present case series first case has been treated by regeneration utilizing bone grafts and GTR membranes and the other two cases by resective procedures like hemisection and root resection.
Conclusion: The cases treated with regeneration and resective procedures had promising results. The main factors for success of treatment depends upon proper case selection, careful surgical procedure and the corner stone being oral hygiene maintenance by the patient.
Clinical Significance: Natural dentition should always be preserved whenever possible. Thus treatment of furcation helps to salvage teeth and helps to maintain teeth functionally during life time.

KEYWORDS

Furcation involvement, Regeneration, Hemisection, Root resection

INTRODUCTION:

Management of furcation involvement has always been a dilemma to a clinician. Furcation involvement may be defined as the invasion of the bifurcation and trifurcation of multirooted teeth by periodontal disease.[1] The main etiologic factor includes bacterial plaque & inflammatory consequences due to its long-term presence and secondary factors includes local anatomic factors like root trunk length, root morphology and local developmental anomalies like cervical enamel projections, dental caries & pulpal death. Modern advances in dentistry as well as increased awareness among patients have led to the development of many treatment modalities which provides opportunity for patients to maintain a functional dentition for life time. The diagnosis of furcation involvement is by clinical examination using periodontal probing and radiographic examination. The therapeutic approach to be followed depends on the severity of the disease; the amount of remaining bone support, length, shape, and divergence of roots. The various treatment modalities include nonsurgical options like scaling & root planing in Grade I and shallow grade II furcation areas. Deeper sites respond less favourably to nonsurgical modality. In such cases with furcation defects involving deep two walled or three walled defects surgical approaches like reconstruction, flap procedures with or without membranes & bone grafts are preferred. In advanced cases that is multirooted teeth with advanced grade II to grade IV furcations the various treatment options comprises of root resection, hemisection, root separation, tuneling and in cases with advanced attachment loss extraction is the preferred treatment modality. In this article we are presenting different cases of furcation involvement with various treatment methods and their follow up.

Case description

Case no 1

The present case reports a 31 year old female who complains of sensitivity and bleeding in relation to upper left back tooth region. On clinical examination there was bleeding on probing with grade I mobility and deep periodontal pocket of about 5-6mm in relation to buccal aspect of 26 (Fig.1) and a radiograph was taken which confirmed a grdae II furcation involvement (Fig.2).

Clinical photos

Fig. 1

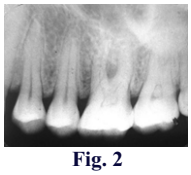

Fig. 2

The treatment strategy was planned which included oral prophylaxis followed by regenerative therapy with bone graft and GTR membrane. During treatment procedure local anesthesia was given, full thickness flap was elevated, area was thoroughly curetted, bone graft was placed followed by GTR membrane placement in relation to buccal aspect of 26 (Fig. 3and 4).

Fig. 3

Fig. 4

After the procedure haemostasis was achieved, flap repositioned and sutured back. Patient was given postoperative instructions and prophylactic antibiotics were prescribed before disposal of the patient. Immediate postoperative checkup was uneventful. One week later sutures were removed. Patient was on further follow-up visits at one month, 3 months and 6 months interval and oral hygiene instructions were reinforced during these visits (Fig.5). Radiograph was taken at 9 months follow up visit which showed bone fill in relation to the furcation area (Fig.6).

Fig. 5

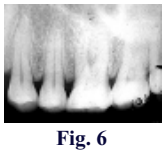

Fig. 6

Case no 2

The second case is a case of pulpo- periodontal involvement with grade II furcation involvement. A 50 year old female reported with a chief complaint of chronic painless swelling in relation to buccal aspect of lower right back tooth region (Fig.7).

Fig. 7

Patient also gave a history of root canal treatment of the same tooth 8 years back. On clinical examination chronic periapical abscess was present in relation to buccal aspect of 46 with deep periodontal pocket in relation to buccal aspect of 46. Radiograph was taken which showed a pulpo-perioodntal lesion in relation to 46 with incompletely filled

mesial root of 46 and guttapercha perforating from roof of furcation (Fig.8).

Fig. 8

This resulted in a bone loss in relation to mesial root of 46 with advanced grade II furcation involvement. Patient was well motivated in saving the tooth and was not willing for extraction. The treatment plan was to do hemisection of mesial half of 46 where advanced bone loss was present and preservation of distal half which showed sufficient bone support with prosthetic rehabilitation later. During the procedure local anestheia was given, flap was reflected, the mesial half of tooth was sectioned with a straight fissure diamond bur and a vertical cut was given through the furcation area corono-apically (Fig.9).

Fig. 9

After that the mesial half was extracted with an extraction forceps and the area was thoroughly curetted (Fig.10).

Fig. 10

Flap was repositioned and sutured back after achievement of hemostasis. Radiograph was taken during immediate post-operative period. Patient was given post op instructions, oral hygiene instructions were given and antibiotics and analgesics were prescribed. Patient was recalled after one week for suture removal and wound healing was satisfactory. Follow up was done at one month, 3 months and 6 months interval after the procedure. At the 6 month follow up radiograph was taken in which bone fill as evident at the extraction socket. Patient was referred to prosthodontist for prosthetic rehabilitation and a fixed partial denture was fabricated extending from 43 to 47 (Fig.11 and 12).

Fig. 11

Fig. 12

Case no 3

The present case is a case of a 32 year old female patient who complained of sensitivity and bleeding in relation to upper right back tooth region. On clinical examination there was bleeding on probing with deep periodontal pocket of about 5-6mm in realtion to distal aspect of 16 (Fig.13).

Fig. 13

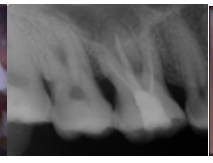

Fig. 14

Fig. 15

The tooth was grade I mobile and there was grade II furcation involvement with class III gngival recession in relation to buccal aspect of 16. Patient also gave a history of root canal treatment of same tooth due to caries 8years back. Radiograph was taken and showed root canal treated tooth with bone loss in relation 16 with advanced bone loss in relation to distobuccal root of 16 (Fig.14). The treatment plan was to do root resection of distobuccal root of 16. During treatment procedure local anesthesia was given, flap was reflected, the distobuccal root was resected with a straight fissure diamond bur and the rough edges were smoothened and polished (Fig.15). The area was curetted and flap was refelected back and sutured with black silk sutures. Post op instructions were given and patient was prescribed antibiotics and analgesics and oral hygiene instructions were given. Suture removal was done after 7 days and wound healing was satisfactory. Follow up recalls were done at one, three, and six months interval (Fig.16) radiograph was repeated at six month recall which showed satisfactory bone level in relation to 16 (Fig.17).

Fig. 16

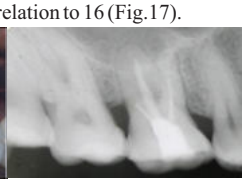

Fig. 17

DISCUSSION

Management of furcation is one of the defiant job to a clinician due to the complex and irregular nature of furcations. The challenge is mainly due to the the size of the furcation entrance, the presence of root concavities and the roughened surface of the roof of the furcation.[2] Previously due to the complex anatomic morphology, difficulty in instrumentation and maintenance extraction was recommended for furcation involved tooth.[3] But later long term studies proved that majority of patients with furcation involved molars responded well to treatment and were retained for periods as long as 40–50 years.[4] Currently, there are various therapeutic protocols for management of furcation and type of treatment modality depends on extent of involvement of furcation. In Grade I furcation involvement non-surgical treatment like scaling and root planing results in complete resolution of the condition.[5] Regenerative procedures using bone grafts and GTR membranes are mainly advocated for the treatment of deep two-walled or significant three-walled components in furcation involved teeth.[6] But all cases with grade II and III furcations are not good candidates for regenerative therapies.[7] In such cases resective procedures come to play. Therefore, resective therapy is an important therapeutic procedure for management of furcation involvement and its success rate depends on proper case selection. So cases planned for resective therapy should be evaluated carefully and thorough clinical and radiographic examinations has to be done pre-operatively.[8] Regenerative therapy aims at reconstruction of lost periodontium whereas respective procedures are aimed at removing structure of the tooth which is a part of furcation so that furcation defect is eliminated. But management with resective procedures is considered unpredictable and long term prognosis cannot be guaranteed because it involves a multidisciplinary approach involving periodontal, endodontic and prosthetic parts. Thus in advanced furcation cases the role of interdisciplinary approach becomes crucial and long term complications can be non-periodontal also, like fracture of one of the remaining roots due to uneven distribution of occlusal forces.[9] Another treatment modality is tunnel preparation and is the process of removing bone from the furcation and flap is apically positioned and sutured to make the area self-cleansable and possibility of cleaning the furcal area by the patient using an interdental brush. But the main limitation associated with the tunneling procedure is the development of root caries.[10]

In the presented first case regenerative procedure with graft and membrane is done and it is one of the most simplest and predictable management options for furcation involvement. The patient was asymptomatic and there was excellent healing of both soft and hard tissues. In the second case managed with hemisection the patient was very cooperative and was motivated in saving the tooth. Although prognosis was questionable the case was carefully planned and a multidisciplinary strategy was advocated and was able to manage the case esthetically and functionally. In the third case managed with root resection chances of root fracture due to unbalanced occlusal forces was informed to the patient, but on subsequent post treatment follow ups patient showed excellent healing and was able to tolerate occlusal forces well. Thus currently all grades of furcation involvement can be managed efficiently through careful and systematic interdisciplinary approach and crucial patient-related factor in respective periodontal procedures is the maintenance of meticulous oral hygiene by the patient.

CONCLUSION

Furcation involvement pose a challenge to the clinician during treatment phase and also maintenance phase because of its complex anatomic nature. Innovations in the field of periodontics had improved the long term prognosis of a furcation involved tooth and

clinical research has indicated that furcation involvements are not a severe complication and a well planned treatment strategic periodontal treatment is sufficient to maintain these teeth in function for long periods. To conclude the keys to long-term success are proper diagnosis, selection of patients with meticulous oral hygiene and careful surgical & restorative management.

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