

## **Hemisection A Feasible Option for Compromised Mandibular Molars – Two Case Reports**

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**Citation of this Article:** Dr Lavanya Boyeena, Dr.Chaitanya Golla, Dr Thirumala Sriya, Dr.Rekha Rani Koduganti, “Hemisection A Feasible Option for Compromised Mandibular Molars – Two Case Reports”, IJDSIR- March - 2020, Vol. – 3, Issue -2, P. No. 234 – 239.

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**Type of Publication:** Case Report

**Conflicts of Interest:** Nil

### **Abstract**

This case series describes a specialized procedure in lower posterior teeth with preservation of the extracted wound using xenograft in one case and a combination of hyaluronic acid gel(gengigel) and hydroxyapatite graft in the other, followed by restoration of the teeth with fixed prosthesis. Hemisection is a conservative procedure, done to retain maximum tooth structure. This procedure is more feasible to the patient economically. The key to success is thorough diagnosis, and an interdisciplinary assessment. Thus a hopeless tooth could be salvaged by meticulous treatment in a motivated patient.

**Keywords:** Furcation involvement, hemisection, socket preservation, fixed partial denture.

### **Introduction**

Hemisection denotes removal of half portion of the tooth. For a molar with extensive bone loss around single root to

be used as a terminal abutment, the treatment options are minimal.<sup>1</sup> Hemisection is done when one root of the multi rooted lower posterior is untreatable because of decay, periodontitis, or iatrogenic factors.<sup>2</sup> From periodontal perspective this procedure is done when there is extensive bone loss around one root, whilst the bone support around remaining root is adequate to act as an abutment. Prosthetic and endodontic assessments are required preoperatively to decide about the feasibility of this procedure. Indications for hemisection include, excessive bone loss around one root of the posterior teeth, a through and through destruction of the furcation, exposure of the root due to attachment and bone loss or vertical fracture of one root or severe destruction of one root due to resorption, caries, trauma or perforation.<sup>3</sup> The extraction socket has a specific wound healing cascade.

To preserve the height and width of alveolar bone,

techniques such as grafting with autogenous bone or bone substitute materials such as allografts, xenografts or alloplasts have been employed. Popularly used are hydroxyapatite, demineralised freeze dried bone (DFDBA), calcium phosphate, HTR polymeric composite and recombinant human osteogenic protein.<sup>4</sup> The present case demonstrates the successful management of mesial root of 36 by hemisection (socket preservation with hydroxyapatite crystals and hyaluronic acid gel) and the distal root of 46 (socket preservation using Xenograft). The cases were treated after obtaining prior informed consent.

**Case report 1:** A male patient aged 50 years visited the department of periodontics with a chief complaint of pus discharge and dislodged crown in relation to 36 (figure 1).

The patient had decay and severe pain in same tooth for which he had undergone endodontic treatment 6 months prior to his visit. Endodontic opinion was once again taken in our institution and it was reconfirmed that re RCT would not be required. It was a primary endodontic, secondary periodontal lesion. The patient was under medications for diabetes since 5 years which was under control. On clinical examination the gingiva was erythematous, soft and edematous with rolled margins, blunt interdental papilla and localised bleeding on probing. There was a sinus tract opening present with pus discharge in 36. On probing with Williams probe a 6mm deep pocket was present and grade I mobility was also noticed. On examination with Nabers probe a grade II furcation was also identified.

On radiographic examination there was a radiolucency in the interradicular region and also involving the whole of the mesial root (figure 2). Since there was adequate bone support around distal root, hemisection of the mesial root was considered appropriate as 36 was the terminal molar in the arch to be used as an abutment for a fixed

prosthesis. The treatment was planned accordingly. Initially incision and drainage of pus and scaling and root planing was carried out. The patient was prescribed antibiotics for 5 days. Patient was recalled after 1 week and hemisection was performed.

Initially the area was anaesthetised using LA and a crevicular incision was given to enable flap elevation using a periosteal elevator. The necrotic granulation tissue was removed using Gracey curettes and thoroughly irrigated using saline solution. Then a long tapered carbide fissure bur was used to initiate a cut from the furcation area of the mesial half of the tooth, dividing the tooth into two equal portions. Extraction forceps was employed to remove the mesial half of the tooth (figure 3). Then the socket was carefully curetted and irrigated with saline solution.

Socket preservation was done by using hydroxyapatite graft which was mixed with hyaluronic acid gel. Then the flap was placed back and sutured with 3-0 non resorbable black silk suture. Periodontal dressing was given with Coe pack and patient was recalled after 10 days for suture removal. Antibiotics and analgesics were prescribed for 5 days (Amoxicillin 500mg twice daily and Aceclofenac 50mg with paracetamol 325mg thrice daily). Post-operative instructions were given. The sutures were removed 10 days later. The patient was monitored on a weekly schedule, postoperatively, to ensure good oral hygiene in the operated site.

The tooth had good bone support after 6 months (figure 4) and it was decided to give a fixed prosthesis involving 35,36 (figure 5). Occlusally, more tooth structure was preserved in relation to 36, which provided more surface area for occlusal table. Follow ups which included oral prophylaxis was done on a regular basis. The patient was able to use the fixed bridge well and also was satisfied with the treatment outcome (figure 6)

**Case report 2:** A male patient aged 28 years came to the department of periodontics with the chief complaint of pain in the left lower posterior region. The pain was dull and throbbing with no associated relieving or aggravating factors. On clinical examination the presence of grade II furcation in relation to the buccal surface of 46 with a probing depth of 6mm was observed. Radiographic examination revealed inter-radicular loss of bone, also involving the distal root completely (figure 7).

It was decided to go ahead with the endodontic treatment followed by removal of the distal root followed by a fixed prosthesis in relation to 46 and 47 respectively. Initially the patient attended the department of endodontics and endodontic treatment was performed. 3 months post endodontic treatment radiographic re-evaluation was done (figure 8). Then hemisection was performed under local anaesthesia and a full thickness flap was reflected after giving a crevicular incision from second premolar to second molar. The Bone was exposed after curettage and root planing.

The molar was then segmented into two separate units after debridement of granulation tissue using the vertical cut method with a tapered fissure long carbide bur (figure 9). Care was taken not to disturb the mesial half of the tooth. The distal segment was extracted and the extracted site was irrigated properly with sterile saline. Then socket preservation was done using osseograft. The flap was then sutured back with 3-0 black non-resorbable silk suture. Patient was recalled after 10 days for suture removal. Postoperative instructions were given and patient was prescribed antibiotics (Amoxicillin 500mg twice daily) and analgesics (Aceclofenac 50mg plus 325 mg paracetamol) for 5 days.

6 months post-surgery, the surgical site had healed well (figure 10). A metal fused ceramic fixed bridge in relation to 46 and 47 was then given. A modified sanitary bridge

design was selected to facilitate oral hygiene maintenance. The patient was able to use the prosthesis and was satisfied with the treatment outcome (Fig 11,12).

### **Discussion**

The success of a clinical procedure is based on thorough clinical knowledge, diagnosis and a multi-disciplinary treatment plan. If the primary endodontic lesion is not diagnosed and treated early, there are chances of secondary periodontal involvement through the apical foramen and the lateral and accessory canals. When traditional endodontic and periodontal treatments prove insufficient to stabilize affected teeth, the clinician must consider other treatment alternatives like root amputation. In the present 2 cases, hemisection was the treatment of choice.

The indication for hemisection was met as the roots of the affected teeth were divergent. The mesial root had a questionable prognosis in case 1 which was resected. Whereas in case 2 severe bone loss was present around the distal root which had to be removed. The decision concerning the final treatment to be performed should be made after the effects of the cause related therapy have been evaluated. Endodontic treatment was performed first in case 2 and re-evaluated before contemplating hemisection.

The present approach is innovative because here the socket preservation was done in case 1 using synthetic hydroxyapatite crystals mixed with hyaluronic acid gel (Gengigel). This reduces the rapid resorption of both material and also hydroxyapatite has osteoconductive potential (acts as a scaffold for new bone formation). Hyaluronic acid has anti-inflammatory activity promoting both hard and soft tissue healing. It also maintains increased growth and differentiation of osteoblasts. In case 2, xenograft was used alone.

The positive influence of the socket preservation therapy

may be attributed more to achieving enhanced restorative and aesthetic outcomes, as well as better maintenance of healthy soft tissues.<sup>5</sup>

Pushendra et al described a simple procedure of hemisection in a mandibular molar with socket preservation with help of an alloplastic bone graft and subsequent restoration of the tooth with fixed prosthesis.<sup>6</sup>

Vineet et al in their case report described the treatment of a vertically fractured mandibular molar by hemisection with socket preservation followed by restoration with a fixed prosthesis and socket preservation which helped to maintain the remaining alveolar bone height and prevented further bone resorption.<sup>7</sup>

### Conclusion

Hemisection has to be thought of, as a treatment option before extracting a tooth because it is a good, biological, low cost alternative. Socket preservation following hemisection helps to maintain the remaining alveolar bone height, prevent further resorption of bony plates, minimize surgical procedures like ridge augmentation and improves aesthetics to achieve optimum treatment results. To successfully meet the challenges of the procedure in daily practice, a team approach is mandatory. The team should include an experienced periodontist, endodontist and restorative clinician. Lastly it is mandatory to motivate the patient to maintain the treated area well and effectively.

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Legends Figures



Fig 1: Preoperative clinical view



Fig 2: Pre operative radiograph

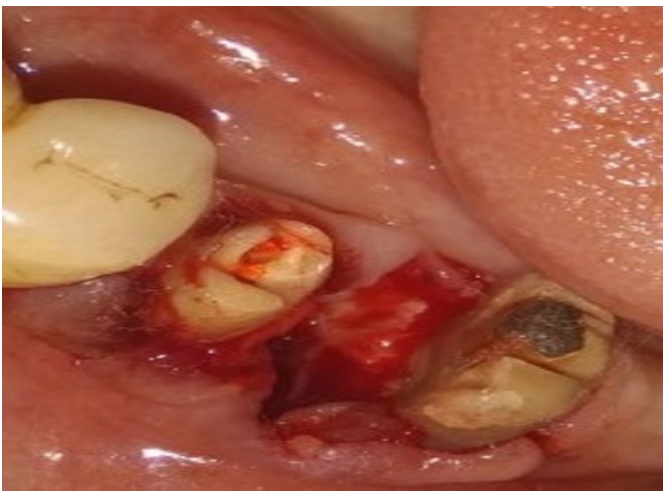


Fig 3: Extracted mesial portion of 36



Fig 4: Postoperative radiograph after 6 months



Fig 5: Fixed prosthesis IRT 35&36



Fig 6: Postop Radiograph with prosthesis

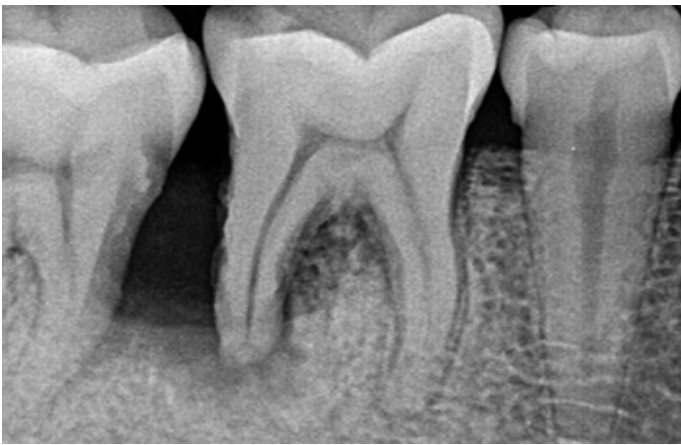


Fig 7: Preop radiograph case 2



Fig 10: Postop healing IRT 46

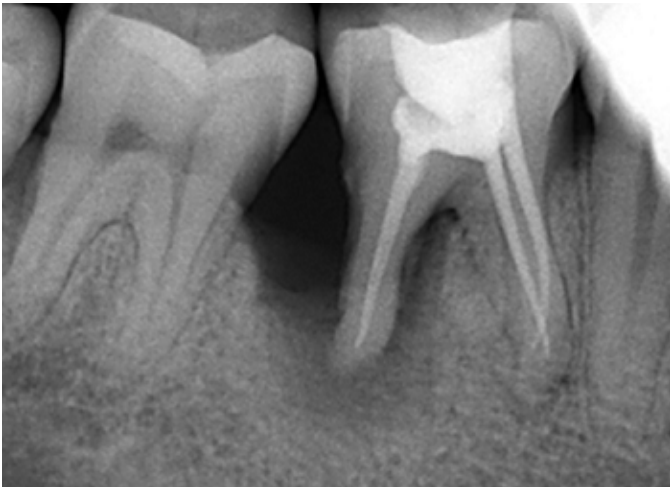


Fig 8: 3 months after obturation of 46



Fig 11: Fixed Prosthesis IRT 46,47



Fig 9: Root sectioning being done



Fig 12: IOPA with prosthesis