

## CASE REPORT

# Third Molar Socket Grafting after Surgical Extraction to prevent Periodontal Pocket Formation

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## ABSTRACT

There is an incidence of periodontal pocket formation and gingival recession on the distal of the lower second molar due to bone defect after third molar surgical removal. Patient referred suffering from recurrent pericoronitis; after clinical and radiographic examination, the lower left 3rd molar is partially erupted and angulated in mesial direction. The radiograph shows there is bone deficiency on the distal of the adjacent 2nd molar. After 3rd molar surgical removal, cancellous bone graft placed on the socket with guided bone regeneration (GBR) procedure and complete primary closure with rotational flap. Patient follow-up after 3 and 6 months, bone formation observed on the distal of 2nd molar with the absence of periodontal pocket. Third molar socket bone grafting with cancellous allograft may be a predictable procedure to prevent periodontal pocket on the distal of the second molar.

**Keywords:** Third molar, Bone grafting, Guided bone regeneration, Periodontal pocket, Surgical tooth removal.

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## INTRODUCTION

Many procedures and techniques have been tried to eliminate or prevent the pocket formation on the distal of the second molar after surgical removal wisdom tooth. Some of these techniques failed to eliminate the pocket formation and others achieved limited success.<sup>1-3</sup> With the evolution of the socket preservation and socket grafting, many grafting materials and techniques have been reported. Many reports agreed that socket grafting

preserve the socket from collapse and better than non-grafted socket or normal healing socket.<sup>4-7</sup> Other studies found that covering the grafted socket with collagen membrane or soft-tissue graft give better result than uncover grafted or nongrafted socket in the term of the amount of bone formation.<sup>6,8</sup> As the collagen membrane try to preserve the blood clot, maintain the space and preventing soft-tissue migration into the socket.<sup>9</sup>

Socket preservation or guided bone regeneration (GBR) now included in the procedure of wisdom tooth removal to eliminate and prevent pocket formation on the distal of second molar.<sup>10,11</sup> A study by Zwahlen et al<sup>12</sup> found using guided tissue regeneration with different membrane in wisdom tooth socket is satisfying with an uneventful healing phase. In this current case report, the author tried to regenerate bone on distal root surface of the second molar that would be exposed after wisdom tooth removal.

## CASE REPORT

The patient was a 20-year-old lady with no history of any systemic disease. The patient presented at this facility complaining from recurrent infection at the area of lower left 3rd molar. When the patient examined clinically, partially erupted wisdom tooth found with food impaction in the distal of second molar (Fig. 1). An orthopantomogram (OPG) was done and showed mesially angulated lower left wisdom tooth with missing bone between the crown of the wisdom tooth and the distal root of the second molar (Fig. 2). Case situation was briefed to the patient that wisdom tooth should be removed but there will be susceptibility of pocketing formation at the distal of the second molar after wisdom tooth removal due to bone defect. Treatment plane and options were discussed with patient regarding the guided tissue regeneration procedure and the type of bone graft. Patient refused animal product bone graft and agreed with the allograft bone graft. Patient was prepared for the surgical removal of 38 wisdom tooth and consent form was obtained from the patient.

Under local anesthesia, two sided flap was done with horizontal incision extend to the external oblique ridge and vertical incision was placed at the mid of second molar crown. Full thickness flap was raised at the buccal

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**Fig. 1:** Clinical view shows partially erupted 38 wisdom tooth with mesial angulation food impaction found in the distal of the second molar



**Fig. 2:** Preoperative OPG shows mesially angulated lower left 3rd molar with bone deficiency on the distal of adjacent 2nd molar

side with minimum reflection at the lingual side. With copious irrigation bone removal with surgical handpiece and small round bur. Guttering was done on the buccal side of the tooth, with complete exposure of the tooth crown. Tooth sectioning was done at the cemento enamel junction separating the crown from the roots. Crown dislodges and removed with coupland chisel. After crown removal, space was available for root removal and rotated out of the socket. Socket inspected and thorough irrigation was done with saline solution. Flap adaptation was checked, and periosteal release was needed for complete closure without tension and was done at the base of the flap with new scalpel. Cancellous bone allograft (Puros, Tutogen, Zimmer, Germany), small particles (0.25-1 mm) was used, mixed with saline and inserted inside the socket into layers with light condensation to allow the blood vessels to grow in between the graft particles (Fig. 3). Resorbable collagen membrane (Genoss), small size (10 × 20) was used to cover the graft and socket, the membrane trimmed

and adapted that extend from the buccal bone plate and tagged underneath the lingual flap (Fig. 4). The flap was adapted and sutured with nylon suture 3/0. Complete and primary wound closure without tension was achieved with rotational flap (Fig. 5). Postoperative pain and edema were controlled by administering an Ibuprofen 400 mg tablet to the patient three times daily for the 5 days following the operation. Combined systemic antibiotics (amoxicillin 500 mg and metronidazole 400 mg) three times daily for 5 days postoperatively to prevent wound infection. Postoperative instruction was given to the patient. After 2 weeks, suture removal was done, the wound healed uneventfully and periapical radiograph was taken for follow-up purpose (Fig. 6).

After 2 months, patient reported that there is food impaction in the distal of second molar. Upon clinical examination, there was no sign of inflammation or exudates discharge. The site was examined with periodontal probe and measured 9 mm pocket depth. Patient advice



**Fig. 3:** Cancellous bone placed inside the socket of the wisdom tooth after remove it surgically



**Fig. 4:** Collagen membrane placed and adapted to cover the graft and tooth socket



**Fig. 5:** Rotational buccal flap to cover the grafted socket and achieve primary closure without tension



**Fig. 6:** Immediate postoperative radiograph shows socket filled with bone graft material



**Fig. 7:** Picture on the left shows normal sulcus depth measured with periodontal probe and on the right, shows healthy gingival tissue covering the socket and the distal part of the second molar



**Fig. 8:** After 6 months, radiograph shows complete bone formation on the tooth socket and on the surface of the distal root of the second molar

to maintain good oral hygiene and to keep the area clean. After 4 months, patient recall again for follow-up examination, there was no sign of inflammation or infection. Distal of the second molar examined with

periodontal probe and there was complete elimination of the pocket, probe measure 3 mm depth (Fig. 7). After 6 months, patient return back to our clinic for follow-up and radiograph examination. Radiograph showed complete bone formation on the distal root of the second molar (Fig. 8).

## DISCUSSION

This case report demonstrates the healing potential of the grafted socket with cancellous bone and collagen membrane. As other study showed less potential of the cancellous bone to preserve the socket dimension in comparison to bioactive glass.<sup>13</sup> Our concern in the case report is to regenerate the bone on the distal root rather than socket preservation. For this reason, allograft was chosen for enhancing bone regeneration and in the same time graft resorbed to allow new bone formation. Many factors contribute for new bone formation in the GBR procedure. Not only restricted to bone graft material but also should include collagen membrane and primary flap

closure for successful of this procedure. Using collagen membrane alone may not give predicted result or bone regeneration on the distal of second molar.<sup>14</sup> In other hand, using bone graft material alone without collagen membrane or soft-tissue coverage may end with less bone formation percentage.<sup>4,8</sup> Study was conducted by Brkovic et al<sup>5</sup> showed the sites that were grafted with membrane demonstrated a more uniform bone structure both in the apical and in the coronal regions of the sockets. Another factor is rotational flap that used in our procedure to ensure complete closure and coverage of the grafted socket and collagen membrane to avoid the consequences of membrane exposure.<sup>15</sup> The time of examination is crucial in GBR procedure as most of the studies recommend average time of healing and bone formation in grafted socket is 12 months,<sup>5</sup> with minimum healing period 9 months and maximum 24 months for pocket elimination.<sup>1,11,16,17</sup> The interesting part in this case report that pocket elimination is achieved within 6 months from time of socket grafting. And, this may be due to factors that mentioned above and the quality of the allograft material. Guided bone regeneration procedure with allograft may be used with predicted result to eliminate the pocket formation in the distal root of second molar after wisdom tooth surgical removal.

## CONCLUSION

Third molar socket bone grafting with cancellous allograft plus collagen membrane and rotational flap may be a predictable procedure to prevent periodontal pocket on the distal of the second molar.

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