



## Primary chronic osteomyelitis following bilateral sagittal split osteotomy-case report

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**Abstract**— Introduction: Mandibular osteomyelitis is said to occur commonly following odontogenic infections and trauma. However, there is minimal literature available which discuss its occurrence after orthognathic procedures like Bilateral Sagittal Split osteotomy.

Patient complaint: Wound dehiscence and bone exposure.

Diagnosis, Intervention and outcomes: OPG revealed radiolucency of size 1.5\*1 cm below the root apices of 46,47 . CT revealed osteomyelitic changes in the same region .. Sequestrectomy was done and resorbable collagen membrane was placed . The decalcified histopathological section revealed necrotic bone in a loose stroma surrounded by moderate inflammatory cell infiltrate composed mainly of lymphocytes and absence of osteoblastic cells in the periphery , suggestive of

Chronic osteomyelitis. Wound healing was uneventful without recurrence on a followup of four years. Conclusion: Resorbable collagen membrane proves to be effective in small osteomyelitic defects as it acts as a scaffold for osteoblasts and growth factors from bone and cells, enhancing guided bone regeneration.

**Keywords:** Osteomyelitis, Bilateral sagittal split osteotomy(BSSO), resorbable collagen membrane .

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## I. INTRODUCTION

Osteomyelitis is an inflammation of bone and bone marrow that usually develops after a chronic infection [1,2]. It is said to occur commonly following odontogenic infections and trauma [2,3]. However, there is minimal literature available which discuss its occurrence after orthognathic procedures like Bilateral Sagittal Split osteotomy. Though there are various complications like infection [4], sensory disturbances[4], temporomandibular joint disorder [4], inadvertent fracture [4], non- union [4] and hemorrhage [4], associated with BSSO, osteomyelitis is a far less reported complication.

Most of the reported cases of post-surgical osteomyelitis were found to have developed early during the recovery period. The time frame for osteomyelitis to occur varied between immediate post-operative days [3,5] to almost an year after surgery. This paper discusses a case report of a patient who came almost two years after BSSO with osteomyelitis of mandible and its management with resorbable collagen membrane.

## II. CASE REPORT

A 25 year old female visited our maxillofacial unit with a complaint of retropositioned lower jaw. She presented with a convex facial profile and retrognathic mandible. Lower facial height was increased and a gummy smile was evident. Clinical examination and cephalometric analysis was done and the patient was diagnosed as skeletal Class II with vertical maxillary excess and deficient mandible. Lefort1 impaction by 4 mm and Bilateral Sagittal Split Osteotomy advancement by 6 mm was planned. She was assessed as a patient with ASA status 2 as she had a history of wheezing.

Lefort 1 impaction and BSSO advancement was done under antibiotic coverage without any post operative complications. Maxilla was fixed with a L and reverse L 1.7 mm 4 holed with gap titanium plates along the piriform rim and interosseous wiring was done along the zygomatic buttress region. The mandible was fixed with 2 mm 5 holed Titanium plate without gap, one on each side. After closure and adequate haemostasis the patient was recovered from General anaesthesia. Following a successful recovery she was discharged the 1<sup>st</sup> post-operative day and oral antibiotics, Taxim 200 mg bid and Metrogyl 400 mg tid were instituted for another 5 days and sequential reviews were planned.

On her first year review, she presented with wound dehiscence **Figure 1**. Her OPG revealed radiolucency of size 3\*1 cm along the plates on the right side of mandible **Figure 2**. Though the plates were infected the patient had no signs of pain, swelling nor pus discharge. The Plates were removed under LA with antibiotic prophylaxis and postoperatively analgesics were prescribed. The biopsy was consistent with granulation tissue. The patient did not report for regular follow up.



Fig 1.wound dehiscence



Fig 2. OPG showing radiolucency in 46,47 region

Two years following the surgery wound dehiscence with exposed bone being necrotic was noted **Figure 1**. But no pain or pus discharge was present. OPG taken revealed radiolucency of size 1.5\*1 cm below the root apices of right last molar **Figure 2**. CT revealed osteomyelitic changes in the same region **Figure 3. and Figure 4**.

CBCT Images - Two years after BSSO

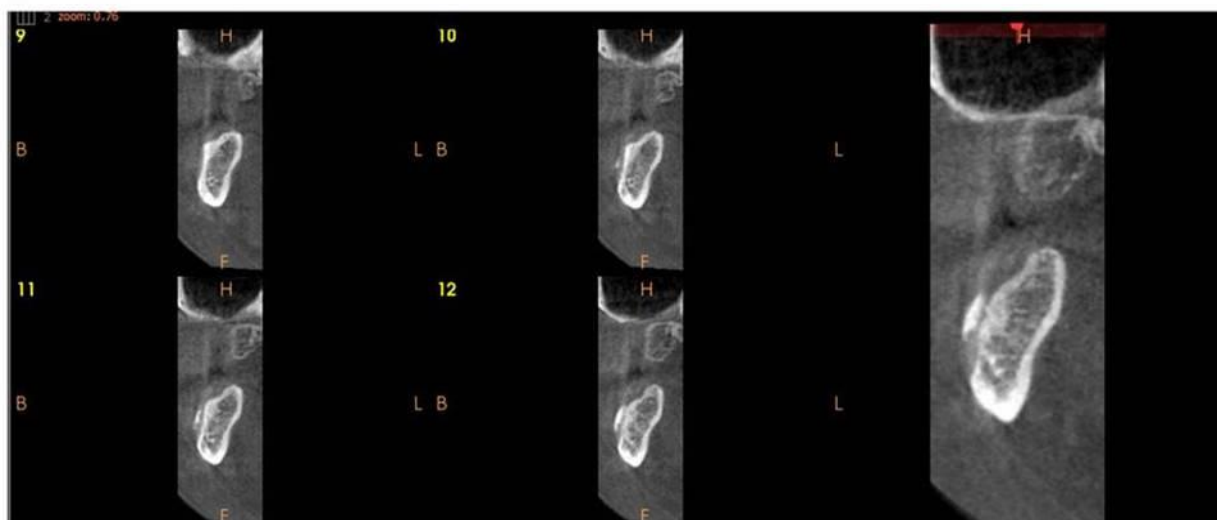


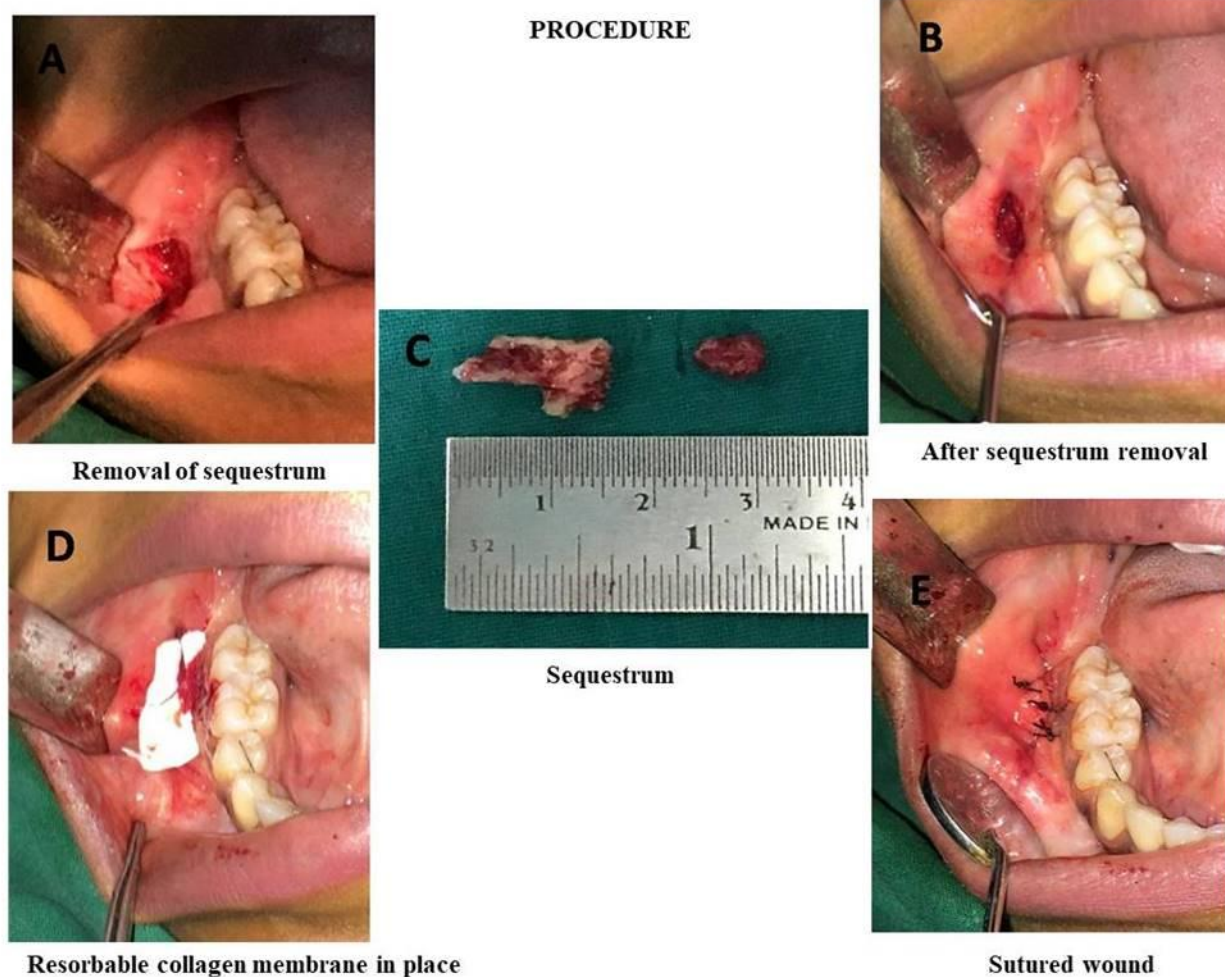
Fig 3. CBCT Images

3D Reconstruction Images - Two years after BSSO



Fig 4. 3D Reconstruction images

Sequestrectomy was planned under LA. Clindamycin 300 mg was given before starting the procedure. The exposed devitalised bone was removed. **Figure 5**. Beneath the bone, the granulation tissue found was curetted. Surrounding bone and mucous membrane were removed till fresh bleeding was visualised. The cavity was then packed with RL resorbable collagen membrane and suturing was done with 3 - 0 vicryl **Figure 5**. The cavity was allowed to heal by granulation. The bone and curetted tissues were sent for biopsy **Figure 5**. Patient was advised to continue Clindamycin 300 mg bid for next three days along with analgesics. Chlorhexidine mouth wash was prescribed and patient was asked to maintain meticulous oral hygiene.



**Fig 5. Surgical procedure**

The decalcified histopathological section revealed necrotic bone in a loose stroma. The stroma surrounding the necrotic bone exhibited moderate inflammatory cell infiltrate composed mainly of lymphocytes. There were also absence of osteoblastic cells in the periphery of bone trabaculae, all features suggestive of Chronic osteomyelitis of mandible which was in par with the histopathological identification of osteomyelitis types by Peter et al [6]. Presently, after four years, the patient is free of complaints and the site is completely healed **Figure 6. and Figure 7.**

Three years after BSSO



Four years after BSSO



Fig 6. Follow up

OPG - Four years after BSSO



Fig 7. OPG after 4 years

### III. DISCUSSION

Since its inception in 1985 [7] Resorbable collagen membranes have been used for wound healing and in guided bone regeneration in various fields of dentistry. Resorbable collagen membrane is a highly purified cross-linked Type I bovine or porcine collagen [8,9] used for protecting the oral wound bed. It provides an excellent matrix to assist in wound healing and resorbs in 8 weeks to 4 months [8] allowing space for new tissues to regenerate. Resorption of these collagen membranes by endogenous collagenases of inflammatory cells form carbondioxide and water as resorption products [8]. Adhesion of fibroblast, platelets and epithelial cells in collagen membrane were proven in ultrastructural analysis. Furthermore collagen membranes

may attract mediators and growth factors from bone and cells, enhancing guided bone regeneration [7,9]. Its optimal structure and thickness allows absorption of both fluid & blood at the defect site giving it a hemostatic property [7,8] to control bleeding and stabilize blood clots. It has also proven to have low immunogenicity [7,8] and good dimensional stability [7]. Apart from finding implications in soft tissue regeneration it is used in various intraoral bone defects [7-9]. However proper preparation of osteomyelitic beds with fulfillment of PASS criteria [7,10] are essential for healing to take place uninterrupted. According to Wang four important biologic principles are needed for bone regeneration. They include primary wound closure, angiogenesis for blood supply and mesenchymal cell delivery to the site, maintenance of space for bone ingrowth and wound stability. These ensure proper osteogenesis to occur without complications and the same has contributed to the success of resorbable collagen membrane for guided bone regeneration in our patient.

Osteomyelitis of the mandible can cause debilitating deformities of the jaw. With the advent of newer investigative modalities and early institution of antibiotics it is possible to reduce the need to opt for surgical resection and reconstruction. In this patient we used resorbable collagen membrane to bridge the defect after sequestrectomy and found that complete closure of the defect was obtained. The entire procedure was carried out meeting Wang's PASS criteria [10]. OPG two year later showed complete mineralisation of the defect. Hence resorbable collagen membrane can be advocated in the treatment of long standing wounds of oral cavity and Guided Bone Regeneration of small bony defects.

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List of Abbreviations:

Abbreviation	Definition
BSSO	Bilateral Sagittal split osteotomy
OPG	orthopantomogram
CBCT	Cone beam computed tomography