International Journal of Research in Medical Sciences
Burman S et al. Int J Res Med Sci. 2026 Mar;14(3):1211-1214
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20260362

Case Report

Unlocking the jaw: sternoclavicular graft in temporomandibular joint ankylosis treatment

Subhasish Burman, Asish K. Das, Moumita Ghosh*, Abhishek Khatua, Kuldip Mukhopadhyay, Purbalee Barman, Swagatam Samanta

Department of Oral and Maxillofacial Surgery, Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, India

Received: 31 December 2026
Accepted: 10 February 2026

***Correspondence:**
Dr. Moumita Ghosh,
E-mail: moumitaghosh1106@gmail.com

ABSTRACT

Temporomandibular joint (TMJ) ankylosis is a condition that leads to impaired jaw function and growth retardation. The primary goals of treatment are to enhance mouth opening, restore joint mobility, stimulate mandibular growth, improve facial esthetics, and prevent recurrence of ankylosis. Sternoclavicualar graft is an ideal choice for reconstructing temporomandibular joint as it is similar to TMJ developmentally and structurally. We reported a case of unilateral TMJ ankylosis in an 11-year-old patient who was treated in our institute using sternoclavicular joint graft for reconstruction of ramus-condyle unit.

Keywords: Temporomandibular joint, Ankylosis, Reconstruction, Sternoclavicular graft

INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is a joint disorder characterised by bony or fibrous fusion of the joint components, resulting in loss of function. It is a severely debilitating condition which leads to impairment of oro-facial functions like restricted mouth opening, speech impairment, decreased chewing ability, restricted airway patency, compromised oral hygiene, which often causes psychological stress.[1]

Surgery is the only effective treatment for this debilitating condition. Various surgical options for treatment of TMJ ankylosis include gap arthroplasty, interpositional arthroplasty and joint reconstruction.[2]

A successfully reconstructed TMJ should restore normal anatomy, enable functional movement, and allow adaptive growth and remodelling. Sternoclavicular graft acts as an adaptive centre and its similarity to TMJ anatomically, physiologically and histologically, makes it an ideal choice for reconstruction of temporomandibular joint.[1]

We hereby present a case of TMJ ankylosis, where we used sternoclavicular graft to successfully reconstruct a patient's temporomandibular joint, helping restore normal jaw function.

CASE REPORT

An 11-year-old male patient reported to the department of Oral and Maxillofacial surgery at Dr. R. Ahmed Dental College and Hospital, Kolkata, with chief complain of reduced mouth opening for 3 years. He gave history of trauma at age of 2 years following which he developed gradual reduction in mouth opening.

Clinical examination revealed presence of facial asymmetry with deviation of chin to right side. Maximum interincisal opening was 15 mm. On palpation, prominent antegonial notch on right side and decreased movement of right temporomandibular joint were noted (Figure 1). Radiographic evaluation confirmed Sawhney's Type I unilateral right side TMJ ankylosis (Figure 2).

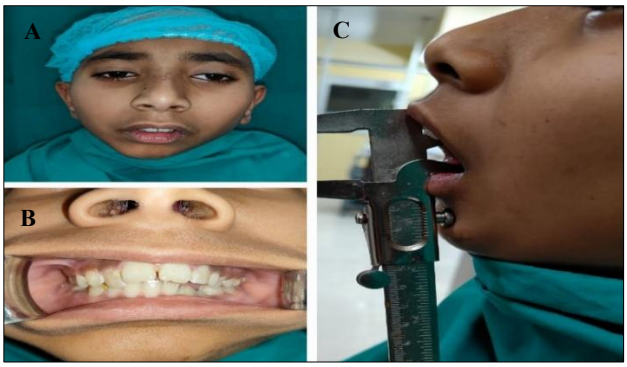

Figure 1 (A-C): Preoperative photos.

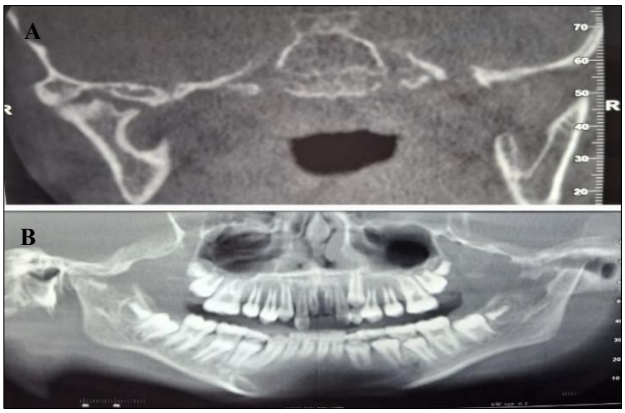

Figure 2 (A and B): Preoperative radiograph

Treatment planned for this case was gap arthroplasty followed by reconstruction of ramus-condyle unit with sternoclavicular graft under general anesthesia.

Preoperatively, posteroanterior (PA) view of chest was done to assess the thickness of clavicle and to rule out any evidence of previous clavicular fracture or pathology.

Surgery was performed under general anesthesia with fiberoptic assisted nasoendotracheal intubation. Surgical sites were scrubbed with 7.5% povidone-iodine solution and draped for isolation. Al-Kayat and Bramley incision was given on right side to access the ankylotic mass. Upon exposure, the ankylotic mass was resected using Lindemann bur, osteotome and mallet, creating a gap of 2 mm. Ipsilateral sternoclavicular graft was harvested by giving a transverse incision over the right clavicle, beginning at its medial end and extending 8 cm laterally. The incision was made through the skin and subcutaneous tissue. The periosteum and muscle attachments were dissected from the superior and medial aspects of the clavicle while preserving the ligamentous attachments of the articular disc to the clavicular head and avoiding pleural injury. The superior half of the clavicle was used as a graft, preserving the integrity of the lower half for arm and shoulder support. The cartilage of the graft was shaped to mimic the condylar head of temporomandibular joint. The graft was kept in an iced-saline solution and subsequently, submandibular incision was given on right side for preparing the recipient bed (Figures 3-5).

Figure 3 (A-C): Marking of the incisions.

Figure 4: Osteotomy cut for harvesting sternoclavicular graft.

On the lateral aspect of the ramus, decortication and a groove was created to accommodate the graft. The graft was secured to the ramus of mandible using 3 screws of size 2×10 mm. Mouth opening of 40 mm was achieved intraoperatively (Figure 6). Temporalis fascia was used as an interpositional material. A negative suction drain was placed at both the donor and recipient sites and the surgical sites were closed in layers.

Figure 5: Sternoclavicular graft.

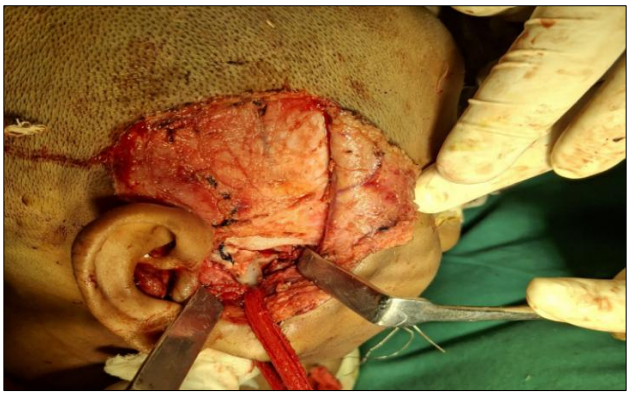

Figure 6: Fixation of the graft to the ramus of mandible.

Postoperatively, the patient was instructed to wear an arm sling and refrain from using the arm for lifting heavy objects for at least 3 months.

Physiotherapy began on the seventh day using Heister jaw opener and continued for 6 months (Figures 7-9). Periodic follow-up was done, and a chest radiograph was taken at the 3rd month post-surgery to assess the healing of the clavicle.

Figure 7 (A-C): Photos showing healed surgical sites.

Figure 8 (A and B): Postoperative occlusion and mouth opening.

Figure 9: Postoperative radiograph.

DISCUSSION

TMJ ankylosis patients face dual challenges: functional impairment and aesthetic concerns, primarily manifesting as restricted mouth opening. Onset during growth can lead to predictable dentofacial abnormalities. Interpositional arthroplasty using autogenous grafts is the preferred surgical treatment. It is because of the complications associated with alloplastic materials such as wear and tear of the material, foreign body reactions, loosening of the implant or displacement, fracture and high cost. various tissues like ear cartilage, temporalis fascia, temporalis muscle, abdominal fat, and buccal fat pad have been used successfully as interpositional material.

However, normal mandible functions as a class 3 lever, with the condyle as the pivot point. Gap arthroplasty alters this to a class 1 lever, potentially causing an open bite and growth issues. Therefore, restoring ramal height is crucial for functional balance.[1] The use of rigid interpositional material like costochondral graft, sternoclavicular graft, iliac crest, fibula, coronoid and metatarsal have been proposed in earlier literatures.[2]

The sternoclavicular graft showed anatomic similarity to the condyle, requiring minimal shaping as noted by Ellis and Carlson. They concluded that sternoclavicular graft may be more suitable for TMJ reconstruction as head of clavicle contains layers of cartilage that are very similar to mandibular condyle.[3]

In 1971, Snyder et al used full thickness sternoclavicular graft on a 70-year-old man.[4,5] Similarly, in the year 1982, Siemssen et al reported the use of muscle pedicled full thickness sternoclavicular graft for TMJ reconstruction. He took a portion of clavicle attached to the sternocleidomastoid muscle and rotated upward to reconstruct the mandible. No functional deformity of the shoulder and arm was reported.[6]

In 1986, Reid et al reported the use of vascularized clavicular bone graft by incorporating the pectoralis major muscle and overlying skin.[7]

In 1994, Wolford et al outlined the surgical technique for harvesting a split thickness sternoclavicular graft and documented the donor site morbidity. 10% incidence of clavicle fractures was reported in their study.[8] Singh et al in 2011 also used the superior half of the clavicle, similar to Wolford et al's design, for condylar reconstruction in 15 patients, and reported improved graft adaptability to the glenoid fossa but has 13% incidence of clavicle fractures.[9]

Rao et al. evaluated the use of sternoclavicular graft for reconstruction of temporomandibular joint after gap arthroplasty and found encouraging results. All the patients showed good postoperative mouth opening as well as excursive movements.[1]

In 2016, Mohanty et al suggested a novel technique for harvesting sternoclavicular graft. Instead of splitting the clavicle into superior and inferior halves, they performed the osteotomy cut along the cephalocaudal plane, thereby splitting the clavicle into anterior and posterior halves. The advantages of this technique are reduced donor site morbidity, excellent aesthetic and functional result, and greater patient comfort.[10]

CONCLUSION

Sternoclavicular graft offers a promising alternative for TMJ reconstruction, due to its simplicity, minimal complications, and favourable outcomes, making it a versatile option for surgeons. However long-term follow-up and larger sample sizes are required to assess the long-term clinical outcome and efficacy of the graft.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Dayashankara Rao JK, Dar N, Sharma A, Sheorain AK, Malhotra V, Arya V. Evaluation of the Sternoclavicular Graft for the Reconstruction of Temporomandibular Joint After Gap Arthroplasty. Ann Maxillofac Surg. 2017;7(2):194-201.
2. Thirunavukkarasu R, Balasubramaniam S, Balasubramanian S, Gopalakrishnan SK, Panchanathan S. Sternoclavicular Joint Graft in Temporomandibular Joint Reconstruction for Ankylosis. Ann Maxillofac Surg. 2018;8(2):292-8.
3. Ellis E, Carlson DS. Histologic comparison of the costochondral, sternoclavicular, and temporo-mandibular joints during growth in Macaca mulatta. J Oral Maxillofac Surg. 1986;44:312-21.
4. Snyder CC, Levine GA, Dingman DL. Trial of a sternoclavicular whole joint graft as a substitute for the temporomandibular joint. Plast Reconstr Surg. 1971;48:447-52.
5. Snyder CC, Benson AK, Slater PV. Construction of the temporomandibular joint by transplanting autogenous sternoclavicular joint. South Med J. 1971;64:807.
6. Siemssen SO. Temporomandibular arthroplasty by transfer of the sterno-clavicular joint on a muscle pedicle. Br J Plast Surg. 1982;35:225-38.
7. Reid CD, Taylor GI, Waterhouse N. The clavicular head of pectoralis major musculocutaneous free flap. Br J Plast Surg. 1986;39(1):57-65.
8. Wolford LM, Cottrell DA, Henry C. Sternoclavicular grafts for temporomandibular joint reconstruction. J Oral Maxillofac Surg. 1994;52:119-28.
9. Singh V, Verma A, Kumar I, Bhagol A. Reconstruction of ankylosed temporomandibular joint: sternoclavicular grafting as an approach to management. Int J Oral Maxillofac Surg. 2011;40:260-65.
10. Mohanty S, Kohli S, Dabas J, Singh C. Novel technique for harvesting the sternoclavicular graft. J Cranio-Maxillofac Surg. 2017;45(2)290-4.

Cite this article as: Burman S, Das AK, Ghosh M, Khatua A, Mukhopadhyay K, Barman P, et al. Unlocking the jaw: sternoclavicular graft in temporomandibular joint ankylosis treatment. Int J Res Med Sci 2026;14:1211-4.