

# Temporalis Myofascial Flap and Conchal Bowl Cartilage Grafting for Temporomandibular Joint Arthritis

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**Summary:** Temporomandibular joint (TMJ) arthritis arises from a multitude of etiologies; however, there is no consensus definitive treatment. The complication profile of artificial TMJs is well known, and outcomes are variable and are reserved for salvage attempts. This case details a patient with persistent traumatic TMJ pain, arthritis, and single-photon emission computed tomography scan of potential nonunion. The present study reports on the first novel use of an alternative composite myofascial flap to help arthritic TMJ pain. This study details the successful use of a temporalis myofascial flap and conchal bowl autologous cartilage graft in posttraumatic TMJ degeneration. (*Plast Reconstr Surg Glob Open* 2023; 11:e4931; doi: 10.1097/GOX.0000000000004931; Published online 24 April 2023.)

Temporomandibular arthritis represents a substantial clinical problem, and despite multiple modalities for treatment, outcomes remain inconsistent. Surgical intervention for temporomandibular joint (TMJ) pain, TMJ arthritis (TMJA) and TMJ degeneration is considered a second-line option after failure of conservative management. Patients with TMJA experience significant debilitation in daily activities, restricted masticatory movements, and reduced overall quality of life.<sup>1</sup>

TMJA arises most commonly from traumatic injuries followed by infection, inflammatory arthritis, malocclusion, occlusal interferences, masticatory muscle discrepancies, or microtrauma from repetitive behaviors.<sup>2</sup> Psychosocial, sleep disturbance, anxiety, and depression represent sequelae of chronic TMJ pain. The goal of early and adequate intervention in TMJA is to prevent deterioration toward salvage arthroplasty.

Herein, we describe an innovative technique to alleviate symptomatic TMJA pain: enveloping autologous conchal bowl cartilage in a vascularized temporalis myofascial flap and transposition into the TMJ. Many TMJ specialists have performed interpositional arthroplasty

with autogenous or synthetic materials but not composite grafts for TMJA. The aim of this study was to report on the novel use of an alternative interpositional gap arthroplasty (IGA) adjunct for TMJA pain and shortened ramus.

## CASE PRESENTATION

A 62-year-old woman with no significant pertinent medical history and a history of a right subcondylar fracture after a mechanical fall 1-year prior presented to our clinic. Initially, she was managed conservatively by an oral surgeon with a soft diet. Over the ensuing 6 months, she endorsed persistent pain along the right subcondylar region and TMJ, and she developed premature right molar contact; rightward deviation of the jaw with mouth opening; pain with excursion, rotation, and translation of her TMJ; ~1–2 mm of left-sided open bite; and maximal incisal opening of 20–25 mm with associated pain. (See **figure, Supplemental Digital Content 1**, which displays (a) the 1-month preoperative photograph of occlusion demonstrating ~1–2 mm of left-sided open bite and right-sided occlusal premature molar contact. (b) Preoperative single-photon emission computed tomography scan of the head and neck. Note the increased signal intensity and increase in metabolic activity along the right aspect of the mandibular ramus and condylar neck, suggesting active remodeling. A prolonged course of metabolic activity in the setting of a previous fracture demonstrates possible nonunion or malunion. <http://links.lww.com/PRSGO/C502>).

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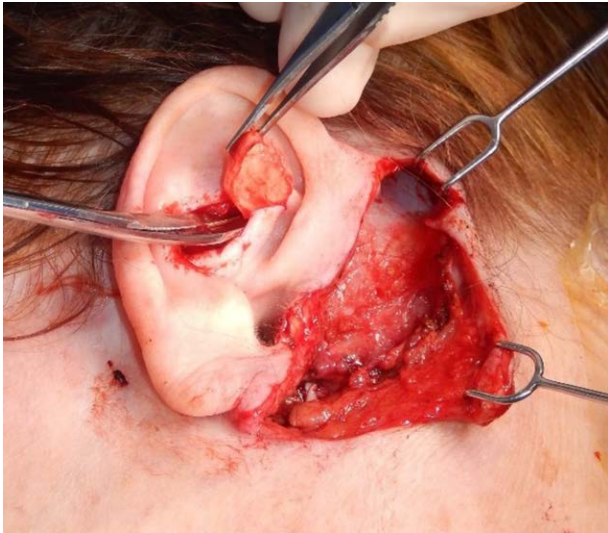
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**Fig. 1.** Dissection and harvest of the right auricular conchal bowl cartilage using a standard anterior approach.

Therefore, a single-photon emission computed tomography scan was obtained, which revealed possible diagnosis of nonunion. (See figure, Supplemental Digital Content 1, <http://links.lww.com/PRSGO/C502>). Surgical revision osteotomy, plate fixation, and possible bone grafting was advised. Strict adherence to the Helsinki Declaration and a signed photographic consent for release of medical images was obtained for publication.

### SURGICAL TECHNIQUE AND CLINICAL COURSE

All dissection was performed with the assistance of a facial nerve monitoring system NIM 2.0 (Medtronic, Minneapolis, MN). Initially, a standard right lower gingivobuccal sulcus was made to access the subcondylar region; however, complete exposure ultimately required an extraoral preauricular incision with anterior transposition of the parotid gland. Upon complete exposure, complete union was evident, and the junction between the ramus and the condyle was nearly indistinguishable. The mandible was stable, yet the ramus was shortened. No abnormalities in rotation and translation were appreciated with ranging of the mandible. There were, however, obvious signs of articular disk thinning, joint scarring, and destructive arthritic changes of the right condylar head and fossa. The intraoperative findings were discussed with the patient's husband, who provided consent to proceed with a temporalis myofascial flap with conchal bowl cartilage to remedy the degenerative articular disk and to lengthen the shortened ramus.

At this point, the temporalis muscle was dissected with ~1 cm of muscle width harvested with the deep temporal fascia. The right conchal cartilage was then harvested using a standard anterior bowl incision (Fig. 1). An approximately 1 × 2 cm strip of cartilage was then wrapped in the temporalis muscle and secured with 3-0 poliglecaprone sutures (Fig. 2). At this point, the composite graft



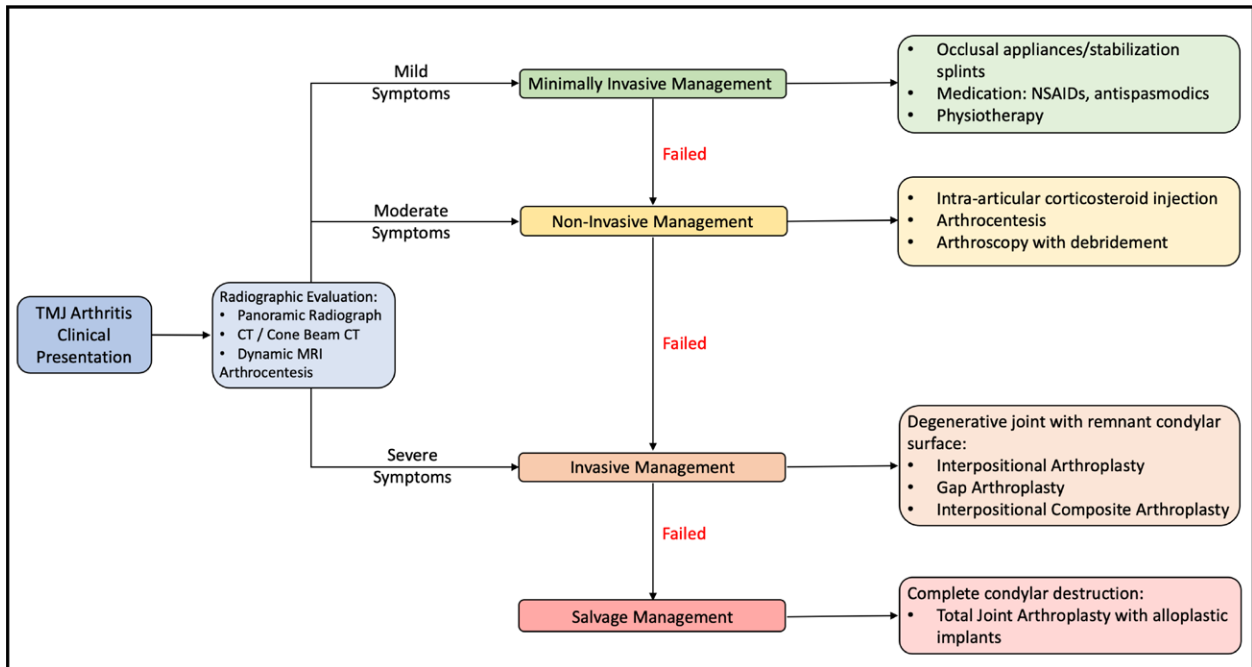
**Fig. 2.** The temporalis myofascial and auricular cartilage composite flap in final configuration before final inset over the zygoma and into the temporomandibular joint.



**Fig. 3.** The final inset and orientation of the composite flap without tension, excess bulk, or contour deformities over the zygoma.

was interposed between the remnant articular disk and the head of the condyle (Fig. 3). Finally, the patient was placed in intermaxillary fixation (IMF) with a custom-fabricated splint for 2 weeks without complications.

At 4- and 8-months follow-up, she reported no pain, significant improvement in her maximum intercuspal



**Fig. 4.** Evaluation and treatment options for TMJA based on noninvasive, minimally invasive, invasive, and salvage techniques.

opening (>30mm) and intercuspation, and improved range of motion. Rightward displacement of the mandible on mouth opening had also improved from our preoperative evaluation.

## DISCUSSION

Surgical management of TMJA is highly variable and consists of various approaches including gap arthroplasty, IGA, and alloplastic joint reconstruction arthroplasty.<sup>3</sup> Gap arthroplasty involves bypassing the intraarticular ankylotic joint by creating a gap distal to the fused TMJ. Gap arthroplasty is the easiest treatment modality to perform, but numerous studies report complications including recalcitrant arthritis, pseudoarticulation external to the true TMJ, and a reduction in vertical ramal height.<sup>1</sup>

Feinberg and Larsen described the pedicled temporalis myofascial flap as an improvement for TMJ ankylosis surgery because it maintains the ramus vertical height, cushions the joint, and preserves proximal attachments to the coronoid.<sup>4</sup> This facilitates movement simulating the physiologic mechanism of the disk.<sup>4</sup> Interpositional grafting for degenerative joint changes are well described, and similar concepts percolate throughout the hand surgery literature regarding basal joint arthritis.<sup>5</sup> Analogous to basilar arthritis, interpositional grafts theoretically act as a buffer and prevent migration of the condyle and painful destructive ginglymoarthrodial articulation.

The use of a composite temporalis flap for TMJ arthroplasty was reported by Herbosa and Rotskoff, but their composite graft only included temporalis muscle, fascia, and periosteum and no adjunct material.<sup>6</sup> In their study and review of the literature, flap transposition is difficult with the zygomatic arch. Studies have reported marginal

osteotomy of the zygomatic arch for flap inset and then zygoma fixation.<sup>7</sup> The current report mobilized the temporalis flap contoured to the auricular cartilage over the zygoma without requiring an osteotomy. Rotating the flap above can cause contour irregularities and muscular pain, while rotating below limits flap thickness that can be tunneled.

The use of IGA for TMJA is a well-established modality for treatment. IGA has historically used multiple autologous (eg, temporalis myofascial flap, fascia lata, auricular cartilage, fat, dermis, and full-thickness flaps) and alloplastic materials (eg, silastic silicone, acrylic, and gold foil).<sup>1,8–10</sup> Temporalis muscle remains the most commonly used construct in IGA due to close proximity, low donor site morbidity, robust vascularity, and excellent pliability.<sup>1,4</sup>

Lei and Krishnan both used autologous auricular cartilage as the interpositional graft with satisfactory results at 2- and 6-years follow-up, respectively.<sup>9,10</sup> Recently, in 2018, Muñoz-Guerra et al utilized IGA of auricular cartilage alone and demonstrated improvement in pain across 24 months of follow up ( $P < 0.001$ ), but MRI at 2 years demonstrated sclerosis and flattening with a high overall failure rate.<sup>3</sup> This case study left a very small degenerated disk in situ and paired it with the composite construct in order to optimize soft tissue coverage and articular support and add length to the ramus with improvement in occlusion.

This aforementioned clinical case provided insight that whenever a patient has a condylar area pain, even if it is presumed condylar nonunion with radiographic single-photon emission computed tomography evidence, thorough discussion with the patient on TMJA is warranted. TMJA can present in a multitude of ways, and before surgical correction, it is important to discuss the arthritis as the etiology and consent the patient for TMJ interposition

arthroplasty. Multiple options exist for TMJA treatment and before any intervention, proper evaluation of symptoms and severity is required as demonstrated in our TMJA treatment algorithm (Fig. 4).

The short follow-up time and single patient cohort limits the long-term efficacy of this technique; however, given rarity of surgical intervention success, this concept provides surgeons an alternative treatment modality to study. Nevertheless, this technique is a valuable modification of the standard temporalis myofascial flap and may benefit patients with refractory disease.

### CONCLUSIONS

The use of IGA remains a cornerstone in TMJ reconstruction in the setting of clinical and radiographically proven arthritis. Multiple materials have been singularly employed, but composite grafting represents a viable, novel option for IGA. The use of a composite graft provides robust soft tissue and stable cartilaginous foundation to potentially help with restoring pain-free TMJ biomechanics.

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### DISCLOSURE

*The authors have no financial interest to declare in relation to the content of this article.*

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