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Retrospective comparison of autogenous cosotochondral graft and coronoid process graft in the management of unilateral ankylosis of the temporomandibular joint in adults

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Abstract

We retrospectively compared the clinical outcomes of autogenous coronoid process grafts (n = 32) and costochondral grafts (n = 28) in condylar reconstruction for the treatment of unilateral ankylosis of the temporomandibular joint (TMJ) in adults. Preoperative and postoperative assessments included diet scores, cone-beam computed tomography (CT), maximal interincisal opening, lateral excursion, and mandibular deviation on opening the mouth. There were no significant differences between the 2 groups in the measurements before and after the operation with respect to incisal opening, lateral excursion, mandibular deviation, diet scores, or recurrence rate, but in both the postoperative incisal opening, lateral excursion, and diet scores had improved significantly compared with preoperatively. After costochondral graft 3 patients developed intraoperative plural tears, and 6 had temporary pain at the donor site. The frontal branch of the facial nerve was temporarily affected in 5 patients after costochondral graft and 3 after coronoid process grafts, all of which recovered in 3–6 months. There was no recurrence after coronoid process grafting, and one after costochondral grafting. The clinical outcomes in both groups were satisfactory and comparable. Autogenous coronoid process grafting may therefore be a good alternative for condylar reconstruction in patients with ankylosis of the TMJ.

Keywords: Temporomandibular joint; Ankylosis; Costochondral bone; Coronoid process; Reconstruction

Introduction

Ankylosis of the temporomandibular joint (TMJ) is a bony or fibrous adhesion of the components of the anatomical joint. It is a distressing condition that prevents the patient from eating a normal diet and impairs oral hygiene and speech. In subjects who are still growing it can also cause severe facial disfigurement, which aggravates psychological stress.

Condylar reconstruction after release of ankylosis is necessary, but it is a challenge for the clinician to rebuild a structurally and functionally satisfactory neocondyle. Several autogenous and alloplastic grafts have been developed for condylar reconstruction, but in our country patients with ankylosis usually cannot afford replacement of the TMJ. Total joint replacement is therefore rarely chosen. Among autogenous grafts, the costochondral graft is one of the most widely accepted,[1] but it has some disadvantages such as the need

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to explore the second surgical site, donor site morbidity, and unpredictable growth potential.[2–8]

The mandibular coronoid process has been widely used as a bone graft in craniomaxillofacial surgery for some time.[9–11] In our previous experimental and clinical studies[12–17] we confirmed the ability of the autogenous coronoid process to restore the mandibular condyle satisfactorily. However, we know of few reports that have compared the use of costochondral and coronoid process grafts for condylar reconstruction,[18] despite them both having been reported to give satisfactory results for condylar reconstruction.[2,8,11–14]

The aim of this retrospective study therefore was to compare the clinical outcomes of the 2 grafts for condylar reconstruction in adult patients with unilateral ankylosis of the TMJ.

Patients and methods

Between September 2008 and October 2012, 60 patients with unilateral ankylosis of the TMJ who were operated on at the Department of Oral and Maxillofacial Surgery, West China College of Stomatology, Sichuan University, were entered into this retrospective study. The inclusion criteria were: all patients were adults who had been diagnosed with bony ankylosis type III or IV according to Sawhney's classification.[19] and all had unilateral disease. Patients were excluded if they had had a previous operation for ankylosis. They had had their condyles reconstructed either with autogenous costochondral bone (n = 28), or coronoid process (n = 32), grafts. The advantages and disadvantages of each graft were explained to the patient preoperatively, and the graft used depended on the patient's preference. All the operations were done by the same experienced surgeon and all the clinical examinations by the same resident. The Hospital Institutional Review Board approved the study and all patients gave their informed consent.

Operative technique

All operations were done under general anaesthesia with nasal intubation. We made a standard preauricular incision with temporal extension as described previously.[14] After exposure and identification of the site of ankylosis, the ankylotic mass was excised radically with round burs and chisels until mandibular movement was achieved. A space at least 1.5-2 cm was created between the zygomatic arch and the upper surface of the ramus, and the glenoid fossa was recreated by suitably-sized burs.

Coronoid process graft

The coronoid process was resected with a reciprocating saw, and the length of the graft was trimmed to the original height of the ramus (Fig. 1). The final position of the coronoid process in the glenoid fossa depended on the position of the ramus when the teeth were placed into occlusion, and the bone graft was then fixed rigidly with a titanium miniplate (Fig. 2).

Fig. 1. The trimmed autogenous coronoid process prepared for grafting.

Costochondral graft

Bone 3-5 cm long with a cap of 5 mm of cartilage was harvested from the right fifth, sixth, or seventh rib. The head of the cartilage was trimmed and reshaped. A suction drain was secured, the wound sutured in layers, and the donor site checked for any pleural tear. The graft was inserted and orientated on the lateral surface of the ramus. The graft was fixed to the ramus with a titanium miniplate (Fig. 3).

The coronoid process on the same side was excised through the preauricular incision and coronoidectomy was done on the other side through a separate intraoral incision if sufficient mouth opening was not attained after release of the ankylosis, as described by Kaban et al.[1] Passive maximum incisal opening of at least 35 cm was achieved during the operation. If the native articular disc was available, it was retained and repositioned to line the glenoid fossa. If not, a temporalis myofacial flap was rotated as an interposition graft. In addition the remaining dead space was filled with the buccal fat pad that had been exposed and harvested through the same incision in both groups to fill the dead space and reduce the chance of reankylosis.

A prophylactic antibiotic was given for 7 days postoperatively. Maxillomandibular fixation was not required. Physiotherapy, which comprised active and passive exercises, was started on the seventh postoperative day. It consisted of