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Clinical Paper
TMJ Disorders

A comparative study of different surgical methods in the treatment of traumatic temporomandibular joint ankylosis

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Abstract. Two different surgical methods for the treatment of unilateral traumatic temporomandibular joint (TMJ) ankylosis with a medially displaced residual condyle are described. Eighteen patients with unilateral traumatic TMJ ankylosis and a medially displaced residual condyle, treated between 2008 and 2013, were included in this study. Group A patients ($n = 10$) were treated with an autogenous coronoid process graft (ACPG) for reconstruction of the mandibular condyle, while group B patients ($n = 8$) were treated by lateral arthroplasty (LAP); a temporalis myofascial flap (TMF) was used as interpositional material in both groups. The long-term results of the two treatments were compared through postoperative computed tomography and clinical follow-up examinations. The two groups were compared in terms of the recurrence rate, facial pattern change, and improvement in maximum inter-incisal opening (MIO) using SPSS 18.0 software. All patients were followed up for 12–24 months. Two patients in group A (20%) had reankylosis; no reankylosis was observed in group B patients. Compared with the ACPG, LAP improved the facial pattern and MIO significantly ($P < 0.05$). LAP is a feasible and effective surgical method for the treatment of unilateral traumatic TMJ ankylosis when the displaced residual condyle is bigger than one third of the condylar head.

Key words: trauma; temporomandibular joint ankylosis; treatment; recurrence.

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Temporomandibular joint (TMJ) ankylosis is a severe disease that causes problems such as limited mouth opening and occlusion disorders, and may interfere with mastication and speech. It also has an impact on the development of the mandible, as evidenced in growing patients, resulting in facial deformity and potentially sleep apnoea–hypopnoea syndrome (SAHS). The major aetiological factors are trauma and infection. In recent years, due to the widespread use of

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antibiotics, trauma has become the leading cause of TMJ ankylosis.[1] A variety of treatments for this condition have been described, including gap arthroplasty, interpositional arthroplasty, and TMJ reconstruction; however, no published consensus has been reached, and recurrence remains the major problem.

Gap arthroplasty without interpositional material has gradually been abandoned by many surgeons due to the associated high risk of recurrence.[2]

The interpositional arthroplasty is a standard procedure that uses autogenous or alloplastic materials between the mandibular ramus and surface of the temporal bone.[3] The temporalis myofascial flap (TMF) is the most widely used material, with benefits that include easy harvesting and a lower chance of resorption. However, this flap also presents problems such as donor site morbidity, chronic headache, and trismus. The trismus caused by scar contracture of the temporal muscle can be prevented by ipsilateral coronoidectomy.[4]

TMJ reconstruction remains a daunting task, because it is difficult to rebuild a structurally and functionally satisfactory neocondyle. A variety of autogenous and alloplastic grafts have been studied; however, no single method has produced uniformly successful results. Recent clinical research supports the use of the autogenous coronoid process graft (ACPG) as a suitable bone resource for condylar reconstruction when it is not involved in the ankylotic mass.[5,6]

He et al. reported the presence of a medially displaced residual condyle and disc in 75% of traumatic TMJ ankylosis cases,[7] and summarized a surgical method to preserve the residual TMJ structure called the lateral arthroplasty (LAP).[8]

The aim of the present study was to investigate the feasibility of the LAP and to compare the differences in clinical effects with the ACPG for reconstruction of the condyle in patients with unilateral traumatic TMJ ankylosis.

Patients and methods

The present study was approved by the ethics committee of the study university. TMJ ankylosis was classified on the basis of Yang's criteria[9]: type A1 represents fibrous ankylosis; types A2 and A3 represent ankylosis with bony fusion on the lateral side of the joint, in the presence of a medially displaced residual condyle and a residual condylar fragment larger than half of the condylar head (type A2) or smaller than half of the condylar head (type A3); type A4 represents bony ankylosis. Eighteen patients (9 female, 9 male) diagnosed with unilateral traumatic TMJ ankylosis who were operated on at a stomatological hospital in Zunyi, China between 2008 and 2013, were included in this retrospective study.

The following inclusion criteria were applied: (1) the aetiology was traumatic, (2) the medially displaced residual condyle was bigger than one-third of the condylar head, i.e. type A2 and some type A3 (Fig. 1), (3) the patient agreed to participate. Exclusion criteria were as follows: (1) patient treated previously with TMJ surgery, (2) the aetiology was infection or other, (3) patient unwilling to participate.

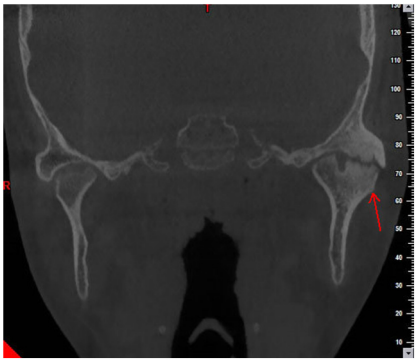

Fig. 1. Preoperative CT scan: the bony mass is located on the left side (red arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of the article.)

The relevant patient details are summarized in Table 1. Group A patients were treated with an ACPG for the reconstruction of the mandibular condyle, while group B patients were treated with a LAP; a TMF was used as interpositional material in both groups (thickness 0.5–1 cm). The advantages and disadvantages of each method were explained to the patient preoperatively, and the method used depended on the patient's preference. All operations were performed by the same experienced surgeon and all clinical examinations were performed by the same resident.

Table 1. General information for the patients in the two treatment groups.

Patient number	Sex/age (years)	Age at injury (years)	Time between open operation and presentation with ankylosis (years)	Surgical method/group	Type of ankylosis (Yang's criteria)	Site of fracture	Preoperative MIO (mm)
1	M/11	10	1	ACPG/A	A2	Right head	5
2	F/12	12	0.5	ACPG/A	A2	Right head	10
3	M/13	12	1	ACPG/A	A2	Right head	0
4	F/11	10	1	ACPG/A	A2	Left head	13
5	M/10	8	2	ACPG/A	A2	Left head	16
6	F/18	16	2	ACPG/A	A2	Right neck	20
7	M/15	13	2	ACPG/A	A3	Right neck	5
8	F/12	11	1	ACPG/A	A2	Left head	10
9	M/15	12	3	ACPG/A	A2	Left head	13
10	F/35	35	0.5	ACPG/A	A2	Right head	8
11	M/16	15	1	LAP/B	A2	Left neck	8
12	F/15	15	0.5	LAP/B	A2	Right head	10
13	M/16	15	1	LAP/B	A3	Left head	9
14	F/10	9	1	LAP/B	A2	Right head	12
15	M/23	20	3	LAP/B	A2	Left head	5
16	F/19	18	1	LAP/B	A2	Right head	0
17	M/20	18	2	LAP/B	A2	Left head	15
18	F/37	33	4	LAP/B	A2	Right head	5

MIO, maximum inter-incisal opening; M, male; F, female; ACPG, autogenous coronoid process graft; LAP, lateral arthroplasty.

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