

# Effects of soft tissue injury to the temporomandibular joint: report of 8 cases<sup>☆</sup>

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## Abstract

Our aim was to describe the effects of soft tissue injury to the temporomandibular joint (TMJ), to analyse possible reasons for it, and to evaluate the results of treatment. Eight patients (12 joints) who developed disorders of the TMJ after trauma to the mandible without fracture of the condyle were treated in our department from 2009 to 2010. Magnetic resonance imaging (MRI) and computed tomography (CT) were used to check the condition of the joint. Five patients had their joints explored to relieve pain and improve mouth opening. MRI showed all 12 joints had displaced discs. CT showed that the surface of the condylar bone was “intact” immediately after injury but destroyed later in 8 joints. Exploration showed fibrous ankylosis in 5, osteoarthritis with intra-articular adhesions in 2, and internal derangement in 1. Four were treated by costochondral graft (CCG) with 7 symptomatic joints. The disc was repositioned in 1 case with 1 affected joint. The mean maximal incision opening at follow-up were significantly better than the one before treatment (mean 34 compared with 23 mm,  $p=0.02$ ). Pain in the TMJ was relieved by operation in all patients so treated. The other 3 patients (4 joints) had no treatment because their symptoms were minor and mouth opening was not restricted. Soft tissue injuries of the TMJ can potentially lead to internal derangement, osteoarthritis, and possibly fibrous ankylosis, which should be considered during follow-up. Displacement of the disc and damage to the condylar cartilage seem to be the causes of these complications. Surgical management is effective in the short term.

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**Keywords:** Temporomandibular joint; Soft tissue injury; Temporomandibular joint; Acute trauma; Non-condylar fracture

## Introduction

Trauma in the area of the temporomandibular joint (TMJ) can cause injuries to both the soft tissue and the skeleton. For those patients who do not have condylar fractures,

soft tissue injury may do more damage to the TMJ than a fracture would have done.<sup>1</sup> However, it is often neglected because there are few radiographic signs. With the development of magnetic resonance imaging (MRI) and arthroscopy, particularly MRI, both bone and soft tissue injuries can be detected. Research has shown that trauma can cause intracapsular damage, including hyperaemia of the capsule, haemarthrosis, synovial ecchymosis, shredding of the disc and articular surfaces, and displacement of the disc.<sup>2–5</sup> The incidence of injury to the soft tissues of the TMJ after mandibular trauma is unknown. There are many reports about the results of condylar fracture, but not many about soft tissue injuries. Complications of trauma to the TMJ are far-reaching

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in their effects and not always immediately apparent,<sup>6</sup> and little is known about why some patients develop problems while others do not.

In this paper we describe the effects of injury to the soft tissues of the TMJ after trauma to the mandible without fracture of the condyle, analyse possible reasons for this, and evaluate the results of surgical treatment.

### Patients and methods

This retrospective study was approved by the Ethics Board of Shanghai Jiao Tong University, School of Medicine. From 2009 to 2010, 8 patients (12 joints) who complained of limited mouth opening, or dull pain in the TMJ on mastication, or both, at least 3 months after trauma to the mandible were referred to our department for treatment. CT immediately after injury had shown no condylar fracture. There were 3 women and 5 men, whose ages ranged from 22 to 48 years old (mean 38). The causes of injury were road traffic crashes ( $n=7$ ) and injury at work ( $n=1$ ). The duration of time after the trauma was 3–15 months (mean 8). There was no secondary trauma to the TMJ. No patient had subjective TMJ symptoms such as pain, “pop”, and “click”, and no restriction of mouth opening before the injury. The limited mouth opening and pain in the TMJ after the trauma had not improved after at least 3 months treatment with mouth-opening exercises and analgesics, and ranged from 8 to 30 mm (mean 23). Four patients had fractures of the mandibular symphysis as well, which had previously been treated in other hospitals or by other surgeons in this hospital (Table 1).

MRI and CT were taken before treatment, and the possible causes were analysed on the radiographic images. Five of the patients had their joints explored. The results were evaluated during follow-up, and measurements of mouth opening before operation were compared with those at follow-up by Student's paired  $t$  test. Probabilities of less than 0.05 were accepted as significant.

### Results

No MRI was taken immediately after injury when the patients first saw other doctors, and those taken at least 3 months later when they came to see us showed that all the 12 affected joints had their discs displaced anteriorly (Fig. 1). The surface of the condylar bone was destroyed in 11 joints (cases 1–4, and 6–8) and remodelled in 1 joint (case 5). Six patients with 9 joints had CT (cases 2 and 4–8), and 2 patients with 3 joints had panoramic films (cases 1 and 3) immediately after injury, which showed “intact” surfaces of the condylar bones (Fig. 2(a)). CT of 6 patients (9 joints) (cases 1–4, 6, and 8) at least 3 months after injury showed that the surface of the condylar bone had in fact been destroyed (Fig. 2(b)) (Table 2).

Five patients (8 joints) were operated on to improve their mouth opening and relieve the dull pain in the TMJ on

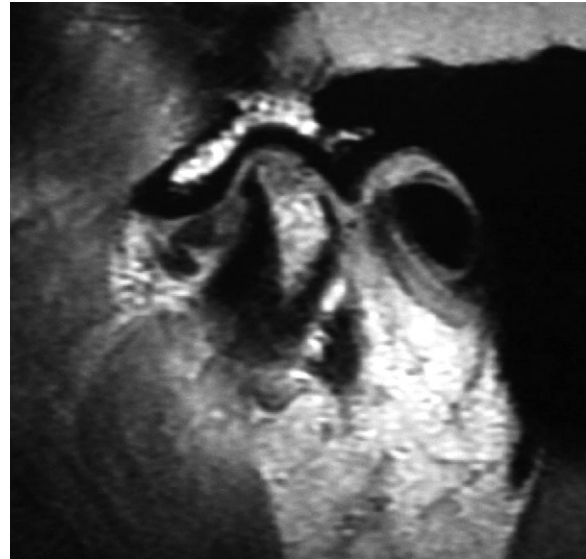


Fig. 1. Magnetic resonance image of the patient showing anteriorly displaced disc and destroyed surface of the condylar bone.

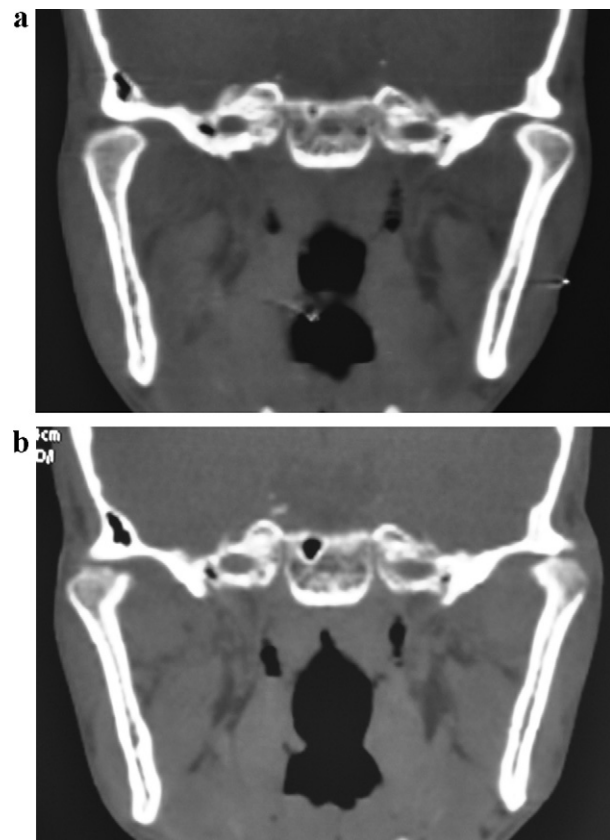


Fig. 2. (a) Computed tomogram immediately after injury showing the surface of the condylar bone to be “intact”. (b) Computed tomogram 3 months after injury showing the surface of the condylar surface bone to be destroyed.

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