Natural Course of Disc Displacement With Reduction of the Temporomandibular Joint: Changes in Clinical Signs and Symptoms

Shuichi Sato, DDS, PhD,* Satoshi Goto, DDS,† Fumiko Nasu, DDS,‡ and Katsutoshi Motegi, MD, DDS, PhD¶

Purpose: The goal of this study was to examine the natural course of disc displacement with reduction in the temporomandibular joint (TMJ).

Patients and Methods: This retrospective study involved 24 patients who had been diagnosed with disc displacement with reduction of the TMJ, but who had not undergone any treatment. The extent of maximal mouth opening, protrusion, lateral excursions, noise of the TMJ, pain of the TMJ, and tenderness of masticatory muscles were recorded monthly for a mean of 25.8 months.

Results: Maximal mouth opening, protrusion, and lateral excursions remained unchanged during follow-up. TMJ pain decreased by 15.7% (P > .05). Clicking decreased by 20.8% (P < .05), and tenderness of masticatory muscles decreased by 33.3% (P < .05). Reciprocal clicking remained unchanged in 19 patients (79.2%) and disappeared in 5 patients (23.8%). Four patients (16.7%) in whom clicking disappeared had a normal mouth opening, but locking developed in 1 patient (4.2%).

Conclusions: In patients with disc displacement with reduction who do not undergo treatment, range of movement remains unchanged over time. Tenderness of masticatory muscles tended lessen, but reciprocal clicking and TMJ pain tended to remain. Clicking did not progress to locking in most patients.

© 2003 American Association of Oral and Maxillofacial Surgeons

Painful disc displacement with reduction in the temporomandibular joint (TMJ) has been treated with medication, disc-repositioning splints1-5 physical therapy,6,7 and surgery.8-10 However, most studies evaluating the effect of a particular treatment for disc displacement with reduction have lacked an untreated control group. Although many patients benefit from these treatments, earlier studies11-13 indicate that reciprocal clicking does not usually progress to locking. An understanding of the natural history of the disease seems necessary for evaluating the actual effect of a particular treatment. The purpose of this study was to clarify the natural course of disc displacement with reduction in the TMJ.

Patients and Methods

This retrospective study involved 24 patients (6 male patients and 18 female patients) ranging in age from 11 to 43 years, with mean age of 19.3 years. Between 1993 and 1998, 321 patients were diagnosed with disc displacement with reduction of the TMJ at the Department of Oral and Maxillofacial Surgery, Tohoku University. Of these 321 patients, 24 were selected for no treatment. They agreed not to undergo treatment and were observed periodically (usually monthly) for a mean of 25.8 months (range, 6 to 53 months). Twenty patients were diagnosed with a unilateral condition and 4 with a bilateral condition. The following inclusion criteria were used: 1) clinical diagnosis of disc displacement with reduction based on the presence of reciprocal clicking; 2) diagnosis confirmed with arthrography or magnetic resonance imaging (MRI); 3) no active treatment provided; and 4)
monthly follow-up data were available for at least 6 months.

The extent of maximal mouth opening, protrusion, lateral excursion to the affected and unaffected sides, noise in the TMJ, pain in the TMJ, and tenderness of masticatory muscles were thoroughly documented at the initial visit and at monthly follow-up. The interincisal distance at active full mouth opening was measured in millimeters as the range of motion for maximal mouth opening. Clicking and crepitus of the TMJ and tenderness of the TMJ and masticatory muscles were evaluated by palpation. Spontaneous pain of the TMJ during maximal mouth opening and mastication were also evaluated. Whether reciprocal clicking progressed to locking during the follow-up period was recorded. Locking was clinically defined as a history of clicking followed by limitation of opening ability without clicking, and protrusion and lateral excursions without clicking.

Paired *t*-tests were used to analyze differences in the range of motion for maximal mouth opening, protrusion, and lateral excursion to the affected and unaffected sides between patients at the initial visit and at follow-up. Fisher’s exact test was used to assess changes in the noise and TMJ pain and changes in tenderness of masticatory muscles if the observed frequencies in 2 × 2 contingency tables differed from those expected. Significance was set at *P* values less than .05.

### Results

In the 24 patients followed up for a mean 25.8 months, maximal mouth opening, protrusion, and lateral excursions to the affected and unaffected sides remained unchanged. TMJ pain was present in 6 patients (25.0%) at the initial visit. It decreased to 2 patients (8.3%, *P* >.05). The number of patients with reciprocal clicking decreased from 24 (100%) to 19 (79.2%, *P* <.05) (Table 1). The number of patients with tenderness of masticatory muscles decreased from 9 to 1 (*P* <.05) (Table 1). Reciprocal clicking remained unchanged in 19 patients (79.2%) and disappeared in 5 patients (23.8%) (Table 1). In 4 patients (16.7%), clicking disappeared without reduced mouth opening a mean of 9.3 months (range, 1 to 17 months) after the initial visit. In 1 patient (4.2%), clicking disappeared with reduced mouth opening 3 months after the initial visit (Table 2).

### Discussion

This study showed that, in patients with disc displacement with reduction who did not undergo treatment, range of mandibular movement remains unchanged over time. Masticatory muscle tenderness tends to lessen, but reciprocal clicking and TMJ pain tend to remain. Clicking does not progress to locking in most patients. Several studies followed the course of TMJ clicking with or without interventions. Lundh et al.11 followed up 23 untreated patients with reciprocal clicking for 52 weeks. The authors observed that reciprocal clicking disappeared in 2 patients without reduced mouth opening after 6 weeks, and locking developed in 1 patient after 17 weeks. However, reciprocal clicking remained unchanged in the other patients. The authors also observed that the frequency of masticatory muscle tenderness increased during 52 weeks.

Koenoenen et al.12 examined the variation of reported and recorded TMJ clicking in 128 young adults longitudinally over 9 years. They found that reported and recorded TMJ clicking increased with age, varying from 11% to 31% and from 11% to 34%, respectively, and that no patients developed locking.

### Table 1. Changes in Clinical Signs and Symptoms

<table>
<thead>
<tr>
<th></th>
<th>At Initial Visit</th>
<th>At Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>A range of motion for maximal mouth opening (mm)</td>
<td>51.4 ± 6.59*</td>
<td>52.1 ± 7.79*</td>
</tr>
<tr>
<td>Protrusion (mm)</td>
<td>7.3 ± 2.37*</td>
<td>8.0 ± 3.41*</td>
</tr>
<tr>
<td>Lateral excursion to the TMJ affected side (mm)</td>
<td>8.1 ± 2.48*</td>
<td>9.0 ± 3.45*</td>
</tr>
<tr>
<td>Lateral excursion to the TMJ unaffected side (mm)</td>
<td>7.7 ± 2.33*</td>
<td>8.1 ± 3.32*</td>
</tr>
<tr>
<td>Patients with TMJ pain (n [%])</td>
<td>6 (25.0)</td>
<td>2 (8.3)</td>
</tr>
<tr>
<td>Patients with clicking (n [%])</td>
<td>24 (100)</td>
<td>19 (79.2)†</td>
</tr>
<tr>
<td>Patients with tenderness of the masticatory muscles (n [%])</td>
<td>9 (37.5)</td>
<td>1 (4.2)†</td>
</tr>
</tbody>
</table>

*Mean ± standard deviation.
†Significant differences between initial visit and follow-up (*P* <.05).

### Table 2. Patients in Whom Clicking Progressed to Locking during Follow-Up

<table>
<thead>
<tr>
<th>Progression to Locking</th>
<th>Patients (n [%])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1 (4.2)</td>
</tr>
<tr>
<td>No</td>
<td>23 (95.8)</td>
</tr>
</tbody>
</table>
results were consistent with those of these studies that clicking does not usually progress to locking in patients with reciprocal clicking who do not undergo treatment. However, our results did not agree with those of Lundh et al regarding masticatory muscle tenderness changes. The present study showed that masticatory muscle tenderness tends lessen in such patients, although Lundh et al found that the frequency of masticatory muscle tenderness increases. It is known that several factors such as age, gender, angle of the posterior slope of the eminence, and degenerative changes of the condyle influence clinical outcome in patients with temporomandibular disorders. We suggest that changes in masticatory muscle tenderness in our patients might be different from those in patients in Lundh et al’s study because of the different distribution of these factors in patients between the 2 studies.

We cannot say why reciprocal clicking disappeared without locking in 4 patients, because these patients did not agree to undergo MRI after the clicking disappeared. In such patients, disc displacement with reduction might convert to disc displacement without reduction, but without occasion locking. Conversely, disc position might be normalized.

When treatment for internal derangement is initiated, reduction of pain is an essential goal. In this study, only 25% of patients exhibited pain when they agreed to forego treatment. The most significant outcome in this group may be the maintenance of function and diminution of clicking. However, whether cessation of clicking should be a treatment goal is controversial.

References


