

Cases Report on Conservative Treatment for the Chronic Closed Lock of Temporomandibular Joint

Gi-Cheol Lee¹, Su-Hyun Park²

1. Department of Oral and Maxillofacial Surgery, Soonchunhyang University Bucheon Hospital, Bucheon, Korea
2. Department of Oral and Maxillofacial Surgery, Bucheon St. Mary's Hospital, The Catholic University of Korea, Bucheon, Korea

Corresponding Author

Gi-Cheol Lee, DDS, PhD

Department of Oral and Maxillofacial Surgery, Soonchunhyang University, Bucheon Hospital, 1174 Chung-dong, Wonmi-gu, Bucheon 420-767, Korea

TEL : +82-32-621-5476 FAX : +82-32-621-5662 E-mail: drcleani@naver.com

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• Abstract

Some treatment methods have been proposed for patients with chronic closed lock of temporomandibular joint. We report a conservative treatment for patients who had chronic closed lock of temporomandibular joint and who did not want surgical treatment. Two patients who had been treated in the Template clinic, Soonchunhyang University Bucheon Hospital, are the subjects of this report. The subjects had chronic closed lock symptom for over 3 months after an onset of locking; conventional therapies had no effect. The subjects were treated by making them wear a Template appliance while sleeping and exercise for 10 hours a day. After periodic follow-up, significant improvement was observed for Template treatment in terms of the maximal mouth opening range. When conventional therapy is expected to be ineffective, The Template appliance can be used as conservative treatment for temporomandibular disorders patients with chronic closed lock of temporomandibular joint.

• Key word : Temporomandibular disorders, Closed lock, Template (TP), Maximum mouth opening

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Introduction

A significant number of reports have indicated that temporomandibular disorder (TMD) is caused by genetic or acquired attributes, tissue problems (jaw joint and musculoskeletal system, arthritis, occlusal disorder, vascular system change, and neuromuscular system), and mental factors such as stress and depression. More than a single factor is thought to be involved normally. A non-invasive method is preferred among temporomandibular joint (TMJ) disorder treatments, showing a lot of desirable results. Still, surgical treatment may be considered for some patients who do not react favorably to conservative treatment but suffer from consistently severe pain with functional disorder^{1,2)}.

According to the progression of TMJ disorder, treatment is performed with the concurrent use of some of the following methods: drug therapy, physiotherapy, splint treatment, injection, TMJ arthrocentesis, TMJ endoscopy, and TMJ open surgery²⁾. In most cases, such treatment results for TMJ disorder are excellent.

As for acute or chronic trismus cases among the many symptoms of TMD, many cases often involve non-reducing anterior disc displacement. In this case, conservative treatment alone is often not good enough for enhancement, which leads to considering a more active surgical treatment. Nonetheless, traditional surgical treatment for TMJ has raised concerns regarding surgical complexity, possible complications, and equivocal results in terms of improvement of symptoms. As an alternative method, temporomandibular arthrocentesis has been mainly recommended, with favorable treatment results³⁾. On the other hand, arthrocentesis requires patient aftercare to sustain the improved symptoms. Realistically, however, it is difficult to expect patient collaboration in some cases. Consequently, treatment results diminish. In particular, a lower success rate of treatment is observed among those patients with chronic non-reducing disc displacement⁴⁾. Furthermore, treatment must be performed by a specialist, either an oral or a maxillofacial surgeon. For general dentists, the location of facial nerves poses difficulty in accessing the articular cavity. Moreover, treating those patients who cannot make regular visits or who feel reluctant following complicated instructions is far from simple.

This report presents the desirable treatment result of the use of Template – a kind of posterior bite elevation plate – to improve chronic trismus symptoms.

Case Report

This study used as subjects patients whose chronic trismus lasted more than 3 months and who were considered to have received appropriate traditional treatment from other hospitals among patients who inquired at the Template clinic of Bucheon Hospital, Soonchunhyang University. TMD diagnosis was performed based on radiographic exams including clinical test, panoramic view, and TMJ series. In this case, bone change was not observed in the panoramic exam. Since no tumor indication had been confirmed through the magnetic resonance imaging (MRI) test by other hospitals, additional tests were not performed in this hospital. The targeted patients were asked to put on -- at least for 10 hours daily -- a template designed to increase the posterior occlusal vertical dimension to 10~12 mm. Apart from the nocturnal use of the device, they were supposed to use it at other times of the day as long as it did not interfere with their daily routine. As a supplementary physiotherapeutic method, ordinary massage using a warm water bag was suggested. No medication was prescribed.

1. Case 1

A 35-year-old female patient visited this hospital for her trismus (Fig. 1). The first test by the hospital showed maximal mouth opening of 25 mm (Fig. 2 and 3). Since her implant treatment at a private clinic, she has had tempo-



Figure 1. Visage photo at the first test. The buccinator muscles appear contracted.

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mandibular dislocation symptoms. She was instructed to take a fluid diet with limited mouth opening after the splint mounting done at other university hospitals. As a result of her long-term opening limitation as instructed, however, no improvement of opening had been made for the last four years, remaining at 15~28 mm. She made a visit to other university hospitals and received temporomandibular arthrocentesis and drug administration, experiencing no better progress in the clinical symptoms. Thus, she was referred to this hospital. At her first revisit one month after treatment commencement, the patient's mouth opening increased to approximately 33 mm accompanied by pain (Fig. 4). Due to her personal circumstances, and because her home was very far (in another region), however, it was difficult for her to make regular visits, and it was not easy to expect cooperation. Nevertheless, 6 months later, her mouth opening improved to 36 mm or so (Fig. 5). At her fourth visit 12 months later, her mouth opening was 40 mm (Fig. 6).

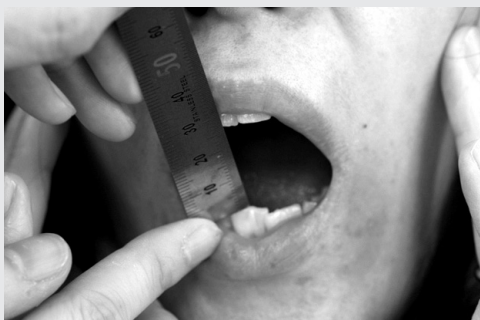


Figure 2. Mouth opening at the first test.

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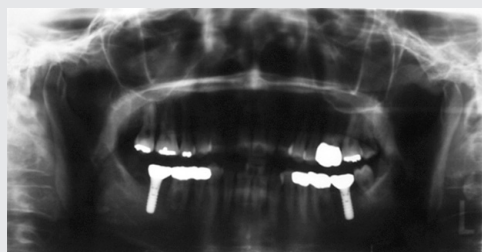


Figure 3. Panoramic view at the first test.

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From the first test since she had occlusal misfit, she had been advised of possible occlusal treatment before starting treatment, but she did not want it due to her reluctance in having long-term dental treatment. Eventually, through maintenance at a level that did not pose daily discomfort, no further occlusal treatment was performed.

2. Case 2

A 48-year-old female patient requested that we address her trismus (Fig. 7 and 8). For the trismus and left-side tem-

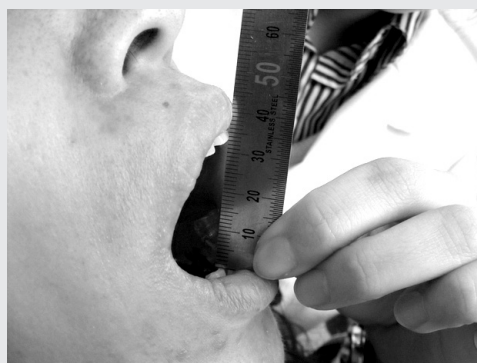


Figure 4. Mouth opening one month after treatment.

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Figure 5. Maximum opening 6 months after treatment: 36 mm.

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Figure 6. Maximum opening 12 months after treatment: 40 mm.

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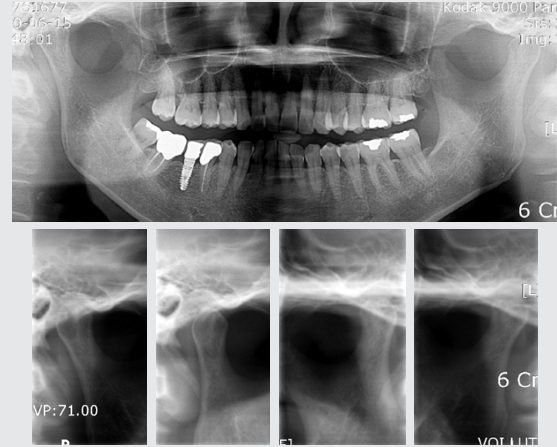


Figure 8. Panoramic view at the first test and temporomandibular photograph.

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Figure 7. Visage photograph at first visit.

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Figure 9. In the left temporomandibular joint region, the endoscopy mark is observed, but it is not generally noticeable.

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poromandibular pain, she had received splint treatment and temporomandibular endoscopy at other university hospitals (Fig. 9). Those treatments eased her painful symptoms but limited her mouth opening, thereby leading her to this hospital. At the first test in our hospital, the maximal mouth opening was 22 mm (Fig. 10). It was 26 mm one week after treatment, and 28 mm at her second visit one month later. She also reported that she got used to the treatment device, feeling no major discomfort. At her third visit two months later, it was 35 mm. On the third month, it improved to 38 mm. The patient was aware of the obvious improvement by

herself. On her fifth visit about six months after the first treatment, the mouth opening was 40 mm (Fig. 11); on her sixth visit 9 months after the first treatment, it improved to 43 mm (Fig. 12). On her seventh visit 12 months after the first treatment, it was 45 mm. And she did not use template after seventh visit. On her eighth visit 18 months after the first treatment, the mouth opening was 43 mm. She was advised of possible occlusal change before the initial treatment, but no occlusal change was actually observed. Subsequently, no further treatment was necessary.



Figure 10. Maximum opening at the first test: 22 mm.

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Figure 12. Maximum opening 9 months after treatment: 43 mm.

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Figure 11. Maximum opening 6 months after treatment: 40 mm.

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Discussion

Mandibular opening and closing movement are made by sensory and motor nerves and harmonious balance of normal muscles with the temporomandibular system. To understand trismus, it is crucial to have knowledge of the masticatory muscles and jaw joint anatomy. Every masticatory muscle has motor and sensory nerves distributed, and all are branches of the fifth cerebral nerves – the trigeminal nerves⁵. A variety of trismus-causing diseases may affect every complex muscle, joint, and nerve. Therefore, the most

important thing is the precise determination of causality and its subsequent treatment. Trismus causes the patient daily discomfort that includes eating problems, causing a sense of insecurity regarding the diminished masticatory function. The causes of trismus include injury or inflammation around the joint and accompanying pain during condylar head movement, which may disable mandibular movement or increase masticatory-system muscle tension. The onset of trismus in the TMD is caused mainly by the anterior displacement of articular disc.

Depending on the cause of the disease, medication, physiotherapy, or mouth opening exercise can lead to improvement. Splint treatment and manipulation may also do the trick⁶. Okeson revealed that, for the treatment of anterior displacement of a non-reducing articular disc, a desirable result was achieved through anterior repositioning splint treatment⁷. Kirk and Calabrese⁸ also found that physiotherapeutic treatment worked for patients with a serious case of temporomandibular arthrosis, but not for patients with non-reduced articular disc displacement. Chung and Kim⁹ learned that the concurrent treatment of stabilization splint and TMJ mobilization brought about a desirable treatment result, and they recommended it as the primary treatment for non-reducing articular disc displacement. In 1991, Nitzan et al.³ reported that, for patients whose acute mouth opening limitation was of great severity, arthrocentesis using lactated Ringer's solution in the upper joint cavity worked, restoring mouth opening and relieving pain. To

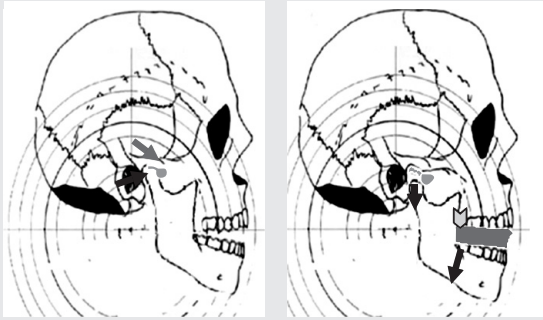


Figure 13. The principle of using the Template works by increasing the occlusal vertical dimension, locating the mandible in the posterior position from the support of the utmost posterior teeth, and directing the posterior pulling of the temporomandibular condylar head region as much as possible. Consequently, this prevents the temporomandibular condylar head from pressing the locking articular disc plate and promotes mobilization, strengthening the mouth closing muscles and relaxing muscular tension. Disc plate (left arrow), muscular tension (right arrows).

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obtain a short-term effect, as a common clinical method, the concurrent application of pumping technique and temporomandibular mobilization is commonly used¹⁰. Murakami et al.⁴ performed temporomandibular arthrocentesis and arthroscopy for patients with closed lock and achieved 70% success rate for temporomandibular arthrocentesis and 91% with the arthroscopy group. Since then, many study results have proven that there was no significant difference between these two methods, and that arthrocentesis was much simpler, causing significantly fewer side effects. Nowadays, arthroscopy is rarely performed, with arthrocentesis preferred for most locking cases¹¹⁻¹⁴. With technical development, however, more microscopic arthroscope can now be manufactured, enabling less discomforting treatment for patients. Arthroscopy might be considered for patients who do not have good indications with arthrocentesis.

With regard to the success rate of temporomandibular arthrocentesis, Frost et al.¹⁵ performed arthrocentesis on patients with acute or chronic closed lock and recorded at least 90% success rate with acute patients and 85% with chronic closed lock. Hosaka et al.¹⁶ had 20 patients for treatment; 6 months after the treatment, they recorded 70% success rate.

Murakami et al.⁴ also reported a 70% success rate, but they advised that a lower rate might be observed with older patients who had more than 7 months' locking period. In the case of chronic closed lock, its lower success rate might be due to more complex morbid causes, or arthrocentesis for the temporary removal of inflammation in the upper joint cavity or improvement of mobilization might be considered insufficient treatment. Otherwise, it could be due to anatomical change around the tissue due to its chronic nature. Clinically, despite occasional cases of ineffective results of conservative treatment and semi-surgical treatment, for those patients who need treatment, surgical approach to TMJ is attempted, but its treatment efficacy has been arguable¹⁷. The recent trend is that surgical treatment has been decreasingly practiced due to rising concerns about the complexity, effect, and complications of conservative surgical treatment.

The principle of using the template -- a kind of oral cavity device -- for locking cases works since it increases the occlusal vertical dimension and locates the mandible in the posterior position from the support of the utmost posterior teeth, directing the posterior pulling of the temporomandibular condylar head region as much as possible. Consequently, this prevents the temporomandibular condylar head from pressing the locking articular disc plate and promotes mobilization, stretch the mouth closing muscles and relaxing muscular tension (Fig. 13)^{18,19}.

There remains a preconception that the template causes a sense of discomfort in use and raises concerns about possible occlusal change due to the greater elevation of occlusal vertical dimension than other ordinary devices. Actually, in clinical application, its initial discomfort is greater than an ordinary splint. If patients are advised with sufficient comprehension and trained on how to use it, however, they get used to the discomfort within one week, and further complaints of discomfort stop. As non-surgical treatment, this approach is more convenient for the patient, requiring fewer outpatient visits that are, after all, advantageous for both patient and surgeon. This approach can be attempted for cases whose chronic mouth opening disorder is not resolved by conservative treatment and for patients who eschew invasive surgical treatment.

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