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Evaluation of mandibular condylar movement exercise for patients with internal derangement of the temporomandibular joint on initial presentation

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Abstract

The aim of the present study was to evaluate mandibular condylar movement in a group of Japanese women who presented with closed lock of the temporomandibular joint. A total of 148 women aged between 19 and 75 years were included in the study. We examined mouth-opening, protrusion, and lateral excursive movements, and divided the patients into two groups (74 experimental cases and 74 controls). The experimental group was treated with exercises of the mandibular condyle, and the median (range) maximum mouth-opening increased from 27 (range 11–34) mm to 38 (24–47) mm. In control cases, it increased from 29 (range 20–35) mm to 30 (20–39) mm without exercise. In the experimental group, the median (range) maximum lateral movement on the opposite (unaffected) side increased from 8 (3–12) mm to 9 (5–13) mm. In the control group it remained similar at 7 (3–12) mm and 7 (3–12) mm. In the experimental group, the median (range) lateral movement on the affected side increased from 6 (2–13) mm to 8 (3–13) mm. In controls it remained similar at 6 (2–12) mm and 6 (2–12) mm. In the experimental group, the median (range) maximum protrusion increased from 6 (3–12) mm to 7 (4–12) mm, and in the control group from 6 (2–10) mm to 7 (2–10) mm. There was a significant difference between the experimental (50/74, 68%) and control groups (3/74, 4%) in the degree of increased mouth-opening. Exercise of the first mandibular condylar seems to be useful in the treatment of closed lock on initial treatment.

Keywords: Temporomandibular joint (TMJ); Internal derangement; Physiotherapy; Exercise

Introduction

Mandibular hypomobility is a common symptom in patients with temporomandibular disorders and various other conditions of the masticatory system.

Chronic closed lock of the temporomandibular joint (TMJ) is the result of an internal derangement of the joint followed by disc displacement without reduction. Clinically it presents with condylar hypomobility together with restriction of, or pain on, opening the mouth. Other conditions have been reported to cause a severe reduction in interincisal opening, including osteoarthritis, myofacial pain and dysfunction, fibrous or bony ankylosis of the TMJ, and the anchored disc phenomenon.[1]

Closed lock symptoms usually include: mouth-opening of less than 30 mm; deviation of the mandible on opening, or protrusion towards the affected side, or both; reduction in, or absence of, previous clicking; and variable myalgia.[2]

The aim of treatment is to normalise masticatory function and eliminate the associated pain.[3] Primary conservative treatment consists of physiotherapy, drugs, and occlusal splints.[4,5] If this fails, operation is essential. Arthrocente-

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sis is effective in the treatment of acute closed lock[6–8] and mouth-opening exercises have also been used independently or after other interventions.[9]

Published reports and our own clinical experience suggest that it is also clear that the use of passive movements to encourage early and effective mobilisation of the joint is extremely important in the management of patients with mandibular hypomobility.[10] Home physiotherapy also has an important place in management.

Mouth-opening exercises consist of the two principal movements of the condyle, which are rotation and translation. Translation is more important if normal mouth-opening is to be achieved. In the case of closed lock, the main mouth-opening movement is rotation, because the ability to rotate is unaffected but the ability to translate is obstructed by the displaced disc.[11]

However, until now we knew of no detailed report of the effect of mouth-opening exercises started at the time of presentation.

We have measured the gap (mouth-opening), and right and left lateral excursive, and protrusive, movements at the time of initial presentation at the clinic. We also measured mouth-opening, and right and left lateral excursive, and protrusive, movements after mandibular condylar exercises.

The aim of the study was to evaluate mandibular condylar exercises started at the time of initial presentation in a group of Japanese women with closed lock of the TMJ.

Patients and methods

This study took place between April 2006 and March 2008. A total of 148 women with closed lock of the TMJ aged between 19 and 75 (mean 40) years were included.

The mean duration of symptoms before the initial consultation was 50 days (range 1–360).

These patients had a distinct combination of symptoms: previous clicking of the TMJ; limitation of mouth-opening immediately after the joint had stopped clicking, with or without slight translation of the condyle; limitation of lateral movement away from the affected side; and deviation of the mandible to the affected side on opening the mouth.

All the patients were assessed clinically by an oral and maxillofacial surgeon, and the following exclusion criteria were used: inability to understand the proposed exercise; age less than 18 years old; current orthodontic treatment; bilateral closed lock; history of drug misuse; history of psychoses; presence of edentulous sites; dental infection or other local dental disease in need of urgent treatment; and a clear maxillomandibular developmental abnormality such as hypertrophy of the facial muscles, or unilateral maxillomandibular hyperplasia or hypoplasia.

Before treatment all patients were examined clinically and radiographically (orthopantomograph). Subjects were excluded from the study if their radiographs indicated severe deformity of the condyle, serious osteoarthritis, rheumatoid arthritis, or a serious mandibular lesion (cyst, or tumour, or both).

Random assignment

Patients were randomly allocated to the exercise or the control group according to a truncated binomial design.

There were 74 patients in the experimental group (age range 19–75, mean 41) and 74 controls (age range 19–71, mean 39). The mean duration of symptoms before the initial consultation in the experimental group was 47 days (range 1 day–9 months), and in the control cases 52 days (range 2 days–11 months).

Baseline measurements

Mouth-opening

A millimeter rule was placed at the incisal edge of the maxillary central incisor that is the most vertically oriented, and measured vertically to the labioincisal edge of the opposing mandibular incisor.

Lateral movement

The subject opened her mouth slightly (physiological rest position) and moved the mandible as far as possible towards the right or left (maximum lateral position). The midline labioincisal embrasure of the mandibular incisors was measured with a millimeter rule.

Protrusion

The initial position was the physiological rest position from which the subject moved the mandible anteriorly without contact with teeth. The distance from the incisal edge of the maxillary central incisor to the incisor edge of the mandibular central incisor was measured in maximum protruded position.

Procedures

For the 74 experimental patients, the clinician began the explanation of the mandibular condylar exercise by standing in front of the patient to explain.

The exercise was as follows: keep a mirror by the left hand; keep the occlusion in the centre; move the right side of the jaw, and contact the teeth at the lateral extruded position; return to the central position; move the left side of the jaw and contact the teeth in the lateral extruded position; repeat the movement on both sides 2 or 3 times; return to the central occlusion; bring the teeth into contact at the protrusion; open the mouth maximally; and repeat this exercise for 10 min.

The patients attempted to open their mouths as much as possible while they placed a thumb on the edge of the upper anterior tooth and a forefinger on the edge of the lower anterior tooth. They then simultaneously pushed against the labial side of the upper anterior tooth with the thumb, and pulled the lingual side of the lower incisor with the forefinger.