Orthodontic treatment for a craniomandibular disorder.  
Case report

Tratamiento ortodóntico de la disfunción craneomandibular. 
Reporte de caso clínico

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The main signs and symptoms of TMJ disorders are associated with a disruption of the disc-condyle complex. Epidemiological studies suggest that approximately 30% of the general population shows some sign of functional alteration of the masticatory system.

**Craniomandibular dysfunction etiology**

Stress, muscle hyperactivity, premature contact points, bruxism and trauma.

**Craniomandibular dysfunction signs and symptoms**

Pain, myofacial pain syndrome, trigger points, articular sounds (clicking and crackling), periauricular pain, dizziness and vertigo, limitation of mandibular movements, malocclusion, alterations at joint level (morphologic alterations, adhesions, dislocation, inflammatory disorders of the TMJ, inflammatory disorders of associated structures) and decreased visual acuity.

**Craniomandibular dysfunction diagnosis**

Clinical chart, physical exam, functional analysis, radiographic diagnosis and diagnostic aids (videos, photographs, study models).

**Craniomandibular dysfunction treatment**

Treatment of the CDM is classified into 2 types:

1. Final: It is aimed to control or eliminate etiologic factors.
2. Supportive: They are therapeutic to modify symptoms.

Another way for classifying CDM treatment is the following: palliative therapy, natural resolution, therapy related to the cause, specific therapy and rehabilitation.

Treatment is performed by means of a myo-relaxation splint, medications, physical therapy, thermotherapy, transcutaneous electrical nerve stimulation (TENS), type ABotox, ultrasound, laser,
psychotherapy, orthodontic appliances and surgical treatment.

CASE REPORT

Female patient of 13 years of age with very strong painful symptoms and generalized muscular hypertonicity, vertigo, inability to walk, limitation of mandibular movements, weak chewing and maximum oral opening of 17 mm (Figures 1 and 2). She was referred from Neurology, and her reason for consultation was to eliminate the pain. Cefalometrically, she presented a skeletal class II due to retrognathism, micrognathia, a tendency to horizontal growth, bi-proclination and dentoalveolar bi-protrusion. Facial analysis showed a convex
profile and bi-prochelia. She suffered from bilateral TMJ pain as well as widespread muscle pain.

Functionally, the patient performed abnormal and limited opening and closing movements and there was a generalized muscle contracture, tongue thrusting, lip suction and weak chewing. In relation to her dental features, she had a left and right non-assessable canine class, severe upper and lower anterior crowding, increased overbite and overjet, deviated dental midlines and upper and lower non-ideal archform (Figures 3 and 4).

TREATMENT PLAN

Therapy with muscle relaxants and thermotherapy with moist heat.

1. Neuromuscular reprogramming with myo-relaxation splint.
2. Upper and lower first premolar extractions.
3. 0.022" Roth system.
4. Phase I. Initial aligning and leveling 0.014"-0.016" NiTi archwires.
5. Phase II-1. Second and third order movements 0.016" x 0.016" NiTi to 0.019" x 0.025" SS archwires.
6. Phase II-2: retraction of the anterior segment with 0.019" x 0.025" SS DKL archwires.
7. At this stage, the possibility of using mini-implants for upper anchorage would be re-assessed.
8. Posterior space closure.
9. Phase III: consolidation and stabilization 0.019" x 0.025"-0.021" x 0.025" SS archwires.
11. Retention.

TREATMENT PROGRESS

First Robaxisal, a muscle relaxant, was prescribed: every 8 hours for 15 days, coupled with hot-water bags and massage of the face and neck muscles 3 times a day as palliative therapy. An upper myo-relaxation splint was placed (Figure 5) and the patient’s appointments were scheduled every 15 days for review of the contact points and wear on the splint, which were smoothed. The appliance was worn for 3 months, time required to determine if the problem was caused by the malocclusion. When the mouth opening, the chewing and the pain improved it was confirmed that the treatment would be orthodontic and that the problem was not caused by a systemic problem such as juvenile rheumatism thus treatment was begun.

Upper and lower first premolar extractions were performed. Molar bands and 0.022 slot Roth brackets were placed on the upper and lower arch. Phase I consisted in initial aligning and leveling with 0.014 NiTi archwires. Phase II, the arches were coordinated through light second and third order movements. Anchorage was obtained through mini-implants. Retraction of the anterior segment was done with a DKL archwire and all spaces were closed. Consolidation, stabilization and retention (Figures 6 to 9).

Figure 5.
Myo-relaxation splint.

Figure 6.
Beginning of treatment, 0.014 NiTi archwires.
RESULTS

The facial and intraoral photographs, the X-rays and the functional analysis show completely satisfactory results since the axial axis of the teeth was corrected and dentoalveolar bipostrusion decreased. The profile improved by decreasing the bipocheilia.

Figure 7.
Mini-implant placement to achieve skeletal anchorage and retract adequately the upper right anterior segment.

Figure 8.
DKL archwire activation on the right side. Reverse curve 0.017” x 0.025” NiTi.

Figure 9.
0.019” x 0.025” continuous stainless steel archwires.

Craniomandibular function was improved by eliminating the widespread muscle pain. An opening and closing pattern without deviation was attained, obtaining a maximum opening of 38 mm. Oral habits were corrected and adequate masticatory function was recovered. Bilateral molar and canine class I was obtained. Dental crowding was eliminated and the
overbite, overjet and dental midlines were corrected. Arch shape was improved (Figures 10 to 12).

All treatment objectives were achieved demonstrating that in cases such these, if they are properly diagnosed and treated, patient’s health may be restored.

CONCLUSIONS

Craniomandibular dysfunctions are each day more frequent in our population, affecting more women than men and with an increasing incidence in children and teenagers.

Figure 10.
End of treatment, impressions were taken to fabricate the retainers. A circumferential retainer was placed on the upper arch and a 0.0175 archwire fixed retainer on the lower.

Figure 11.
Final facial photographs and maximum opening.
This disease is multifactorial therefore it should be treated multi-disciplinarily in order to obtain an integral result that involves facial, articular, functional, dental, aesthetic, psychological, social, and emotional changes.

There are currently different alternatives to deal with the CMD so it is important to be trained to implement the most appropriate for each patient and in this way manage pain and relieve the patient's suffering.

The main challenge for the orthodontist in CMD cases is the diagnosis in order to determine the extent to which the malocclusion is affecting the craniomandibular problem.

RECOMMENDED READINGS


— Bell W. Temporomandibular disorders: Classification, Diagnosis and Management, 2nd ed. Mosby, EUA. 1986.