

# Temporomandibular Joint Derangement With Multiple Surgical Interventions: A Case Report

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*This case report describes the experience of a 26-year-old woman who underwent multiple jaw surgeries. An initial 22 months of unsuccessful nonsurgical therapy was followed by a 7-year period during which the following were performed: 12 surgeries of her right temporomandibular joint; one surgery of her left temporomandibular joint; bilateral coronoidectomies; one surgery of her right mandible; and three surgeries of her left mandible. This case is important because although the existence of multiple jaw surgery cases are widely noted throughout the literature, this is the first case report that presents in-depth prospective documentation.*  
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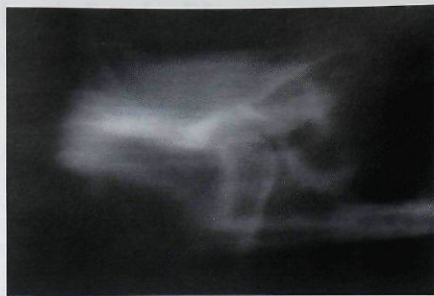
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Failures of treatment for temporomandibular joint (TMJ) problems occur for many reasons, ranging from technical inadequacy to incomplete or inaccurate identification and treatment of the causes and perpetuating factors of the patient's pain and dysfunction. It has been speculated that it is the latter that is responsible for the greatest portion of surgical and nonsurgical treatment failure. Unfortunately, discovering all causes and perpetuating factors of TMJ pain and dysfunction can be difficult and sometimes impossible, even in "simple" cases such as those arising from a known traumatic injury. It is important to note that approximately 20% of all therapies (surgical and nonsurgical) for temporomandibular disorders (TMD) fail to result in improvement.<sup>1-11</sup> Inability or failure to identify and treat all etiologies not only increases the probability of immediate treatment failure, but these factors also must be considered when symptoms return months or years after an initially successful therapeutic intervention.

The present report describes a case involving various unsuccessful nonsurgical therapies and multiple unsuccessful surgical interventions (12 surgeries of the right TMJ, one surgery of the left TMJ, bilateral coronoidectomies, one surgery of the right mandible, three surgeries of the left mandible, and one myotomy), all during a 7-year period. This case is important because detailed information on the sequence of events that lead a patient into multiple TMJ surgical interventions has not been reported in the literature, despite numerous examples of patients requiring multiple surgical interventions.<sup>4-8,12-26</sup> The following case report is also unique due to the existence of an extensive examination completed before the patient's first jaw surgery and also at various times postoperatively, allowing meticulous monitoring of the surgical results and comparison of these results to the preoperative status. These examinations were



**Fig 1a** Right TMJ tomograph in January 1986, before patient's first TMJ surgery.



**Fig 1b** Left TMJ tomograph in January 1986, before patient's first TMJ surgery.

performed because of her voluntary inclusion in a prospective research project at the Clinical Research Center of the University of California, Los Angeles. Patients were referred to this study by several oral and maxillofacial surgeons (OMFS) practicing in the community, and all evaluations were performed independently from the treating clinicians and their staff. The study was designed to analyze the long-term effects of arthroscopic TMJ surgery.<sup>27,28</sup> The protocol for this project included a comprehensive presurgical examination evaluating the patients' preoperative status regarding history, symptoms, occlusion, joint noise, jaw habits, and jaw function, and it required periodic postoperative evaluations of these parameters during a 5-year period.

## Case Report

A 26-year-old woman was referred to the Clinical Research Center of the University of California, Los Angeles, in June 1986, by her OMFS (No. 4). The comprehensive research examination was performed 1 week before her first jaw surgery, a right TMJ arthroscopic lysis and lavage. Preoperatively she complained of right preauricular pain with right TMJ locking and limited jaw function. Both sets of TMJ tomographs revealed right and left joints to have no evidence of osteoarthritic changes, to have normal cortical outlines of the condyles, the fossae, and eminence, and to have an acceptable condyle/fossae relationship (Figs 1a and 1b).

Medical histories were recorded, and clinical examination and any needed radiographic imaging procedures were performed pretreatment by each

of the 11 OMFS involved in this case. Of interest in the patient's medical history are two items: (1) the patient reported that she had undergone nine gynecological surgeries between 1970 and 1985 and (2) the patient had stated that she wondered whether the anesthetic intubation procedures used during these prior surgeries resulted in strain on her jaw that might have caused her jaw problems. It should be noted that at no time has this patient undergone psychometric testing. After surgery 5, the patient was referred to a psychologist, but for relaxation counseling and biofeedback therapy only. After surgeries 10 and 15, her OMFS (No. 7) referred her for psychometric testing and evaluation; however, she has not yet complied with this referral.

Just before surgery 6 (ie, an open arthrotomy to remove the alloplastic disc implant) in October 1989, the patient started orthodontic therapy to improve her occlusal relation. This was done upon recommendation of her OMFS (No. 7), who had informed her that her "near edge-to-edge occlusion" was adversely affecting the right TMJ. As previously mentioned, presurgical information on this patient's occlusion is available because she was part of an independent prospective study evaluating the long-term results of TMJ arthroscopic surgery.<sup>27,28</sup> It was noted during the presurgical examination that the patient's occlusion was Class I, with a centered maxillary midline and a normal 2-mm overbite and 2-mm overjet relationship. In all aspects, this patient's occlusion was considered very stable, with solid centric contacts on every tooth (except the mandibular left lateral incisor) in both the anterior and posterior segments bilaterally (Figs 2a to 2c).



At surgery 7, the patient underwent a complete right condylectomy, condyle replacement with a segment of her rib cartilage, and a simultaneous left mandibular orthognathic surgery to "improve her occlusion." The patient reported that as a result of surgery 7, her mandibular left lip and gingivae were numb but giving "electric shock sensations" periodically. One month later, the patient was accidentally struck on her right mandible, and the left osseous healing site was displaced and repaired with emergency surgery (surgery 8). At a subsequent research recall examination, it was observed that the patient's occlusion was open anteriorly (as much as 3 mm) with contact only on her two mandibular right molars. Due to the anterior open bite, the patient said she could not eat well and could not "bite or chew really." At the same time, the patient stated that her right side was feeling better than it had felt before the first surgery ("80% improved overall"). Then, to close her open bite, her jaw was "wired shut for 2 weeks" in late November 1990. Her anterior open bite soon closed, but ever since the jaw was first wired closed, she had "almost constant severe pain in the right TMJ and cheek area."

In March 1991, the grafted rib section on the right tore loose from the mandibular body because, the patient was informed, "the superior portion had ankylosed to the temporal fossa." In May 1991, the right TMJ was resected and replaced with a complete titanium-nickel-cobalt-polyurethane joint prosthesis, which was custom fabricated utilizing a computer aided design-computer aided manufacture (CAD-CAM) procedure. By August 1991, the patient reported overall malaise and constant, deep right TMJ pain and right cheek pain with periodic formation of hives on the right side of her face and neck and on her entire torso. These symptoms prompted a special consultation with OMFs No. 10, who performed additional allergy/sensitivity testing. With the blood work showing no allergy/sensitivity but the epidermal patches being inconclusive, suspicion of allergy/sensitivity to the TMJ prosthesis resulted in the patient being advised to have all metal components of the TMJ prosthesis removed. In November 1991, the condylar portion of the prosthesis was removed to see if the reaction would diminish. By December 1991, the swelling and deep pain were only slightly reduced. The fossa portion of the prosthesis was then removed, resulting in reduced swelling and pain. Through January 1992, her dentition remained open and unstable, with centric contacts only in the right molar region, but her complaints of hives, diffuse



Fig 2a to 2c Dentition in June 1986, before patient's first TMJ surgery.

swelling, and deep pain associated with the suspected allergy/sensitivity were finally gone.

From February 1992 through January 1993, the patient underwent seven additional surgical procedures that were performed during four operating sessions. The Treatment Timeline has a full chronology and further explanation. As of June 1994, her jaw opening is again at "about one and one-half finger widths," extreme pain and swelling remain in the right TMJ, mild pain (but extreme pain to light touch) exists along with an unesthetic concavity in the body and angle region of her right mandible, and 40% of the original paralysis of the right eyebrow and eyelid remains. The patient's anterior occlusion remains open (as much as 2 to 3 mm in some areas), and her only occlusal contacts are on her right molars, leaving her unable to chew properly and restricting her to a soft diet.

## Treatment Timeline

- April 1984** First symptoms of jaw dysfunction develop, including pain and intermittent clicking in the right TMJ.
- June 1984** Patient begins wearing occlusal appliance (at night only). During the next 14 months, she receives numerous other conservative treatments (occlusal equilibrations, rest, soft diet, moist heat, chiropractic manipulations, prescription medications), resulting in little or no symptom relief.
- October 1985** First episode of jaw locking occurs. Continued jaw pain with limited jaw function. General dentist refers patient to OMFS No. 1 for consultation.
- January 1986** Examination and consultation with OMFS No. 2, who diagnoses her left TMJ as having a displaced disc that is the source of the pain on her right side.
- February 1986** Consultation with OMFS No. 3 results in construction of mandibular stabilization appliance that fails to reduce symptoms. Patient is later referred to OMFS No. 4.
- February 1986** Bilateral TMJ arthrograms, performed per request of OMFS No. 4, reveal anteriorly displaced disc (without reduction) in right TMJ, no arthrotic changes, and a normal left TMJ.
- June 1986** Preoperative research exam performed at UCLA Clinical Research Center.
- June 1986** *Surgery 1*: Right TMJ arthroscopy performed by OMFS No. 4. Pain 95% gone for 7 months.
- February 1987** Pain returns in right TMJ.
- November 1987** *Surgery 2*: Right TMJ open arthrotomy performed by OMFS No. 3. Patient reports no substantial improvement postoperatively. Patient undergoes 3 months of physical therapy, ending in February 1988.
- August 1988** *Surgery 3*: Right TMJ arthroscopy performed by OMFS No. 5. Pain in right TMJ gets immediately worse.
- January 1989** Examination and consultation with OMFS No. 6.
- February 1989** *Surgery 4*: Right TMJ arthroscopy performed by OMFS No. 7. Pain is lessened at first, but by April 1989, pain returns to same level as before surgery 1.
- May 1989** New occlusal appliance constructed and inserted by OMFS No. 7.
- August 1989** *Surgery 5*: Right TMJ open arthrotomy with discectomy performed by OMFS No. 7. An alloplast implant is placed. Pain is unchanged at first, but gets worse within 2 weeks.
- September 1989** Patient referred to psychologist by OMFS No. 7 for relaxation counseling and biofeedback therapy only.
- October 1989** Orthodontics started. Significant pain in right ear develops due, the patient is informed, "to the displaced implant." Patient stops wearing occlusal appliance.
- November 1989** *Surgery 6*: Right TMJ open arthrotomy performed by OMFS No. 7 to remove implant. No change in symptoms.
- May 1990** *Surgery 7*: Right condylectomy with rib replacement performed by OMFS No. 7. Also, a left mandibular orthognathic surgery is performed to improve bite. Symptoms slightly better. Patient's "lip and gum are numb on the left side."
- June 1990** *Surgery 8*: Repair of accidentally fractured left mandible performed by OMFS No. 7. "Numbness with periodic electric shock feelings" remain on mandibular left side.
- July 1990** *Surgery 9*: Mandibular osseous surgery performed by OMFS No. 7 to repair dehiscence on left and remove sequestrum. "Left lip and gum still numb" with "periodic electric shocks," and anterior bite still open (as much as 2 to 3 mm). Patient is occluding only on her right molars.
- October 1990** Patient feeling "80% improved overall. . . right side is feeling better now than it was before the first surgery."
- November 1990** Her jaws are wired shut in an attempt to close the open bite. Patient immediately experiences pain in right TMJ with periodic swelling in front of her ear and right cheek. Pain began with placement of wires and is still present, but her bite is closed now.
- December 1990** Consultation with OMFS Nos. 8 and 9.
- March 1991** With pain worsening and with jaw opening and overall mobility greatly reduced, the grafted rib section of the right TMJ tears loose from the body of the mandible (it had ankylosed to the fossae).
- May 1991** *Surgery 10*: Patient's right TMJ is resected and replaced with a titanium-nickel-cobalt-polyurethane TMJ prosthesis by OMFS No. 7.
- June 1991** Patient referred by OMFS No. 7 for psychometric testing and evaluation.
- August 1991** Patient ends 7-month period of a narcotic pain medication program for chronic-pain patients.
- September 1991** Right TMJ pain and swelling (with hives on right side of face and neck



## Treatment Timeline (continued)

and on torso) leads OMFS No. 7 to refer patient to OMFS No. 10 for special consultation. History and symptoms raise suspicion of allergy/sensitivity to TMJ prosthesis. Sensitivity (patch) testing is inconclusive, while blood work at Case Western Reserve University, Cleveland, OH, shows no sensitivity to nickel, cobalt, chromium, titanium, or Proplast (Vitek, Houston, TX). Patient is advised to have metallic components of right TMJ prosthesis removed. The prosthesis is planned for removal after consultation with OMFS No. 10. Patient is also advised that her recently symptomatic left TMJ will require surgery soon.

**November 1991 Surgery 11:** Prosthesis in right TMJ is removed (except for superior "fossa" portion) by OMFS No. 7. Hives have not recurred since this removal, but moderate swelling and deep pain in right TMJ remain.

**December 1991 Surgery 12:** Patient is informed of suspected allergy/sensitivity to the remaining prosthetic polyurethane fossa, and it is also removed. Since its removal, the swelling and deep pain associated with the suspected allergic reaction have subsided. Patient is taking six pain relievers and eight muscle relaxants per day. Her teeth hurt from postoperative fixation. Her right cheek area has muscle pain, but neither TMJ region has pain. Patient has minimal chewing function and is on a strictly soft diet.

**January 1992** Consultation with OMFS No. 11.

**February 1992 Surgery 13:** Another rib segment is used by OMFS No. 7 in an attempt to restore the patient's right TMJ. At 6 weeks postoperation, the patient's jaw locked open. Archwires and ligatures were used to close the jaw during a 2-week period.

**April 1992 Surgery 14:** Soft tissue surgery performed on the left side by OMFS No. 7. The patient reported that the "teeth and muscles on the left don't hurt anymore, like they have for the past 2 years."

**June 1992** Patient reports that "the titanium plate used to secure the rib graft had shifted, causing the skin to bulge out" at the angle of the right mandible.

**August 1992 Surgery 15:** Titanium plate is removed and replaced by OMFS No. 7 with a piece of the patient's hip "to maintain facial contour."

**September 1992** Patient reports she has a "one and a half finger width" mouth opening and

a "golf ball-sized" swelling over the right TMJ region. The swollen area is exquisitely painful and her doctors "don't know yet what it is from." The right TMJ hurts constantly and worsens with opening. The left TMJ hurts with all movements and sometimes at rest. Her upper right neck is "very painful 80% of the time."

**November 1992** Symptom status unchanged. Patient referred by OMFS No. 7 for psychometric testing and evaluation at a pain management clinic.

**December 1992** New tomographs and a second consultation with OMFS No. 9, who diagnoses bilateral elongated coronoid processes, left TMJ fibrous ankylosis with a displaced disc, and right TMJ bony ankylosis.

**January 1993 Surgery 16:** Right TMJ open procedure to reduce bony ankylosis, right coronoidectomy, left TMJ arthroscopy to treat fibrous ankylosis and displaced disc, and left coronoidectomy by OMFS No. 9. Results: jaw opening "about 3 finger widths"; left TMJ 95% improved; mandibular right angle and body have a marked "dished in" contour with periodic pain and swelling and are extremely painful to touch; right TMJ area still extremely painful with "golf ball-sized" swelling over right TMJ. Right eyebrow and eyelid severely paralyzed.

**May 1993** Severe paralysis of right eyebrow and eyelid begins fading.

**July 1993** "Three-finger width" jaw opening gained from surgery 16 begins to reduce in magnitude.

**June 1994** Jaw opening remains at "one and one-half finger width." Right eye paralysis is "still about 40% as paralyzed as it was" after January 1993 surgery. Left TMJ remains 95% improved and has only mild pain very infrequently and is of no concern to her. Mandibular right body and angle continue to present a very unesthetic concave contour with periodic swelling and mild to moderate pain, but is extremely painful to touch. Right TMJ is extremely painful with constant marked swelling. Patient cannot eat any food that requires even minimal chewing and is basically restricted to a soft diet. Her bite is still open anteriorly, with her teeth meeting only on her mandibular right molars.

## Discussion

Although the present case may be unique, we believe that it represents a process commonly seen in multiple surgery cases.<sup>26</sup> This process, of escalating to a more invasive procedure after a more conservative procedure fails, is widely viewed as the only treatment choice. No treatment, or a return to conservative therapies, is not seen as a viable option by many therapists or patients. This case has further significance because it is the first reporting of a TMJ prosthesis failure associated with a suspected allergic reaction to the TMJ prosthesis. It seems especially important to report this complication so that future designs may utilize materials with reduced potential for sensitivity reactions and that future implant candidates can receive definitive preoperative testing to avoid complications due to suspected material sensitivities.

It is interesting to note that of the five OMFS who actually treated the patient, four (OMFS Nos. 3, 4, 5, and 9) performed only one operation each. The remaining 13 procedures (performed during 12 operating sessions) were performed by OMFS No. 7. This same surgeon also recommended orthodontic therapy and orthognathic surgery on her mandible to resolve her "aberrant occlusion," despite her documented normal occlusal status. The patient accepted these suggestions and had the orthodontics and then the orthognathic surgery performed.

In hindsight, it appears that additional diagnostic investigations should have been undertaken to identify the causes of previous treatment failure before performing additional invasive procedures. It was only after surgery 5 that the patient was referred to a chronic-pain program for biofeedback and relaxation training. By report of the program director (a psychologist), the patient received two sessions of brief counseling and did not return for the prescribed biofeedback treatment. The patient participated in a second pain management program involving some counseling and narcotic medication management/withdrawal for a 7-month period, ending August 1991. After surgery 10 in October 1991, and again after surgery 15 in November 1992, OMFS No. 7 referred the patient to a pain clinic for a full psychological evaluation (including psychometrics). To date, the patient has not performed these tests.

## Summary

The present study is a single case of multiple surgical treatments of the TMJ. The present authors

believe that it is the only detailed case report in the literature outlining this occurrence, although numerous other reports mention or contain evidence of surgical re-treatments of the TMJ.<sup>4-8,12-26</sup> One notable example is a large study of total joint replacements.<sup>26</sup> This study reported a correlation between increasing severity of symptoms and the number of previous operations. The authors<sup>26</sup> also found that the "number of previous surgeries was a strong predictor of postoperative pain, function, and diet scores, as well as of maximum interincisal opening." Unfortunately, the conclusions of this study (cumulative success rate of 92% at 4 years, and 97% if "patient failures are removed, because patient failures were not the fault of the implants") are greatly weakened by missing preoperative examinations, inconsistent data collection, unexplained loss of subjects to recall (more than 60% of subjects were lost at the 6-month, 1-year, and 2-year follow-ups, with only 13% and 3% of subjects completing the 3- and 4-year postoperative examinations, respectively).

It should be stated that, in all regards, the 1984 TMJ surgery guidelines suggested by the American Association of Oral and Maxillofacial Surgeons<sup>29</sup> were followed by the various OMFS in this case. However, the 1984 guidelines<sup>29</sup> and even the more recent 1992 guidelines<sup>30</sup> do not provide clear guidance for the management of the failed surgical therapy case. One logical suggestion would be to insist on a thorough psychological evaluation before considering additional surgical therapy. For example, the American Academy of Orofacial Pain<sup>31</sup> has published guidelines that contain suggestions for behavioral and psychosocial assessment. These guidelines<sup>31</sup> also give examples of useful in-office self-assessment instruments and include factors affecting the need for considering psychological referral. This form of guidance offered by the American Academy of Orofacial Pain is an important beginning not only for developing a protocol of added diagnostics, but also for establishing solid referral guidelines for the psychological assessment of pain patients and especially those suffering from repetitive treatment failures.

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## Resumen

Malfuncionamiento Interno de la Articulación Temporomandibular con Intervenciones Quirúrgicas Múltiples: Reporte de un Caso

Este reporte presenta la experiencia de una mujer de 26 años de edad quien fue sometida a múltiples cirugías en la mandíbula. Inicialmente se realizó infructuosamente terapia no quirúrgica durante 22 meses. Luego durante un periodo de 7 años se realizaron los siguientes procedimientos: 12 cirugías en la articulación temporomandibular (ATM) derecha; una en la ATM izquierda, coronoidectomías bilaterales; una cirugía en la mandíbula derecha; y tres cirugías en la mandíbula izquierda. Este caso es importante porque aunque los pacientes que se han sometido a cirugías mandibulares múltiples son mencionados extensamente en toda la literatura, este es el primer reporte que presenta una documentación prospectiva cuidadosa.

## Zusammenfassung

Mehrfache chirurgische Intervention bei Myoarthropathie des Kausystems: Ein Fallbericht

Dieser Fallbericht beschreibt die Erfahrungen einer 26-jährigen Frau, die mehrfach am Kiefer operiert worden war. Nach 22 Monaten erfolgloser konservativer Therapie folgte eine sieben Jahre dauernde Episode, während der die folgenden Massnahmen getroffen worden waren: 12 Operationen am rechten Kiefergelenk, eine Operation am linken Kiefergelenk, beidseitige Koronoidektomie, eine chirurgische Intervention am rechten Unterkiefer und drei Operationen am Unterkiefer links. Der vorliegende Fallbericht ist wichtig, weil er, obschon Berichte über Patienten mit mehrfachen Operationen am Kiefer in der Literatur keine Seltenheit sind, als erster eine sorgfältige prospektive Dokumentation enthält.