

Phase II Therapy for a Chronic Pain Patient: A Clinical Report

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ABSTRACT: One of the roadblocks to success in treating temporomandibular joint dysfunction (TMD) patients is an accurate diagnosis. The terms "TMJ" or "TMD" are not specific enough to provide definitive treatment. Initially the disorder must be classified as a muscular or an internal derangement problem. Once accomplished, the further diagnostic breakdown of the problem will prepare the patient and the doctor for the scope of treatment necessary and the prognosis. This lack of a specific diagnosis can lead to inappropriate treatment and inadequate communication among clinical dentists, academia and patients. Our patients and the profession will continue to suffer until a single diagnostic system is universally agreed upon and utilized.

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Patients who experience chronic pain from temporomandibular disorders often present a major challenge to the restorative dentist. Many patients who present for evaluation of their temporomandibular (TM) disorders were previously misdiagnosed with *Chronic Pain*. When a structural cause for masticatory system disharmony is present but has not been uncovered in previous evaluations, the source of pain is often missed and left untreated. Initially, diagnosis and classification of the TM disorder takes place. Since the treatment for a muscular versus an intracapsular disorder can be so different, proper diagnosis is mandatory. Only after the patient has no masticatory muscular pain and is comfortable on loading in Centric Relation (CR) or Adapted Centric Posture (ACP)¹ should final rehabilitative therapy begin. After a permissive splint has been used to obtain a comfortable neuromusculature, the challenge is to maintain this harmony in the final rehabilitation. The design of the occlusal scheme in relation to the condyle/disk assembly is the major factor in the ultimate successful result for the patient.

A 48-year-old mother of four was referred for restorative evaluation after completion of her orthodontic treatment. She had presented to the orthodontist after eight years of intense facial/joint pain and headaches which started with no history of trauma.

Temporomandibular joint (TMJ) classification revealed a Piper IIIA bilaterally (displacement of the

lateral border of the disk which reduces) and a Dawson IIA occlusal analysis (mandible must displace from a portion of the disk to get the teeth together in maximal intercuspation). During orthodontic treatment, occlusal appliance therapy had been alternated between the maxillary and mandibular arches depending on tooth movement and periods of muscle pain exacerbation. Her medical history revealed a brittle diabetic on 28-30 units of insulin 4X/day, migraine headaches (physician diagnosed), hearing impairment and prescription medications for pain including amitriptyline HCL, acetaminophen with codeine, ibuprofen (800 mg) and hydrocodone bitartrate. Chronic depression and excessive amounts of pain medications were affecting her social environment.

Her dental history revealed evaluations by six different dentists including two years of myomonitor therapy which exacerbated her condition. Psychological counseling and electrical stimulation to her face were also unsuccessful. The patient (Figure 1) described her last eight years as being "like an animal trying to seek pain relief."



Figure 1
Full face preoperative photo of patient immediately after orthodontic treatment.

Clinical examination revealed a marked left side posterior vertical asymmetry, severe maxillary anterior incisal notching (#9), posterior generalized moderate/heavy wear, friable gingival tissue with minimal attached gingiva and generalized posterior recession/abfraction lesions with no pocket depths over three mms (Figure 2). CR and maximum intercuspation (MI) were not coincident with a lateral deflection of 1.5 mm from CR to the left due to a deflective incline on #8. The patient had bilateral excursive interferences, no anterior coupling in the left anterior area, and an inadequate anterior guidance. Cervical gingival levels were also asymmetrical. The majority of the posterior teeth exhibited moderate wear, vertical cracks on the molars, and failing restorations. Facial/joint pain subsided during orthodontic and occlusal splint therapy, however, recapses of masticatory system headache pain persisted.

Complete occlusal rehabilitation was planned (except for the lower anteriors); special attention was given to the patient's diabetic and limited attached gingival condition. Occlusal appliance therapy was provided for three months before the restorative phase of treatment to eliminate any signs of tension or tenderness in the joints or muscles, to establish a comfortable occlusal scheme, and to achieve a verifiable CR that could accept loading. The envelope of function is the principle determinant of anterior guidance. Since a steeper guidance on the splint produced masticatory muscle dysfunction and pain due to the mechanical disadvantage created in the musculature and her specific lateral parafunctional bruxing patterns, gradually flattening the splint's anterior guidance introduced neuromuscular harmony to the system. At the successful completion of permissive appliance therapy, diagnostic casts of the dentition were mounted in CR to evaluate the muscle-relaxed jaw position. Equilibration of the casts followed by a complete waxup at a diagnostic vertical dimension



Figure 2
Intraoral view showing asymmetry, abfraction/recession, notching and gingival tissue.

with equal intensity centric stops and immediate disclusion of all posterior teeth in all excursions was accomplished. The Broadrick Flag was used to determine an acceptable curve of Spee. Care was taken to flatten the lateral anterior guidance on the linguals of the upper cuspids and centrals to permit more freedom of masticatory muscle function. This would be repeated in the final rehabilitation. Number 15 was sacrificed due to the occlusal scheme suggested in the waxup (Figure 3).

Materials and Methods

Complete occlusal adjustment in CR was accomplished on the natural dentition prior to the start of rehabilitative therapy. This verified vertical dimension, vertical stops and the final treatment position after short-term utilization. Now the patient could be weaned off the splint. The natural lower anteriors were reshaped with consistent incisal edge heights and bevels for definitive anterior contacts. Due to her diabetes and gingival frailty, the decision was made to not change any gingival cervical heights and to use IPS Empress crowns for her upper anterior teeth. The crowns were prepared at the level of the gingival crest and temporized indirectly using a reversible hydrocolloid impression material (Van R, Oxnard, California) for the impression, a hardened stone (Snap Stone, Whip Mix, Louisville, Kentucky) for the model, a matrix formed indirectly over a model of the waxup (Biostar, Great Lakes Ortho, Tonawanda, New York) and Allie (GC America Inc., Chicago, Illinois) as the provisional material. Maintenance in the pressure pot for 20 minutes was followed by trimming, forming, adjusting and cementation with Fynal (Caulk, Milford, Delaware) and lightly coating with petroleum jelly. Anterior guidance was worked out with articulating ribbon (Accufilm, Parkell, Farmingdale, New York)



Figure 3
Preoperative waxup showing #15 above the normal curve of Spee.

through all excursions while loading the orbiting condyle. The lower posterior teeth were then prepared for PFMs with the acrylic temporaries fabricated at the pre-designed curves of Spee and Wilson. Build-ups were accomplished on the necessary teeth with Single Bond (3M, St. Paul, Minnesota) and Ketac Silver (ESPE, Norristown, Pennsylvania). The upper posterior teeth were then prepared for porcelain shoulder PFMs, temporized to match the existing occlusion, and refined for definitive centric stops and immediate posterior disclusion in all movements. Final impressions with reversible hydrocolloid (Van R, Oxnard, California) were then made in the same sequence as prepared. The upper anterior units were cemented with Porcelite (Kerr, Romulus, Michigan) untinted cement and all of the posterior units with Prep W & D (Value Dental, Auburn, Washington) and Vitremer (3M, St. Paul, Minnesota). Impressions of the upper arch in irreversible hydrocolloid (Identac, Cadco, Oxnard, California) were taken immediately after cementation of the upper posteriors for nightguard fabrication.

Discussion

In order to begin treatment for any TMD/facial pain patient, a definitive diagnosis of the condyle/disk assembly as related to the occlusion must be determined. The diagnosis of a bilateral Piper IIIA and a Dawson IIA determined the patient was still functioning with the medial portion of the articular disk in the proper anatomic position. Despite her chronic pain condition, a treatment regime which included permissive occlusal appliance therapy, orthodontics and rehabilitative dentistry could be expected to produce a good prognosis. A diagnosis of a Piper IVA (or above) or a Dawson III (or above) would not have been nearly as favorable over the long-term due to their nonreduction and advanced deterioration.

Most TMD/facial pain patients seen by clinical dentists have occlusal imbalances that are directly related to their symptoms. While these patients may function well for many years with their occlusal imbalances, stress, trauma and/or a lowering of their adaptive processes can initiate major muscle pain. The literature^{4,5} has shown that a less than 50 micron imbalance can trigger muscle hyperactivity which is often the difference between extreme pain or total comfort. These patients require attention to detail in their occlusal schemes to provide an acceptable restorative result as demonstrated in this case.

She was made comfortable with a universal flat plane appliance with equal intensity pinpoint centric stops on all of the teeth. Immediate posterior disclusion and a shallow anterior guidance with a smooth transition in lateral,

protrusive and crossover movements was also perfected. The creation of a shallow anterior guidance was of critical importance for this patient to prevent muscular pain and headaches by freeing up the musculature. This occlusal scheme had to be reproduced in her rehabilitative (phase II) therapy to maintain neuromuscular harmony (Figure 4). The anterior teeth were fabricated using an incisal guide table and an incisal edge index to reproduce the facial extension, incisal edge length and lingual contours that had been previously worked out in the provisional restorations for six months (Figure 5 A and B). IPS Empress was the restorative material of choice due to its natural appearance, similar wear characteristics to tooth enamel and esthetics with supragingival preparations. Immediately after placing the permanent anterior crowns, the patient experienced a minor relapse in headaches and facial pain. A refined occlusion in CR, long centric and laterotrusion eliminated all discomfort (Figure 6). The lower posterior teeth were restored using high noble PFMs with one mm metal collars due to her history of abfraction, dentogingival complex concerns, and strength requirements. Again the occlusion was refined against the opposing provisional restorations in all excursions. After all long appointments, some relapse of muscular pain and/or headaches was experienced until the muscles could relax. With any occlusally disadvantaged patient, the author uses gold occlusals on the lower arch but an esthetic compromise was made for this patient. Our compromise agreement provided control over the upper occlusal surfaces which were done in 80% gold. This material could be more easily shaped to provide the small lingual occlusal contacts necessary for the required occlusal result which included equal intensity CR stops with immediate posterior disclusion and smooth lateral transitions (Figure 7). The final treatment step



Figure 4
Postoperative lateral view in cuspid rise showing shallow guidance and smooth transition onto the anterior teeth.



Figure 5 (A and B)
A. (photo above) Provisional restorations after six months;
B. (photo below) Lateral view of central provisional showing angulation of bevel to create smooth transitional movements and make a shallow guidance possible.



was to fabricate a new universal flat plane appliance for night wear only. The patient was instructed to have the occlusal appliance checked every six months for proper



Figure 6
Occlusal view of upper anteriors showing occlusal markings during the refining of CR, MI and all excursions.



Figure 7
Crossover movement closely mimicking the occlusal scheme that produced comfort for the patient on the splint.



Figure 8B
Postoperative of lower arch. Notice shallow anatomy.

mechanics. If any indentations were seen in the acrylic, immediate return to the office for adjustment was mandatory. The patient has been pain free for three years at this writing. She takes no medications and reports leading a normal life again (Figures 8A through 8D).



Figure 8C
Postoperative of upper arch with 80% gold occlusals.



Figure 8A
Postoperative full face smile. Notice patient's eyes.



Figure 8D
Postoperative of anterior view of entire dentition in CR.

Summary

This clinical report illustrates the value of a thorough diagnosis of the condyle/disk assembly in relation to the occlusion in treating the advanced TMD/facial pain rehabilitative case. Without a specific classification of the condition of the patient's TM joints and the position of the TM joints in relation to her MI, the clinician might surmise that her condition was untreatable or much more advanced than it actually was. Her dental history would indicate that she was either untreated or mistreated due to the variety of treatment modalities that failed to achieve pain relief. Pain medications provided only palliative relief and did not address the source of the problem.

Without comparing and classifying the joint position to the occlusion, the development of neuromuscular harmony and concomitant pain resolution would have been virtually impossible anatomically.

This author strongly believes that the treatment of the advanced TMD/facial pain patient who needs phase II

therapy is greatly enhanced by a thorough understanding of the following: 1. Piper TM joint classification system; 2. Dawson occlusal classification system; 3. universal flat plane appliance therapy; 4. ceramic and metal properties; and 5. Dawson's determinants of occlusion.

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