An Anterior Maxillary Appliance for Treating TMJ Dysfunction

Abstract

The method of treatment described in this article first establishes a physiological mandibular position and then maintains this functional position throughout treatment. (This may involve conventional banded orthodontic techniques or passive eruption.) This system was specifically designed for treating patients who have TMJ dysfunction. The author presents case histories illustrating the corrections of a number of TMJ problems involving different stages of dysfunction. This system provides the practitioner with an option that can be incorporated easily into existing treatment modalities with little additional cost to the practitioner or the patient. It also offers positioning and precision that are not always available in other systems.

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An Anterior Maxillary Appliance for Treating TMJ Dysfunction

By Duane C. Keller, D.M.D.

After undergoing successful TMJ splint therapy a number of years ago, I was faced with a common problem: how to remove my splint and return to an orthotic-free way of life. I found that I could not function successfully with removable appliances (sagittal or bionator), so I experimented with a series of ideas to develop a system that I could wear. It was essential that the system be able to maintain the mandibular position established by the splint. It should also ideally be worn 24 hours a day, be adaptive to speech and mastication, and simultaneously allow dental corrections with the precision of fixed (banded) orthodontics. The system that I eventually devised consists of a small acrylic and wire positioning appliance that is worn on the lingual of the anterior maxillary teeth.

After learning to manage the system and successfully correcting my own problem, I next used it to treat my wife's acute TMJ dysfunction (see Case Five) and to intercept a developing TMJ problem for my oldest daughter (see Case Three). After a successful treatment of my daughter's case, I began using this for corrections with a number of other TMJ patients, including an unsuccessful TMJ surgery case (see Case Six). These cases have all been successful, with no return of TMJ symptoms.

I soon began using the system for all my postsplint TMJ patients, as well as for some patients who were still in splint therapy. The system proved successful. It was very adaptive, it could perform a number of different functions, and it greatly enhanced the precision of other treatments. After successfully using the system in my own office, I introduced it to a few other TMJ practitioners to use in their offices as an experimental treatment. When they were also successful with the system, I introduced it at the American Equilibration Society meeting in Chicago, February 1984.

Advantages of the System

This system incorporates related skills in orthopedics, orthodontics, and TMJ management. It allows for the precise tooth movement available from fixed (banded) orthodontics, as well as for the functional development of oral structures and the mandibular positioning provided by orthopedic therapies, to successfully treat the various problems associated with TMJ dysfunction. This systematic approach uses treatment methods that do not compromise the components of the stomatognathic apparatus. The diagnostic, interceptive, corrective, and preventive skills that are used can help to harmonize the muscles of mastication, the temporomandibular joints, the related structural components, and the occlusion.

The goal of this system is to properly position the mandible in relation to the maxilla and to approximate the dentition so that the TMJ assembly can function normally, the muscles of mastication have a normal physiologic motion, and the dentition occludes in the proper relationships with adequate lateral and protrusive protections. By establishing the desired end-of-treatment mandibular position first, the teeth can be approximated in harmony with the muscles of mastication. In TMJ dysfunction patients, this system can maintain the final splint position and allow dental approximation orthodontically or orthopedically. In orthodontic patients, the system can help reduce the chances of posttreatment TMJ problems, and it can also be used to intercept and correct potential TMJ problems.

The most important step in this technique is establishing the proper mandibular position. This can be accomplished with equipment such as a Myomonitor,* a Mandibular Kinesograph,* or an Electromyograph,* or with tomographs, splint therapy, kinesiology, TMJ radiographs, or other means. Once the position is established, the appliance described here will help to maintain it throughout treatment.

Fabricating the Appliance

To prepare the dentition for the appliance, place orthodontic separators mesial and distal to the teeth to be used for anchorage. (Maxillary first molars work best, but

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second molars will also work.) Then place the prepared bands, with proper buccal and lingual attachments, on the posterior teeth selected for anchorage.

If a conventional splint was used to approximate the mandible, trim the splint to allow cementation of the posterior bands. If wax or another bite positioning medium is used, it should be trimmed in a similar manner. Cement the bands in place.

Next verify the proper mandibular position. Then position the tubes on the lingual of the abutment teeth so that a threaded lingual wire can be passed through both tubes from the anterior. This threaded wire will act as the primary carrier and positioner. For rotated posterior anchorage teeth, compensating bends on the lingual threaded wire or offset tubes may be used to correct the discrepancy.

Place the threaded wire with double compression nuts into the lingual tubes. If the wire does not slide easily into the tubes, strip the ends with a tapered diamond. After both ends of the wire are placed in the lingual tubes, the anterior bend of the wire should approximate the lingual surfaces of the maxillary anterior teeth so that the patient can close his or her mouth in the proper physiologic position without hitting or distorting the wire. Minor adjustments may be made in the wire if necessary, or the bands may be removed and recemented.

In instances where full banded orthodontics will not be necessary, or where anterior orthodontic attachments will not be used, a buccal Hawley wire can be added to the appliance for additional support. This wire should contact the buccal surfaces of the maxillary anterior teeth, pass between the teeth without interfering with proper closure, and approximate the threaded wire on the lingual surfaces.

A separating medium must be placed over all plastic or acrylic in the patient’s mouth. After this is accomplished, place quick-cure acrylic on the lingual surfaces of the six anteriors. There should be enough acrylic to contact all of the maxillary anteriors, completely cover the threaded lingual wire (or Hawley wire), and contact the opposing anteriors when the patient bites into the positioning device. As treatment proceeds, the acrylic may be altered for repositioning for rotational correction of the anterior teeth.

When the quick-cure acrylic is beginning to set, instruct the patient to close into the bite device (splint, wax bite, or other means), or manipulate the jaw into proper closure. The mandibular anteriors should indent into the acrylic on the lingual surfaces of the maxillary anteriors. When the acrylic has set, these indentations will act as a guide in mandibular closure, bringing the jaw to the proper anatomical and physiological position. The appliance may thus function as a maxillary splint. While the acrylic is setting, care must be taken to remove any excess extending into obvious undercutts of the anterior teeth.

Once the acrylic has set, have the patient open and close his or her mouth, and verify the closed position of the mandible to be sure that it is accurate. Any wax bite, splint, or other positioning device may now be removed from the patient’s mouth. The mandibular position has been transferred to the new appliance, and the original devices are therefore no longer necessary.

With adequate ramping, the appliance can hold the mandible forward. This function is comparable to that of a pull-forward disk appliance, a bionator, or an orthopedic corrector (see Case Two). The patient can wear the new appliance for orthopedic correction, or fixed banded orthodontic treatment can be initiated (see Case Three).

It has been my experience that patient acceptance of this new appliance is generally excellent. This is especially true in older patients for whom bulkier appliances may cause masticatory or speech impediments.

Final Steps

To remove the new appliance, gently grasp the threaded wire and pull down with an explorer or other instrument to disengage the acrylic from the front teeth. The buccal Hawley wire should never be used for this initial disengaging, since it can become distorted. Gently apply forward pressure behind the acrylic and pull the device gently toward the edges of the anterior teeth. If the two sides of the threaded wire slide together, continue this downward and forward motion until both sides are completely disengaged. If one of the sides hangs up, depress the restricted side slightly toward the palate, and apply a slight forward movement to the threaded wire until it disengages the lingual tube.

Once the appliance is removed from the mouth, trim it as thin as possible in an anterior/posterior direction so it will not interfere with the patient’s speech. The appliance should contact only the maxillary anteriors, cuspid to cuspid. Adjust it as needed for anterior tooth rotation, or tip and torque angulations. The lower six anteriors should be the only mandibular teeth contacting the acrylic, and the acrylic should be adjusted as necessary for mandibular tooth movements. Take care not to occasionally overload the mandibular central and lateral incisors, and be sure that the proper lateral and protrusive guidances have been added.

The lateral and protrusive guidances should be developed during the setting stage of the acrylic. As the acrylic is hardening, guide the patient through the excursive and protrusive movements, taking care to ensure that there are
no distalizing or deflective contacts. Make final adjustments once the acrylic has completely set.

**Establishing Condylar Position**

Establishing a tentative initial treatment position, or interceptive condylar position, is extremely important. The proper vertical and anterior/posterior relationships must be established so that the components of the stomatognathic apparatus can work in harmony. Various means can be used to determine and attain this position.

I have found it helpful to establish a mandibular position with a wax bite and then check this position with transcranial oblique radiographs or other means. Once the anatomical components are properly aligned, the wax bite can be used to fabricate an orthotic to maintain this position. Careful maintenance and adjustments may be necessary to improve this position until all TMJ symptoms have subsided. The patient then continues to wear the orthotic for three to four months without pain and dysfunction before other treatments are discussed.

If the patient requires orthodontics, the anterior teeth may be aligned while the patient is wearing the orthotic. This allows the proper anterior coupling to develop before the initial orthotic is replaced by the TMJ system described above. When the anterior overbite is insufficient, this may be developed orthodontically, or a surgical intervention may be considered.

Before any orthodontic corrections are undertaken, be sure that the initial joint position is a functional position. This is determined by noting a cessation of symptoms and dysfunction, by radiographs, or by other means.

**Other Considerations**

In trimming and polishing, take care not to distort the appliance. Polish the appliance away from the ends of the threaded wire; there is less likelihood this way of catching the wire and distorting the appliances. If the appliance is bent and does not function adequately, new acrylic can be added and the steps described above can be repeated. This greatly speeds repairs and decreases repair costs.

Begin reinserting the appliance by placing one end of the threaded wire inside one of the lingual tubes of the posterior bands. Bend the wire slightly to fit it into the lingual tube of the other posterior band. Once both ends are started into the lingual tubes, apply pressure to the front acrylic and gently slide the appliance into place. If it is distorted in any way, the appliance may be repaired as previously explained.

One of the advantages to this system is that it may be used as a transverse appliance. The threaded lingual wire can be expanded laterally so that the wire overlaps the first and second bicuspids as well as the first molar. When it is reinserted into the lingual tubes, the threaded wire exerts a lateral force on the maxillary dentition, which helps to expand the maxillary arch. The same technique can be used in the mandibular arch if necessary (see Case One).

Place coiled springs between the compression nuts and the lingual tubes of the molar bands to initiate movement in an anterior/posterior direction. This movement serves the same function as a sagittal appliance and coincides well with some practitioners’ removal of 12-year molars.

Unlike some sagittal appliances, this system usually provides for excellent patient cooperation. The patients are able to wear the appliances all the time. There are few, if any, impediments to speech, and mastication of food can proceed with the appliance in place. It can be removed for proper oral hygiene and reinserted (see Case Four).

If the patient has a myofunctional problem, the threaded wire can be allowed to extend slightly beyond the lingual tubes. If an anterior dysfunctional movement is the problem, the anterior acrylic may be left unpolished as well. In dysfunctional movements, the rough acrylic and the extending threaded wire act as reminders to the patient to function within the limits of the maxillary wire. Often patients will correct their swallowing habits with this continuous reminder. The appliance serves as a myofunctional aid in these instances.

With this anterior appliance, the patient’s teeth do not occlude. This may allow some or all of the posterior teeth to erupt as they would with a functional appliance. If the posterior teeth do not repose themselves, the practitioner can then use whatever orthodontic system is necessary to guide the teeth and obtain proper movement. Intermaxillary elastics may be helpful.

In patients needing complete mouth reconstruction, the teeth can be approximated so that there is no compromise of the crown/root ratio. This allows precise fixed or removable prosthodontic corrections to be made.

With the proper patient cooperation, this system is very helpful for correcting orthopedic/orthodontic problems. The treatment period is less than with conventional methods, and the comfort and manageability are excellent.

**Case One: Transverse Appliance Function**

This patient (Figure 1) had an inadequately developed maxillary arch. The maxillary posterior teeth were tipped to the lingual, with resulting insufficient transverse maxillary development. I placed maxillary molar bands on the first molar and inserted threaded lingual wire. The wire
was removed and expanded in a buccal direction until the threaded wire overlapped the central fossa of the first molars and the first and second bicuspids. This transverse action resulted in expansion of the maxillary arch (Figure 2). The appliance was subsequently used as a bionator (Figure 3), and full banded orthodontics were used later.

The action of the appliance in this instance was the same as could be accomplished with a transverse appliance and a bionator. However, since only one appliance was necessary, the cost and treatment time were decreased and both functions were accomplished simultaneously. This appliance is different from other functional appliances in that it can be worn full-time (even while the patient is eating), it is much smaller than most appliances, and patient acceptance is usually quite good.

Case Two: Bionator or Orthopedic Corrector Function

This patient was diagnosed as having insufficient mandibular development, crowding of the dental arches, and insufficient vertical development of the alveolar processes (Figures 4-8). In such an instance, it would probably be best to use a functional appliance such as a bionator or an orthopedic corrector, although another practitioner had previously recommended full banded orthodontics with first bicuspid extractions.

To treat this patient, I cemented maxillary and mandibular first molar bands with lingual .036” hollow tubes onto the maxillary and mandibular first molars. The lingual tubes approximated the desired plane of occlusion. I then inserted an .032” threaded wire with double compression nuts into the lingual tubes. I next contoured a maxillary labial arch wire to approximate the surfaces of the maxillary anterior. This passed through the embrasure distal to the lateral incisor and was then bent to approximate the lingual threaded wire. I mixed self-curing orthodontic acrylic and placed it against the lingual surfaces of the maxillary anterior teeth, covering the threaded lingual wire and the ends of the labial arch (Hawley) wire.

I then manipulated the patient’s jaw into a closed position to establish the desired mandibular and TMJ position and took Denar Accurad* transcranial radiographs to verify the TMJ position. The six anterior mandibular teeth made indentations into the curing acrylic, and once the acrylic set, these indentations served as a guide for mandibular closure. I shaped the acrylic so there was a ramp distal to the indentations, and the acrylic anterior to the indentations was trimmed flat. This allowed the patient to protrude his mandible but not to retrace it past the distal ramp. This positioning accomplished the same task as would a maxillary disk appliance or a functional appliance (Figures 9-11).

The patient was instructed to wear the appliance at all times except when he removed the splint portion for cleaning. He found it comfortable during mastication and during speech. A slight lateral expansion was directed on the maxillary posterior teeth, and a distalizing spring was

*Denar Accurad 200 — Denar Corporation, Anaheim, California.
placed between the double compression nuts and the maxillary lingual molar tubes. This arch expansion and distalization helped reduce the dental crowding.

The mandibular arch had a threaded .032" lingual wire with coil springs between the compression nuts and the lingual mandibular molar tubes. This wire helped align the anterior segment of the mandibular arch, and it provided a slight distalization for the posterior dentition. Through the passive eruption of the maxillary and mandibular posterior teeth, the dentition was leveled and aligned (Figures 12-14). Figures 15-17, taken one year after treatment, show that the occlusion continued to improve, while the
TMJs and the mandible were in the positions established at the onset of treatment.

This system may be used in the same way as a functional appliance. It is smaller and less bulky than some functional appliances, and it may therefore be easier for patients to wear. Many functions can proceed at the same time, including fixed appliance therapy, thus minimizing treatment time. The appliance can be worn full-time, so that the selected mandibular position is maintained.

Special care must be exercised for cases in which long-term wear may be necessary. Problems such as depression of teeth, proclination of anterior segments, stripping of attached gingiva, flaring of cuspids, and excessive mobility must be guarded against.

Case Three: Interceptive Orthodontics

This patient (Figures 18-20) presented with insufficient maxillary development, with resultant crowding of the mandibular dentition in habitual occlusion. The initial

Figure 12
Case Two, anterior view after 9½ months of wearing the appliance. The transverse correction with the expansion of the lingual wire has occurred and the posterior teeth are passively erupting.

Figure 13
Case Two, right side, midtreatment view. The lower threaded lingual wire has been used to distalize the first and second molar and to position the lower right lateral incisor. The maxillary expansion has been completed.

Figure 14
Case Two, left side. Midtreatment photo showing the degree of passive eruption.

Figure 15
Case Two, one year after treatment. No fixed appliances were necessary.

Figure 16
Case Two, left side one year after treatment. Dental results of mandibular advancement and passive eruption.

Figure 17
Case Two, right side results. The dentition maintains the mandibular advancement.
Denar Accurad transcranial radiographs showed the patient's left condyle to be slightly displaced in the glenoid fossa. My treatment plan was to develop the maxillary arch and advance the mandible while positioning the temporomandibular joints. The patient elected to undergo orthodontic treatment to correct the tooth position and the mandibular and TMJ positions.

I bonded the patient's maxillary and mandibular teeth in a straight-wire orthodontic appliance and then placed a threaded lingual wire into the lingual tubes on the maxillary first molars to level and align the six anterior maxillary teeth. I next placed orthodontic self-curing acrylic around this threaded lingual wire and advanced the mandible. The patient's lower six anterior teeth formed indentations in the acrylic. Once the acrylic set, these indentations served as a guide for mandibular closure and positioned the patient's joints anteriorly and superiorly in the glenoid fossae (Figures 21-23).

I used a straight-wire orthodontic appliance to complete this case (Figures 24 and 25). By using maxillary and mandibular utility arches along with the straight-wire system, the temporomandibular joint positions were maintained while the dentition was approximated (Figures 26-28). Throughout the course of treatment, the patient experienced no TMJ pain, no headaches, no deviations in opening, no joint sounds, nor any other TMJ dysfunction symptoms.

At the completion of treatment, I removed all of the orthodontic appliance except the maxillary first molar bands with the lingual tubes. I then removed the acrylic from the threaded lingual wire. New self-curing acrylic and a labial wire were then put in place, and the patient again bit into the acrylic. This lingual appliance was then used as a positioner as well as a retainer (Figures 29-31).

**Case Four: Orthodontics to Maintain Splint Position**

This patient presented for treatment of possible TMJ problems after having seen 18 other practitioners for treatment. During prior treatments, she had received a number of maxillary and mandibular orthotics.

After diagnosing the patient's joint problem and related
Figure 22
Case Three, left side at the onset of treatment. The vertical correction and mandibular advancement are comparable to those attained with a bio-nator or orthopedic corrector.

Figure 23
Case Three, anterior view at the onset of treatment. Lateral expansion and mandibular advancement have been initiated. This system's size and stability facilitate patient acceptance and comfort.

Figure 24
Case Three, left side. Fixed edgewise appliances in place while the lingual threaded wire and acrylic maintain the mandibular position.

Figure 25
Case Three, anterior view. The precision of fixed edgewise appliances and the orthopedic corrections occur simultaneously. This maintains a good condyle/disk/fossa relationship while the dentition is being stabilized.

Figure 26
Case Three. Fixed edgewise corrections nearing completion while the mandibular position is stabilized.

Figure 27
Case Three, right side. Tooth alignment and interdigitation in the pre-established mandibular position.

Figure 28
Case Three, left side. Distalization of the maxillary posterior molars is almost complete and the orthodontic alignment is proceeding normally.

Figure 29
Case Three, left side view of dentition six months after completion of fixed edgewise therapy and mandibular advancement.
symptoms, I discussed these problems and the treatment alternatives with her. The patient elected to again undergo splint treatment for her temporomandibular joint problem. After a number of months, the symptoms began to decrease noticeably until they eventually ceased altogether. The patient was able to function without pain and to resume her normal work load.

The problems this patient experienced probably resulted in part from the early extraction of the maxillary right cuspid because of a crowded dentition. The disharmony that this caused was too great for the normal compensation of the stomatognathic system. This probably led to many of the pains the patient had experienced.

After wearing the repositioning splint for six months without pain, the patient elected to undergo orthodontic TMJ treatment. This treatment would need to maintain the mandibular position while approximating the dentition, and restore a normal bite with adequate lateral and protrusive guidance. I decided to initiate a sagittal correction with a coiled spring on the threaded wire to regain the lost space of the right maxillary cuspid. Later fixed prosthodontic therapy could replace the missing right maxillary cuspid and restore arch harmony.

I transferred the mandibular position from the original mandibular splint to the acrylic template on the lingual of the five maxillary anterior teeth (Figures 32-34). I then placed a large coiled spring between the two compression nuts and the lingual tube on the right maxillary first molar. This acted to drive the maxillary first and second molars distally and to initiate anterior tooth movement.

I later added a straight-wire appliance to all of the maxillary and mandibular teeth to aid in their rotational alignment. During this time, the maxillary lingual appliance continued to open the space for the missing maxillary cuspid, and coiled springs were placed on the buccal orthodontic wire to help with this also. Once adequate space for the cuspid was regained, a plastic tooth was put in place and was joined to the acrylic template on the lingual of the five maxillary anterior teeth (Figures 35-37). This denture tooth was adjusted to allow adequate lateral and protrusive guidance of the mandibular teeth in excursive movements.

During the course of treatment, the patient experienced one episode of pain. The patient had previously undergone endodontic treatment to the left maxillary first and second bicuspids, and there were now radiographic indications that these procedures had not been successful. I referred the patient to an endodontist, who re-treated these two teeth, and the pain in that area subsided completely. I had to equilibrate some deflector skids in the posterior teeth as they began to occlude, but there were no other complicating factors.

By using a series of segmented orthodontic procedures, I was able to establish an interdigitation of the posterior occlusion while the patient wore the maxillary threaded appliance that maintained the desired mandibular position (Figures 38 and 39). During this entire period of treatment, there was no return of the initial temporomandibular joint problems.

The treatment described here allowed fixed orthodontic appliances to be used at the same time the patient was undergoing sagittal development. The patient’s acceptance of this system was exceptional; she was able to speak and eat easily, and she could readily remove and reinsert the appliance.

Case Five: Correction of an Acute Postorthodontic TMJ Dysfunction

When this patient began orthodontic treatment (Figures 40-42), it was noted that she had a crowded dentition and clicking in her TMJs during opening and closing movements. Her practitioner made a note to watch this clicking during treatment. After a thorough diagnosis and
Figure 32
Case Four, anterior view. Patient’s mandibular position being transferred from her mandibular splint to the maxillary anterior appliance.

Figure 33
Case Four, right side. Lower repositioning splint and maxillary appliance in place prior to removal of the splint.

Figure 34
Case Four, left side. Mandibular splint position shows the extreme vertical problem in the posterior region.

Figure 35
Case Four, anterior view. Maxillary development by posterior distalization and anterior advancement. The mandibular position is maintained with the maxillary lingual appliance.

Figure 36
Case Four, right side. Midtreatment photo shows the sagittal development with this system as the cuspid space is regained and an acrylic denture tooth is attached to the lingual threaded wire.

Figure 37
Case Four, left side. Midtreatment photo shows a combination of segmental and utility arch treatments used to approximate the dentition. The second bicuspid erupted faster even though it had no direct vertical forces.

Figure 38
Case Four, right side. End-of-treatment results prior to retention and fixed prosthodontics. The mandibular position has been maintained throughout treatment.

Figure 39
Case Four, left side. The vertical development is evident as the dentition interdigitates while the mandibular position has been maintained.
evaluation, treatment was begun. This included extracting
the four first bicuspids, leveling and aligning the teeth,
and then closing any residual spaces. The orthodontic
course of treatment proceeded as expected. There were few
complications, and the occlusion that resulted was esthetically pleasing.

After the orthodontic bands were removed, the patient
was given a positioner. At this time, she noticed that the
clicking in her joints was replaced with a grinding noise,
and she began to have increasing pain in the TMJs. She
also could not bite with her anterior teeth, since this
casted intolerable pain. The patient also began to experi-
ence recurring headaches, which she treated with over-
the-counter medications. These symptoms worsened over
the next one and a half years.

When I examined this patient for an acute temporoman-
dibular joint problem, I found that she had a unilateral
displaced disk, and the occlusal plane slanted noticeably
don the left side (Figure 43). She had palpable trigger
points in the primary and secondary muscles of mastication,
and her dentition was not able to provide adequate
guidance or protection of the temporomandibular joints.
Her right disk was probably perforated as well; there was a
grinding noise on all opening, closing, and protrusive
movements. Oblique transcranial radiographs showed ex-
tensive flattening of the fossa and degenerative arthritic
changes in the condyle. The patient did not wish to have
tomograms or arthograms to verify the possible perfora-
tion.

I next undertook treatment to establish a more favorable
mandibular and temporomandibular joint position, this
time using a lower Gelb repositioning splint. In the 12
weeks after the appliance was inserted, the patient’s symp-
toms subsided, and she remained pain-free with the splint
for six months.

After the six months, we began orthodontic corrections
to maintain the mandibular splint position and approxi-
mate the dentition. I transferred the mandibular splint
position to the acrylic template on the lingual of the
maxillary anterior teeth. This allowed the mandibular
splint to be removed, but maintained the splint position
(Figures 44-46). Orthodontic corrections were then un-
dertaken to approximate the dentition (Figures 47 and
48). After one year in orthodontic treatment, the patient’s
occluded dentition and TMJs were maintained in the
splint position (Figures 49-51). She remained free of

Figure 40
Case Five, right side. Preorthodontic study models. The initial diagnosis
and treatment involved removing the four first bicuspids.

Figure 41
Case Five, anterior view of the study models. The mandible deviated
slightly to the right, and the right joint had an opening click.

Figure 42
Case Five. Left side showing the dental crowding and the partially
locked-out cuspid.

Figure 43
Case Five. Frontal view at the end of the first orthodontic treatment. The
interpupillary plane and the occlusal plane are not parallel.
headaches (except during her menstrual period) and free of trigger points, and the grinding noise in her right joint eventually subsided until it could no longer be heard with a stethoscope.

Once the proper joint position was established, I made an error by removing the appliances too soon; the dentition then started to settle. I reinserted the appliance to regain the proper mandibular position (Figures 52 and 53), and treatment was finished with the mandible in this position.

In this patient’s case, all the signs and symptoms of a potential subacute TMJ problem were present prior to the initial orthodontic treatment. Because the mandibular position and the potential TMJ problem were not properly controlled, an acute TMJ problem occurred. When I later repositioned the mandible and maintained this position during orthodontic dental repositioning, the case was successfully completed.

Case Six: TMJ Orthodontics After Unsuccessful TMJ Surgery

When I first examined this patient, she was experiencing excruciating pain in the head and neck region. She explained that she had previously had TMJ surgery to correct some of the dysfunction in her mandible that

Figure 44
Case Five, occlusal view. The anterior acrylic contacts the mandibular anteriors in closing to maintain the splint position.

Figure 45
Case Five, left side. Patient occluding into the anterior maxillary device. The initial treatment failed to attain this functional position.

Figure 46
Case Five, right side. Mandibular splint position transferred to the anterior template.

Figure 47
Case Five, right side. Midtreatment photo shows the vertical development attained with compensating curves and reverse bends.

Figure 48
Case Five, anterior view. Space closure and posterior approximation while the mandibular position is maintained.

Figure 49
Case Five, anterior view. End of treatment, but not overcorrected.
caused great pain. However, the results of the surgery were unsatisfactory, because the patient was now experiencing more pain than she had before the operation. My initial treatment was to fabricate a mandibular splint to reposition and align the patient’s mandible in relation to the maxilla. This was somewhat difficult, because her oral surgeons had performed a high condylectomy on her left joint and had removed the disk. Through a matter of trial and error, we attained a final mandibular position, and the patient’s headaches and joint pain subsided completely.

The finalization treatment that I recommended for this patient was the wearing of a permanent splint. However, having been a long-term patient in my office, she had seen other people go through TMJ orthodontics and then have splints removed, and she decided she would like to undergo this same treatment. With marked hesitancy, I undertook temporomandibular orthodontic treatment.

The initial procedure was to duplicate the mandibular splint position (Figure 54). I placed acrylic around the threaded wire on the lingual of the patient’s six anterior maxillary teeth. I then completed a precise positioning and removed the patient’s mandibular splint (Figure 55). Because of the patient’s guarded condition, I decided to proceed as rapidly as possible, using segmented arch orthodontics with heavy elastic forces (Figure 56).

The patient found that she could comfortably maintain her mandibular position as she bit into the maxillary template. Throughout the course of treatment, the patient had few complaints. She was aware of a grating noise in the surgerized joint, but there was no pain.

Good occlusal contacts with adequate lateral and protrusive guidance were obtained in six months (Figures 57 and 58). These will serve to protect the patient’s compromised temporomandibular joint (Figure 59). Up to this time, the patient has not had any more temporomandibular joint dysfunction.

Conclusion

This article illustrates a TMJ orthodontic system that can be used to help intercept and correct potential temporomandibular joint problems. It also shows how this system is being used to treat patients with active TMJ problems. This system should not be seen as an end-all cure, but simply as one step in TMJ treatment.

I feel that this system can help to intercept many potential temporomandibular joint problems by establishing the
proper end-of-treatment mandibular position and then correcting the occlusion to meet this desired position. The precision that the system offers allows the practitioner to use orthopedic and orthodontic treatments for a greater range of potential problems.

I have found no conclusive evidence that the system described here is potentially better than a combination of other orthopedic and orthodontic systems. However, this system allows a number of various treatment principles to be used simultaneously, which can help decrease the period of therapy while increasing the end-of-treatment precision. It is up to each practitioner to review the information presented in this article and draw his or her own conclusions regarding its values.

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Suggested Additional Reading


