

Case History #2
Mandibular Rehabilitation

Case History #2 Tina M.

1. Chief Complaints

- a. Patient felt her teeth were wearing down, had pain in the left TMJ and felt the two were connected. Patient was given options in her care. Patient elected to only have Mandibular care to help her issues. Patient did not want to explore other possible health issues and wanted, though extensive, least amount of treatment to help these problems. Limitations were stated however it was felt that treatment would lead to improved quality of life. More would be known after Phase I. Patient agreed to gain that insight prior to final decisions on level of care for Phase II.

2. Past Medical History

- a. Patient is 78 years old, weighed 132lbs and was 5'6" tall. Patient has had a history of high blood pressure, which is under care. Patient had tonsils and adenoids removed as a child and had cataract surgery two years ago. Tear glands have been a problem with blockage since the surgery. Patient was in an auto accident 30 years ago with head trauma and was told she broke her jaw; however she does not remember any care or treatment for it. Patient has no allergies and only takes HBP medicine of Inderol and a baby aspirin once a day.

3. History of Illness / Trauma

- a. Patient had head trauma 30 years ago and was told she broke the bone near here TMJ. Pain to the region was constant and ranged from mild to almost moderate and had been present during the last several years. Patient felt her teeth were wearing down and had veneers/crowns on anterior maxillary six (#6-11). Though she felt they were too long she understood that the dentist had followed her request to show more teeth in her smile (fig. 3). It then became apparent to the patient that her bite was collapsing and might be the cause of her pain

4. Clinical Examination

- a. Patient presented with a regular pattern of seeing a dentist and had felt she had taken care of problems as they presented dentally. Oral Hygiene was good and periodontal health was stable though it was noted there was marginal gingivitis due to poor crown margins. Vertical dimension was compromised using Golden Proportion analysis. (Fig. 2,3) Though an end-to-end molar relationship was noted on the right side; the left side showed a Class II and anterior teeth appear to have that tendency even with crowns noted. Patient had minimal muscle pain with only reporting of mild tenderness in the left pterygoid both lateral and mesial.
- b. Range of motion showed limitations in head side bends 25degrees and left head tip of 15degrees. Patient exhibited a left shoulder lower and minimal head forward posture. Head tipped back to the right slightly with left eye slightly higher from horizontal plane (fig.1).
- c. Finger palpation of TMJ areas gave noted popping sound on right side a midpoint of closure. Possible displaced disk.
- d. Soft tissues exam was within normal limits.

5. Diagnostic Procedures

- a. Radiography
 - i. Cone Beam Tomography
 - ii. Full mouth series
 - iii. Panoramic
- b. Study models
 - i. HIP relationships
 - ii. CO evaluation
- c. Electrosonography of the TMJ
- d. Computerized Mandibular Scanning studies
- e. Electromyography studies of anterior/posterior temporalis, masseters, and anterior digastric muscles

6. Diagnostic Data Analysis

- a. Cone Beam Volumetric Tomography (CBVT) mapping showed several items of interest (fig 4A, 5A, 5B). Patient showed extensive general dentistry and an overall intact dentition with only the missing of #1,17,32. The right condyle shows a very minimal superior joint space and a generous distal capsular space. Bone contours are within normal limits. The left temporal Mandibular joint shows

condylar beaking, fossa and condylar erosion, minimal joint space and a flat profile of the eminence. This gives the look and feel of a Class I right TMJ and an advanced internal derangement with degenerative arthritis on the left TMJ with a class III eminence profile pathologically. This resultant condition is often an end result of a Class II malocclusion and is the most damaging malocclusion to the TMJ. ¹ Noted in iCAT (fig. 5A) patient has good airway and no nasal limitations to airflow. Patient had a history of tonsil removal as a child. Turbinate shape did show some enlargement in serial slices of other views.

- b. Panoramic view in (fig. 4A) shows a particular *slice* in the iCAT view. This was to gain an overall perspective of the teeth and bone support, which looks within normal limits. Condyle issues appear and are looked at closer in other views. The full range of slices were reviewed for relevant issues to the treatment of this patient.
- c. The full mouth series showed numerous single crowns, veneers in the Maxillary anterior and several clinically successful endodontic treatments. (fig. 4B).
- d. Study models showed a Class II molar relationship on the left side and an end-to-end molar relationship on the right side (fig.2). There was a 90% overbite and zero overjet anteriorly. The HIP showed an accentuated Curve of Spee consistent with a Class II relationship. The midline gave indication of a maxillary cant to the patient's right as noted by the tooth line angles. Study models also showed severe posterior wear and localized recession on buccal areas. Mandibular anterior wear was also noted. Patient's vertical was 15mm and with a central width of 9mm the golden vertical should be 18.6.
- e. Electrosonography with scan 15 provided evidence of a pronounced mid-closure click on the right side. (fig. 6) This supports the idea that the disk posteriorly displaced. As the jaw translates back and up during closure the condyle "rides" back up on part of the disk with the resultant click. Patient protects this by the noted velocity slowdown at that point on closure. The left side shows a mid opening/closure click and together with radiographic evidence may have lost

much of the TMJ shape. In fact the result is tearing of the disc and its full range of attachments with eburnation and lipping of the condyle. The eminence degeneration may be collateral to the primary forces or may be due to the history of trauma the patient report to that area 30 years ago.

- f. Computerized Mandibular Scanning showed on scan 2 that patient had limited opening of 35mm and a left deviation of 4.8mm. Velocity was slow in all points on the closing and opening cycle. This evidence future supports the idea that the left side has adhesions and arthritis. The right side has some freedom so disk is not an impediment upon opening and may have a posterior partial displacement. Scan 3 shows a preTENS freeway space of 3.3mm and is considered overclosed in the vertical. Teeth as they hit contact in CO see a posterior shift of about 1mm (fig. 8). Adding scan 6 adds to the overclosure possibility due to 3mm space from swallow to closure (fig. 9). Scan 13 continues to show the left deviation of 5mm and a limited opening sagittally of 32mm (fig. 10).
- g. Electromyography study. Scan 9 (fig 11) and Scan 10 (fig. 13) displayed roughly normal values if not a bit low. Possible fatigue can be considered and considering the condition of the joints would be expected. Muscle palpation and patient reports do mirror these findings. Scan 18 showed possible fatigue in the left temporalis (fig. 12) yet the Post TENS 18 was more indicative of fatigue and showed possible ascending issues in anterior temporalis and masseter groups bilaterally (fig. 14). The scan 4/5 (fig. 15,16) gave a result that would be expected from the previous data above. The result was a bite record for orthotic and later reconstruction of the Mandibular teeth. The golden vertical was used even though the maxillary teeth were not to be involved. Also the patient did not want to go future with time in the orthotic longer than to gain a clinical belief that the position was comfortable as she reported and did not want additional scans or adjustments. The conclusions were that we would open the vertical 3.8mm and set .5mm to the left. This was an estimate and conservative. The scan indicated significant room for

improvement laterally. However with no commitment by the patient for further scans I felt this was a safe place even though compromised. The AP would change by 1mm anteriorly.

7. Diagnosis

- a. Temporomandibular Joint Disorder Arthralgia of the Temporomandibular joint ICD 524.62.
 - i. Relates to CBVT data showing severe bony defects to joint complex and is consistent with scans and exam.
- b. Temporomandibular Joint Disorder non-reducing ICD 524.63
 - i. Relates to possible disk displacement on the right side. Not confirmed with MRI to help with acquired data.

8. Treatment Objectives

- a. The rehabilitation of the Mandibular arch with full coverage crowns of all teeth. Zirconium type restorations were fabricated.
- b. Prior to restorative care patient agreed that if we were to change the bite relationship she would be willing to wear a removable orthotic to evaluate the bite instead of “eyeballing” the bite or manipulating the bite without any data to support the new position. This treatment would then have limited orthopedic realignment of the mandible with the goal to help with the left TMJ tenderness and perhaps slow down the degenerative factors to both joints. Patient did not want to explore these issues further. Patient did understand any opening of the vertical would help with the compressive joint loading. The occlusal plan also was very limited, as I had no real control on the occlusion due to existing crowns and curves of the maxillary arch already in place. I planned on providing as much freedom in lateral movements as possible and use any of canine rise or group function in lateral movement. Protrusive would also be somewhat compromised however all changes we were considering would be an improvement over the “locked” position currently patient was functioning with. It was important in this case to preserve the vertical dimension

and accurately keep the measurements intact during bite/orthotic/prep/temporize/and cementation (fig. 19,20).

9. Treatment Rendered

- a. Creation and delivery of a neuromuscular repositioning appliance worn 24/7 for three months (fig. 17).
- b. Upon agreement of stability of position with orthotic a waxup of case was done with approval of shape (fig. 18).
- c. Crown preparation of all Mandibular teeth for zirconium full coverage crowns. Case control of vertical continually checked (fig. 20).
- d. Temporization to continue to monitor comfort reports by patient and agreement on size, shape, and color (fig 21). The use of a temporization stint in which the vertical is maintained and occlusal rests are placed in the stint for the opposing teeth allowed for even pressure during seating and I feel helped in the maintenance of the correct vertical throughout the arch.
- e. Cementation and occlusion check with TENS with vertical check control measurements. Two week post op again with TENS and occlusion refinement to complete the case. (fig. 22, 23)

10. Treatment Outcome Data really derives from the use of the orthotic. As patient did not want additional care for her skeletal issues and her reported pain had resolved no long term scans were done.

- a. Patient reported no TMJ tenderness
- b. Muscle palpation exam at recall showed no tenderness with Pterygoid but the Trapezius on left side was tender to palpation though patient did volunteer this prior to palpation.
- c. Periodontal probing showed health actually improved with localized pretreatment of 4mm resolving to 3mm and no bleeding from these historical sites.
- d. Occlusal evaluation with occlusion paper in a standing position showed good stability from post cementation contacts noted. Patient agreed to TENS for this evaluation. I check the patient at each recall for occlusal contact changes. I would expect long-term osseous and articular disk changes over time.

e. One year post op shows no cracking or tooth sensitivity.

11. Analysis of Outcome Data is very encouraging even without scan data. The muscle resolution concurs with the concept that with a decompressed joint space muscle in their physiological zone that comfort would result. The fact that the Trapezius was tender did not surprise me as patient has cervical issues and may even be future down the postural chain as was evident on scan 18. Patient had been warned of this. The fact that gingival inflammation was reduced with probing and bleeding index's also was no surprise with the leaking crowns and poor margins of past dental care. Though we did not have an optimal bite, still there was improvement and this helps with gingival health. The occlusion paper exam was surprising somewhat. As we get some limited healing in the temporal Mandibular joint complex I would expect some changes in the bite. Also as the cervical issues change slowly over time I also expect subtle changes to occur. Due to the age of the patient I feel this is still to come. Patient has been warned of these issues and wants to take "life as it comes.... You can only do so much" she feels.

12. Narrative Abstract of Case: Tina came to my office hoping to find agreement that she was not crazy for thinking her left TMJ tenderness was part of problem of her teeth wearing down. A full examination of various tests and studies showed her to have significant TMJ degenerative disease, poor quality restorative situation, bite collapse, and gingival inflammation. After diagnostic tests and imaging treatment was initiated. Therapy included a neuromuscular orthotic worn 24/7 for three months and then full coverage crowns on the Mandibular teeth. Treatment completed upon cementation and follow-up TENS and refinement of the dentition completed this case. Given the stability of the occlusion and lack of evidence of bruxism no occlusal guard was recommended.

13. Future Treatment Recommendations.

- a. Referral to physical therapist to help with cervical issues
- b. Referral to AO to evaluate cervical issues
- c. Return for postoperative scans to confirm stability of cranial relationship to the dentition.
- d. Regular re-care visits

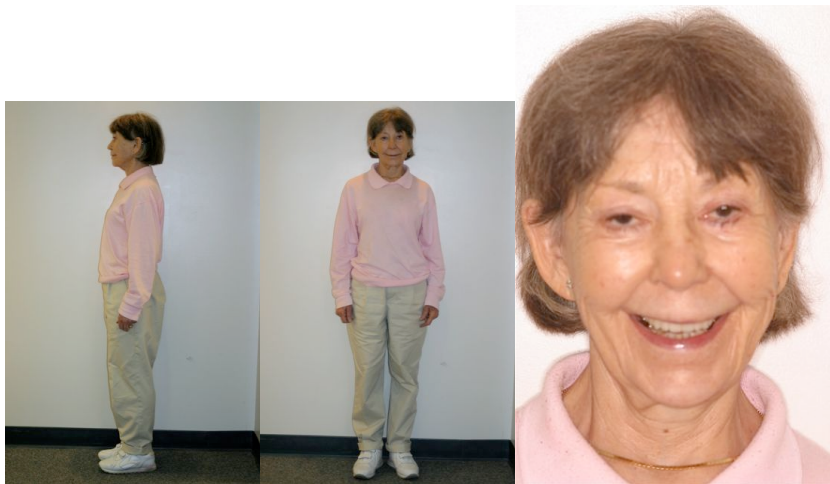


Figure 1



Figure 2



Figure 3



Figure 4A

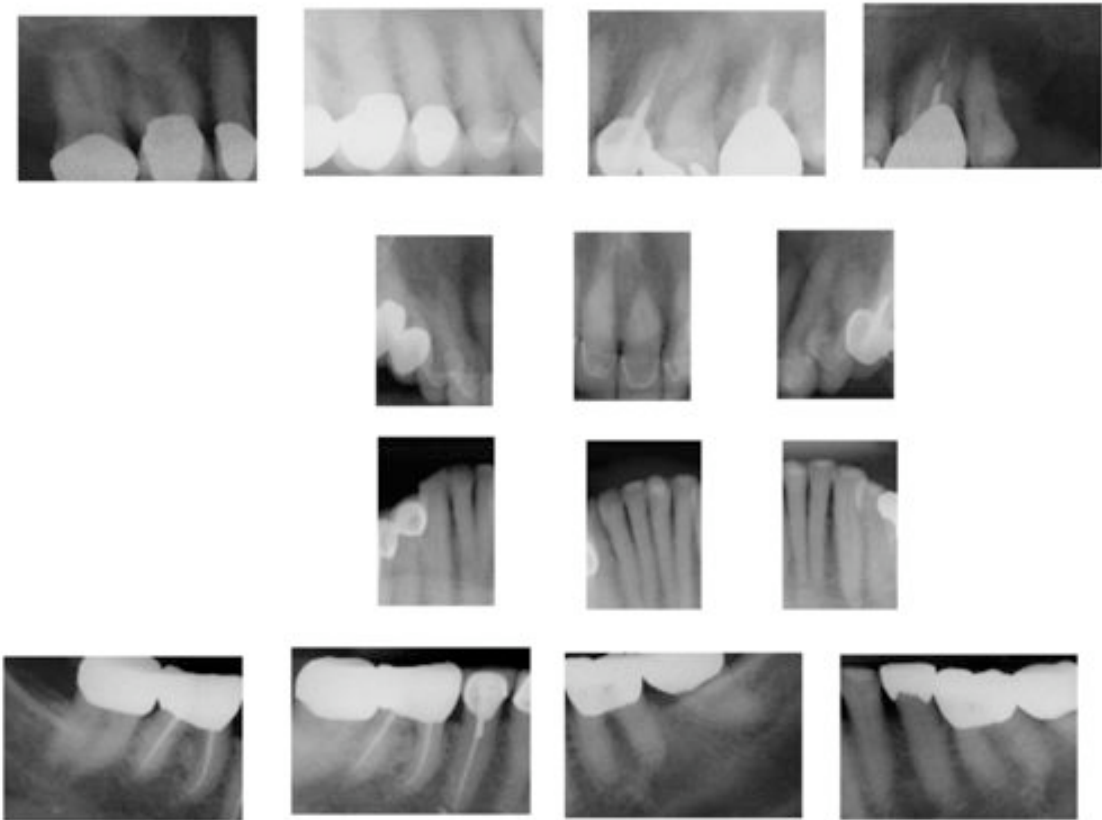


Figure 4B

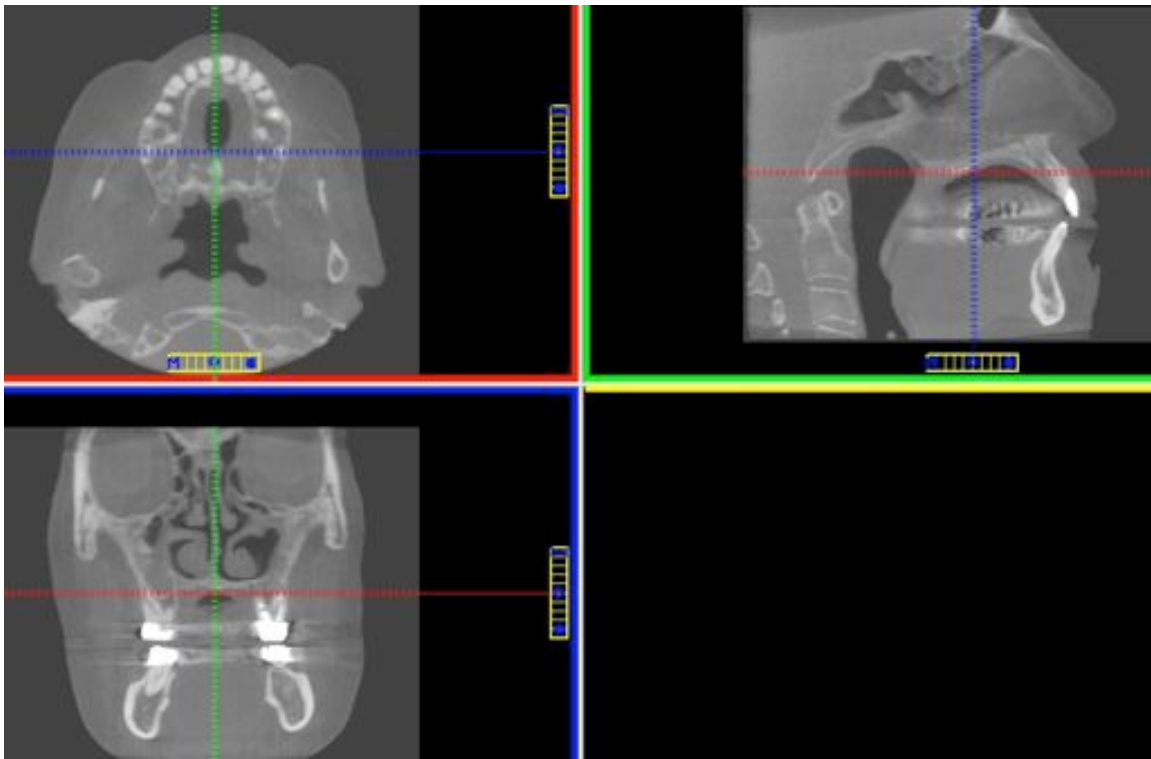


Figure 5A

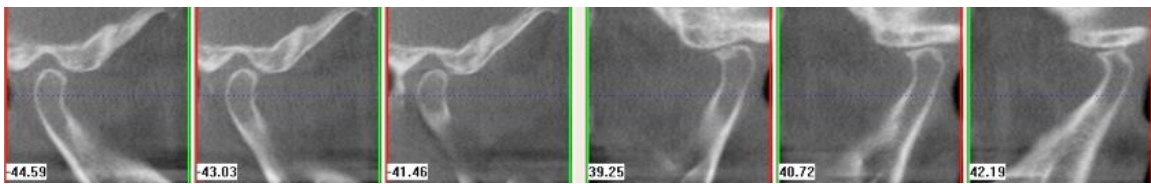


Figure 5 B

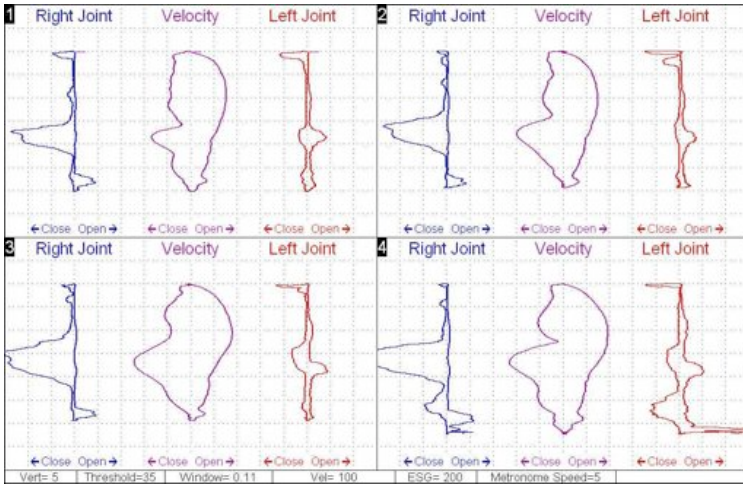


Figure 6

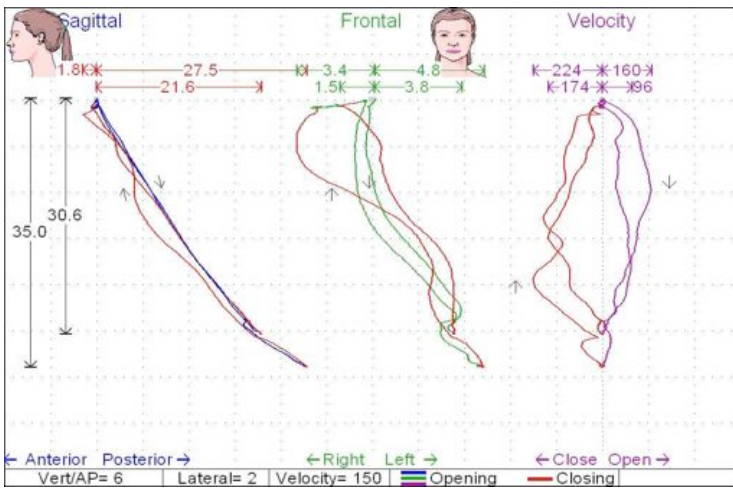


Figure 7

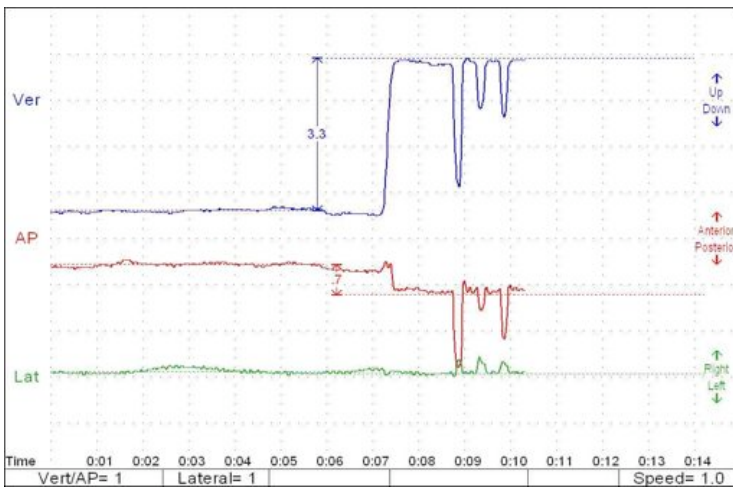


Figure 8

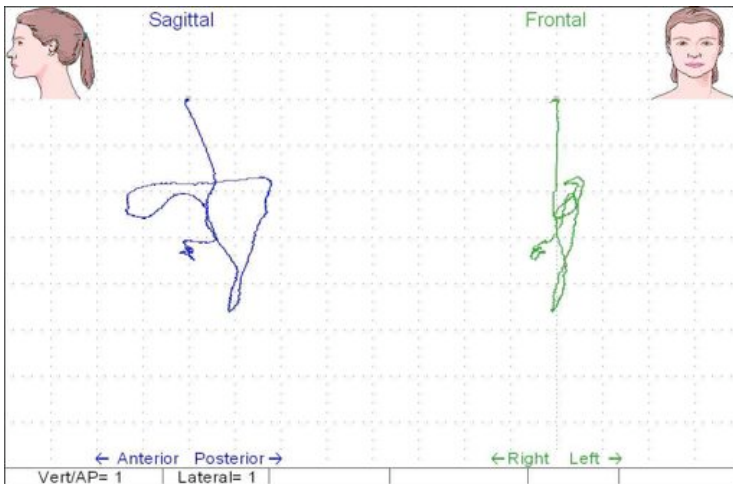


Figure 9

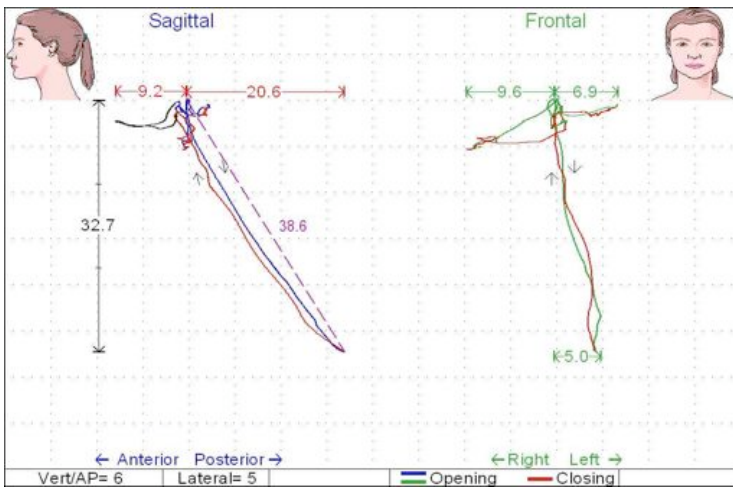


Figure 10

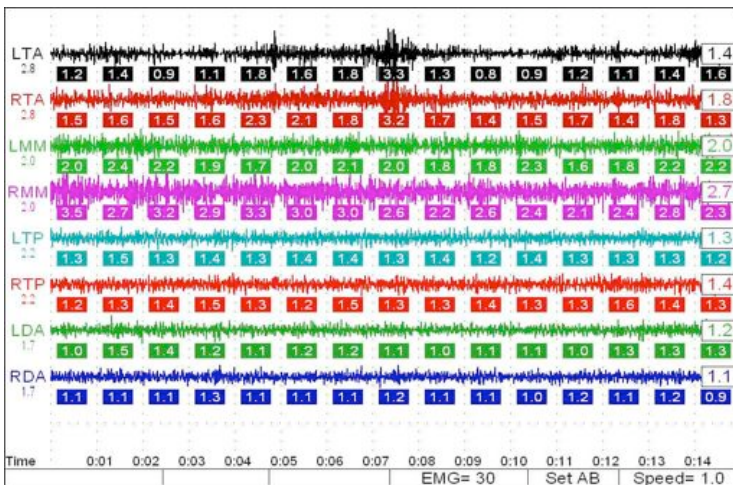


Figure 11

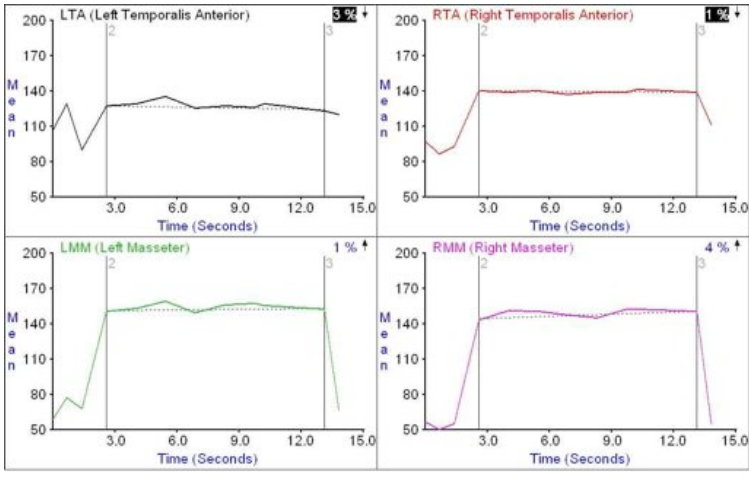


Figure 12

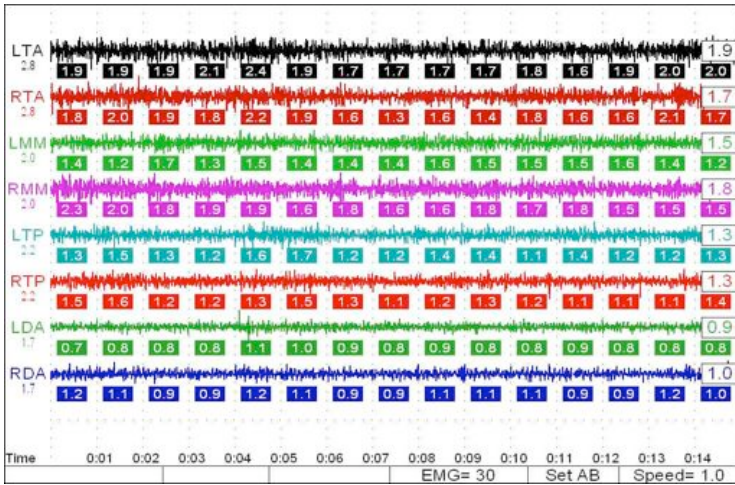


Figure 13 Post TENS

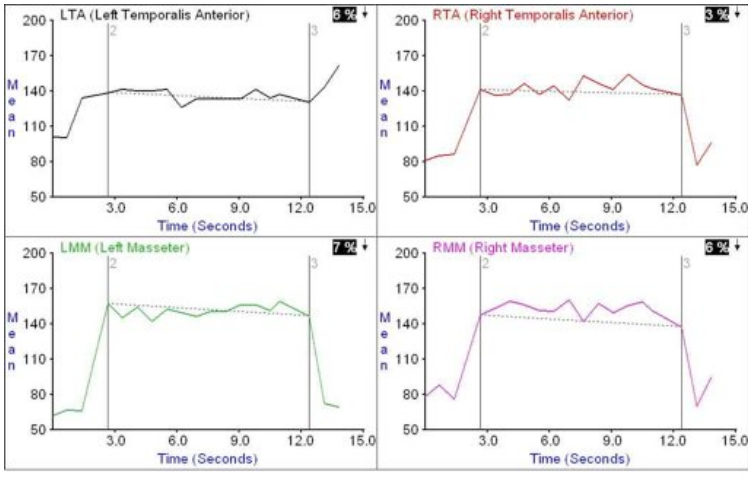


Figure 14 Post TENS

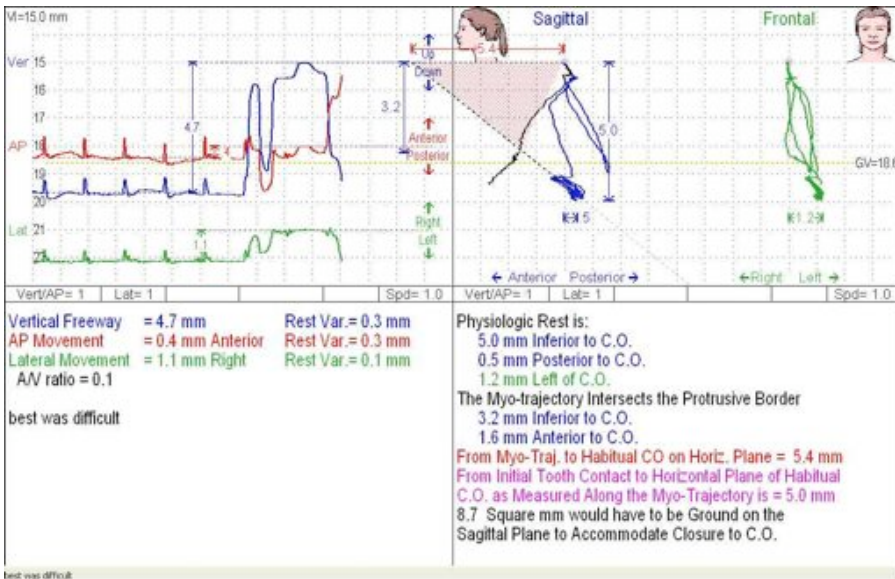


Figure 15

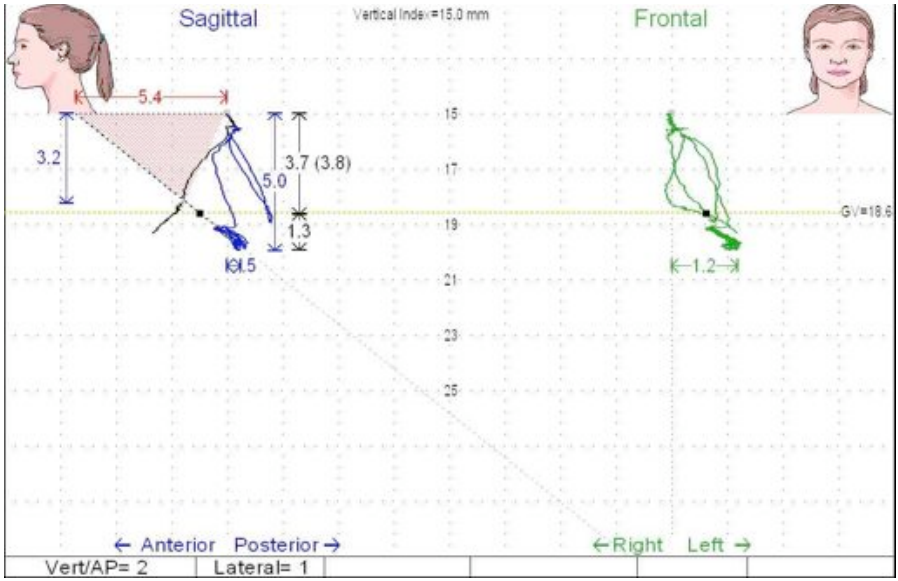


Figure 16



Figure 17



Figure 18

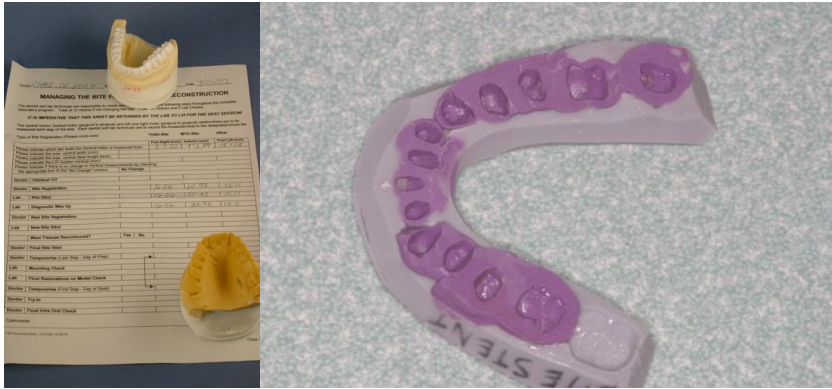


Figure 19



Figure 20 confirming vertical



Figure 21 temporary stent from waxup

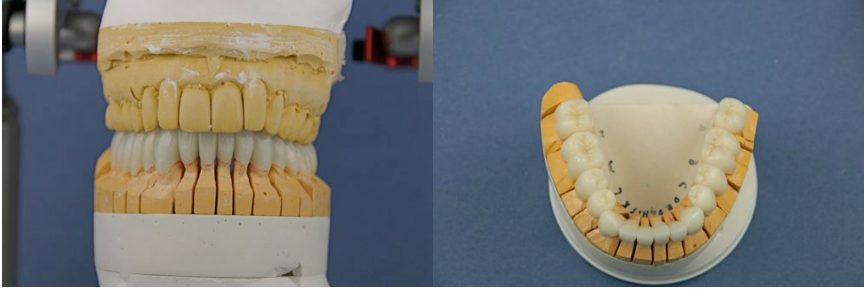


Figure 22



Figure 23