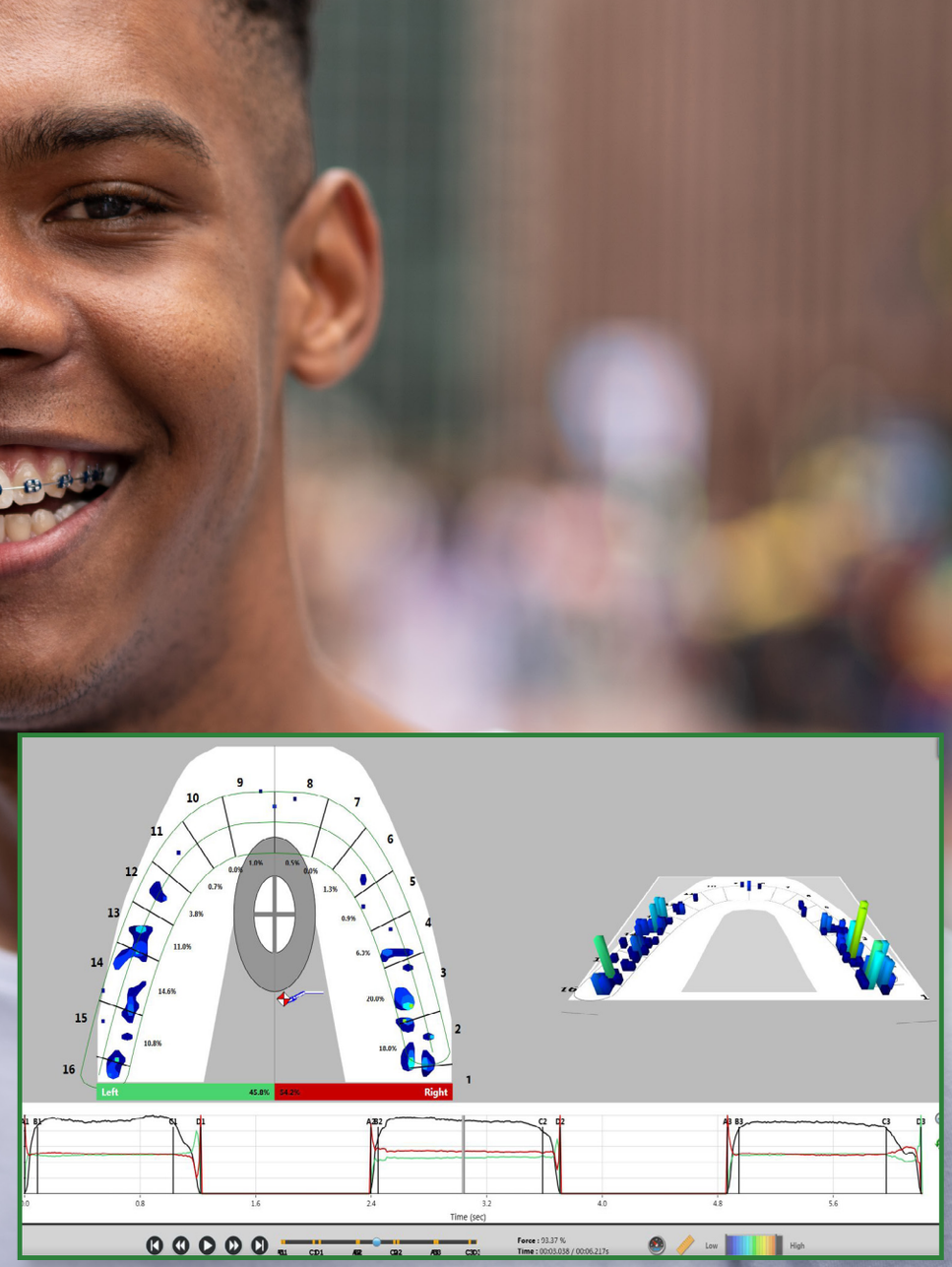
Orthodontics & Occlusion:

T-Scan as Part of a Top-Notch Toolkit

An Cosmetic Case Summary Provided by
Dr. Hoon Kim, DDS, MSD, Diplomate, ABO

Tekscan™



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Patient Overview

A 23-year-old male came to my dental office with an unrelenting issue—he was referred by his mother who knew of my reputation through other TMD patients I had successfully treated. Upon examination, I identified several problematic factors:

- **Facial asymmetry**
- **Clicking of the right condyle**
- **Bilateral pain to palpation in the masseter and internal pterygoid muscles**
- **A mandibular shift during opening and closing**
- **A limited mouth opening of 35 mm, and**
- **Bruxism**

After an initial clinical examination and patient interview, I collected precise, objective data through several measurement methods, including facial photos (frontal, smiling, and profile), intraoral teeth photos, and four radiographic series (both lateral and frontal cephalograms, a panoramic, and a TMJ series). In addition, stone dental casts and a Brux Checker were obtained. **(Figures 1, 2, 3, 4).**

This patient demonstrated an internal disk displacement with reduction, which informed my decision to establish orthopedic stability before initiating orthodontic treatment. He underwent three months of splint therapy, which successfully achieved orthopedic stability, eliminating the clicking sounds and pain upon muscle palpation. He could open and close his mandible without deviation, and the maximum opening increased to greater than 50 mm.

After he completed splint therapy, we took another set of measurements and determined comprehensive orthodontic treatment was necessary.

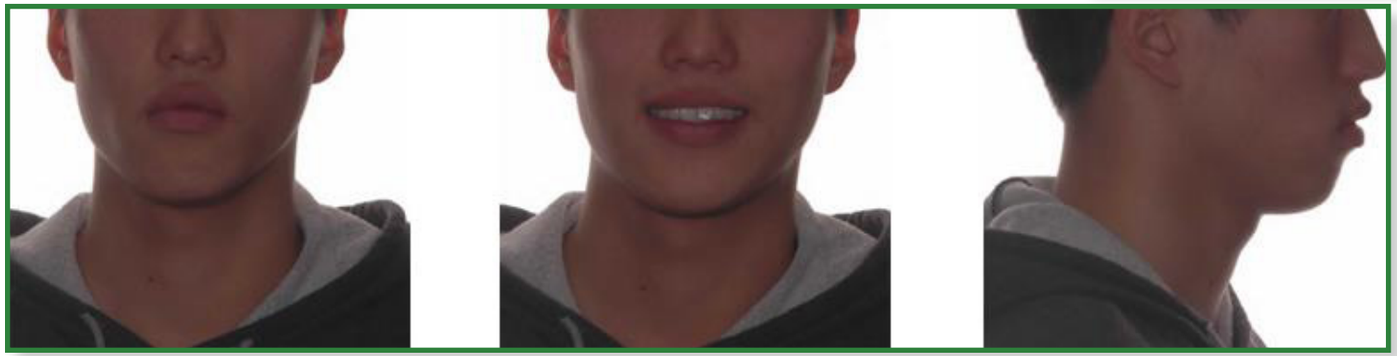


Figure 1: Patient's facial photos

About the Author:
Dr. Hoon Kim, DDS, MSD, Diplomate, ABO

With an extensive background in orthodontics, Dr. Hoon Kim has designed a treatment philosophy all his own: HOON. Not only is this his first name, but it also stands for **H**armony **O**f **O**rofacial **N**ature. Harmony of Orofacial Nature is the driving force behind Dr. Kim's practice through which he helps individuals achieve an excellent, harmonious occlusion via orthodontic treatment. This fuels his ultimate goal of ensuring every patient leaves with a beautiful smile and improved quality of life.

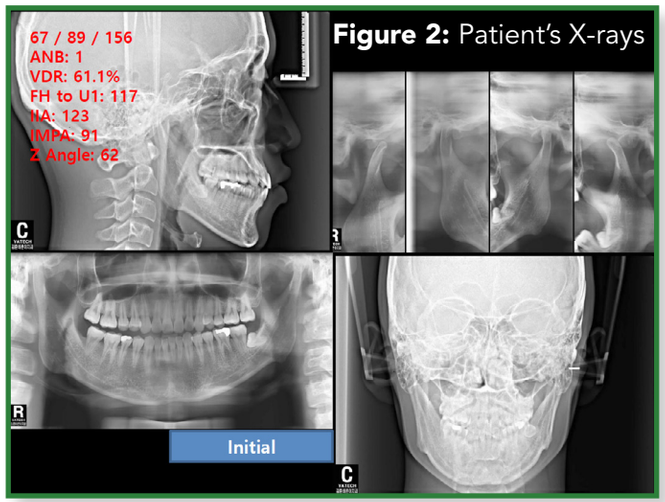


Figure 2: Patient's X-rays

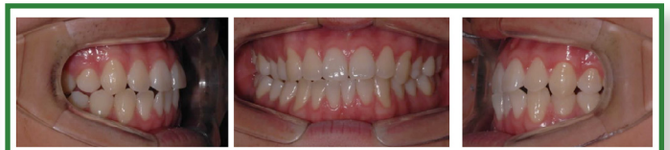


Figure 3: Patient's intraoral photos

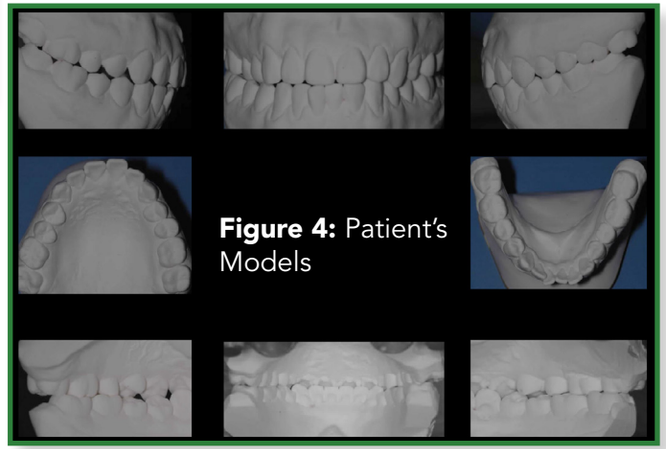


Figure 4: Patient's Models

“This patient required orthognathic surgery to address his facial asymmetry.”

The patient exhibited a high-angle class III malocclusion, with facial asymmetry, and a skeletal transverse discrepancy. Dentally, he had both upper and lower mild crowding, a lower dental midline shift to the right, a posterior crossbite on the right side (with Class I canine and molar relationships), and Class III canine and molar relationship on the left side (along with a constricted maxillary arch).

To ensure both occlusal form and function, this patient required orthognathic surgery to address his facial asymmetry, the imbalances in his mandibular body length, and the deviation of the lower dental midline.

TREATMENT PLAN

I applied Metal self-ligation brackets (Smart Clips: 3M Unitek) with .018 slot and MARPE (Micro-implant Assisted Rapid Palatal Expander) to correct his posterior crossbite **(Figure 5)**.

After aligning and leveling the upper arch teeth, I placed an anterior bite plate and two microimplants between the second premolars and first molars, which were used to align and level the teeth on his lower arch **(Figures 6, 7, 8, 9)**.

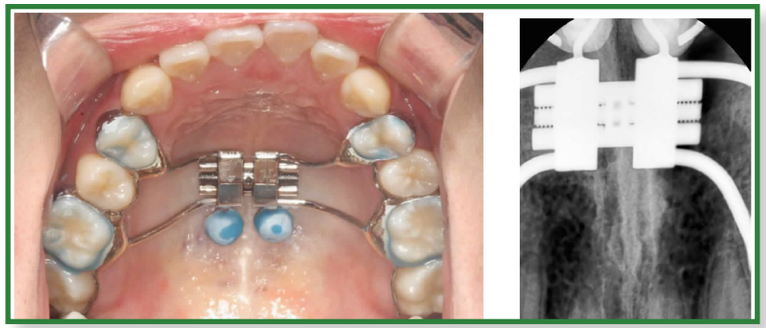


Figure 5

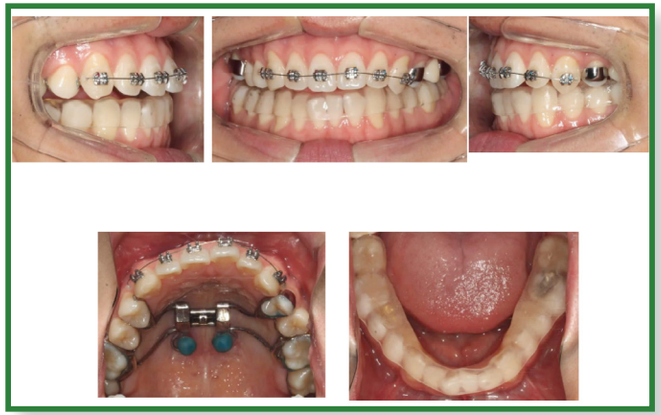


Figure 6

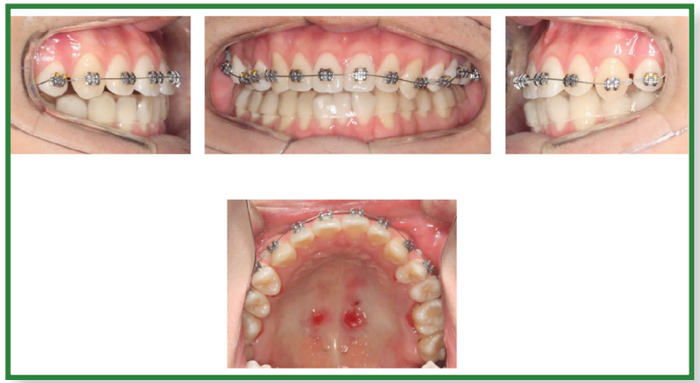


Figure 7

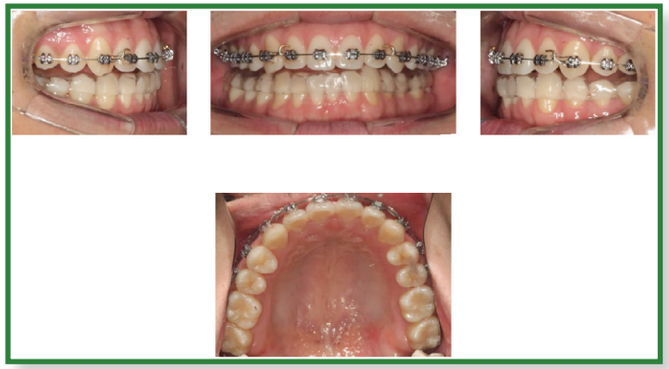


Figure 8

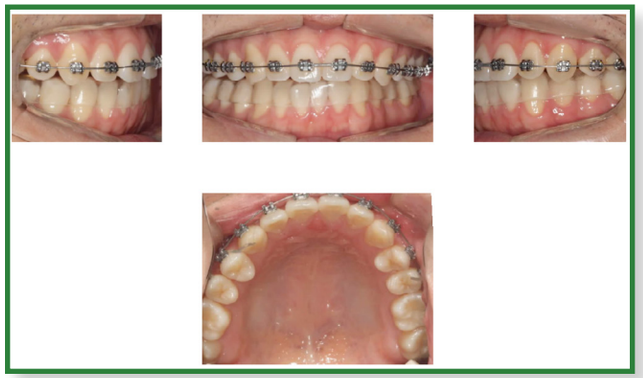


Figure 9

Treatment Plan Cont.

I placed lower power chains from his lower canines to the microimplants along the upright canines, and finally to the lower second molars **(Figures 10, 11, 12, 13, 14).**

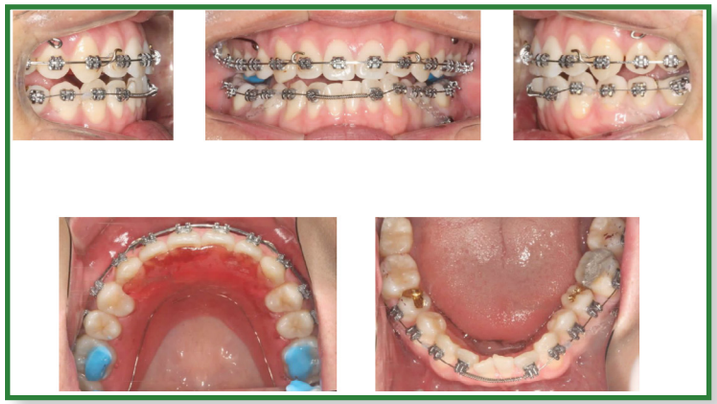


Figure 10

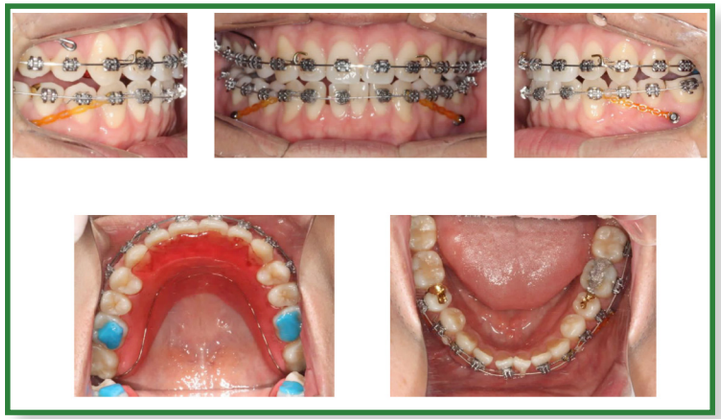


Figure 11

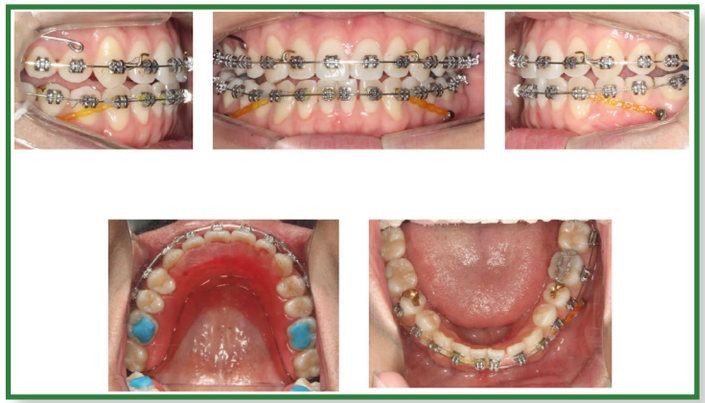


Figure 12

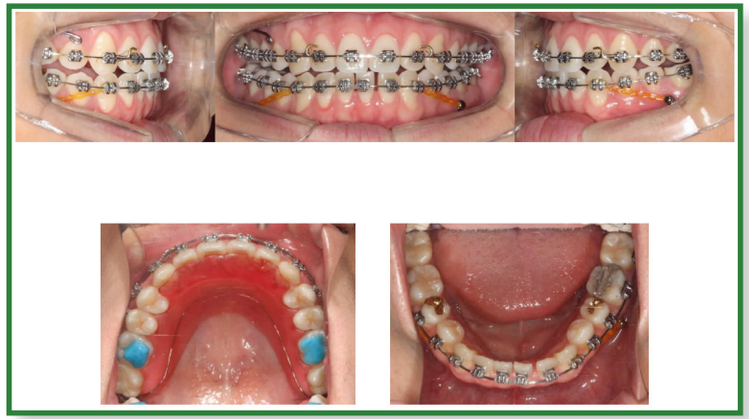


Figure 13

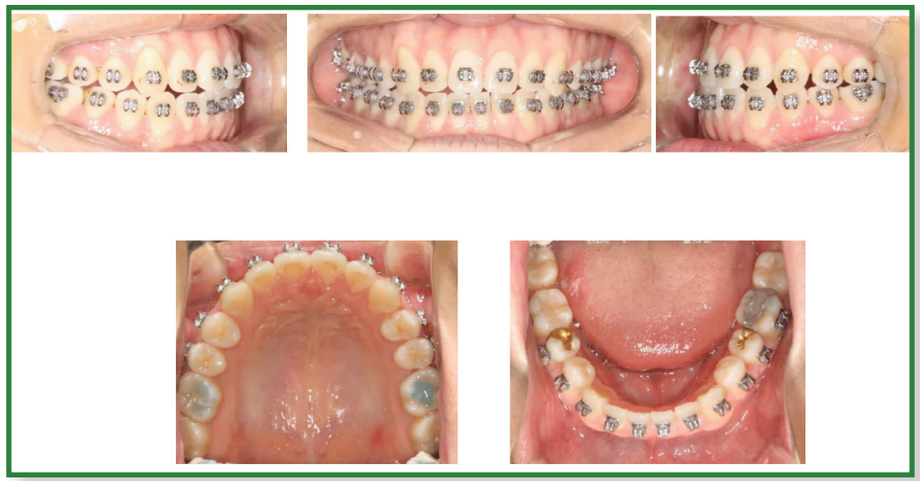


Figure 14

Orthognathic Surgery Procedure

We went ahead and performed Orthognathic surgery with posterior impaction of the upper arch, combined with a mandibular set-back, a genioplasty, and reshaping of the mandibular angles **(Figure 15).** MEAWs (Multiloop Edgewise Arch Wires) were used to establish excellent occlusion **(Figure 16).** Fixed retainers were placed on his upper four incisors and lower six incisors **(Figures 17-21).**

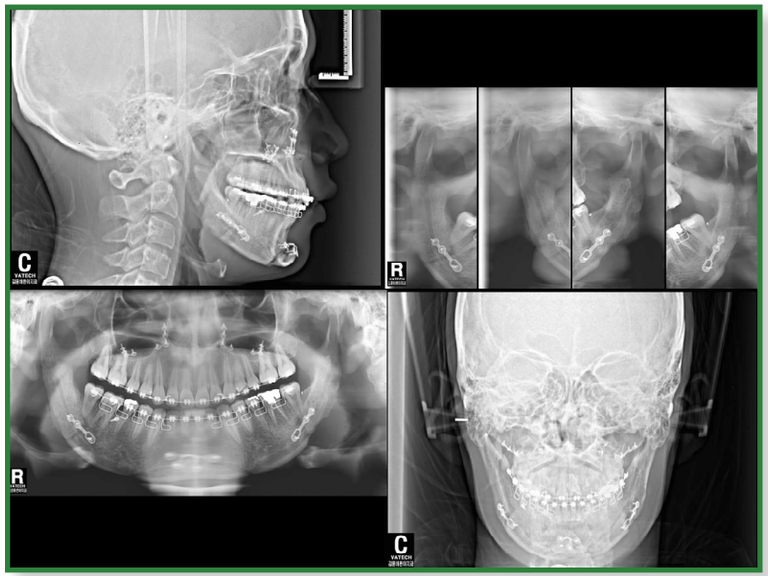
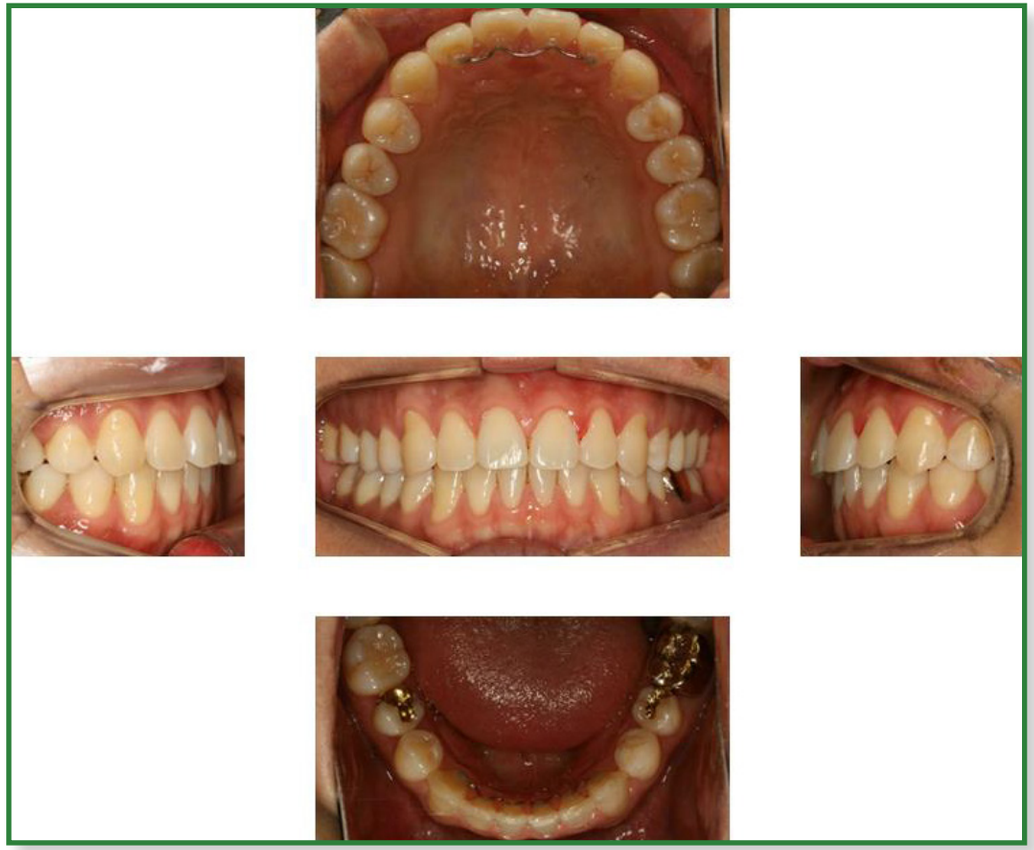


Figure 15



Figures 17-21

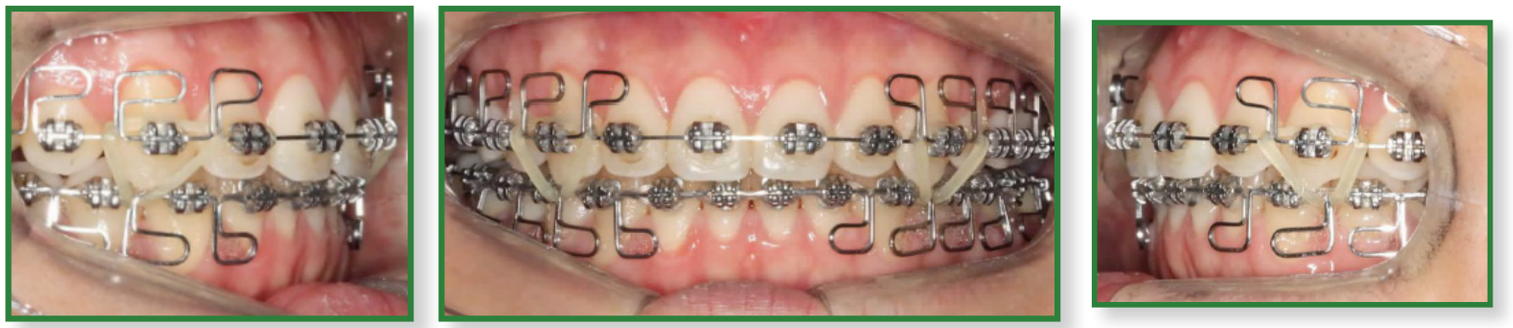


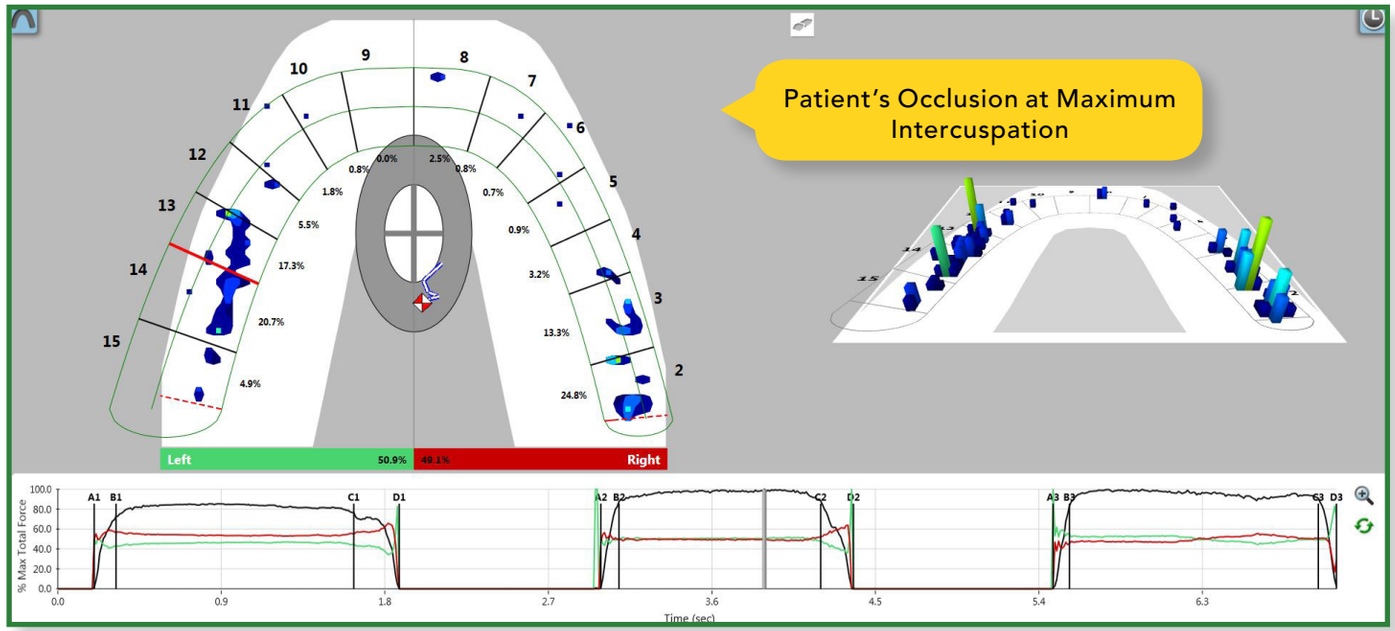
Figure 16

Adjustments with T-Scan (3 Months after Procedure)

With this digital occlusal analysis tool, I measured the patient's occlusal force balance, Occlusion Time, and Disclusion Time.

The black line in the Force vs. Time graph (to the right) should hover around 100% of Max Movie Force (MMF). This line should generally be horizontal at full occlusal force. If it undulates, the masticatory muscles are most likely exhibiting hyperactivity or hypoactivity.

At this time in the patient's treatment course, occlusal examination with T-Scan, performed under physiologic conditions, did not detect any interfering tooth contact pattern from the patient's potential parafunctional habit. Thus, a Brux Checker was employed to identify bruxism during sleep, and to verify the presence of posterior interferences from grinding **(Figure 22).**



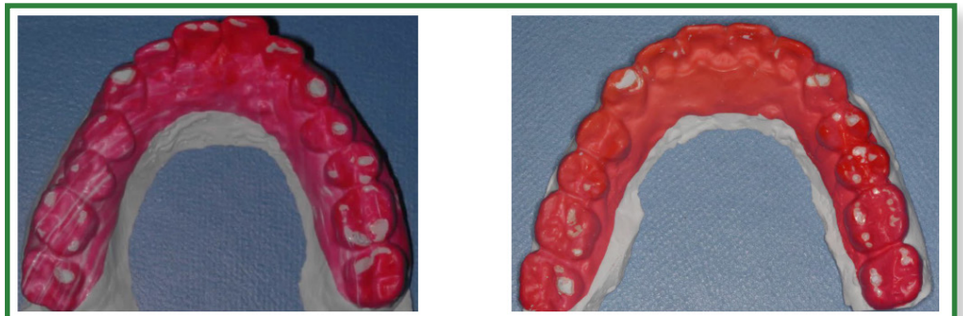


Figure 22

Zoomed-in T-Scan Graph Displaying Max Movie Force

Adjustments with T-Scan (3 Months after Procedure) Cont.

Patients who have canine-protected occlusion during the day can exhibit a parafunctional habit at night. Patients with bruxism can have powerful muscle force, so following orthodontic treatment, the four incisors and canines should protect the molars during lateral excursions (or grinding), and the molars should protect anterior teeth during clenching.

The initial Brux Checker, taken before orthodontic treatment, showed there was a grinding pattern with posterior interferences occurring during sleep. Although post orthodontic occlusal adjustments accomplished with the T-Scan achieved a canine-protected occlusion (with a DT=0.21 seconds), a final Brux Checker taken after the occlusal adjustments still indicated there were posterior interferences present during the patient's parafunctional habit. I marked this interference on the maxillary arch, and then adjusted the corresponding tooth surfaces **(Figure 23).**

After the occlusal adjustments, wraparound retainers were fabricated to remove this interference. These auxiliary tools maintained the well-balanced occlusion **(Figure 24).**

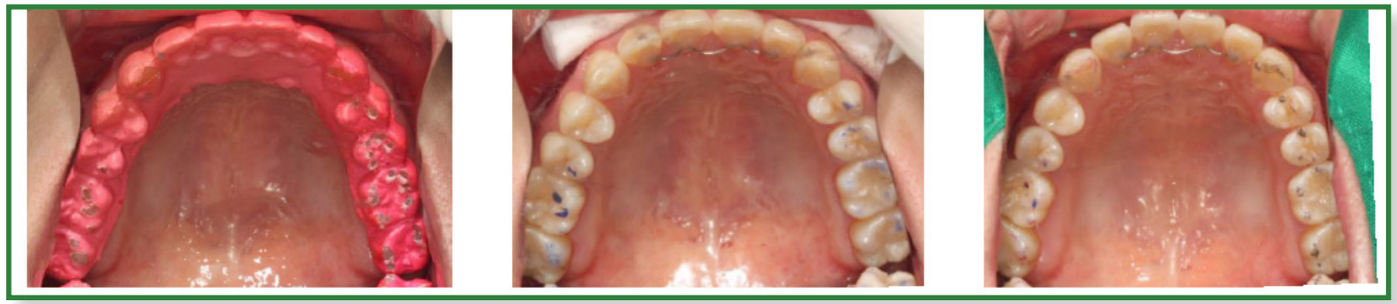


Figure 23

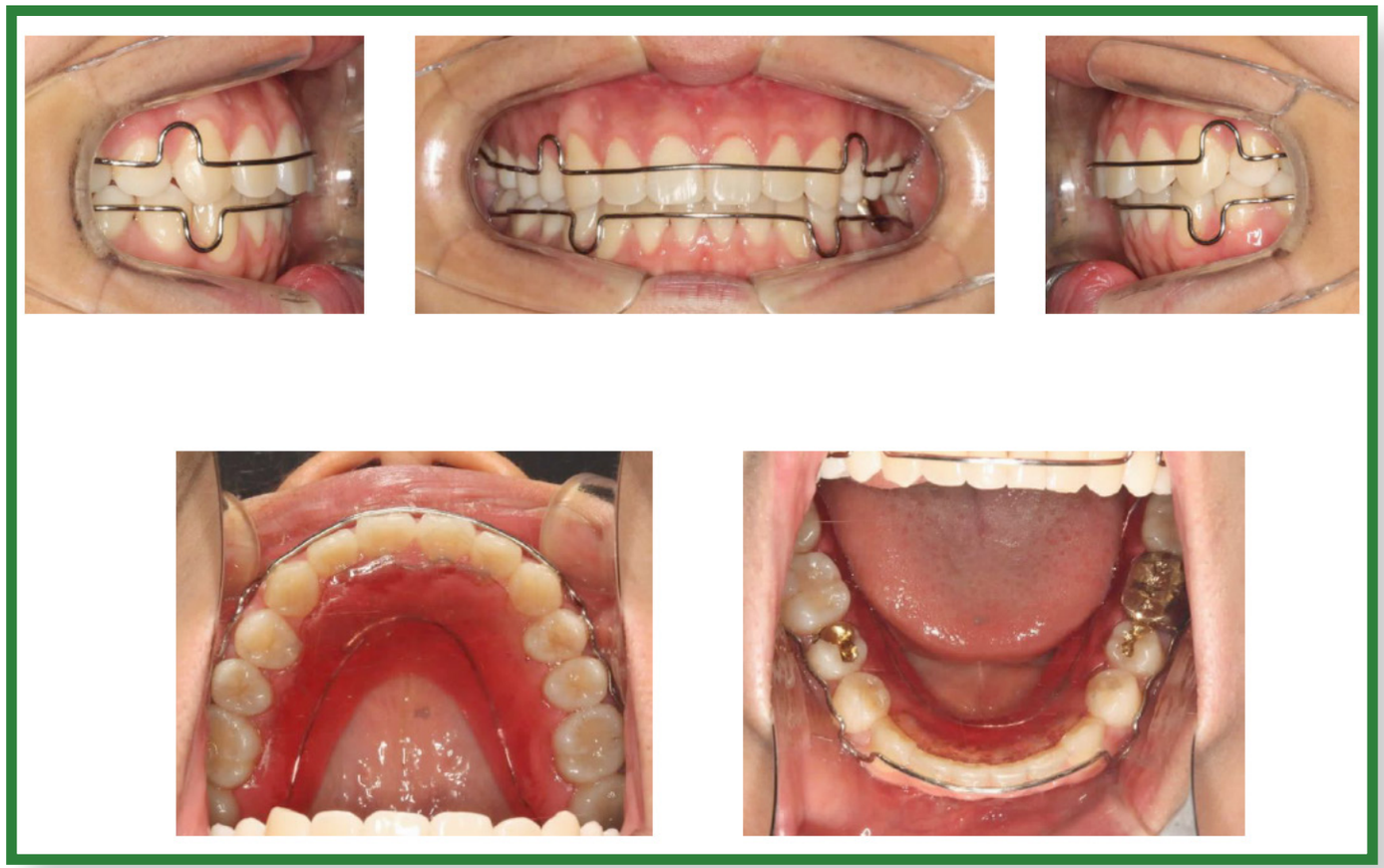
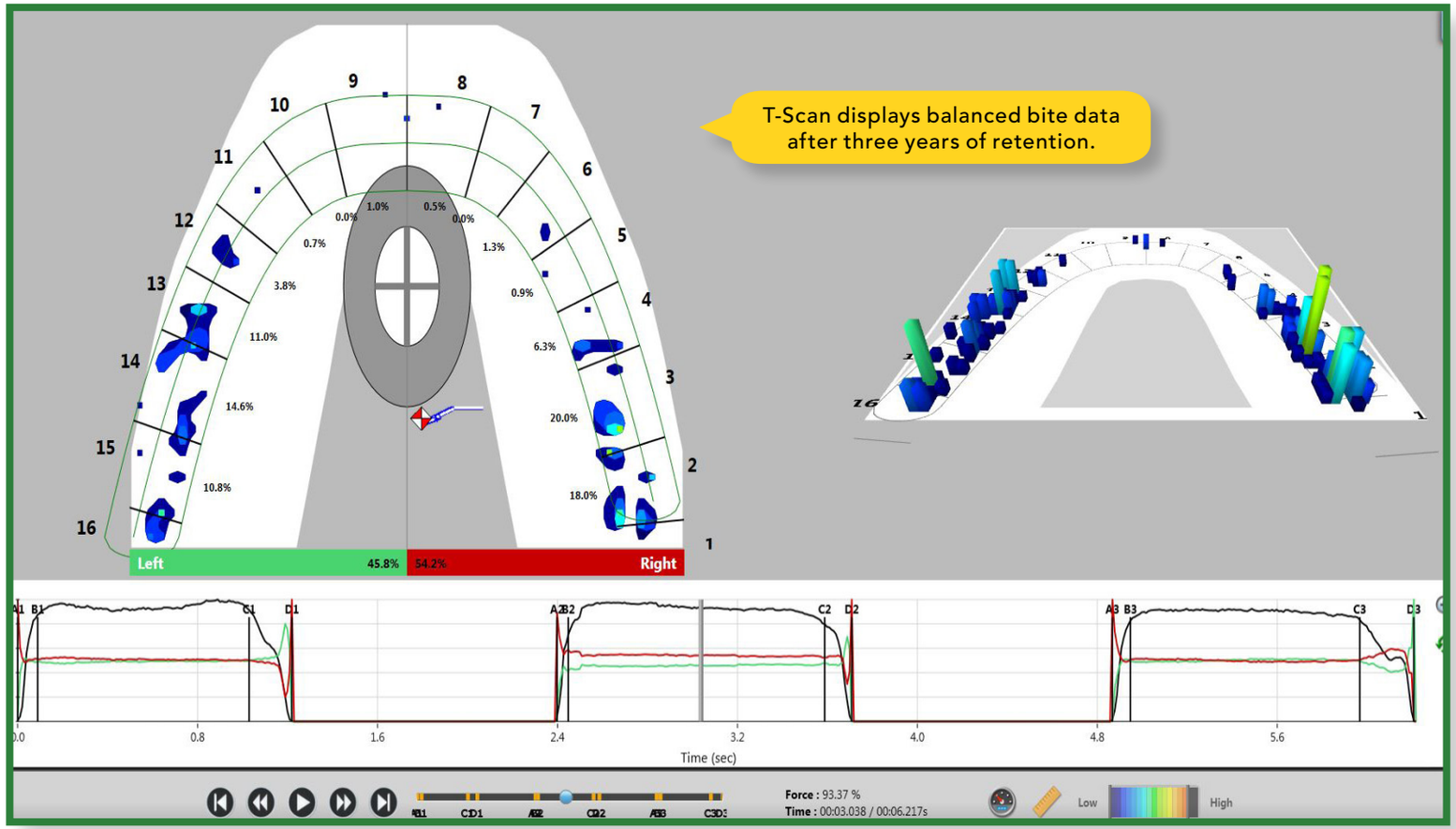


Figure 24

“With T-Scan, I’m Able to Validate and Ensure the Long-Term Success of My Cases.”

Following debanding, I used the T-Scan to measure the patient’s occlusion until the force balance, the Occlusion Time, and the Disclusion Time were within normal ranges. Often, orthodontic patients will come in for follow-up appointments to achieve optimal occlusal schemes.

After three years, the patient returned and we took another T-Scan measurement. As you can see, his bite force and timing have remained within acceptable ranges. With T-Scan, I’m able to validate and ensure the long-term success of my cases.



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