

Case Reports

Clear Aligner Treatment Instead of Orthognathic Surgery for a Skeletal Class III

by Jamie Mellert Houck, DDS



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Abstract

Many skeletal Class III patients are reluctant to have orthognathic surgery for the ideal orthodontic finish. In many cases, even without surgery it is nevertheless possible to provide a better functional and esthetic result either with standard brackets and wires or with Clear Aligner orthodontic treatment. Important treatment planning goals include assessing soft-tissue relationships and adaptations in both the lips and face as well as in the gingiva, improving functional occlusion (recognizing that ideal occlusion is not always possible given certain constraints), and preventing injury to the tissue surrounding the TMJ. This case study outlines the orthodontic treatment of a Class III malocclusion patient whose lack of posterior occlusion led to numerous dental and medical issues. Invisalign was used as the orthodontic treatment, with acceleration using EOCA Munchies.

It is commonly recommended that clinicians avoid providing dental treatment to family, but after consulting with several orthodontists who would treat my husband's case only after orthognathic surgery, and knowing that was something he did not want to endure, I decided to take on the challenge of correcting his bite through Invisalign treatment to give him improvement and relief of his symptoms.



Figure 1: patient's initial occlusion showing primary contacts at teeth #8 and #26, with bilateral open bite and Class III relationship.



Figure 2: initial ClinCheck showing proposed IPR. Ultimately, 0.2 mm of IPR was completed from canine to canine.

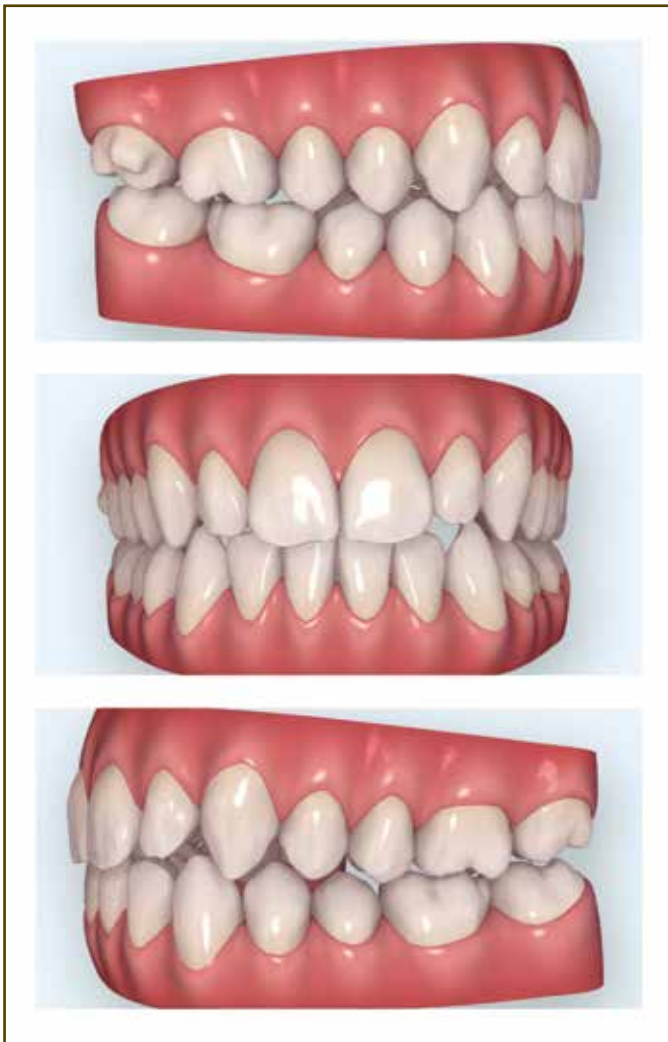


Figure 3: mid-treatment scan showing improvement in occlusion and change in molar and canine relationship.

My husband, Tim, had bracket-and-wire orthodontics completed as a young preteen, and like many boys, he hit puberty as a late teen. This left him in his early twenties with straight teeth, but with a Class III malocclusion, complete posterior open bite, and his main contacts on the incisors of

teeth #8 and #26. This lack of occlusion led to problems with gastric reflux, TMD, difficulty chewing, heartburn, recession on upper anteriors, and chipping and wear on his anterior teeth. This lack of occlusion even landed Tim in the E.R. for an emergency procedure in the middle of the night to treat "Steakhouse Syndrome" (a large bolus of food stuck in the lower esophagus) which was a result of his not being able to chew his carne asada taco. As his wife, I was eager to help provide some improvement in his occlusion.

Treatment goals

The most urgent goal for this dental treatment was to give the patient a better functional occlusion, recognizing that the ideal occlusion is not always possible considering skeletal and dental constraints. I wanted the patient to be able to chew food thoroughly, preventing further gastric issues. As well, I wanted to diminish his TMD symptoms by preventing injury to the tissue surrounding the TMJ.

In addition to providing functional occlusion, another goal was to improve the soft-tissue relationships and adaptations, in both the lips and the face as well as in the gingiva. The patient has a skeletal maxillary insufficiency and mild prognathism. This presented in protrusion of the lower lip and appearance of a long face due to dental interferences preventing him from closing further. He also had gingival recession of the maxillary centrals and canines, most likely due to traumatic occlusion and lack of posterior occlusion.

Lastly, the esthetic goals included improving the significant maxillary cant, broadening the patient's smile in the buccal corridor, decreasing his gummy smile, and giving him proper overjet and overbite. Composite bonding was planned at the end of the treatment to improve the size and shape of the narrow lateral incisors (**Figure 1**).

This patient is a residential realtor and spends much of his time face to face with his clients. For this reason, Invisalign was the ideal treatment modality for him, as it would not affect his professional or social life.

ClinChecks

The initial ClinCheck (**Figure 2**) for this patient was set up with 0.2 mm of IPR from mandibular canine to canine, with 0.3 mm of space planned distal to the maxillary laterals to allow for cosmetic bonding later. The velocity for each aligner was set to 0.2 mm, and the patient was instructed to change aligners at 7-day intervals. The patient was very compliant through this initial set of aligners, and we achieved mild anterior proclination of the maxillary incisors and uprighting of the maxillary premolars, as well as the initial leveling of the occlusal plane by intruding the upper right posteriors. At 2.5 months, I scanned the patient for a midcourse correction, as we had some unintended intrusion of tooth #23 that I wanted to get back on track.

The next ClinCheck was set up with similar goals to the first, although this time it included Class III elastics to help with some



Figure 4: occlusion after Invisalign treatment, including finishing bonding to enhance final shape of upper anteriors.

of the anterior-posterior (A-P) correction. Class III elastics were worn for 4 weeks full time on the left side and for a total of 10 weeks at night bilaterally while sleeping, resulting in significant improvement to the molar and canine relationship, especially on the left side. The patient continued with these aligners for 4 months.

At the beginning of the next refinement (**Figure 3**), the patient presented with Class I relationship and intercuspation on the right side, Class I relationship on the left side with open bite and anterior interference by the canine, 3 mm overbite, 2 mm overjet, and improved leveling of the maxillary cant. We were starting to see great improvement of the patient's occlusion and autorotation of the mandible as the bite was closing up.

Throughout the remainder of aligner therapy, the inclination of both maxillary and mandibular incisors was improved through proclination and torque (with the assistance of power ridges). Box elastics were worn over the aligners from upper left canine and first premolar to lower left second premolar and first molar for a span of 2 weeks, with the goal of closing the unilateral open bite and continuing to improve the A-P relationship.



Figure 5: lateral photograph showing changes in upper lip support and appearance of prognathism.



Figure 6: before and after smile photos showing correction of maxillary cant and appearance of gummy smile.

After a 9-month hiatus (see Conclusion), a final ClinCheck was created, with goals that included extruding the molars to establish posterior contacts, increasing the root torque on the upper canines to alleviate anterior interferences, and intruding the maxillary anteriors to improve the gummy smile. In this final stage, the posterior occlusion was established, and the maxillary cant was resolved.

Finishing touches

At the end of treatment, the last aligner was cut distal to the canines, allowing the posterior occlusion to settle for 6 weeks. Treatment was completed and proper occlusion confirmed, with molar occlusion holding mylar and with anteriors dragging

mylar. Proper interproximal contacts were confirmed throughout the mouth with ideal flossing.

After orthodontic treatment was completed, mild enameloplasty was performed on the maxillary canines to improve the shape of the canines, as well as minimal occlusal adjustments to alleviate some remaining anterior interference of the maxillary canine. Composite bonding was then added to repair the incisal chip on the maxillary upper right central and improve the esthetics and shape of the distofacial aspects of the maxillary laterals (**Figure 4**).

Conclusion

Overall, this treatment was completed in 2.5 years, including a 9-month hiatus during which my husband was gracious enough to let me put his treatment on the back burner when

I needed to focus my limited time on other patients at the end of my pregnancy and the first few months of my newborn daughter's life. Throughout his treatment, most aligners were changed at 7-day intervals, with acceleration through EOCA Munchies during the last half of treatment.

The patient has had resolution of all of his previous dental conditions, including ease of chewing; no TMJ pain; improved esthetics; better maxillary lip support with decrease in the protrusion of the lower lip (**Figure 5**); less gingiva showing at full smile (**Figure 6**); less recession on teeth #8, #9, and #11; resolution of heartburn and gastric issues; and improvement in overall esthetics. Tim is thrilled with his new smile and has an added appreciation for chewing carne asada tacos well. ■

