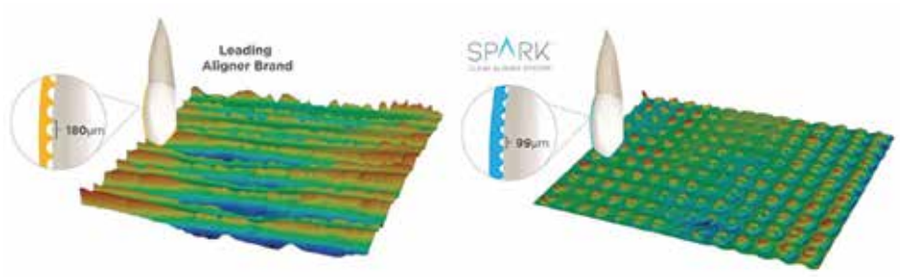
Using Spark™ Clear Aligners in open bite closure with TADs

Dr. Bill Dischinger illustrates treating a patient's narrow arches and anterior open bite with clear aligner therapy

My orthodontic training taught me how to close skeletal anterior open bites utilizing maxillary impaction surgery. I was fortunate enough to treat two patients in conjunction with the oral surgery department at my university using this technique. The patients, the surgeon, and I were thrilled with the results. We achieved bite closure as well as a very pleasing facial esthetic result.

Upon entering private practice, I discovered quite quickly that many patients would not accept surgery as an option. There were various reasons for this including a lack of finances, fear, or just plain unwillingness. We still had patients that did accept this route, but more would not. I was struggling to achieve the results I desired as an orthodontist, but meet the demands patients were placing on me. This began to change in 2008 when I treated my first skeletal anterior open bite utilizing TADs as anchorage to intrude the maxillary molars. This case turned out beautiful with little to no complications. I used a transpalatal arch to maintain torque in my molars while intruding.

Over the years, I tried various techniques I would see presented in lectures, written in articles, or observed by colleagues. All of the techniques had merit, but all of them also had drawbacks. Maintaining arch form and torque during active intrusion was always the challenge. I found I needed either to place transpalatal bars or pull on both the buccal and lingual, and even with all of this, I just wasn't seeing the easy results I was trying to achieve.



Microscopic image of aligner surface (10x magnification)

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In 2018, our practice began working with Spark™ Clear Aligners from Ormco™ Corporation. As we began treating cases with this new product, we started to see results that were better and more predictable than I had achieved with previous aligners. The more predictable results that I have found with Spark are likely due to a combination of Spark's TruGEN™ material, which has proven to have higher sustained force retention compared to the leading aligner brand, and Spark's use of the latest in aligner manufacturing technology, which results in better contact surface area between the tooth and the aligner than the leading aligner brand.* Once I started to feel more comfortable with aligners as my primary treatment of choice for many types of malocclusions, we began to expand our number of clear aligner cases across all demographics in our practice. As I began to feel more comfortable and confident in this form of treatment, I, of course, began to treat more difficult cases with Spark.

I have taught for many years at the University of the Pacific in San Francisco, where Dr. Robert Boyd was the chairman for over 20 years. Dr. Boyd was a pioneer in clear aligner treatment and wrote an article stating that he felt open bites were treated more easily with clear aligners than with fixed appliances. At the time, I was intrigued, but doubtful. I wasn't quite ready for that jump in my practice. After using Spark for about a year, I decided to start treating skeletal anterior open bites utilizing TADs and Spark aligners as I would in my cases treated with braces. My hope was that even though I didn't place a transpalatal bar, I could maintain molar torque.

What I found amazed me. Having full coverage of the molars with the aligner provides a number of advantages. The first, and in my opinion the most important, is that molar torque is maintained. Fully encapsulating the molars, so to speak, completely controls them as they are intruded. They don't rotate, and they don't lose torque control — they just purely translate in an intrusive movement. The second advantage I found was the speed in which intrusion

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Disclosure: As an Ormco™ key expert, Dr. Dischinger was invited to trial the Spark™ Clear Aligner System in 2018 and is lecturing on his experience with Spark worldwide. Having employed the Damon™ System for 21 years, he is also a Damon System certified educator, and lectures around the world on a variety of subjects.

occurred. I placed TADs between the 6's and 7's in the maxillary arch both buccally and palatally. We have the patient wear an elastic (1/8" 6oz.) from buccal TAD, over the occlusal of the aligner to palatal TAD full time. In addition, we are now placing rectangular attachments on the occlusals of the upper molars. We do not place composite on the teeth, but just use the occlusal attachment "bubble" in the aligner to give more occlusal contact and force on the molars to help give a mastication intrusion force. My feeling is that the molars intrude faster for two reasons. First, the elastics are changed out 3 to 4 times per day and thus stay fresh without any fatigue. With fixed appliances, I would activate the power chain every 4 to 5 weeks and probably lost some force in the last couple weeks. Second, keeping the molars in constant occlusal contact with the aligners aids in the intrusion effect.

Diagnosis

The case presented in this article is a 45-year-old female. She has narrow arches with an anterior open bite. In looking at her smile, I did not want to extrude the anterior teeth as I felt it would give her a gummy smile if I extruded the maxillary anteriors, and if I extruded the mandibular incisors, we would have too much display of the lower incisors. My plan was to intrude the maxillary molars to level the occlusal plane, allowing the mandible to auto rotate into a proper overbite relationship (Figure 1).

I have heard some clear aligner presenters preach to not do vertical mechanics at the same time as arch broadening mechanics. I decided to disregard their advice (just because I am not always the smartest decision-maker). Actually, using this new aligner technology, I wanted to see if we could be more efficient and accomplish both.

Treatment progression

The primary round of aligners consisted of 19 active stages and 4 stabilizing aligners. I set up for 3 mm of posterior molar intrusion with 5 mm of autorotation in the anterior,

Figures 1A-1D

Figures 2A-2C

Figures 3A-3C

closing down the bite. I placed four 10 mm Vector TAS TADs between the maxillary 6's and 7's, with two being buccal and two being palatal. At delivery, we showed her how to place the elastics, again using 1/8" and 6 oz. in force.

We checked in at 10 weeks to see the progress and make sure the aligners were fitting properly. (This has now turned into a virtual visit for these appointments post COVID-19 shut down.) I was shocked at the progress after just 10 weeks (Figure 2). We were gaining width in the maxillary arch, uprighting the canines and premolars, and her open bite had just about fully closed in the central incisor area. I was very excited. At 19 weeks, she was through her first round of active aligners. In all honesty, we could have completed her treatment at this point. Her open bite was fully closed, and alignment looked great (Figure 3). I wanted to upright her maxillary canines and premolars further though to give her a broader smile. I ordered another 13 active aligners to complete her treatment.

At this time unfortunately, we ran into the beginning phases of the COVID-19 pandemic. We ended up doing a "drive-through" aligner pickup 7 weeks after sending in her refinement scans. She wore the aligners for 13 weeks, at which point we had been allowed to open back up and see patients. She was thrilled with her bite and smile, and we both agreed she was done with treatment (Figure 4).

Figures 4A-4G

Conclusion

The patient actively wore aligners full-time for 32 weeks. She did wear them at nighttime only while in the transition into refinement for 7 weeks due to the COVID-19 shutdown. I saw her in our office for a new patient consultation, an initial aligner delivery, a checkup for aligner fit (which would now be done virtually), a refinement scan appointment, another aligner delivery (which we actually just handed to her in her car in the parking lot), and a final placement of lingual bonded retainers and final records. Kathy had a total of six appointments in our office, which included the consultation and the final records. With our virtual appointments now being utilized, this would have been a 5-appointment treatment over 7.5 months of active treatment.

The patient was our first treatment performed in this fashion, but her success gave me the confidence to utilize this in more open-bite cases. We have since started many such cases and completed a number of them. We are also utilizing this for gummy smile intrusion cases as well.

I am very excited by the success of these treatments and how much easier and quicker they are than what I was previously doing with fixed appliances. My only regret is that I did not listen to Dr. Boyd years ago. I no longer treat cases in which I will be intruding maxillary teeth with TADs in fixed appliances. I only treat these with Spark Clear Aligners. OP

*80% better printing resolution than leading aligner brand; more uniform surface area than leading aligner brand; 19% better contact surface area between the tooth and aligner than leading aligner brand. Data on file with Ormco™