

SureSmile Aligner Case Report: DIY Generalized Spacing Case for Superior Control and Cost-Effective Treatment

As the old saying goes... “With age comes wisdom.” This is most certainly true with what I have seen transpire over the past 20 years with the inception and development of clear aligner therapy in orthodontics. As a technology embracer and young orthodontist, I readily embraced Invisalign when it first came to market in 1999 and started my first Invisalign patient nearly 20 years ago in November of that year. Invisalign was without a doubt a **disruptive dental technology**, and it has forever changed the way we all practice orthodontics because it is a highly desirable treatment option for patients seeking esthetic orthodontic treatment. In addition, Invisalign will forever be known as the first digital orthodontic treatment modality invented by the founders of Align Technology, Zia Chisti and Kelsey Wirth. However, in October of 2017, approximately 40 of Align’s patents expired which has paved the way for many new clear aligner competitors to come to market.¹ With this recent development, we as orthodontists now have multiple options for clear aligner treatment and at different price points to offer to our patients, which I personally feel is a great thing for us as orthodontists, and most importantly for our patients to have different options for treatment. In this case report, I am going to review a generalized spacing case which I treated utilizing SureSmile’s clear aligner software applications.

Patient Information:

This patient presented to me for her new patient examination on April 29, 2017 as a healthy 27-year, 5-month-old adult female. She stated that her chief complaint was that she wanted a nicer looking smile as she did not like her generalized spacing in both maxillary and mandibular arches. Her MX and MD arch forms were slightly asymmetric and ovoid.

Diagnosis and Etiology:

Intraoral examination revealed a Class I malocclusion (See Figure 1). She presented with an overbite (OB) of 20% and overjet (OJ) of 1 mm. There was 4 mm of spacing present in her maxillary arch and 6 mm of spacing present in her mandibular arch. There was excess maxillary and mandibular incisal wear present.

Frontal facial evaluation revealed a symmetrical and balanced facial pattern for her upper, middle, and lower facial third heights. Profile evaluation revealed a straight profile with normal chin with nasio-labial angle equal to 120 degrees. Her upper and lower lips were both in normal positions and competent at repose. A frontal smile evaluation revealed acceptable upper and lower smile lines with no buccal corridors present. Her maxillary midline was centered with her facial midline and her mandibular midline was deviated to her right by 1 mm. The patient was pregnant at this time, so no cephalometric or panoramic X-rays were taken. Instead, we evaluated the periapical and bitewing radiographs from her dentist which displayed very good dental health.

Treatment Summary:

This patient expressed a strong desire for an esthetic orthodontic treatment option. As a result, SureSmile Aligners were proposed to her as the treatment option of choice. On May 30, 2017, an intraoral scan was taken and was then uploaded to SureSmile for both maxillary and mandibular

SureSmile Aligners to create her Diagnostic Model 1 for staging of her aligners. In 2017, we were still in the process of setting up our digital lab and 3D printers. As a result, we were scheduling 6 weeks in between the intraoral scan and the SureSmile Aligner insert to give our digital lab enough time to create the SureSmile Aligner stages, have the doctor review the individual SureSmile Aligner stages, to 3D print the models, and then to fabricate, package, and label the aligners. Today, we can do all of this in 1 week if necessary, but we typically schedule 3 weeks in between the intraoral scan and the insert to not stress our digital lab. The SureSmile Aligner stages were created by our digital lab and then approved by me for both maxillary and mandibular arches. There was a total of 11 maxillary aligners and 10 mandibular aligners with tooth movements for U3-3 and L4-4 only (See Figures 2 and 3).

On July 17, 2017, the patient returned to our practice for her SureSmile Aligner insert. A total of 5 maxillary and 5 mandibular aligners were given to the patient with instructions to change her aligners every 2 weeks and to wear them 20 hours per day. There were no attachments prescribed for her as my aligner philosophy tries to minimize attachments necessary during treatment. We as clinicians should also remember with aligner therapy that patients do not like attachments especially in the maxillary anterior region. My aligner philosophy for attachments is based off of a research study performed at the University of Nevada Las Vegas, which has demonstrated that trimming the aligners 2 mm past the gingival margin increases retention of the aligners by 4 times in comparison to a scalloped trim (See Figure 4).² As a result, our lab trims our aligners with a straight cut 2 mm past the gingival margin which minimizes the need for attachments. Another important factor for retention is the size or surface area of the clinical crowns. Larger clinical crowns will have greater retention and smaller clinical crowns will have less retention. Undercuts are also another important factor for retention. For spacing cases, our lab does wax out slightly between the spaces. However, there is a great deal of retention still in the areas of spacing.

On September 26, 2017, the patient returned to our practice for delivery of her remaining SureSmile Aligners (Maxilla – Aligners 6 – 11 and Mandible – Aligners 6 -10). On December 16, 2017, the patient returned to our practice for SureSmile Aligner Refinement and a second intraoral scan was taken on the patient with updated photos to create her Diagnostic Model 2 for staging of her refinement aligners (See Figure 5). Her refinement SureSmile Aligner stages were created by our digital lab and then approved by me for both maxillary and MD arches. Again, no attachments were prescribed. Her SureSmile refinement aligners were then delivered on February 16, 2018. There was a slight delay in her treatment of approximately one month due to the delivery of her baby. On May 10, 2018, the patient's SureSmile Aligner treatment was completed. Because of her generalized maxillary and mandibular spacing, we direct bonded U2-2 and L3-3 lingual splints. An intraoral scan was taken for her final retainer which was given to her on May 16, 2018. Her total treatment time in SureSmile Aligners from delivery of her initial SureSmile aligners including the time for staging and fabrication of her refinement SureSmile Aligners was 10 months and 2 days.

Summary and Conclusions:

It is my belief that we are now entering the next stage of development for aligner treatment in our esteemed profession of orthodontics, where the orthodontist is now taking back control of treatment in the digital biosphere, because we now understand how to treat in the digital world. The digital era of orthodontics for treatment began with Invisalign in 1999. However, from 1999 to the present time, many other digital orthodontic technologies have emerged (SureSmile, Insignia, Incognito, eBrace,

Harmony, ClearCorrect, etc.). We as orthodontists now have many different options for digital orthodontic treatment for labial and lingual fixed appliances and even more so with aligner therapy. As a result, over the past 20 years, many clinicians are now very comfortable treating with digital technology and the younger generation of orthodontists are even more comfortable since they have grown up with technology in their hands from childhood.

In our 3 practices, we have chosen SureSmile Aligners as our preferred aligner partner for 4 reasons: 1) SureSmile's software applications gives us superior control for staging, which I personally feel gives us better treatment outcomes for our patients. 2) SureSmile's Cloud is phenomenal as it is fast and reliable. I have worked on cases on SureSmile's Cloud all over the world in my travels over the past 15-plus years with no issues. 3) SureSmile understands the importance of digital workflow and has created an incredibly efficient digital workflow system. We use it every single day in our clinics and it helps the clinics to flow seamlessly. SureSmile's digital workflow platform has been in existence and continuous development for over 20 years and there are no other companies other than Invisalign which have that much history in the digital orthodontic world or understands it as well. 4) Finally, with SureSmile Aligners, we can now control our aligner overhead expenses much better by staging and fabricating the aligners ourselves. We have two digital orthodontic labs with five – 3D printers (3 – Structo Dentaforms, 1 – Envision TEC Vida2, and 1 – Envision One). We print all our models and then fabricate all our SureSmile Aligners within our 2 labs. This obviously has resulted in significant savings with the cost of our SureSmile Aligners for our 3 practices. I have provided a cost break down for this patient's case report for review (See Figure 9). The total cost for labor and supplies for this SureSmile Aligner case was \$314. The only cost which was not factored into this cost analysis is for my time in evaluating her case.

The SureSmile Aligner case which I have reviewed in this case report is the perfect example of what happens to any sector of business, industry or healthcare when a technology goes mainstream. In this case, it pertains to clear aligner treatment in orthodontics. Technologies will always continue to evolve, develop, and improve and this is true for clear aligner technologies as well. In addition, with increased utilization, this results in decreased expenses. Because of this cost savings, we can offer SureSmile aligners to our patients at a lower cost but still make the same profit margin. We no longer need to outsource our clear aligner cases to an outside vendor at an exorbitant lab fee. In my opinion, this is a win-win for us as clinicians as well as for all our patients. I do know that my patients *love* hearing that I can offer them a more affordable clear aligner treatment option than my competitors. In my opinion, this is just smart business practice and isn't that a beautiful thing???

- 1) Tindera, M. Bracing for Competition. Cheaper Challenger's Enter Invisalign's 1.5 Billion Market. Forbes: May 2, 2018.
- 2) Cowley, D; Mah, J; O'Toole, B. The Effect of Gingival-Margin Design on the Retention of Thermoformed Aligners. J Clin Orthodontics 2012, 46(11):697.

Figure 1: AP - Initial Records – 4/27/17

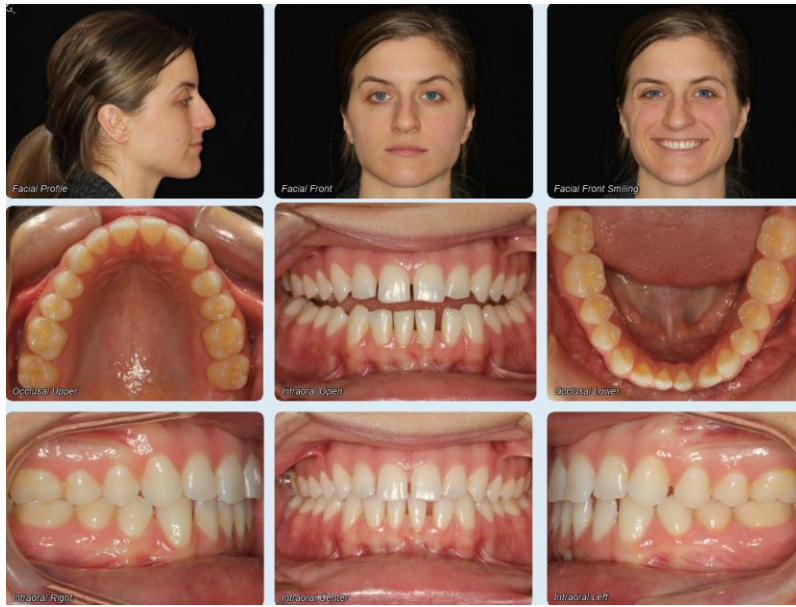


Figure 2: AP – 7/10/17 SureSmile Maxillary Aligners Staging

	UR8	UR7	UR6	UR5	UR4	UR3	UR2	UR1	UL1	UL2	UL3	UL4	UL5	UL6	UL7	UL8
mesial (+) / distal (-)						0.1	0.3	0.3	0.1	-0.5	-0.6					
buccal (+) / lingual (-)						-0.5	-0.9	-1.3	-1.9	-1.2	-0.8					
occlusal (+) / gingival (-)																
Torque facial (+) / lingual (-)						2	-3	-1	-2	2	2					
Ang. mesial (+) / distal (-)						-3	-3	-2	-2	-2	-3					
Rot. mesial (+) / distal (-)						22	9	-5	-6	10	22					
Gap (+) / Intersection (-)																-0.1
Fixed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comparison Stage: **Diagnostic Model 1**
 Displacement Type: Tooth Cusp Tip %
 Malocclusion Includes Max. / Mand. Alignment Adjustments
 Cumulative: Cumulative Incremental
 Edit Selection:

Figure 3: AP – 7/10/17 SureSmile Mandibular Aligners Staging

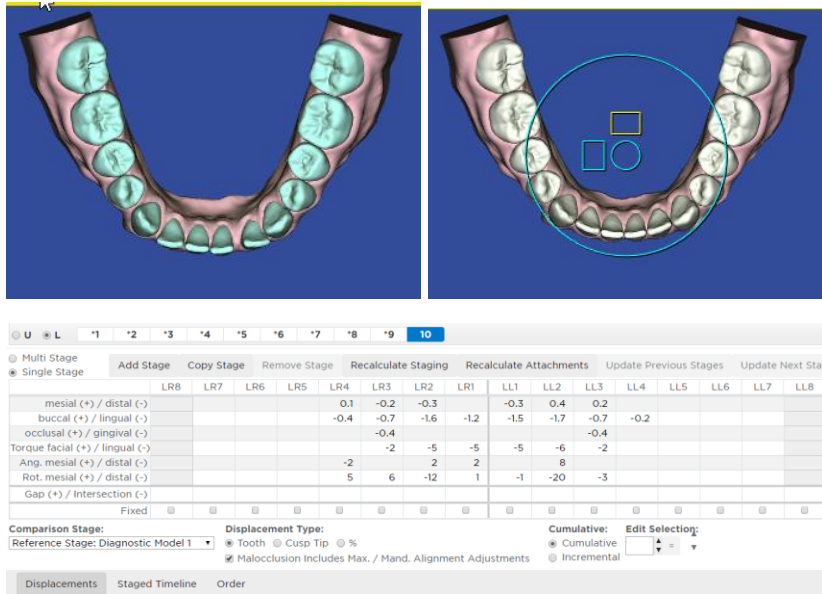


Figure 4: JCO Study Illustrating Aligner Trim

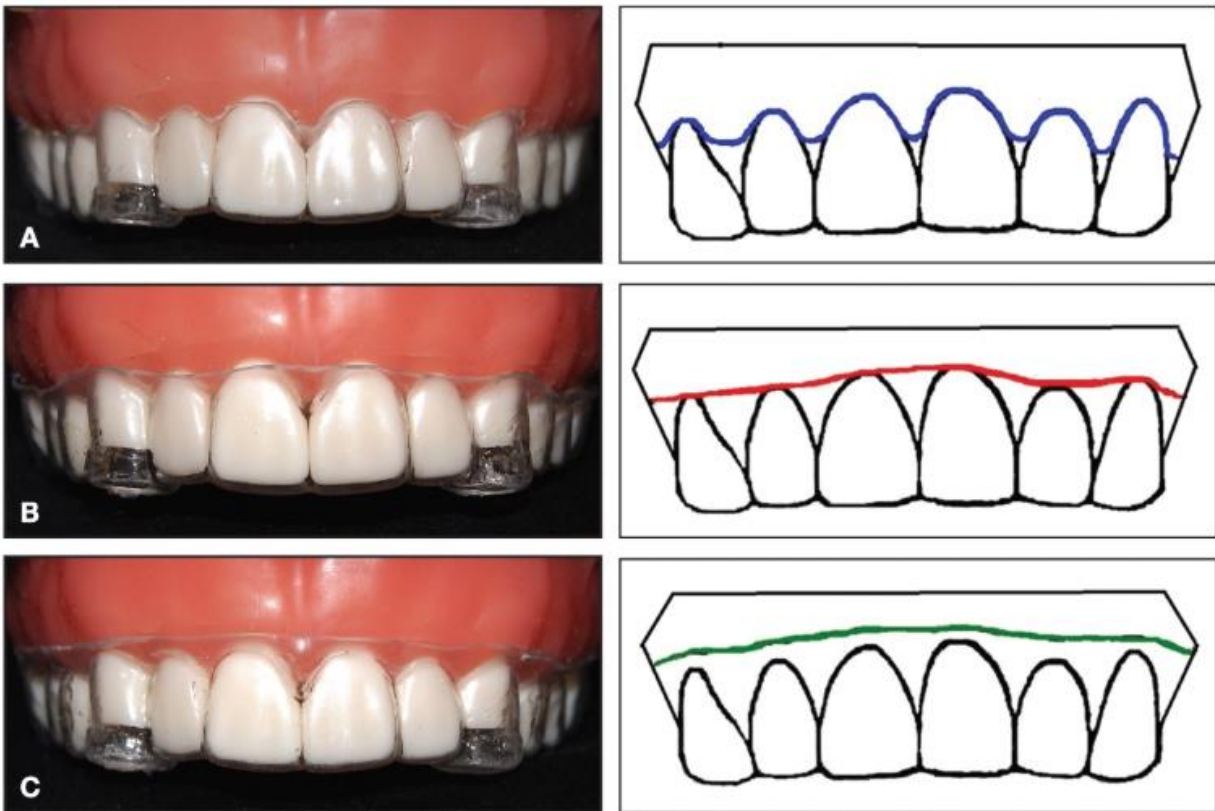


Fig. 1 Gingival-margin designs of aligners tested in this study. A. Scalloped margin. B. Straight cut at gingival zenith. C. Straight cut 2mm above gingival zenith.

Figure 5: AP – 12/16/17 - SureSmile Aligner Refinement



Figure 6: AP - 12/16/17 - Maxillary SureSmile Alignment Stages

U L 1 2 3

Multi Stage Add Stage Copy Stage Remove Stage Recalculate Staging Recalculate Attachments Update Previous Stages Update Next Stage

	UR8	UR7	UR6	UR5	UR4	UR3	UR2	UR1	UL1	UL2	UL3	UL4	UL5	UL6	UL7	UL8
mesial (+) / distal (-)										0.1						
buccal (+) / lingual (-)																
occlusal (+) / gingival (-)																
Torque facial (+) / lingual (-)																
Ang. mesial (+) / distal (-)										-2						
Rot. mesial (+) / distal (-)										-4						
Gap (+) / Intersection (-)		0.1														
Fixed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comparison Stage: Reference Stage: Diagnostic Model 2

Displacement Type: Tooth Cusp Tip %

Malocclusion Includes Max. / Mand. Alignment Adjustments

Cumulative: Cumulative Incremental

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Figure 7: AP – 12/16/17 - Mandibular SureSmile Alignment Stages

Multi Stage
Single Stage

Add Stage Copy Stage Remove Stage Recalculate Staging Recalculate Attachments Update Previous Stages Update Next Stage

	LR8	LR7	LR6	LR5	LR4	LR3	LR2	LR1	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
mesial (+) / distal (-)								0.1								
buccal (+) / lingual (-)							-0.3	-0.5	-0.5	-0.3						
occlusal (+) / gingival (-)									-0.2							
Torque facial (+) / lingual (-)																
Ang. mesial (+) / distal (-)							1		1	1						
Rot. mesial (+) / distal (-)									2							
Gap (+) / Intersection (-)								-0.1	-0.1							
Fixed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comparison Stage: Reference Stage: Diagnostic Model 2

Displacement Type: Tooth Cusp Tip %

Malocclusion Includes Max. / Mand. Alignment Adjustments

Cumulative: Cumulative Incremental

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Displacements Staged Timeline IPR Tracking Order

Figure 8: AP – SureSmile Aligner Digital Workflow Sequence (14 Maxillary and 11 Mandibular Aligners)

SureSmile Advanced Apple Creek Orthodontics Ashley Prickette (B8E5)

! Bond Date Estimated 2017-05-31

! Therapeutic Scan Date Estimated 2018-01-17

! Setup Approval Date Estimated 2018-02-07

! Wire Insertion Dates Estimated 2018-02-28

Task	Status	Date
Bond Date	Estimated	2017-05-31
Diagnostic Model 1	Approved	2017-06-02
AB-Aligner Sim		2017-07-05
AB-Aligners Staged: A=11, B=10	Not ordered	2017-07-10
Diagnostic Model 2	Approved	2017-12-19
AB-R Aligner Sim		2018-01-04
AB-R Aligners Staged: AR=3, BR=5	Approved	2018-01-08
Therapeutic Scan Date	Estimated	2018-01-17

Figure 9: AP – SureSmile Aligner Cost Analysis

- AP – SS Aligners Cost Analysis**
- MX – 14 Aligners and MD – 15 Aligners**
- Diagnostic Model at \$45 Each x 2 = \$90
 - 29 Total MX and MD Aligners x \$4/Model = \$116
 - 29 Aligners x \$2/Sheet of Essix Ace .030" = \$58
 - 5 Minutes of Labor to Fabricate and Package Each Aligner x 29 = 2 Hours and 25 Minutes x \$20/Hr = \$50
 - We Only Print 20 Aligners at a Time and Have An Internal Tracking System to Control Waste of 3D Printed and Unused SS Aligner Stages
 - \$90 + \$116 + \$58 + \$50 = \$314