

# Invisalign Correction of a Teenager's Class 2 Division 1 Malocclusion

by Dr. David J. Harnick

## Introduction

Introduced by Align Technology in 2008, Invisalign Teen is an excellent alternative to fixed appliances for some teenagers. Initially, Invisalign was primarily used to correct minor alignment, crowding, and spacing issues<sup>1-4</sup>. However, as Clear Aligner Treatment (CAT) appliances gained acceptance this treatment modality was increasingly used to correct more complex malocclusions as well<sup>5-9</sup>.

Today, these techniques can be used predictably on teenagers. There are a number of teenagers that would prefer not to wear fixed appliances, for the obvious reasons. Since there is occlusal coverage during the entire treatment duration, Invisalign treatment presents new opportunities and challenges that need to be clearly understood. All types of malocclusions exist in these younger patients, including complicated skeletal disharmonies. Many of the patients are still growing. This case report of a Class 2 malocclusion demonstrates some important factors in utilizing Invisalign Teen to achieve the best esthetic and functional result.

## Diagnosis

**Chief Complaint:** This 14 year old female's chief complaint was a "bite problem." Her medical history was clear.

**Facial:** Symmetrical from frontal view. Normal incisor and gingival display for her age. Profile is within normal limits. The smile photograph shows palatally inclined buccal segments. **Fig.1.**



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**Radiographic:** Panoramic radiograph shows that all wisdom teeth are developing. Teeth #s 8, 9 have short root formation. **Fig.2.** Cephalometrically, she has an ANB of 6 degrees which is suggestive of a Class 2 skeletal problem. Her incisors are of normal angulation. **Fig.3.**

**Dental:** There is a Class 2 Division 1 malocclusion with mild upper and lower crowding. The mandibular midline is off, 1mm to the right. There is mild excess overjet and normal overbite. The maxillary arch is constricted with a moderate



**Figure 1:** Initial montage photographs. Note the narrow arch forms with palatally inclined buccal segments. Also, because of the end-on occlusion of the canines, there is flattening of the maxillary canine cusp tips.



**Figure 2:** Initial panoramic radiograph. Note the moderately short root development of the maxillary central incisors.



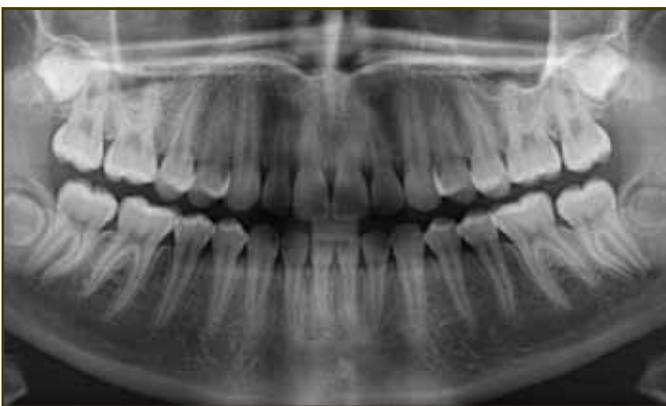
**Figure 3:** Initial cephalometric radiograph.



**Figure 4:** Seven month progress photos. Note buttons for class 2 elastics on the buccal of the mandibular first molars. Arch forms have improved and the Class 2 malocclusion is resolving.



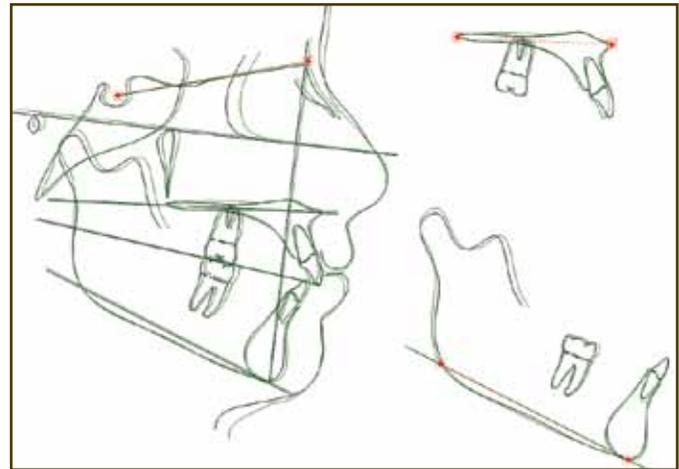
**Figure 5:** Final photographs. The Class 2 malocclusion has been resolved, the arch forms are more ideal, and the maxillary canines have been reshaped for a more normal cusp tip appearance. There is good alignment of the teeth with ideal overjet and overbite, and the buccal segments have been uprighted.



**Figure 6:** Final panoramic radiograph. Note that the roots of the maxillary central incisors appear to be unchanged.



**Figure 7:** Final cephalometric radiograph.



**Figure 8:** Tracing superimpositions show retraction of the upper incisors, good vertical control of the molars, and a small amount of mandibular growth.

“V” shaped arch. **Fig.1.** Wear of the maxillary canines was noted. The patient was aware of night bruxism.

### Treatment Plan

The patient was given the choice of Clear Aligner Treatment (CAT) or conventional fixed appliances. CAT is capable of correcting Class 2 malocclusions<sup>8</sup>, and that is what the patient selected. It is important to offer the choice of CAT or conventional fixed appliances to the patient, when appropriate. Careful case selection is critical because of the increased need for patient compliance and cooperation with CAT. PVS impressions were taken and the case submitted for Invisalign Teen.

### Treatment Progress

Cutouts were done for the mandibular first molars, brackets were bonded for Class 2 elastics, and these elastics were utilized at initial delivery. The patient was given 3 sets of aligners at a time, and was seen every 6 weeks. Photos were taken at 7 months showing good progress **Fig.4**, and the case was completed after 9 months of treatment. No case refinements were needed. The maxillary canines were reshaped, the incisal edges were smoothed, and clear retainers fabricated.

### Results

The Class 2 malocclusion was corrected with ideal overjet and overbite. Good tooth alignment was accomplished. **Fig.5.** No Interproximal Reduction (IPR) was needed. The maxillary width and archform were improved. The midlines were improved but not ideal. To make the midlines ideal would have required IPR, but both the patient and author felt it was not warranted. Panoramic evaluation showed no changes in the root shapes of the teeth, including the maxillary centrals. **Fig.6.** Cephalometric imaging **Fig.7** and cephalometric superimpositions **Fig.8** revealed there was a small amount of mandibular growth that contributed to the Class 2 correction.. The maxillary incisors were uprighted and retracted to a more normal and pleasing



**Figure 9:** Seven months post treatment photos. There has been no change in the Class 2 correction.

position. There was essentially no vertical eruption of the molars contributing to the Class 2 correction. Finally, seven month post treatment photos were taken to verify the stability of the Class 2 correction. **Fig.9.**

### Discussion

It is important, especially on our younger patients, to provide the best esthetic and functional result possible, and, whenever appropriate, to correct the occlusion in order to achieve an optimum result.

In this case, it was imperative to develop the maxillary width for both functional and esthetic reasons. If not properly corrected, the resultant smile would not be harmonious with the width of the lips. Also, if merely alignment were to be accomplished, the Class 2 correction would not be possible; as a result, either post-treatment excess overjet would remain, or significant maxillary Interproximal Reduction (IPR) would become necessary. Most Class 2 patients have insufficient maxillary width. Note the photos showing the change in arch form achieved via the orthodontic treatment. This maxillary width development was a key factor in achieving the best cosmetic outcome **Fig.10-11.**

### Advantages of Clear Aligner Technology

Clear Aligner Treatment provides some advantages over fixed appliances in certain cases. In this case, treatment time was very efficient (less than one year) because the class 2 elastics were able to commence with the initial delivery. By contrast, when using Class 2 elastics along with fixed appliances, it generally takes many months to be able to utilize wires that are of sufficient size and strength<sup>10-11</sup>.

Also, when using Class 2 elastics along with fixed appliances, there can be canting of the occlusal plane because of the resulting vertical component of force. With Clear Aligner



**Figure 10:** Pre- and post-treatment photos of the maxillary arch. Note the arch form improvement.



**Figure 11:** Pre- and post-treatment photos of the mandibular arch. Note improvement of the rotation of #20 and #29.



**Figure 12:** These before and after photographs, with teeth out of occlusion, demonstrate judicious reshaping of the teeth. The uprighting of the maxillary buccal segments contribute to the successful orthodontic result.

Treatment, because the occlusal surfaces are completely covered, the typical “Class 2 elastic effect” is eliminated or reduced. This theoretically would mean a more forward position and better profile correction. This particular case did not need significant profile correction.

Although confirming research needs to be done, it appears that Clear Aligner Treatment has less potential for causing root resorption than conventional fixed appliances. This makes it an ideal choice for teeth that may be susceptible to root resorption. Note how in this case, there was minimal, if any, change in the already shorter maxillary central incisors.

### Enhancing the final result

While achieving proper width and archform improve the cosmetic aspect of orthodontic treatment, subsequent tooth reshaping helps enhance the final cosmetic outcome. Initially, because of the end-on Class 2 relationship of the canines, there was significant wear on the maxillary canine cusp tip. The patient and family did not want restorative treatment, so simple tooth recontouring and reshaping succeeded in attaining a more normal canine appearance. **Fig.12.**

This was accomplished by never touching the deepest part of the worn area, and by sloping the mesial and distal in order to give the appearance of a more normal tooth form. Reshaping of the incisal edges to remove small discrepancies can significantly improve the final cosmetic result. This contouring, of course, needs to be done with care.

### Conclusion

To achieve the best functional and cosmetic result possible, a very thorough and complete orthodontic diagnosis is necessary when using Clear Aligner Treatment. Correction of the malocclusion can be an integral part of achieving the desired cosmetic and esthetic result. This modality is not merely limited to the re-alignment of malposed teeth, but can also successfully correct Class 2 occlusal relationships. **Fig.13-16.** ■

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**Figure 13:** Note the improved smile via uprighting of the buccal segments.



**Figure 14:** Pre- and post-treatment photos of the left buccal occlusion, showing the correction of the class 2 relationship.



**Figure 15:** Pre- and post-treatment photos of the right buccal occlusion, also showing the correction of the class 2 relationship.



**Figure 16:** Pre- and post-treatment photos highlight the midline improvement.