



One-week wear case-series.
 Analysis of the clinical efficacy and benefits of
 7-days aligner change in four cases.



Dr. Arturo Vela-Hernandez

Dr. Arturo Vela Hernández (MD, DDS, PhD) is a Doctor of Medicine, Stomatologist and Orthodontist, and has been working with Aligners since 2002. Since 2003 he has lectured in the Orthodontics Master's program at Universidad de Valencia, where he heads the Orthodontics training program with Invisalign. He has also been a guest lecturer at a number of universities in Europe and America, and was awarded the JM Moriyón Prize by the Spanish Orthodontics Society in 2008. He is an Invisalign Diamond Provider, European Key Opinion Leader and member of the European Orthodontic Advisory Board for Invisalign. Dr. Vela has given a number of courses and spoken at conferences around the world.

Introduction

Recently Align Technology has advised the weekly change of the aligners rather than the two-weekly protocol recommended so far with the Invisalign system. With this change in protocol there is the potential to reduce treatment time by up to 50%. If the treatment goals can be reached with no significant difference compared to the traditional two-week change, the impact of this new protocol from a clinical, patient and a practice aspect could be enormous.

The objective of this paper is to show sets of cases treated with the new weekly exchange protocol, to illustrate the clinical results, and the impact of shorter aligner wear time for our patients and our clinics.

After the case presentation we have included a discussion on what has been the impact of weekly aligner changes in our practice from a clinical point of view, practice efficiency, and patient experience, and a final conclusion from our experience with weekly aligner changes so far.

Case 1: Class I, class III, anterior open bite, narrow arches.

Patient initials: I.C.
Sex: Female
Age: 38



FIGURE 1. Case 1. Pre-treatment pictures.

Presenting Complaint: “My top teeth don’t touch the bottom ones and it is uncomfortable to eat.”

Clinical History and aetiology: At the initial appointment the patient had no relevant medical history and was dentally stable. There were several sound restorations present due to previous carious lesions and there was mild bone loss in the molars.

Clinical findings

- **Dental:** Molar class I, left canine class I and right canine class III. Anterior open bite with decreased overjet. Midlines coincident with the face and with each other. Curve of Spee: upper inverted and lower increased. Narrow arches.
Cephalometrically the upper and lower incisors are proclined.
- **Skeletal Pattern:** Class I.
- **Facial:** Correct profile with lip protrusion. Lower facial third increased.
- **Functional:** Bruxism patient.

Treatment Goals

The treatment goals for this patient are primarily to correct the anterior open bite, to resolve the crowding and to expand the buccal segments without causing increased recession.

Treatment approach

The open bite was treated mainly by posterior expansion and extrusion of upper and lower incisors.

Treatment plan

1. Graft on 3.1 previous to the Invisalign treatment
2. Relative extrusion of the upper incisors was planned and facilitated by expansion of the posterior segments. This extrusion favours the gingival level of the patient, and improves the smile arch/buccal corridors.
3. Analysis of the tooth size discrepancy revealed a mandibular excess of 2.24 mm.
4. Expansion of premolars and molars was planned by means of the buccal tipping of the crowns until upright.
5. Lower IPR to compensate Bolton’s discrepancy with the upper arch, and to avoid proclination of the lower incisors. IPR was carried out from the first aligner.
6. Night guards at completion of treatment.

Treatment details

- Total treatment time: 12 months.
- Number of aligners: 22 aligners + 15 additional aligners.
- Aligner wear time: The first 10 aligners were changed every 10 days, thereafter the aligners were changed weekly.
- Number of appointments:
 - Regular appointments: 13. Monitoring appointments every 8-10 weeks
 - Emergency appointments: 0
- Attachments and other features: optimized attachments were placed by the system for improved tooth movements.
- Auxiliaries: Buttons and elastics (4.5 oz, 3/16") were used to extrude lateral incisors in the second phase of the treatment. The patient was instructed to use the elastics 24h.
- IPR: Lower IPR to compensate Bolton's discrepancy with the upper arch, and to avoid proclination of the lower incisors. IPR was carried out from the first aligner.
- Retention: fixed lingual retainer from canine to canine, and removable retention in both arches.

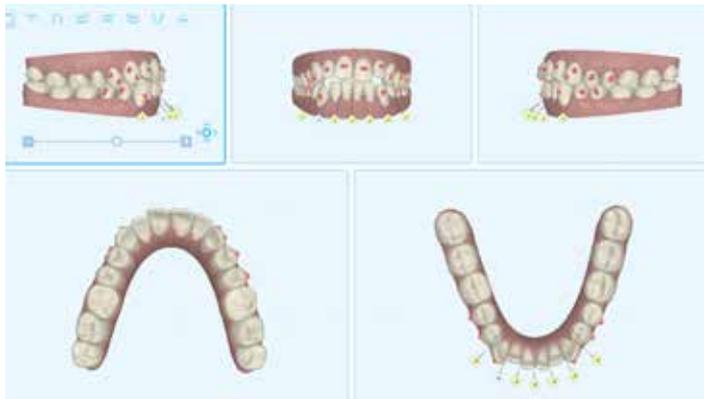


FIGURE 2. Case 1. Initial ClinCheck view.

Treatment outcome

All of the treatment goals were achieved. Open bite was closed, alignment was achieved in both arches without proclination of the lower incisors, and the smile line was balanced.



FIGURE 3. Case 1. Post-treatment pictures.

Case 2:

Class I, anterior crossbite, moderate crowding, narrow arches.

Patient initials: S.D.
Sex: Female
Age: 27



FIGURE 4. Case 2. Pre-treatment pictures.

Presenting complaint: “I worry about my bottom teeth: they are too crowded.”

Clinical history and aetiology: The patient presented in good health and was dentally stable. Upon examination, sound restorations on several teeth due to previous caries were noticed.

Clinical findings

- **Dental:** Bilateral Class I molar and canine relationship. Normal overbite and overjet, crossbite of 1.2-4.2 with gingival recession at 4.2. Midlines coincident with the face and with each other. Moderate upper and lower crowding. Narrow arches. Analysis of the tooth size discrepancy revealed a mandibular excess of 1.23 mm. Cephalometrically the upper incisors are retroclined.
- **Skeletal Pattern:** Class I.
- **Facial:** Harmonious Profile. Facial thirds proportional.
- **Functional:** No problems with TMJ or opening.

Treatment Goals

The treatment goals for this patient are mainly to correct cross-bite 1.2-4.2 and to solve crowding.

Treatment approach

The space needed to resolve the crowding was created by posterior expansion and IPR. Proclination was avoided to prevent recession in 4.2.

Treatment plan

1. Gingival grafting at 4.2 was recommended post-treatment due to recession. Proclination was avoided to prevent recession.
2. Expansion and IPR was performed from the beginning.
3. Premolar and maxillary molar expansion was performed only by means of the buccal tipping of the crowns until upright.
4. IPR to offset Bolton’s discrepancy and to improve black triangle 2.1-2.2.
5. Bite ramps were requested.

Treatment details

- Total treatment time: 9 months.
- Number of aligners: 18 aligners +11 additional aligners.
- Aligner wear time: aligners were changed every 7 days .
- Number of appointments:
 - Regular appointments: 16. Monitoring appointments every 8-10 weeks
 - Emergency appointments: 0
- Attachments and other features: Optimized attachments and Power Ridges were placed by the system for improved tooth movement. Bite ramps were requested.
- Auxiliaries: Buttons and elastics (4.5 oz, 3/16”) were used to extrude left lateral incisor in the second phase of the treatment. The patient was instructed to use the elastics 24h.
- IPR: IPR was performed to resolve crowding, to offset Bolton’s discrepancy and to improve black triangle between left central and lateral incisors.
- Retention: fixed lingual retainer from canine to canine, and removable retention in both arches.

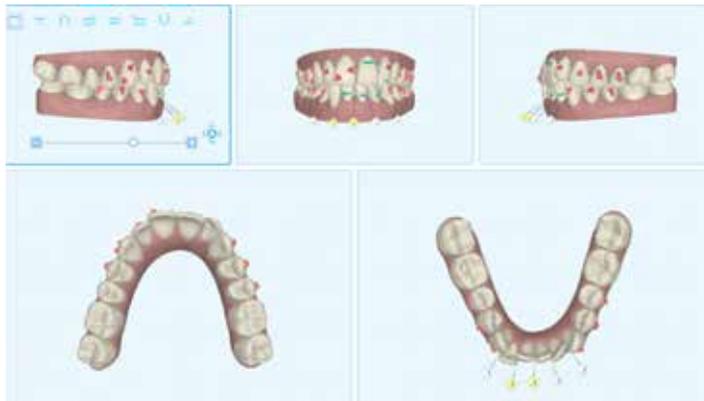


FIGURE 5. Case 2. ClinCheck view.

Treatment outcome

All treatment goals were achieved, and even the torque of 4.2 was improved to a final good position for subsequent grafting.



FIGURE 6. Case 2. Post-treatment pictures.

Case 3: Class II, midline shift, severe crowding.

Patient initials: A.O.
Sex: Female
Age: 46



FIGURE 7. Case 3. Pre-treatment pictures.

Presenting complaint: "I have very uneven teeth. I want to improve my smile."

Clinical history and aetiology: The patient was in good health on first examination. She had several restorations due to previous carious lesions and the retained roots of 1.6. 4.6 is also missing. 3.6 has a partial provisional restoration with total loss of the mesial cusp. Definitive restoration is delayed until completion of Invisalign treatment.

Clinical findings

- **Dental:** Bilateral class II molars and canines. Increased overbite and overjet. Upper midline deviated to the right of the patient. Severe upper crowding. Cephalometrically the upper central incisors are retroclined and the upper lateral incisors proclined.
- **Skeletal pattern:** Class II.
- **Facial:** Profile with slight mandibular retrusion. Lower facial third increased.
- **Functional:** No problems with TMJ or opening.

Treatment Goals

The treatment goals for this patient are primarily to correct severe upper crowding as well as full bilateral class II and to improve midline centering.

Treatment approach

Frontal alignment simultaneous to distalization. Posterior expansion planned from the beginning. The radicular remains of 1.6 were removed. After the treatment an implant will be placed in 1.6, and 3.6 will be restored.

Treatment plan

1. The anterior alignment was performed at the same time as the distalization.
2. A temporary anchorage device (TAD) was placed in the upper right quadrant to reinforce anchorage.
3. Expansion of maxillary premolars and molars by the buccal inclination of the crowns until upright.
4. Precision bite ramps on upper incisors and conventional bite ramps on the upper canines were requested.

Treatment details

- Total treatment time: 13 months.
- Number of aligners: 28 aligners + 27 additional aligners.
- Aligner wear time: aligners were changed every 7 days.
- Number of appointments:
 - Regular appointments: 14. Monitoring appointments every 8-10 weeks
 - Emergency appointments: 0
- Attachments and other features: optimized attachments and Power Ridges were placed by the system for improved tooth movements. Bite ramps were prescribed for upper incisors and canines.
- Auxiliaries: Class II elastics (6 oz, 1/4") from canines to molars. The patient was instructed to use the elastics 24h.
- IPR: IPR was performed to create space to resolve the crowding.
- Retention: fixed lingual retainer from canine to canine, and removable retention in both arches.



FIGURE 8. Case 3 IClinCheck view.

Treatment outcome

The alignment of both arches was achieved, in addition to the correction of the class II relationship, pending the implant for 1.6. Midline shift as well as increased overbite and overjet were corrected, without significant modification of incisors inclination.



FIGURE 9. Case 3. Post-treatment pictures. After reconstruction of 3.6.

Case 4:

Class II, crowding, narrow arches.

Patient initials: I.G.
 Sex: Female
 Age: 38



FIGURE 10. Case 4. Pre-treatment pictures.

Presenting complaint: “My front teeth are crooked.”

Clinical history and aetiology: The patient was in good health on first examination. She presented with several sound restorations and root fillings due to previous caries in addition to multiple gingival recessions which were more severe in the upper arch.

Clinical findings

- **Dental:** Bilateral class II molar and canine. Increased overbite and overjet. Mid-lines coincident with the face and with each other. Moderate upper and lower crowding. Lower curve of Spee increased. Narrow arches with gingival recession. Moderate gummy smile. Cephalometrically upper and lower incisors are proclined.
- **Skeletal pattern:** Class II.
- **Facial:** Profile with retrusive jaw. Lower facial third raised. Lip incompetence with mouth breathing.
- **Functional:** No problems with TMJ.

Treatment Goals

The treatment goals for this patient are to correct bilateral class II, crowding and narrow arches.

Treatment approach

Class II correction by sequential distalization with elastics for anchorage. IPR was applied in lower incisors to maintain crown angulation whilst providing overjet.

Treatment plan

1. Correction of the bilateral class II by sequential distalization of the upper arch, with elastics for anchorage.
2. IPR was performed in lower incisors to maintain crown angulation whilst providing overjet.
3. 1 mm of posterior expansion per side was performed by means of the buccal tipping of the crowns until upright.
4. Precision bite ramps were requested.

Treatment details

- Total treatment time: 13 months.
- Number of aligners: 27 + 14 additional aligners.
- Aligner wear time: aligners were changed every 7 days in the first phase of the treatment. In the additional aligners phase, aligners were changed every 10 days to reinforce the effect of the elastics.
- Number of appointments:
 - Regular appointments: 14. Monitoring appointments every 8-10 weeks
 - Emergency appointments: 1
- Attachments and other features: optimized attachments and Power Ridges were placed by the system for improved tooth movements.
- Auxiliaries: Class II elastics (6 oz, 1/4") from canines to molars. The patient was instructed to use the elastics 24h.
- IPR: IPR was performed to create space to resolve the crowding.
- Retention: fixed lingual retainer from canine to canine, and removable retention in both arches.



FIGURE 11. Case 4. ClinCheck view.

Treatment outcome

All treatment goals were achieved. Bilateral Class II, crowding and narrow arches were corrected.



FIGURE 12. Case 4. Post-treatment pictures.

Impact of weekly aligner changes

Treatment objectives and clinical results

Excellent patient service and optimal clinical results are the essential foundation in our clinics. With weekly aligner changes we don't see any impact in these two pillars, and our treatment goals and clinical quality are not disrupted by the new aligner wear protocol.

From our experience, weekly aligner change does not reduce the predictability of tooth movements.

However, for certain very specific situations we still ask the patient to use the aligners more than 7 days at specific stages of the treatment, as shown in Case 4 of this case series to reinforce the effect of the elastics.

Aligner changes every 7 days did not impact the stability after treatment. The cases presented in this publication were monitored 6 months after treatment and both occlusal and periodontal status were stable in all cases, same as with our 2-weeks wear treatments.

Treatment monitoring

With weekly aligner changes we continue scheduling **monitoring appointments every 8-10 weeks, as we did with 2-weeks wear.** This is a big benefit for us because **with half number of visits we can end the treatment with the same good clinical result.** And this has allowed us to treat some patients who live abroad, with total confidence.

Patient motivation and compliance

Interestingly, changing the aligners every 7 days is highly motivating for patients and has a direct and positive impact in compliance. Longer treatment times may lead to patients less willing to use additional aligners to refine the treatment and get the perfect results we aim for.

With weekly aligner changes we have motivated patients happy to get additional aligners for a perfect result.

Patient experience

Within the orthodontic community there is a growing interest in assessing not only the clinical results but also the impact of orthodontic treatments in patient's experience. I see this more and more often in medical publications (Fujiyama 2012, Salish 2014, Azaripour et al 2015), which is a consequence of the increasing awareness of the importance of this aspect as an essential element in the overall success of any orthodontic treatment.

In my experience, changing aligners every 7 days instead of every 2 weeks, has a very positive impact in patients. **Patients treated with Invisalign aligners and weekly aligner changes reported to have experienced an easy and comfortable treatment that is fully compatible with their lifestyle.** I feel confident that as patients share this positive experience with friends and family, this will translate into more patients coming to my practice asking for the possibility of being treated with the Invisalign System.

Practice efficiency

After incorporating the weekly aligner changes we have increased by 150% the number of Invisalign patients compared to 2 weeks-wear.

The duration of each appointment is the same as with 2-weeks wear. However, the number of appointments per patient has been reduced up to half with weekly aligner changes.

Despite the significant growth in number of patients, an increase in the opening hours or the headcounts was not needed. This has positively impacted the profitability in our practice – **with the same resources we have been able to treat more patients without compromising the quality of our service and the good clinical results.**

Conclusion

Weekly changes proved to be reliable and also effective in different types of malocclusions as demonstrated in the cases shown in this publication. Same as with 2-weeks aligner changes, proper monitoring of each case is essential to achieve good clinical results, wearing the Invisalign aligners 22 hours a day is essential, and the use of chewies twice a day for 10 minutes may be of benefit. As with any orthodontic technique, for certain cases special conditions might be needed such as wearing the aligners for more than 7 days at certain stages of the treatment as shown in Case 4 to reinforce the effect of the elastics.

In our practice, a reduction of up to 50% in total treatment time was associated to weekly aligner changes. The incorporation of weekly aligner changes and the shorter total treatment time led to an improved practice efficiency and positive patient experience, without compromising the quality of our service and the good clinical outcomes.

References

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Align Technology BV
Arlandaweg 161,
1043 HS Amsterdam
The Netherlands
Other (English): +31 (0)20 586 3615
www.invisalign.eu

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