

# Advanced Aligner Orthodontics

Ojima Kenji

Director, Smile Innovation  
Orthodontics, Tokyo, Japan

## Abstract

Invisalign initially had limitations which have now been overcome. Advances in the quality of aligner materials, attachments and the introduction of a new force system, have expanded the range of treatment possibilities from severe crowding to more difficult extraction cases, open bite cases, and lower molar distalization cases.

**Key words:** AcceleDent, accelerate orthodontics, aligner, aligner orthodontics, craniomandibular dysfunction, extraction orthodontics, Invisalign, midline shift, open bite, orthopulse, temporomandibular disorder

In recent years, adult patients have demanded inconspicuous orthodontic appliances.<sup>[1-7]</sup> Even with aligner therapy, one of the greatest sources of dissatisfaction among adult patients remains the length of treatment. This article describes three patients with difficult malocclusions. The first case is a four premolar extraction treatment. The second case is a Class III case treated with lower molar distalization. The last case is a patient with an anterior open bite.

## CASE 1: ANTERIOR CROWDING +ACCELENT

This 25-year-old female had a chief complaint of anterior crowding and a highly placed canine [Figure 1].<sup>[8-11]</sup> We planned four premolar extractions and used Invisalign aligner treatment with elastics.

After extraction, we started retraction of canines and leveling of the full arch at the same time [Figures 2-5].



Figure 1: Initial clinical check

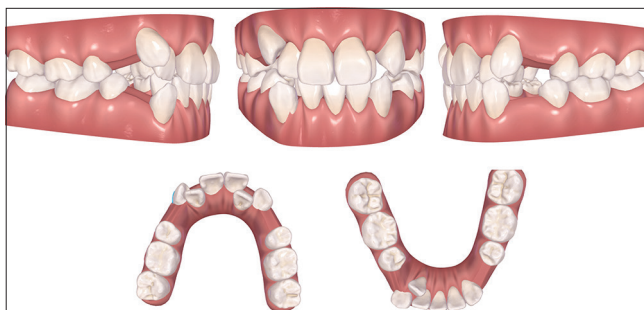


Figure 2: Initial clinical check

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Access this article online	
Quick Response Code:	Website: www.apospublications.com
	DOI: 10.4103/apos.apos_29_17

### Address for Correspondence:

Dr. Ojima Kenji,  
2-39-5-2F Hongo Bunko-ku, Tokio, Japan.  
E-mail: kenjiman2007@yahoo.co.jp

**How to cite this article:** Kenji O. Advanced aligner orthodontics. APOS Trends Orthod 2017;7:69-72.

This case used an acceleration device AcceleDent<sup>[12-18]</sup> everyday for 20 min per day at home. Aligners were changed every 5 days

Finally, we obtained space closure and functional guidance.

Treatment time was 18 months for this case [Figure 6].

### CASE 2 - INVISALIGN + TEMPORARY ANCHORAGE DEVICES, LOWER MOLAR DISTALIZATION

A 25-year-old male presented with a chief complaint of anterior open bite and Class III<sup>[19-21]</sup> relationship with a midline shift to right [Figure 7]. We placed temporary anchorage devices in the mandibular arch and used elastics.



Figure 3: First aligner set post four premolar extraction

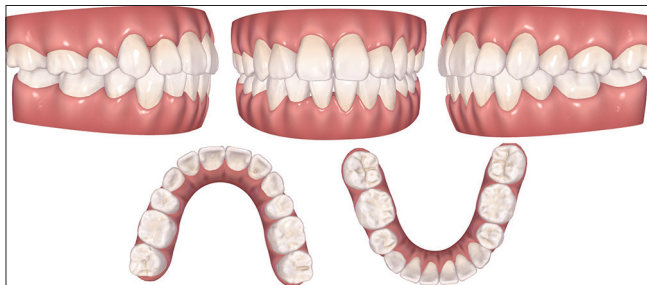


Figure 5: Final clinical check



Figure 7: Initial oral

This case used acceleration device AcceleDent everyday for 20 min per day at home. Then, aligners were changed every 5 days. Finally, we improved functional guidance, over bite, overjet, and attained a Class I relationship between canine and molars. Treatment time was 18 months for this case [Figures 7-13].

### CASE 3 - OPEN BITE+ACCELERATION

A 40-year-old female presented with a chief complaint of anterior open bite and crowding [Figure 14]. She used Invisalign aligners. Normal Invisalign protocol needed 46 aligners.

However we combined Orthopulse,<sup>[22]</sup> an acceleration device, that allowed the patient to change aligners every 3 days. Orthopulse was used 10 min per day at home. This treatment finished in 6 months (compared to 23 it would have taken with conventional mechanics) [Figures 14-20].

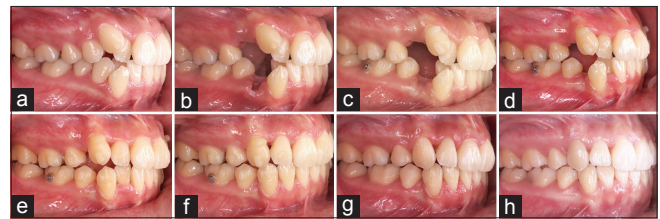


Figure 4: Case 1 treatment procedure (a) Initial (b) Postextraction (c) Attachment (d) Start retraction (e) Anterior retraction (f) Torque (g) Detail (h) Final



Figure 6: Final



Figure 8: Cephalogram and orthopantomogram

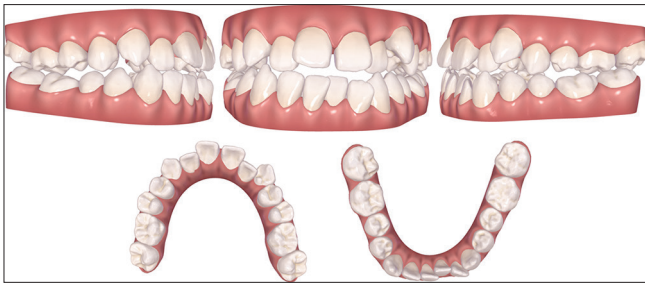


Figure 9: Initial clinical check



Figure 10: First aligner set



Figure 11: Treatment procedure

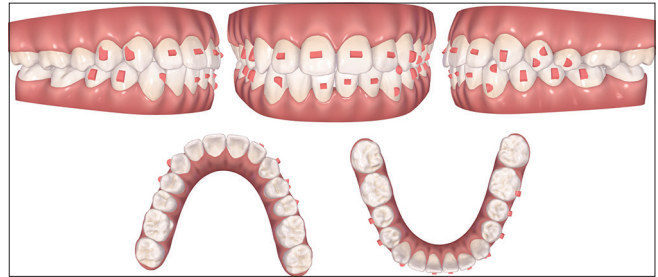


Figure 12: Final clinical check

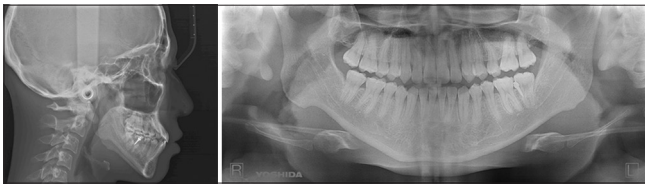


Figure 13a: Cephalogram and orthopantomogram



Figure 13b: Final



Figure 14: Initial oral



Figure 15: Aligner set with attachment



Figure 16: Good Aligner fit during treatment

## CONCLUSION

Aligners are not only comfortable and esthetically pleasing to adult patients but, they are easily removed and hygienic. In

future, aligners are likely to be used in even more complex cases involving rotations, open bites, and four premolar extractions and lower molar extractions.

Further clinical investigations are needed into the effects of accelerated tooth movement in such cases.



Figure 17: Final oral

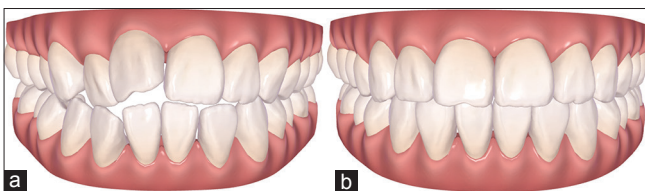


Figure 18: Clinical check (a) initial and (b) final

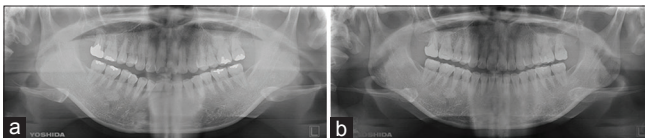


Figure 19: (a) Initial and (b) final orthopantomogram

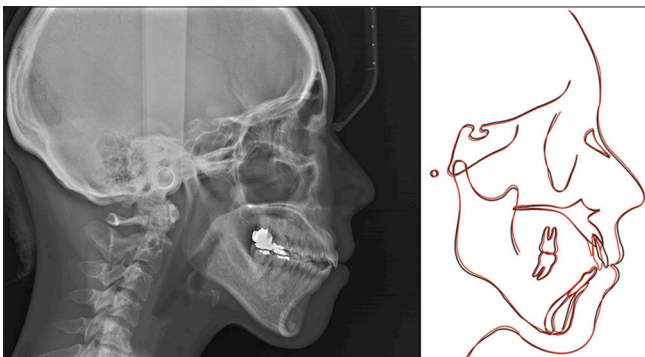


Figure 20: Initial and final superposition

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### REFERENCES

1. Vlaskalic V, Boyd R. Orthodontic treatment of a mildly crowded malocclusion using the Invisalign system. *Aust Orthod J* 2001;17:41-6.
2. Boyd RL, Miller RJ, Vlaskalic V. The Invisalign system in adult orthodontics: Mild crowding and space closure cases. *J Clin Orthod* 2000;34:203-12.
3. Giancotti A, Di Girolamo R. Treatment of severe maxillary crowding using Invisalign and fixed appliances. *J Clin Orthod* 2009;43:583-9.
4. Schupp W, Haubrich J, Neumann I. Treatment of anterior open bite with the Invisalign system. *J Clin Orthod* 2010;44:501-7.
5. Guarneri MP, Oliverio T, Silvestre I, Lombardo L, Siciliani G. Open bite treatment using clear aligners. *Angle Orthod* 2013;83:913-9.
6. Krieger E, Seiferth J, Marinello I, Jung BA, Wriedt S, Jacobs C, *et al.* Invisalign® treatment in the anterior region: Were the predicted tooth movements achieved? *J Orofac Orthop* 2012;73:365-76.
7. Giancotti A, Farina A. Treatment of collapsed arches using the Invisalign system. *J Clin Orthod* 2010;44:416-25.
8. Fiorillo G, Festa F, Grassi C. Upper canine extractions in adult cases with unusual malocclusions. *J Clin Orthod* 2012;46:102-10.
9. Womack WR. Four-premolar extraction treatment with Invisalign. *J Clin Orthod* 2006;40:493-500.
10. Hönn M, Göz G. A premolar extraction case using the Invisalign system. *J Orofac Orthop* 2006;67:385-94.
11. Giancotti A, Greco M, Mampieri G. Extraction treatment using Invisalign technique. *Prog Orthod* 2006;7:32-43.
12. Kau CH. A radiographic analysis of tooth morphology following the use of a novel cyclical force device in orthodontics. *Head Face Med* 2011;7:14.
13. Kau CH. A novel device in orthodontics. *Aesthet Dent Today* 2009;3:42-3.
14. Kau CH, Nguyen JT, English JD. The clinical evaluation of a novel cyclical force generating device in orthodontics. *Orthod Pract* 2010;1:43-4.
15. Nishimura M, Chiba M, Ohashi T, Sato M, Shimizu Y, Igarashi K, *et al.* Periodontal tissue activation by vibration: Intermittent stimulation by resonance vibration accelerates experimental tooth movement in rats. *Am J Orthod* 2008;133:572-83.
16. Werner A. Acceleration by vibration. *Orthod Prod* 2011;30-1.
17. Miles P, Smith H, Weyant R, Rinchuse DJ. The effects of a vibrational appliance on tooth movement and patient discomfort: A prospective randomised clinical trial. *Aust Orthod J* 2012;28:213-8.
18. Darendeliler MA, Zea A, Shen G, Zoellner H. Effects of pulsed electromagnetic field vibration on tooth movement induced by magnetic and mechanical forces: A preliminary study. *Aust Dent J* 2007;52:282-7.
19. Fischer K. Invisalign treatment of dental class II malocclusions without auxiliaries. *J Clin Orthod* 2010;44:665-72.
20. Schupp W, Haubrich J, Neumann I. Class II correction with the Invisalign system. *J Clin Orthod* 2010;44:28-35.
21. Lin JC, Tsai SJ, Liou EJ, Bowman SJ. Treatment of challenging malocclusions with Invisalign and miniscrew anchorage. *J Clin Orthod* 2014;48:23-36.
22. Ojima K, Dan C, Kumagai Y, Schupp W. Invisalign treatment accelerated by photobiomodulation. *J Clin Orthod* 2016;50:309-17.