Treating Deep Overbite and Moderate Crowding with the Invisalign System
The patient, a female middle school student, was 11 years of age at the time of first presentation. The patient’s main concern was in relation to her asymmetrical dentition. She wished to undergo treatment with a bracketless and transparent device for aesthetic reasons.

I. Intra- and extra-oral images before treatment

Pre-Treatment

Clinical presentation
The patient presented with malaligned teeth, a deep overbite and moderate crowding in the upper and lower dentitions.

II. Panoramic radiograph before treatment

III. Cephalometric radiograph before treatment
Clinical findings

- Skeletal Class I malocclusion; average growth type.
- Class I molar relationship.
- Mixed dentition stage with deciduous tooth 65.
- Overjet of 4 mm and deep overbite of 5 mm.
- Teeth 12 and 43 in crossbite.
- Teeth 14 and 44 in scissor bite.
- Moderate upper and lower crowding.
- Depth of the curve of Spee: 3 mm.

Treatment goals

- Maintain the Class I molar relationship.
- Obtain normal overjet and overbite.
- Relieve upper and lower crowding.
- Align the dentition by correcting the malaligned teeth.
- Level the curve of Spee.

Treatment approach

The patient was recommended treatment with the Invisalign System across two phases of treatment.

Phase 1
The goals of the first phase were to maintain the current position of the molars, relieve crowding through preservation of the Leeway space, as well as to correct the deep overbite, level the curve of Spee and open the occlusion by intruding the mandibular anterior teeth whilst elevating the posterior ones. Polyvinyl siloxane (PVS) impressions were taken for development of the ClinCheck treatment plan and treatment with the aligners commenced when 25 permanent teeth were erupted and their gaps subsequently closed. Aligners were changed every 2 weeks and follow-ups were conducted every 2 months from the initiation of treatment.

Phase 2
The goals of the second phase of treatment were to continue to open the occlusion and continue to align the teeth. Crowding was further relieved through interproximal reduction (IPR), as well as protrusion and palatal expansion of both the upper and lower anterior teeth. The aim was to achieve normal overjet and overbite. Aligners were changed every 2 weeks with follow-ups being conducted every 2 months. A refinement phase was not required.

Retention

Transparent Wrap Around retainers were worn throughout the day for 2 years.

Treatment outcome

At the completion of treatment, normal overjet and overbite were achieved, the curve of Spee was levelled and the occlusion opened. The crowding was also relieved through a combination of methods, including preservation of the Leeway space and IPR. The Class I molar relationship was maintained and the malaligned teeth corrected, resulting in a symmetrical dentition. The patient was satisfied with the treatment outcome.

Clinical tips

- Treatment for this patient lasted 26 months on account of extra time spent waiting for eruption of the deciduous tooth 65. In general, one would expect treatment with the Invisalign System to be of a longer duration for patients presenting at the mixed dentition stage.
- The Leeway space may be leveraged for patients starting treatment at the mixed dentition stage to help relieve anterior crowding. This can reduce the amount

IV. Intra- and extra-oral images after treatment
of IPR and anterior protrusion required, helping to maintain the patient’s lip profile. Additionally, Invisalign aligners can stabilise the positions of molars by taking advantage of the Leeway space without affecting eruption of the succedaneous permanent teeth.

- It is recommended to avoid IPR during the first phase of a two-phase treatment plan for patients presenting at the mixed dentition stage, especially when crowding can be partially relieved through preservation of the Leeway space. IPR should only be conducted when all succedaneous permanent teeth are erupted, which usually occurs in the second phase of treatment. Additionally, the decision to use IPR should be made after certain characteristics of the dentition are taken into consideration, such as the Bolton ratio, intensity of crowding and the overjet and overbite.

**Impact on clinical practice**

This case shows that treatment with the Invisalign System during the mixed dentition stage enables use of the Leeway space to the patient’s advantage, without affecting eruption of the succedaneous permanent teeth. The favourable outcomes of this case clearly demonstrate that the Invisalign System is effective in paediatric patients starting treatment at the mixed dentition stage.

**Conclusion**

At the time of presentation, the patient was at the mixed dentition stage and had a deep overbite, moderate crowding in the upper and lower dentitions and malaligned teeth. Treatment was recommended with the Invisalign System and all the treatment goals were met at the completion of treatment. Crowding was relieved through a combination of preservation of the Leeway space, IPR and protrusion and palatal expansion of the anterior teeth. The deep overbite was corrected by intruding the mandibular anterior teeth and elongating the posterior teeth. This case demonstrates that the Invisalign System is an effective and reliable treatment choice for paediatric patients at the mixed dentition stage.

**Author disclosure**

Professor Li Xiaobing was provided an honorarium from Align Technology, Inc., for his contribution towards the creation of this case report.

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Li Xiaobing completed his Bachelor of Dental Surgery and PhD in Oral Medicine at the West China University of Medical Sciences, Sichuan University, China. He has also obtained Membership in Orthodontics from the Royal College of Surgeons of Edinburgh.

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