Clinical limitations of invisible orthodontics and related responsibilities: a case report

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Abstract

Invisible orthodontics, primarily represented by clear aligners, has introduced an aesthetic and minimally invasive approach to managing malocclusions. However, complex cases present significant challenges that require careful planning and strict clinical control to achieve optimal results. This report describes three clinical instances in which the exclusive use of clear aligners allowed for addressing complex orthodontic issues. The clinician must take responsibility for surpassing the limits suggested by the technicians who virtually design the clinical case, customizing the treatment to ensure optimal functional and aesthetic outcomes.

Keywords: invisible orthodontics, clear aligners, clinical limitations

Introduction

Invisible orthodontics, mainly using clear aligners, have been on the market for over twenty years. This method has revolutionized orthodontic treatment from a mechanical and therapeutic management perspective by offering aesthetic and minimally invasive solutions (1). However, this method presents inherent limitations that require careful clinical consideration to achieve optimal results. This case report presents three clinical cases in which the limitations of invisible orthodontics were overcome and highlights the clinical responsibilities necessary to manage these cases effectively.

After seven visits with as many specialists as possible, a 52-year-old patient came to our attention. The patient aimed to resolve severe lower crowding by recovering the 4.1 element without performing extractions (2).

Correcting a deep bite and severe lower dental crowding was addressed through the exclusive use of clear aligners. The main challenge involved the recovery of a completely lingualized lower incisor and managing the deep bite (3), both significant issues requiring a targeted and precise approach. The treatment lasted 11 months. Clear aligners played a fundamental role in correcting the deep bite. These devices create a physical thickness between the dental arches, facilitating the repositioning of the teeth and contributing to opening the bite. During the treatment, the thickness of the aligners prevents the complete closure of the deep bite, inducing a gradual change in the patient's occlusion (4). As the treatment progresses and the aligners are replaced, the interocclusal height progressively increases, helping to elevate the bite. This approach allowed for the alignment of the teeth, opening of the anterior bite, and improvement of masticatory function (5). **T**he lower dental crowding, accentuated

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CLINICAL CASE N. 1:

by a completely lingualized lower incisor 4.1, was managed through a treatment plan that combined lower arch expansion with interproximal stripping (6). The arch expansion was achieved through the gentle and continuous pressure exerted by the aligners, which gradually increased the available space for the teeth.
On the other hand, interproximal stripping was used in strategic areas to align crowded teeth without dental extractions (3) effectively. In conclusion, this clinical case highlights how a minimally invasive orthodontic treatment based solely on clear aligners can successfully resolve even complex cases such as deep bites and severe dental crowding. The key to success lies in a carefully designed treatment plan that leverages the aligners' ability to modify the vertical dimension of the occlusion and expand the dental arch to achieve optimal results.
This clinical case 2 involves a 23-year-old patient who previously underwent 6 years of treatment with traditional braces (7) during adolescence. It represents relapse therapy, a complex orthodontic treatment performed solely with clear aligners. This

CLINICAL CASE N. 2:

treatment addresses multiple issues in upper and lower arches, such as severe lateral-posterior contraction and crowding.

The treatment required significant transverse dentoalveolar expansion in the upper arch to correct the shape of the highly contracted arch. Only clear aligners were used to achieve this gradual expansion, increasing the upper arch's width. Additionally, the patient had a deep bite, which was managed by utilizing the aligners' ability to provide additional thickness between the teeth, promoting the opening of the bite.

The patient presented with severe rotations in the lower arch, notably 3.3 and 4.3, and significant crowding. Clear aligners were used to derotate the teeth and align them correctly within the arch. Lower arch expansion and moderate IPR (Interproximal Reduction) further supported the management of crowding, allowing for a more uniform distribution of the teeth and improving both the aesthetics and overall functionality of the smile (8).

The treatment demonstrated the effectiveness of clear aligners even in borderline cases, where the combination of transverse expansion and correction of severe rotations led to optimal results, improving both the patient's occlusion and dental aesthetics. The valuable aid of a well-planned stripping process proved successful in achieving the desired outcome within a timeframe of less than 12 months.

A 38-year-old patient was previously treated for periodontal issues and with traditional orthodontic therapy for 4 years.

The presented clinical case involves a patient with a complex condition following a significant relapse who was treated exclusively with clear aligners. The main issues included diastemas, a lateral incisor tooth 1.2 in cross-bite, compromised dental alignment, severe overjet, crowns on tooth 2.1, and the absence of tooth 1.6 in the upper arch and tooth 4.6 in the lower arch. Additionally, the lower arch exhibited significant misalignment and transverse contraction, with a complete lack of symmetry.

Clear aligners were used to address these issues non-invasively, successfully closing the diastemas, correcting the cross-bite of the lateral incisor 1.2, realigning the present teeth, and improving the overjet. Despite the challenges posed by crowns and the absence of teeth, the careful use of aligners allowed for lower arch expansion and overall occlusal improvement, enabling the prosthodontist to plan a combined treatment with the orthodontist.

The treatment demonstrated that clear aligners can manage even complex cases, confirming their effectiveness in expanding the arches, correcting misalignment, and improving the smile's aesthetics without neglecting the potential and visible therapeutic planning discussed in collaboration between the orthodontist and prosthodontist (9).

Discussion

The use of clear aligners in these three clinical cases highlighted this method's potential advantages and intrinsic limitations. The aligners, designed to apply specific forces on the teeth, showed the ability to expand the dental arches, correct severe rotations, and reduce deep bites through an increase in the vertical dimension of the occlusion. However, managing severe cases requires careful and calculated treatment planning and sometimes integrating other techniques

CLINICAL CASE N. 3:

(10, 11), such as interproximal reduction (IPR), to create the necessary space for proper alignment.

Conclusions

The presented cases confirm that, although invisible orthodontics has intrinsic limitations, as noted by the technical team, with careful planning and a meticulous clinical approach, it is possible to manage even complex cases successfully. The exclusive use of clear aligners has proven effective in correcting severe dental crowding, managing deep bites, and resolving complex misalignments, offering patients a minimally invasive treatment with satisfactory aesthetic results. The key to success lies in the clinician's responsibility to identify and address the limitations of this technique, thereby ensuring high-quality orthodontic treatment.

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