



CASE REPORT

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INVISALIGN® ALIGNERS AS A NEW PERSPECTIVE OF THE CURRENT ORTHODONTICS: CASE REPORT

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ABSTRACT

Introduction: In the last decades, Aesthetic Dentistry has gained great prominence, making the different areas of Dentist Surgeons work in a pattern that, increasingly, praises the beautiful. In orthodontics, during the process of braces evolution, there was a decrease in the use of brackets and orthodontic metallic wires and replacement by aesthetics. Over the last few years, the emergence of invisible aligners has increasingly won over patients for aesthetic characteristics superior to conventional appliances. **Objective:** Given the prominence of new aligner systems, this study aimed to report through a clinical case the orthodontic treatment using the imported aligner system. **Methodology:** This is a documentary research in which clinical data will be collected from a patient treated with Invisalign® aligners (Align Technology, Inc., Santa Clara, California). **Results:** It can be seen that Invisalign® aligners are capable of performing accurate dental movements and are currently effective in correcting various malocclusions. **Conclusion:** Given this report, it is evident that the system of aesthetic aligners has become an alternative to the use of brackets and orthodontic wires, presenting greater comfort and accuracy without reducing the effectiveness of orthodontics in each case.

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INTRODUCTION

Dentistry has developed new therapeutic methods in its various specialties, performing a broader function than healing and health maintenance. In this sense, aesthetics has become increasingly prominent, given the priority and imposition of society on the physical appearance of individuals. Thus, in orthodontics, the often unpleasant appearance of using brackets, whether metallic or ceramic and orthodontic wires have given space to invisible aligners (WHITE et al., 2017). The history of orthodontic appliances has shown that they have been used since BC and their uses have been identified in

Greek and Etruscan societies. Over the years, new materials and techniques have been proposed, highlighting a variety of devices that have been replaced and suited to present times. The most current and dental aesthetic devices available are the Invisalign® system, produced by Align Technology, based in San Jose, California. FALTIN et al. (2002) published that the company was the pioneer in the production of transparent aligning devices, launching in 1999. Since then, braces have evolved a lot and for this reason, it is one of the most advanced systems and features available for orthodontists to offer their patients. This method pioneered the use of an exclusively three-dimensional (3D) digital technology. A series of stages produces successive and precise tooth movements through

computer programs that manipulate virtually 3D images. This system consists of transparent, removable aligners made of plastic material, individually tailored by computer and 3D scanner. This system then reproduces their movements and pressure on the dental elements (FALTIN *et al.*, 2002; ROJAS *et al.*, 2016). The Orthodontist should firstly make molding and obtain an addition silicone mold or by digital scanning, as these aligners are made through them. For its development, studies have shown that the scans are more favorable, considering its high precision, making it easier to obtain a high fidelity model, besides being more comfortable for the patient. The dental aligning plates are then made and every one or two weeks it must be replaced so that the correction and adequacy of the dental elements are effective (Vieira *et al.*, 2013; Yeste *et al.*, 2014; Ojima *et al.*, 2016; Monguilholt *et al.*, 2017). Its indication and use vary according to each case and situation. The literature addresses some situations in which its use may be indicated, such as moderate malocclusion, deep bite, overbite, constricted or atretic arch of non-skeletal origin (Vieira *et al.*, 2013; Calheiros *et al.*, 2014; Maldoti *et al.*, 2014). The advantages of aligners are diverse, among which we can highlight as principal points: aesthetics, due to its transparency, being removable, facilitating the patient's oral hygiene and feeding, comfort, not having cytotoxic activity and an average of 4 months less treatment than conventional mechanics (Acar *et al.*, 2014; Lima *et al.*, 2016; Gu *et al.*, 2017). Despite these advantages, these devices have some limitations, such as impediment of biomechanical control by the professional during orthodontic consultations, an association of attachments made with composite resin and placed on the buccal surface of dental elements, and relatively high cost of treatment for not being produced in Brazil (Srivastava *et al.*, 2017; Pando *et al.*, 2018). Lima *et al.* (2016) report that patients using this dental device may have increased salivary flow and the possibility of speech alteration. Given the peculiarity and possible advantage over orthodontic alternatives, the Invisalign® system has gained emphasis, as well as requiring more studies, addressing this treatment option as a reality and perspective of current orthodontics. In this sense, the objective of the present study was to present, through a clinical case, the use of invisible aligners as an

innovative and efficient technique in orthodontic treatment, at a time in which aesthetics in the most diverse areas have been highlighted.

CASE REPORT

This is paper is documentary research, which will use the data collected in the patient's records and photos. The data were collected during the treatment of a female patient, brunette skin, and 27 years old. The patient reported being chronic asthmatic and having hypocomplementemic urticarial vasculitis, being classified as ASA III. The patient has no drug allergy. She sought the office with the complaint of rotating teeth (canines) and localized diastemas. Clinical examination revealed an absence of third molars, good oral hygiene, Angle Class II 1st division right subdivision, rotated upper and lower canines and diastema between units 33 and 32, 43 and 42 (Figure 1).

As standard procedure, anamnesis, complete clinical and orthodontic examination were performed. Complete orthodontic documentation was requested, consisting of panoramic radiography, profile telerradiography, and cephalometric analysis, models of both arches and extra oral and intraoral photos. Given the analysis of radiographic examinations, no changes in the jaws that prevented orthodontic treatment were observed. During the return visit, the patient selected, among the treatment options offered, the treatment through Invisalign® aligners. For this reason, the addition of silicone molding was also performed for sending to Align Technology and making the virtual set up, called ClinCheck. Nineteen aligners were approved at the first moment of treatment, with monthly consultations. The aligners were changed every 15 days, with daily use of 22 hours. However, after the last dental plate, during the clinical examination was observed a slight rotation of the element 13 which was aesthetically unpleasant. The patient was not satisfied yet. Alignment and leveling of the arches were obtained but as it was not enough to correct the canine rotation at the first moment, a scan, and new intraoral and extra oral photos were sent to Invisalign® (Figure 2). ClinCheck has been approved with 11 additional aligners to finalize the case.



Figure 1. Initial extraoral and intraoral photos

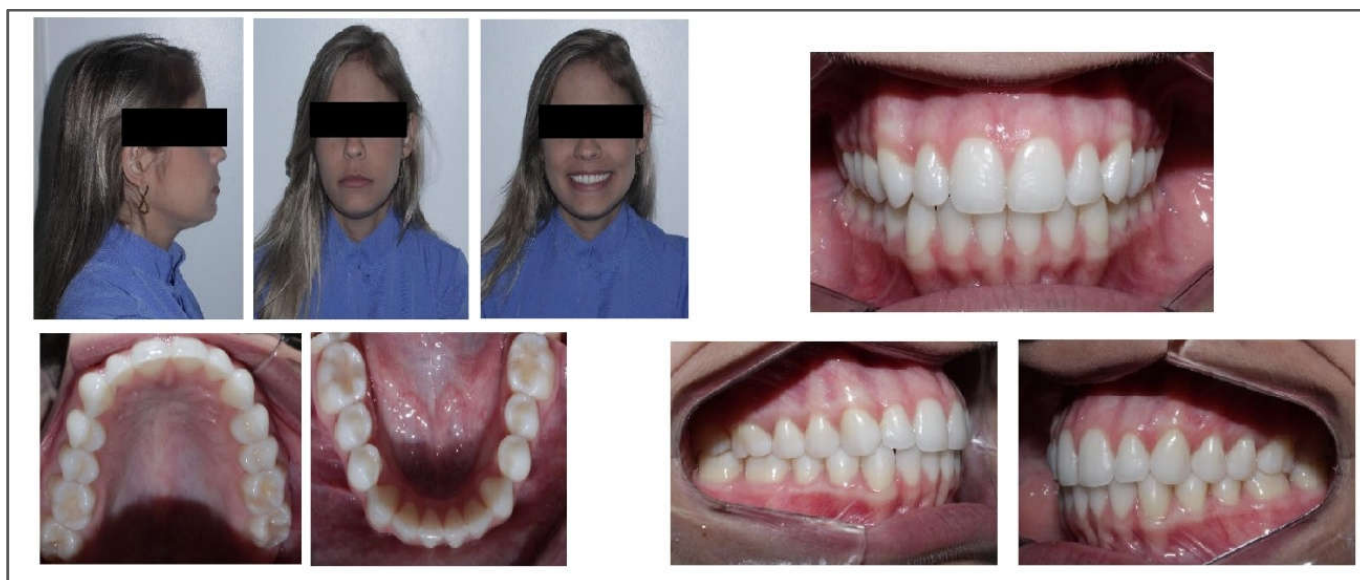


Figure 2. Extraoral and intraoral intermediate photos



Figure 3. Extraoral and intraoral final photos

The aligners were changed every 7 days, considering that it was the new protocol proposed by Invisalign®, with monthly appointments. At the end of aligner 11, the final result was obtained as expected (Figure 3).

DISCUSSION

Smile, as the oldest means of communication, has a strong impact on individuals' lives and can affect their personal, social and even professional lives. Given its importance, this has gained prominence in several recent studies in the literature, such as de Souza *et al.* (2019), in which it was observed that, in addition to dental professionals and students in the field, dental aesthetics has also stood out among laypeople. This condition has made this audience increasingly observant and demanding concerning the theme, thus emerging the concept of Aesthetic Dentistry. This practice intends to reestablish function during treatment, thereby restoring facial harmony (Lima *et al.*, 2016; Papadimitriou *et al.*, 2018). With the great importance of the smile, the patient

reported in this case said she was dissatisfied with some details that she found inharmonious in her smile. To solve the case, a therapy with great support in the literature, which is Orthodontics, was elected. Azaripour *et al.* (2015) e Alessandra *et al.* (2018) claim in their work that with dental aesthetics on the rise, the use of orthodontic appliances has become a challenge, as the market has increasingly demanded aesthetic products such as aesthetic or lingual brackets and the Invisalign® system. This aligning system, which involves the use of a set of removable dental plates, serves as a valid alternative for orthodontics to fixed treatments. The use of these aligners has been in increasing demand in recent years due to their positive response to aesthetics, proper movement, and lower risk of gingivitis, caries or periodontal disease risks. Besides, there is no need for a dietary restriction, more comfort, movement accuracy and shorter treatment time (Takehara *et al.*, 2013; Monguilholt and Zanardi, 2017; Kumar *et al.*, 2018). All these points were essential to the choice of treatment by the patient reported in this case, thus facilitating its acceptance by orthodontic therapy. Despite its many

advantages, this aligning system has some conditions that can be disadvantageous in its use. Among these situations, some studies highlight the limited control of movements, making its use in some clinical cases unfeasible. They also have limited intermaxillary corrections in some cases of skeletal discrepancies, lack of direct orthodontist control during the treatment, as this therapy is highly dependent on patient disposition, need for specific and costly documentation, need for use for at least 22 hours daily. (Neves *et al.*, 2012; Monguilholt; Zanardi, 2017). Monguilholt e Zanardi (2017) also consider as disadvantage the high cost of therapy. The use of Invisalign® also proves to be a very useful resource in several areas of dentistry, which are the scanner and digitalization systems of the case. In orthodontics, digital planning favors the application of cephalometric and aesthetic concepts, providing adequate and efficient individual planning (Davis, 2007). However, the use of this system makes the treatment more expensive, as digital molding is not yet so close and easily accessible, especially in smaller cities (Carmadella *et al.*, 2014). Invisible aligner systems may sometimes require accessory devices called attachments.

These are lumps of composite resin adhered to the dental surface (Monguilholy and Zanardi, 2017). Josell e Slegel (2007) consider that attachments are placed so that aid in aligner retention, intrusion, rotation, space closure and verticalization occurs. Kravitz *et al.* (2008) e Neves *et al.* (2012) claim that these resin devices can assist by allowing for greater control of tooth rotation, tilt, intrusion and extrusion as they promote additional mechanical retention. Attachments, while significantly assisting in orthodontic movement, promote disadvantages, as they are an extra volume to the dental element, ceasing to be more aesthetic, especially for those patients who have high aesthetic criteria (Monguilholy; Zanardi, 2017). This situation was a complaint of the patient of this report due to the presence in the anterior superior region. Also, another condition inherent in resin composites, pigmentation, interfered especially with the diet which was with high dye contents (Oliveira *et al.*, 2019). As discussed, therapy with these aligners is performed through aligner changes. In the patient in this report, two different moments were performed. At first, as recommended by some authors, plate changes were performed every 15 days. However, some recent studies show that this change between plaques and plaques can be performed every 7 days and is selected for the second therapeutic moment of this case (Vieira *et al.*, 2013; Monguilholt and Zanardi, 2017). After the two stages of Invisalign® System therapy, the patient was highly satisfied because she had solved her aesthetic and functional need through highly aesthetic orthodontics, even with the presence of attachments that significantly disturbed her. Thus, the efficiency of aesthetic aligners is evidenced in their functionality and practicality in an era when dental aesthetics is so demanded by patients.

Conclusion

Given the issues addressed, it is evident that there is currently a growing search through patients for dental aesthetics. This situation favored the emergence of orthodontic devices with treatment purposes and favorable maintenance of a dental aesthetic. Therefore, it is inferred that the Invisalign® System is very efficient, especially because it can to correct malocclusions, maintaining a favorable aesthetic, despite some limitations. As it was approached in the clinical case in

question, in which the patient had a high aesthetic requirement, in the end, high satisfaction with the results obtained through the use of the aesthetic aligners system was presented.

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