



## Case Report

# Effectiveness of invisalign aligners in treating an adult with proclined incisors: A case report

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## ABSTRACT

Nowadays aligners have become alternative treatment in adult patients who do not want fixed orthodontic appliance due to various reasons such as aesthetic, easier to care and clean as food also don't get stuck in aligners and patient can smile with confidence with aligners. Present case report demonstrates effectiveness of Clear aligners used to treat an adult female patient with proclination in upper arch having good periodontal condition. Predicted results were achieved with clear aligners as per virtual setup with reduction in proclination and a pleasing facial profile with competent lips within 6 months. Thereby, concluding that invisalign/clear aligners provide esthetic and comfortable option in cases of mild to moderate orthodontic correction even in adults.

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## 1. Introduction

An aesthetic smile is an important aspect of rehabilitation, which involves physical function which is often underestimated. Indeed, nowadays beautiful smile affects perception that people have for themselves, therefore important for interpersonal relations. In this context, orthodontic therapy plays remarkably important role with substantial improvements, not only regarding oral health, but also to quality of life in general.

In 1997, U.S. company Align Tech. introduced new therapeutic method –Invisalign<sup>1,2</sup> that is able to realign elements through a series of removable and invisible dental appliances in transparent polymer.<sup>3,4</sup> Invisalign is new technique that is able to resolve some orthodontic malocclusions without the use of traditional fixed equipment.<sup>1</sup> It favours use of clear, removable

transparent masks that represent mechanotherapy.<sup>4,5</sup>

The real innovation of methodology is represented by Clin Check, a digital three-dimensional simulation that allows clinicians and patients to see film on computer tracking movements from beginning to end of dental treatment.<sup>2,6</sup>

Invisaligners, made of transparent thermoplastic polymer, allow a tooth movement of 0,15-0,25 mm; they must be worn at least 20 -22 hours a day and have to be replaced every 7-15 days with next aligner.<sup>2,3</sup> At same time removing of these alignments can help to control possibility of daily oral hygiene.

Incorporation of digital technology has revolutionized practice and appliances used in orthodontics. As in other fields of dentistry, CAD-CAM systems have become involved in orthodontics and aligner treatment.<sup>7</sup>

The most complex CAT (Clear Aligner Therapy) appliance currently available is Invisalign – which offers utility of both scan or impression submission, doctor-

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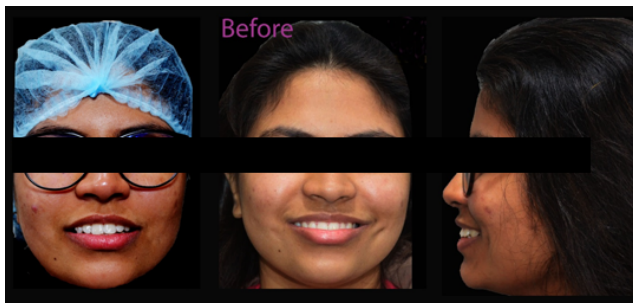
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adjustable (to high degree of detail) computerised treatment plan and appliance design, computerised 3D model manipulation to high level of precision, and pressure-formed tooth-borne aligners which are accompanied by wide range of specifically computer-analysed and designed attachment types, anterior bite ramps and precision cuts and button cut-outs for ease of incorporation of wear of elastics in treatment, and power arms and power ridges for improved axial root control and torque control, respectively. Pressure points are also built into aligners to assist with more difficult uprighting and tooth-intrusion movements.<sup>8</sup>

In present case report we here by present a case of achieving a pleasant smile through invisalign aligners in an adult female with proclined maxillary incisors within 6 months.

## 2. Case Report

A 30-year-old female patient reported with chief complaint of protrusive upper anterior teeth. On intraoral examination, she had proclined maxillary anterior teeth and Extraoral analysis, showed convex facial profile. (Figures 1 and 2 )



**Figure 1:** Pre-operative facial profile photographs

Primary concern of patient was alignment of her upper anterior and her upper right 1<sup>st</sup> premolar was not in occlusion. She was not willing to wear braces because of aesthetics reasons, as she had her wedding in next 6 months. Treatment of 1st premolar was time consuming and complicated.

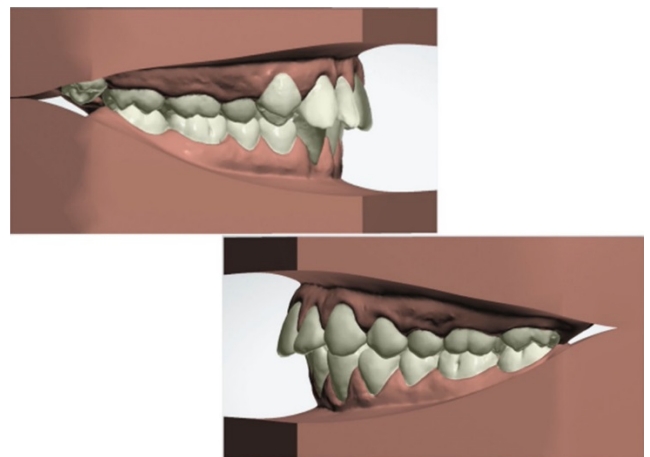
Based on her requirement, we planned for Invisalign clear aligners as our treatment plan. Primary goal was to maintain occlusion and aesthetics. Treatment was explained to patient. It was decided to treat patient with clear aligners as only tipping of anterior teeth was needed without complex tooth movement and to address esthetic concerns of patient. Pre-operative OPG was done to assess condition. Clinical and radiographical examination showed healthy gums and bone which were suitable invisalign treatment.

On next appointment digital impression of both jaw was taken using Sirona Dentsply, digital impression was then assessed. Patient treatment plan came which showed number of aligners to be used and minimum 6 months' time period needed, computer-generated virtual setup developed



**Figure 2:** Pre-operative intraoral photographs

by aligner company was reviewed, modified and accepted. (Figure 3)



**Figure 3:** Computer-generated virtual setup showing reduction in proclination

The available space in upper and lower arch was used to retract proclined upper and lower aligners (U1, L1) were delivered and patient asked to wear it for nearly 22 hours for 1 weeks except while eating. Patient was advised to send her photographs with and without aligners to check for aligner fit, any breakage and treatment progress. On this appointment interproximal reduction was done. The overall treatment duration was 6 months with 14 upper and 14 lower aligners. The final result showed fairly good alignment in upper and lower arches maintain occlusion.

At end of treatment all spaces were closed and the maxillary and mandibular incisors were kept upright, molar

and canine were in classic relationship, lip strain reduced and lip Competency achieved and favourable overbite and overjet was achieved with pleasant smile. (Figure 4)



**Figure 4:** Post-operative facial profile photographs



**Figure 5:** Post-operative intraoral photographs



**Figure 6: A-D:** Patient was highly satisfied and happy with final outcome in just within 6 months.

### 3. Discussion

Smile is oldest means of communication which has strong impact on individuals' lives and affect their personal, social

and professional lives. Given its importance, this has gained prominence in several recent studies in literature, such as de Souza et al. (2019) in which it was observed that, in addition to dental professionals and students in field, dental aesthetics has also stood out among laypeople. This condition has made this audience increasingly observant and demanding concerning theme, thus emerging concept of Aesthetic Dentistry. This practice intends to re-establish function during treatment, thereby restoring facial harmony (Lima et al., 2016; Papadimitriou et al., 2018).<sup>9</sup> With great importance of smile, patient reported in this case said she was dissatisfied with some details that she found inharmonious in her smile. In order to improve her smile, we opted for clear aligners as only tipping was required along with occlusion maintenance with no advanced orthodontic treatment

In recent years orthodontic treatments have evolved and occupied an important space in contemporary orthodontics. In this scenario, invisible aligners have emerged as alternatives to conventional orthodontic appliances in order to provide clinical results similar to metal brackets with aesthetic needs of patient (WEIR, 2017).<sup>10</sup> Here too patient was satisfied with final esthetic outcome.

Clear Aligners have become current generation treatment option for adults wanting to undergo orthodontic tooth correction with aesthetic concerns. However, selection of patient for clear aligner therapy is very crucial and predictable results can be achieved in mild to moderate tooth corrections involving space closure, retraction and decrowding. It is important to compare clinical positions of teeth with virtual setup images after every 4-5 sets of aligners. If comparison is not within 10%, clinician should stop treatment at that point and ask laboratory to deliver a new set of aligners with all necessary corrections incorporated into aligners.<sup>11</sup>

Intraoral scans or PVS impressions are required in Invisalign treatment for a) Preparation of virtual treatment plan b) Modification of the treatment plan or midcourse correction c) Case refinement d) Fabrication of retainers.<sup>2</sup> We too followed with similar protocol in our workplace.

As number of adults treated with clear aligners increased, periodontal effects of this treatment were found to be less in literature.<sup>12-14</sup> Use of clear aligners facilitates oral hygiene, thus improving periodontal status and causing decrease in plaque levels, gingival inflammation, bleeding upon probing, and pocket depth.<sup>15</sup> Fixed appliances and wires make plaque control difficult and had adverse effects on periodontal tissues, making orthodontic treatment a predisposing 4 factor for periodontal diseases. In this case too treatment was uneventful without any effect on periodontal health.

#### 4. Conclusion

Clear aligners provide aesthetic and comfortable option as compare to conventional fixed mechanics as clear aligners help to maintain periodontal health and less white spot lesions develop during the treatment. Clear aligners are usually used in mild to moderate crowding cases but caution must be exercised in complex cases.

#### 5. Source of Funding

None.

#### 6. Conflicts of Interest

None.

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