

## Invisible aligners: The indiscernible forces

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### Abstract

Esthetics play a huge impact on an individual as it has a direct effect on the personality of the person. Facial profile is most commonly affected by eyes, nose, teeth, lips and the skin texture. Basic metal braces have been substituted with ceramic braces and lingual orthodontics. Clear aligners also known as invisible aligners are termed so as they are clear, non-opaque and esthetically acceptable by the patient.

**Keywords:** Invisible aligners, Braces, Esthetics, Orthodontics, Clear aligners.

### Introduction

Esthetics play a huge impact on an individual as it has a direct effect on the personality of the person and can also be termed as show stoppers, as it is the most basic need perceived by any individual around the globe in the current era. The facial profile, dressing sense and the composure of the patient helps to ensemble an attractive personality as the outcome, which makes the individual happy and also helps the person attain a social position in the society.

Facial profile is most commonly affected by eyes, nose, teeth, lips and the skin texture. Other than the teeth, all other features can be corrected within a short period of time. Correction of teeth is the only procedure, which is time consuming in comparison to the other procedures and also it is more non-surgical than surgical procedures.

This time consuming non-surgical procedure would definitely mean the use of appliances over a long period of time, which would give a visual impact and reflect in their appearance. Hence, the patient becomes more conscious and thinks more before getting the treatment done.

Over the years, even though the treatment period has decreased, but it has not diminished to the negligible levels which mimics the patient's expectations of immediate treatment outcome. To encounter such a problem the basic metal braces have been substituted with ceramic braces and lingual orthodontics. However to make it further easy, the advent of clear aligners have certainly taken over all of them at the highest possible level but limited only to certain treatments which are admissible and feasible.

Clear aligners also known as invisible aligners are termed so as they are clear, non-opaque and esthetically acceptable by the patient. Clear aligners represent the fresh era of aesthetic orthodontic treatment and their demand is snowballing at a massive rate owed to its esthetic

compatibility in comparison to those who are conscious of the unaesthetic appeal of the regular orthodontic appliances.

Diagnostic groundwork for working with the invisible aligners is similar to that for treatment with conventional fixed orthodontic appliances; clinicians play a more limited role during treatment with the Invisible appliance.

Although diagnostic preparation for treatment with the Invisible appliance is similar to that for treatment with conventional fixed orthodontic appliances, clinicians play a more restricted part during treatment with the Invisible appliance.

The preparation includes initial assessment, diagnosis, treatment planning and completion of pretreatment records (e.g., panoramic and lateral cephalometric radiographs, bite registration, photos and polyvinyl siloxane impressions), all of which must be sent to Align Technology in California where simulated virtual treatment is formulated by proprietary 3-dimensional CAD-CAM technology. Clinicians then download the virtual treatment set-up from the Internet to evaluate the proposed final positioning of the teeth. Clinicians can request modifications at this time, but once the aligners are made, they cannot alter the appliance during the treatment.<sup>4</sup>

Study models are prepared pre-clinically. With the help of polyvinyl material, impression is done and bite is recorded and then it is sent to laboratory. A well developed technology is used. With the help of highly sophisticated software and 3D scan technology, a virtual patient is created. Also other software like 'Tooth shaper' & 'Autobite tool' is used to identify the shape of the teeth and put them in centric relation.<sup>2</sup>

With the help of other software like Clin Check set-up, diagnosis and treatment planning is done which is also used to evaluate the need for IPR, extraction, expansion,

distalization and proclination. It also show treatment limits to patient as it evaluates the anchorage with superimposition or surgical simulation tools.

Even though invisible aligners are preferred by the patients they cannot be used in all patients due to its limitations. One of the primary limitations for the use of invisible aligners is following premolar extraction for orthodontic purpose. The reason why Invisible appliance is not advisable is because it cannot keep the teeth upright during space closure and also leads to limited movements due to bonded restorative attachments.<sup>1</sup>

The treatment protocol is rather simple for clear aligners and the work carried out in the preparatory phase is outside the mouth rather than inside the mouth. In the initial phase, impressions are recorded to fabricate the cast which represents even the minute details of the teeth and its supporting as well as related structures in the oral cavity. This can be achieved by scanning the structures with a 3D scanner, which will form a virtual 3D model.<sup>2</sup>

The 3D model can then be influenced by the dentist and the problem of malocclusion is approximately treated via the proprietary software as per the requirements. The process consists of fabrication of a set of clear plastic aligners that steadily correct the malocclusion. After the delivery of the aligners to the patient, they are educated to wear the aligner for about 20 hours a day and to replace them with the next set of aligners after every two weeks to month duration.

For each aligner worn a shift of the teeth around 0.25 to 0.3mm is expected.<sup>2</sup>

Clear/Invisible aligners are either fabricated from thermoformed appliances, which is sometimes known as Essix Retainers (RaintreeEssix, Dentsply Corp., York, PA), that are made by making adjustments to the tooth positions on models and fabricate one or more aligners to treat a minor malocclusion. Over the time, advances have taken up a drastic role and commercially available aligners are available.<sup>3</sup>

Essix retainers, lingual orthodontics, Trutain retainers and Invisible appliances are some of the current treatment's that are rapidly taking over the conventional metal brackets for treatment.

They are detachable in nature hence Trutain retainers and Essix retainers are indicated for mild non-skeletal malocclusions. Essix appliances have usually been used as anterior retainers from cuspid to cuspid. They are fabricated from vacuum formed plastic sheets which extend into the gingival undercuts. With minor changes, it can achieve small tooth movements, and provide as temporary bridges and bite planes.<sup>4</sup>

Invisible is one of the most commonly known invisible aligners in the market nowadays. They are fabricated from thin plastic transparent material molded with CAD-CAM laboratory techniques. These aligners are comparable to splints which cover the clinical crowns as well as the marginal gingiva. Each aligner is planned to move the teeth a maximum of about 0.25 to 0.3 mm over a 2-week period. Excellent observance is mandatory as the appliance has to be worn a minimum of 20 to 22 hours a day and each aligner should be worn 400 hours to be effective.

The treatment duration is prolonged as the treatment plan must include the chronological movements for every tooth from starting to end of the treatment. If changes are required once the treatment starts, significant additional span and documentation are required to alter the treatment plan. In addition, the lag time between formulating a treatment plan and inserting the appliance can be up to 2 months.<sup>4</sup>

## Conclusion

In the current scenario, invisible aligners are the most preferred orthodontic treatment that is available in the market. However, the limitations of the invisible aligners and also the high cost of the aligners is a major setback for the patient and also involve self-regulation of the appliance at the recommended treatment interval. Non-compliance of the patient to the instructions given by the clinician and the company is the most common reason for the failure of the treatment process.

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## Conflict of Interest

None.

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