



CLEAR ALIGNERS: THE INVISIBLE SHIELD BOUNTIFUL OF A BEAUTIFUL SMILE

Dr Shashikala S , Dr Naveen Kumar Krishna, Dr Saleem Mohammed,
Dr Nagarathna KN, Dr Manju Prasad and Dr Gaonkar Shivaprasad

Department of Orthodontics and Dentofacial Orthopedics Kgf college of Dental Sciences

ARTICLE INFO

Article History:

Received 13th January, 2019

Received in revised form 11th

February, 2019

Accepted 8th March, 2019

Published online 28th April, 2019

ABSTRACT

Modernisation has not only technologically advanced but also has made an aesthetic impact. Clear aligners are the latest in the Aesthetic Orthodontic treatment approaches used exclusively for adults who are very self-conscious of their appearance during their treatment procedure. They are clear, custom-made, thin, removable plastic aligners which are mostly unnoticed and effectively move the teeth into their preferred position

Key words:

Aesthetics, Aligners, Smile,
Malocclusion.

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INTRODUCTION

A smile can change many things; this is only complete with a bright smile whose credit can be given to good teeth. Modernisation has not only technologically advanced but also has made an aesthetic impact. People have become more self-conscious and they are now more focused on their looks and tend to search for techniques to improve them. Mal-aligned teeth form the critical part when one looks at himself/ herself in the mirror. This reminds oneself of the dentist for smile correction which will in turn change their aesthetic profile.

The conventional technique of correction of mal-aligned teeth with braces and wires still remain the basic treatment protocol. However modernization has revolutionized the demands and needs of the patients further increasing and providing us with the latest technologies to fulfill the same. These include ceramic or composite braces, lingual orthodontics, and clear aligners.¹

Clear aligners are the latest in the Aesthetic Orthodontic treatment approaches used exclusively for adults who are very self-conscious of their appearance during their treatment procedure. They are clear, custom-made, thin, removable plastic aligners which are mostly unnoticed and effectively move the teeth into their preferred position.²

Accurate impressions are taken to allow the construction of precision casts which can be scanned to produce a virtual 3D model, which can then be manipulated by the orthodontist and virtually corrected using proprietary software. Later with the help of the software, a set of clear plastic aligners that

gradually correct the malocclusion is designed and later fabricated as per the design. These are typically worn for a period 20 hours per day with the wearing of the next sequential fabricated prosthesis starting after two weeks. Each aligner will move the teeth around 0.25 to 0.3 mm.^{3,4}

Indications for Invisalign Appliances²

- Crowding (mild) and mal-aligned problems (1-5 mm)
- Spacing problems (1-5 mm)
- Deep overbite (Class II division 2)
- Narrow arches that can be expanded without tipping the teeth too much.
- For absolute intrusion (1 or 2 teeth)
- Lower incisor extraction for severe crowding cases.
- To tip the molar distally

Advantages^{5,6}

- Trays are aesthetic and comfortable
- Absence of metal brackets or wires prevents any tissue laceration.
- The invisible nature allows patients to smile with greater confidence
- Improved oral hygiene than during conventional treatment
- Unlike traditional braces, the trays can be removed for brushing, flossing, and eating.
- Smaller dental appointments.
- Retention facilitated.

*Corresponding author: Dr Shashikala S

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- Decreased occlusal abrasion from parafunctional habits during treatment.
- Less technique sensitive than lingual appliances.
- Treatment duration is decided at the start of the treatment
- Avoids extractions
- Less visits to the dentist
- Healthier periodontal tissue
- Less risk of enamel decalcification by avoiding brackets

The lack of fixity of the braces to the teeth is highly advantageous as they can be removed by the patient whenever required. This gives them the freedom to remove it when they are uncomfortable or when they want to eat sticky food or even have soda. This further helps the patients in brushing and flossing, which would usually be reduced or not possible during fixed brackets, all of which would reduce the chances of possible staining and decay.²

Disadvantages^{7,8}

- Lack of recalls makes it patient dependent treatment
- Patient motivation is required
- Removal of the appliance during consumption of hot food/ drinks is necessary as it increases the chances of deformation of the appliance.
- Even though treatment time is pre-determined, non compliance of the patient may cause difficulty in obtaining the results.
- Poor oral hygiene
- Loss of appliances can not only increase the treatment period but also increase the cost factor

Treatment Protocol

The treatment protocol for the clear aligners can be divided into different phases. Initially, impressions are taken and pretreatment study models are set, these should be preferentially be made by polyvinyl material as they are high precision impression materials. Further, the bite is also recorded, and the impressions are propelled forward to the lab for further process.

The second part includes a 3D scan with highly sophisticated softwares and technology with the ability to create a virtual patient. Some of the specific software are the 'Tooth shaper' & the 'Autobite tool' which have the ability to ascertain the silhouette of the teeth and occlude them in centric relation.²

ClinCheck is an aligner software that was used by Nelson whose set-up can be used for diagnosis and treatment planning. It can also be used to evaluate the need for Inter-proximal reduction, expansion, extraction, distalization, or proclination. This software can also be used to verify the performed modifications made by technician, as a consultation device to show treatment limits to patient, to verify that the aligner is tracking and to evaluating anchorage with the superimposition or surgical simulation tools and staging.

Aligners include Clear path aligners, Invisalign, Inman aligners, Nuvola and Fantasmio System.

ClearPath Aligners are removable medical grade plastic appliances which are USFDA approved.¹⁰

The simplest aligner removable appliances are the Inman aligners which are used for alignment of front teeth at a rapid pace safely. They are usually considered for pre-alignment of

teeth, which would be done prior any cosmetic selections such as bonding or minimal veneers. They have Nickel Titanium coil springs that power two aligner bows that gently oppose each other, guiding the teeth to their new position. It should ideally be worn for a period of 16-20 hours a day. The gentle forces are dynamic over the treatment period acting continuously with a large array of movement, which provides us with rapid tooth movement, all of which provides us with the desired results.¹¹

Fantasmio aligners are fabricated with poly-vinylchloride. The material is elastic in nature and can undergo plastic deformation when moderate loads are applied. They are ideally worn for a period of 14 hours a day, and their thickness determines the amount of tooth movement. However with this material the drawback is that it never exceeds 1 mm.¹²

Nuvola aligners are fabricated of polyethylene terephthalate glycol (PETG) material, which is light, resistant and clear material. They are impervious to wear over the time and is ideally worn for a period of 22 hours a day. Its pliability helps in gradual tooth movement. These aligners have a non-uniform thickness over the treatment period with different treatment phases. In the initial phase it is 0.75 mm, 0.85 mm during the mid-phase, and finishes at 1 mm at the end of treatment.¹²

The probability of use of clear aligners was more in females than in comparison with males. This may be attributed to the higher aesthetic concern of females than in males. The same was proved in a study conducted by Nedwed *et al* with the majority of patients being females (78%).¹³

CONCLUSION

Appearance plays a major role in the persona of a patient, this has an big aesthetic impact which helps in choosing the appropriate treatment methodology with the help of professionals. Clear aligners are not only aesthetically pleasing but are also helpful for motivating the patient for daily regular wear and in daily cleaning of the appliance.

It further helps in overcoming the disadvantages faced by the patients wearing normal fixed orthodontic appliances. However, clear aligners have their own limitations and disadvantages which limits/reduces its use during all treatment protocols.

Regular use of the appliance as stipulated by the manufacturer becomes a necessity, in which patient compliance becomes a primary factor. Also the cleaning of the appliance and the maintenance of teeth in good condition with the required oral hygiene aids is wholly dependent on the patient. Hence, clear aligners are more of patient centric than being dependent on the treating dentist.

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How to cite this article:

Dr Shashikala S *et al* (2019) ' Clear Aligners: The Invisible Shield Bountiful of A Beautiful Smile', *International Journal of Current Medical And Pharmaceutical Research*, 05(04), pp 4111-4113.
