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CLINICAL CASE TREATED WITH CLEAR ALIGNERS IN AN ADULT PATIENT

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Abstract— Patients are increasingly requesting esthetic and comfortable alternatives to conventional orthodontic treatment with brackets and archwires. To meet this demand, orthodontic manufacturers have introduced (or reintroduced) clear plastic brackets, tooth-colored ceramic brackets and archwires, lingual brackets, and clear aligners. Esthetic improvements in orthodontic appliances are often associated with reduced efficiency.

Aim- The aim of this case with Class I skeletal and dental relationship along with spacing in the maxillary anterior region, and crowding in the mandibular anterior region treated with the help of aligners.

INTRODUCTION Orthodontic treatment with clear aligners is a rapidly growing sector of orthodontic treatment. Both the increase in esthetic awareness and the increase in orthodontic treatment demand from adults.

- Clear plastic tooth-moving appliances are excellent options for adults or responsible adolescents who might be reluctant to wear fixed appliances.
- Prior to 1998, orthodontic clear aligner treatment was predominantly for very minor tooth movement, usually at the end of orthodontic treatment or to treat minor alignment relapse.
- In 1998, Align Technology introduced Invisalign to the orthodontic market. It used computerized 3D technology to visualize and move the teeth in a virtual model.

CLEAR ALIGNER SYSTEMS

- Clear aligners can be either analog or digital. Analog CAT(clear aligner therapy) involves a physical model that is modified either by resetting the teeth or creating divots and voids in the model prior to vacuum-forming the aligner.
- Digital CAT starts with a three-dimensional scan of the dental arches, an impression, or a plaster model. All tooth movement is performed digitally, and the trays are fabricated from a series of 3D-printed models. Digital CAT has several advantages over analog CAT and is required for any corrections beyond mild spacing or crowding.

DIFFERENCE BETWEEN ANALOG OR DIGITAL CAT

Analog CAT	**Digital CAT**
Analog CAT involves a physical model	Digital CAT starts with a three-

that is modified either by resetting the teeth or creating divots and voids in the model prior to vacuum-forming the aligner.	dimensional scan of the dental arches, an impression, or a plaster model. All tooth movement is performed digitally, and the trays are fabricated from a series of 3D-printed models.
CAT can be based on the submission stone models, or impressions (usually polyvinyl siloxane but not exclusively) by the treating clinician to a laboratory which allows the appliances may be manufactured via the use of 3D scanning technology.	The models produced from the varying sources can be, in turn, manipulated into the various treatment stages via manual adjustment or by CAD-CAM technology. Some products are available to the clinician to manufacture in-house via 3D printing,
Example-MTM Clear aligner, Essix system , eclinger aligner	Example- Clear Correct , Clear aligner system , Simpli5 , Invisalign system,

CLEAR ALIGNERS Vs FIXED APPLIANCES

CLEAR ALIGNERS	FIXED APPLIANCES
It is an esthetic appliance.	It is a non-esthetic appliance.
The pain and discomfort are less.	The pain and discomfort is more.
Clear aligners treatment (CAT) was found to be associated with increased periodontal status.	Fixed appliances treatment was found to be associated with decreased periodontal status
Reduced chair side time	Increased chair side time
Worse performance in severe malocclusion cases	Good performance in severe malocclusion cases

CLINICAL CASE

A 28-year-old female presented with a Class I malocclusion and an orthognathic profile. She was in the permanent dentition with normal maxillary central incisors, moderate overbite, and spacing in the maxillary anterior, mild crowding in the mandibular arch. Her primary concern was the alignment of her maxillary incisors and she refused to have fixed appliances. The treatment objectives using a clear aligner were to align her front teeth, close space in the maxillary arch, and alleviate crowding in the mandibular arch. The occlusal goals were to maintain the Class I buccal segments, obtain a normal overbite and overjet and achieve a functional occlusion.

Clear aligner treatment involved 14 upper and 14 lower aligners. Attachments were placed on several teeth to achieve a more predictable tooth movement using aligners. Once treatment was completed , for retention, the patient was given an Essix retainer. The patient was instructed to wear the removable appliances full time for 6 months and nighttime thereafter.

FIGURE 1 -INTRAORAL PHOTOGRAPH

FIGURE 2 -EXTRAORAL PHOTOGRAPH

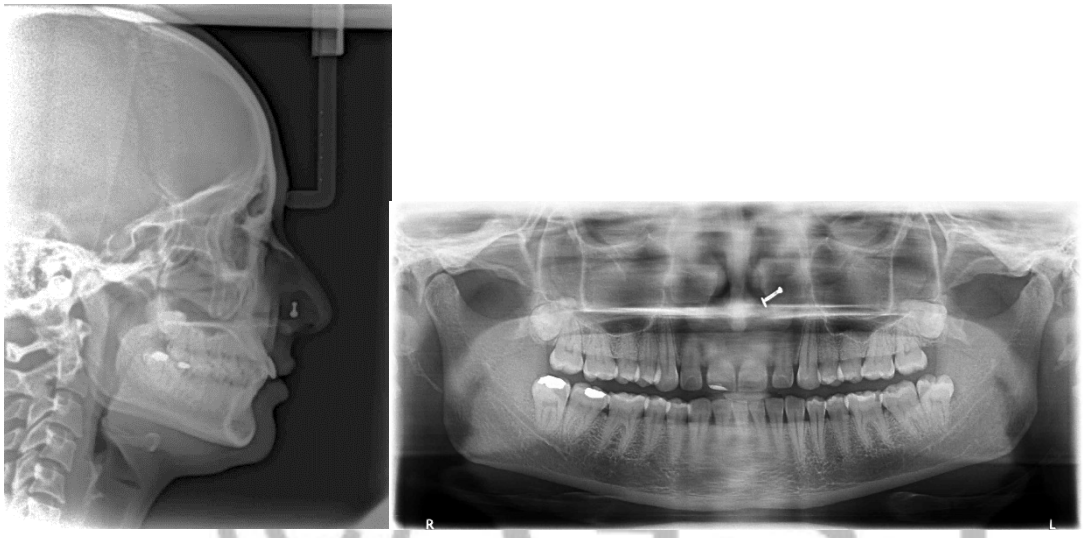

FIGURE 3 -RADIOGRAPH

FIGURE 4- ATTACHMENTS w.r.t 11,13,14,16,23,24,26,31,33,34,36,43,44,46

BIOMECHANICS WITH ALIGNER SYSTEM

- With a typical fixed appliance, the wire is engaged in a bracket with the adhesive retaining the bracket on the tooth. The active archwire is elastically deformed and moves the tooth to a determined position as it returns to its original shape.
- With an aligner, the plastic encapsulates the tooth and in doing so must provide both retention and activation to move the teeth. The natural undercuts of the teeth provide the retention and the active component to move teeth is provided by the elastic deformation of the aligner.
- Because there is very limited ability for such elasticity within the plastic itself, these movements must be divided into very small increments and are considered difficult. Some of these difficult movements include controlling torque, root parallelism, rotations and extrusions.

CONCLUSION

- With aligners a new system for orthodontic tooth movement using the established methods for minor correction to achieve greater magnitudes of correction has been introduced.

- The major advantage of the system is the aesthetic, hygienic, low discomfort, and removable nature of the appliance.

- There are currently limitations to this appliance in terms of case selection, increased cost, experience required for computer treatment planning, difficulty obtaining certain tooth movements, and the lack of potential in cases involving mixed dentition or impacted teeth.

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