

**Custom-Made Clear Aligner (CMCA Appliance)**

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**Conflicts of Interest:** Nil

**Abstract**

Tooth rotations are most commonly seen problem and very difficult to treat. It is a malposition caused due to abnormal turning of a tooth to its long axis. Rotation correction can be achieved either by couple forces or by single force and stop. The aim of the present study is to correct the rotation with a new technique custom-made clear aligner. It is made to derotate teeth by essix sheet and template is made for standardization with kesling setup done to derotate teeth. Cases where they do not require braces it is alternative method easy to fabricate in laboratory and economical.

**Keywords:** CMCA, Tooth Rotation, Orthodontic

**Introduction**

Tooth rotation is the one of the problem among the eruption disturbances which poses greater difficulty for correction. There are various methods for the correction of tooth rotation. For rotation correction, pure couple is required, but till date, none of the mechanics provides pure couple and all have some translator vector involved in them. Here a new developed technique for rotation correction, which solely provides pure couple

to derotate tooth, and is based on the natural organization of gingival circular fibers.<sup>1</sup>

In fixed orthodontic treatment finishing of tooth rotation often cause more difficulty. Now a day’s one of the most esthetic choice is clear aligners,<sup>2,3</sup> but compared with fixed orthodontic treatment it is ease for maintaining oral hygiene.<sup>4,5</sup> From a biomechanical point of view these two approaches are not equivalent.

A new technique custom-made clear aligner is made to derotate teeth by essix sheet and template is made for standardization with kesling setup done to derotate teeth. Cases where they do not require braces it is alternative method easy to fabricate in laboratory and economical.

**Diagnosis and Treatment plan**

**Case report**

A 17 years old male patient reported to the orthodontic office with the chief complaint of irregularly placed single tooth in the upper front region. (Fig:1,2) On clinical examination it reveals 3mm overjet 2mm overbite with severely rotated 21 and spacing between 21,11, 22 and 23, mild lower anterior crowding with

class I molar and class I canine relationship on both right and left sides. Treatment objective is to correct the irregularly placed single tooth and align lower anteriors and to maintain the ideal overjet and overbite with class I molar and canine relationship.

An attempt was made to correct single tooth to derotate by couple mechanics with the help of essix sheet (thickness 1mm) and align both upper anteriors and lower anteriors for esthetic concern.

Figure 1: Pre-Treatment-Extraoral Photographs



Figure 2 A – E: Pre-Treatment-Intraoral Photographs



Figure A: Overbite



Figure B: Right Molar Relation



Figure C: Left Molar Relation

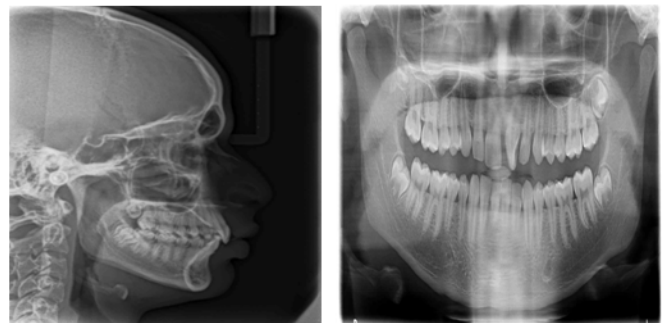


Figure D: Maxillary Occlusal



Figure E: Mandibular Occlusal

Figure 3: Pre Treatment Lateral Cephalogram And OPG



## Materials and methods

### Armamentarium:(Fig:4)

Saw (axe-saw blade), template (white card), pencil, scale, protractor, upper and lower arch impression with polyvinyl siloxane (PVS), standardization cast impression with PVS impression material, Orthokal, dental stone, wax sheet, Essix sheet (soft) of 1mm thickness, Easy vac machine (Biostar), BP blade and handle. Upper and lower arches impression were recorded with polyvinyl siloxane (PVS) impression. A series of casts were obtained from Orthokal.

### Template preparation and standardization:(Fig:5,6)

OA template was made on white card or sheet by marking the outline of the cast with the help of pencil followed by marking midline passing through the between two upper central incisors. The angulation of rotated 21 was measured from the midline as  $33^\circ$ . Then a series of each  $5^\circ$  were marked till the correction of 21 to desired position. Before slicing standardization of cast model with PVS impression material were done to place other casts on same position matching midline on template. The standardized material were sectioned into 3 pieces horizontally the upper section was done to expose the mal-aligned 21 and 22 and lower section was done to see whether the cast was placed on the midline.

### Slicing of the cast :( Fig: 7)

A series of casts were taken 21 and 22 are sliced according to the need of rotation and alignment. Then the trail fit of 21 and 22 done after that 21 is derotated for  $5^\circ$  and 22 spaced closed and the sectioned pieces stabilized with wax and sealed with dental stone in desired position.

### Altered cast: (Fig: 8)

The altered cast model and Essix sheet (soft, 1mm thickness) was placed under biostar machine (easy vac).

After thermo-vacuumed the cast was removed from the biostar machine and the thermo vacuumed sheet after cooling removed and trimmed till the 2mm above gingival margin. Likewise a series of casts with  $5^\circ$  change in rotation of 21 was done, till the desired esthetics was obtained.

Then the lower anterior crowding was decrowded by mild proximal stripping and aligned by essix sheet.(Fig: 9,10). After derotation and decrowding fixed retainer was given to both upper and lower arches.

Figure 4: Armamentarium



Figure 5: Lab Procedure: Impression Making, Template Preparation

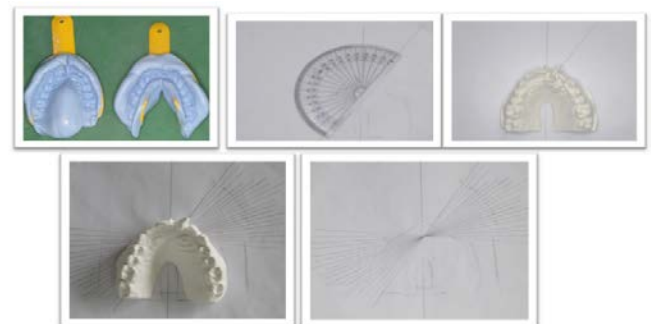


Figure 6: Standardization



Figure 7: Lab Procedure: Kesling Setup & Trail Fit



Figure 8: Lab Procedure: Preparation of Invisible Tray Aligner



Figure 9: Treatment Progress



Figure: 10



Figure 11: Post Treatment OPG



### Discussion

The Essix appliance is simple, inexpensive and clinical controlled. Tooth movement requires force and space.<sup>6</sup> In this case without the need of fixed appliance, derotation and alignment was done. A new thermoplastic appliance called Essix H (RaintreeEssix, Inc., 4001 Division St, Metairie, LA 70002, USA) was first introduced as a retainer by Sheridan and colleagues in 1993.<sup>7</sup> Since then, various usages of Essix have been described by several authors. Sheridan and colleagues used divots, windows and thermo sealing and Rinchuse used a spring added to the Essix plates in order to maintain tooth movement.<sup>7</sup>

There are two types of Essix plastics: types A and C. Typical applications for type A are for minor tooth movement with divots and windows, bite planes, TMJ splints and intrusion appliances. Type A must be used when bonding acrylic to the appliance.<sup>7</sup>

Essix type C plastic has poor aesthetics compared with type A, but its abrasion resistance is better than Type A. Type C is best used for anterior and full arch retainers. Essix sheet is used as<sup>8</sup>

1. Retainer
2. Moving teeth
3. Bite planes
4. Closing reopened extraction sites

5. Holding corrected anterior open bites closed
6. Temporary anterior bridges
7. Posterior stabilizing appliance
8. Intrusion of excessively erupted teeth
9. Stabilization and protection of osteointegrated implant
10. Bleaching teeth
11. Mouth guards

### **Conclusion**

- In this case a single tooth which is severely rotated upper left central incisor unpleasing on smiling. So an attempt was made to derotate and decrowd through essix sheet. Where arches are well aligned doesn't require braces.
- It is chair side procedure and economical. Easy to fabricate.

### **References**

1. Shastri D, Tandon P, Singh GP, Singh A. A New Rotation Correction Technique: Technique clinic. J Ind Orthod Soc 2014; 48(4):566-569.
2. Boyd,R.L: Periodontal and restorative considerations with clear aligner treatment to establish a more favorable restorative environment, Compend. Cont.Ed. Dent.30:280-282,284,286-288 passim,2009.
3. Wheeler, T.T: Orthodontic clear aligner treatment, Semin. Orthod.23:83-89, 2017.
4. Chhibber, A.;Agarwal, S.;Yadav,S.; Kuo, C.L;and Upadhyay, M.:Which orthodontic appliance is best for oral hygiene? A randomized clinical trial, Am. J.Orthod. 153:175-183,2018.
5. Buschang,P.H.;Chastin, D.;Keylor, C.L; Crosby,D.; and julien,K.C: Incidence of white spot lesions among patients treated with clear aligners and traditional braces,Angle Orthod.89:359-364,2019

6. Raintree Essix Publication, Essix appliance technology update, a scientific journal on fabrication, alteration & retention of essix appliances. Spring 2003, volume 3.
7. Sheridan, J.J.; LeDoux, W. and McMinn R. Essix retainers: fabrication and supervision for permanent dentition, J.Clin.Orthod.(77)37-45,1993.
8. Sheridan, J.J.; McMinn R., LeDoux, W. Essix thermosealed appliances: various orthodontic uses, J.Clin. Orthod. 29:108-113,1995.