COMPLEX MALOCCLUSION TREATED USING KLINE CLEAR ALIGNERS: A CASE REPORT

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INTRODUCTION

Clear Aligners treatment modality has gained popularity with increase in number of adult patients seeking orthodontic treatment. Clear aligner have several advantages over conventional braces: better aesthetics during treatment, better oral hygiene, and improved patient comfort. However, patient compliance is a must for a successful outcome. It is also pertinent to choose the right aligner vendor as adult patients are more demanding as well as want results in the shortest duration.

Two cases are presented which were treated using Kline Clear Aligners from Germany. Both patients are adults and both cases demonstrate the ease and predictability of treating complex malocclusions with Clear Aligners.

CASE I: DIAGNOSIS AND TREATMENT PLANNING

A 40-year-old male presented with a severe arch-length discrepancy that produced severe upper (8.5 mm) and lower crowding (4 mm) and palatally blocked-out maxillary laterals and mesially tipped mandibular canines **(Figures 1a-f)**. The patient had a Class I molar and canine relationship with crossbite seen with respect to 12, 22, 23 with an overjet and overbite of 0mm. Maxillary midline was coinciding and mandibular midline shifted to left by 1mm with respect to facial midline. Bolton's mandibular anterior excess of 1.4mm and mandibular overall excess of 3.4mm

The radiograph showed a full permanent adult dentition with previous history of root canal treatment on 27 **(Figure 2)**. Cephalometric findings included a well-positioned maxilla and prognathic mandible, resulting in a slightly excessive sagittal jaw relationship or Class III relation with proclined maxillary incisors and upright mandibular incisors.

The treatment objectives in this case were primarily to resolve the maxillary and mandibular arch crowding. Correction of anterior crossbite, achieve an acceptable overjet and overbite as well as correction of mesially tipped mandibular canines. Further goals included improving the lower midline and resolving the Bolton discrepancy and composite build up on incisal

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FIG 1: Pre-treatment Extraoral and Intraoral photographs

Table 1: IPR Chart before Aligner no. 1

17		16		15		14		13		12		11		21		22		23		24		25		26		27
M	D	M	D	M	D	M	D	M	D	M	D	M	M	D	M	D	M	D	M	D	M	D	M	D	M	
		0.2	0.2	0.2	0.2	0.2	0.2											0.2	0.2	0.2	0.2	0.2	0.2			

47		46		45		44		43		42		41		31		32		33		34		35		36		37
M	D	M	D	M	D	M	D	M	D	M	D	M	M	D	M	D	M	D	M	D	M	D	M	D	M	
		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	

edges of 11, 21. While maintaining harmonious Soft Tissue Profile and Class I canine and molar relationship.

To alleviate the anterior crowding, reproximation of the posteriors were done distal to canine in both arches and the teeth were retracted. IPR was also done in the lower anteriors. The bite was raised on lower third molars to jump the bite for anterior crossbite correction. Attachments were bonded onto the canines, first and second premolars in both the arches for better control during retraction.

FIG 2: Pre-treatment OPG

TREATMENT PROGRESS

Upper and lower polyvinyl siloxane impressions were taken for clear Aligners. The patient's final tooth setup and stages of tooth movement were generated by the three-dimensional software and reviewed by the orthodontist. Prior to delivery of the first aligner, composite attachments were bonded and interproximal stripping was done according to IPR chart **(Table 1)**. Patient changed to new set of aligners every 2 weeks. Patient was given instructions for wear and maintenance of Aligners.The patient was seen every four weeks for delivery of new aligners and monitoring of treatment progress and aligner fit.

In the first phase, consisting of 14 upper and lower aligners, space gained by IPR was used for decrowding anteriors in the upper and lower arch by retracting the canines. Impressions were retaken after this. In second phase 0.2mm IPR was done only mesial to maxillary canines to further alleviate crowding of maxillary anteriors. The second phase consists of 12 upper and lower aligners. **(Figures 3a-3e)**. Correction of crossbite and crowding was seen post the Stage 2. Stage 3 consisted of 4 aligners in maxillary and mandibular arch. Buttons were bonded onto the maxillary first molars and

FIG 3: Mid treatment intraoral photographs (Aligner no. 9)

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FIG 4: Class III elastics for better intercuspation

FIG 5: Post treatment intra and extraoral photographs

mandibular canines for wearing light Class III elastics to achieve better intercuspation and good overjet and overbite **(Figures 4a-e)**. Composite build-up was done on incisal edges of 11&21. The total treatment time was 18 months with a total of 30 sets of aligners. Bonded lingual retainer was given from canine to canine in both arches along with essix retainer.

TREATMENT RESULTS

Post-treatment facial photographs showed little change in facial profile or smile **(Figures 5a-f)**. The Class I molar and canine relationship was maintained. Both arches showed good alignment, with coinciding upper and lower midlines. Anterior crossbite was corrected with good overjet and overbite. The cephalometric superimposition **(Figure 6b)** confirmed the proclination of the upper incisors and retraction of the lower anteriors. The mandible rotated anticlockwise due to the slight intrusion of the posterior teeth which is one of the common outcomes achieved during aligner therapy.

The super-impositions of pre-treatment with post-treatment STL models **(Figures 7a-h)** showed arch development in maxillary arch with increase in inter-canine width. Good retraction of canines in both maxillary and mandibular arch to help alleviate anterior crowding and achieve good overjet and overbite. Minor change in upper incisor proclination preventing flaring of maxillary anteriors. Correction of mesial tipping of mandibular canines. Improvement of periodontal condition of lower central incisors and correction of midline.

DISCUSSION

Adults are often averse to wearing traditional fixed appliances with wires, bands, and brackets. Clear aligners makes it possible for orthodontists, to offer adult patients requiring full-mouth orthodontic treatment an esthetically agreeable solution using a computer-assisted technology that produces a sequential series of aligners.

Some aligner companies provide guidelines for the types of malocclusion that can be successfully treated with Clear aligners. That indicate mild to moderate crowding (discrepancy: -1 to -6 mm), and/or spacing (+1 to +6 mm), non-skeletal constricted arches, and relapse after fixed appliance therapy[1].

FIG 6a: Post treatment OPG and cephalograph superimpositions

FIG 6b

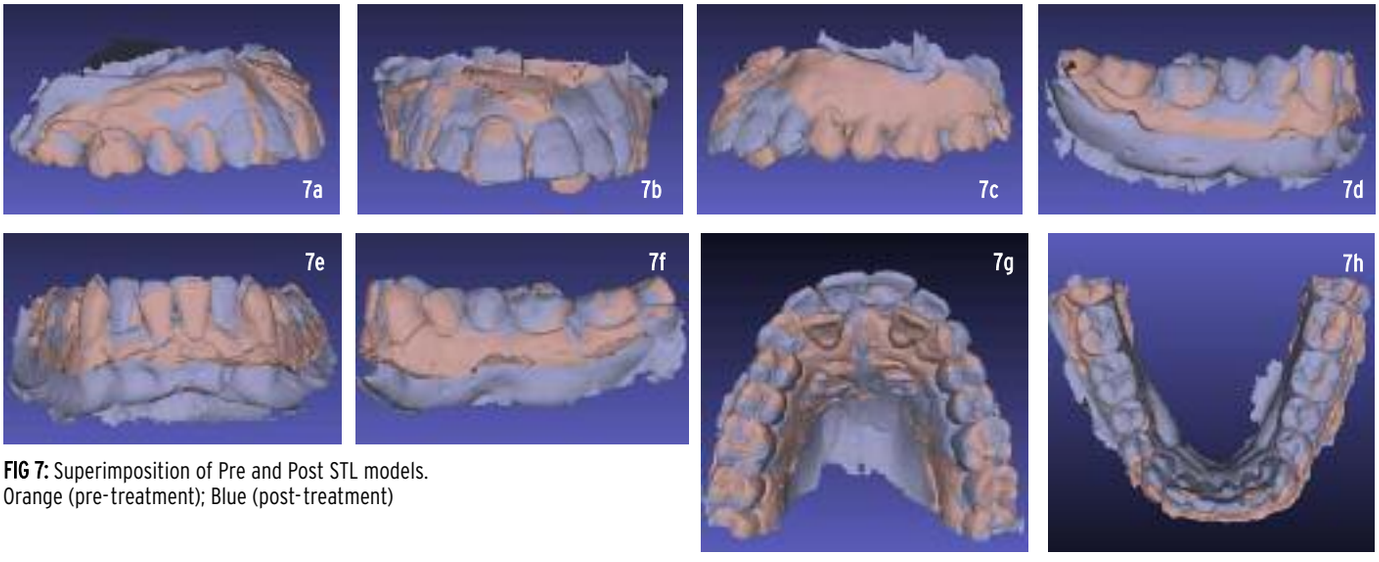

FIG 7: Superimposition of Pre and Post STL models. Orange (pre-treatment); Blue (post-treatment)

The presented case was treated by KLine clear aligners, the treatment planning and patient's good compliance, determined teeth movements that fulfilled the therapeutic aims: a moderate anterior expansion in the upper and lower arches, for creating space for anterior alignment and levelling. A selective intrusion and protraction of the upper lateral incisors and correction of canines rotation and tipping is presented in the case. An appropriate over-jet and overbite and an enhanced esthetics of the smile was achieved in the presented case.

These findings correspond to those obtained by Boyd, [2, 3] Vlaskalic[4] and Miller[5] and, who first revealed efficiency of this method as an orthodontic treatment alternative for clinical cases with mild to moderate malocclusions.With the innovation of new attachments, advances in material science and digitisation techniques, the scope of aligners will most likely expand for correcting more complex cases. Case selection is the key to success when treating cases with aligners.

REFERENCES

1. McNamara JA and Brudon WL. "Orthodontics and Dentofacial Orthopedics". ann arbor (2001): 483-486
2. Boyd R L., et al. "The Invisalign system in adult orthodontics: mild crowding and space closure". Journal of Clinical Orthodontics 34 (2000): 203-213.
3. Boyd RL. "Complex orthodontic treatment using a new protocol for the Invisalign appliance". Journal of Clinical Orthodontics 41 (2007): 525-547.
4. Boyd R L and Vlaskalic V. "Three-dimensional diagnosis and orthodontic treatment of complex malocclusions with the Invisalign appliance". Seminars in Orthodontics 7 (2001): 274- 293.
5. Miller KB *et al.* " A comparison of treatment impacts between Invisalign aligner and fixed appliance therapy during the first week of treatment" Am J Orthod Dentofacial Orthop 2007;131:302.e1-302.e9)

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