Treatment of Class 2 div 2 subdivision with severe anterior crowding by Damon Q Self Ligating Bracket System

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Introduction

A 19-year-old post pubertal female, reported to the P.G Clinic of Department of Orthodontics with the chief complaint of malaligned upper and lower front teeth.

Family History

Her parents are alive and healthy. General health of the family is reported to be normal. No previous family history of orthodontic treatment. The attitude of the patient towards the treatment is positive.

Medical & Dental History

There is no history of trauma, prolonged hospitalization or any drugs taken. Patient has undergone oral prophylaxis before 1 months and amalgam restoration 2 months back. The patient and parent are aware of the dental condition and shows positive attitude.

Prenatal History

The condition of the mother during pregnancy is reported to be normal. Her mother's nutritional status during pregnancy was good. There is no history of any infection, trauma or drugs taken during pregnancy.

Natal history

The delivery was full term and normal with no complication during and after delivery. There is no history of Rh incompatibility or any other congenital anomaly.

Postnatal History

She was breast fed for 1.5 years and bottle fed for 1 year. All her milestones of growth were normal & commensurate well with her age. There is no history of thumb sucking or any other habits. Her speech began at

10 months of age. There is no history of trauma to the teeth or jaw.

General examination

Patient is moderately built with height of 157 cm and weight of 57 kgs. She has normal gait with erect posture. Vital signs are normal.

Extra oral Examination

Shape of the head is Mesocephalic.

Macro esthetics

In frontal view her facial form is mesoprosopic with apparently symmetrical features. In general nose is proportional, balanced and symmetrical. Size, shape & contour of her nose are normal and blend with his facial features. Nasolabial angle is normal. Philtrum height and commissure height are adequate. When examined individually the upper lip and lower lip are anatomically proportional in size, shape and contour. When examined together lips are incompetent with a interlabial gap of 1 mm. Mentolabial sulcus is deep.

In profile view face is concave with anterior divergence. The inclination of mandibular plane to Frankfort horizontal plane is low and chin appears protruded.

Mini esthetics

Incisal exposure during speech is 1 mm and during smile is 7 mm. Gingival exposure is normal. No consonant smile arc and buccal corridors are visible.

Intra oral examination

Soft tissues

The oral hygiene of the patient is satisfactory.

The oral and buccal mucosa appears to be normal with normal frenal and muscle attachments. Colour and texture of gingival appears to be normal with no periodontal pockets. Attached gingival is of adequate width. Shape, size & posture of tongue are normal. Palate contour is normal.

Hard tissues

Eruption Status

7 6 5 4 3 2 1	1 2 3 4 5 6 7
7 6 5 4 3 2 1	1 2 3 4 5 6 7

Patient is in permanent dentition stage. Reveals full set of permanent teeth including 3rd molars. Enamel of all the teeth appears normal.

Micro esthetics:

Height: width ratio, golden proportion of 62 %, gingival zenith, connectors of 50%, 40% and 30 % are not maintained. Black triangle is absent

Intraarch examination

The maxillary arch is 'U' shaped and asymmetrical. There is severe crowding in anteriors. Mesiopalatal rotation of 11 and labially placed 23 is seen. Inter canine width of 33 mm is present. Mandibular arch is 'U' shaped and asymmetrical with mild crowded anteriors. Curve of spee is 6mm on both sides. Intercanine width of 27 mm is present in lower arch. Intermolar width of 52 mm and 42 mm are present in upper and lower arches, respectively.

Inter arch examination

In occlusion, molars and canines on right side is Class I and on left sides are in End on relation.

Overbite of 7 mm and overjet of 4 mm. Lower dental midline is shifted by 2 mm towards left side.

Functional examination

Functional examination reveals normal function mastication, swallowing & speech. Maximum interincisal opening is 45 mm with freeway space of 2 mm. There is no clicking or pain in the TMJ. No history of pain or tenderness in muscle of mastication. There is no occlusal prematurity.

Radiographic Examination

Pre-Treatment OPG

OPG reveals normal condyles, well defined lower border of the mandible & a normal palate. The shadow of the soft palate can be seen on both sides. The trabecular pattern of the mandible appears to be normal. It also reveals complete set of teeth including the third molars which are erupting. There is no evidence of any supernumerary teeth or rarefaction.

Pre-Treatment Cephalogram

Examination of the cephalogram reveals well defined outlines of the hard & soft tissues of the skull. The vault of the skull is evenly radio opaque. The cavity of the maxillary sinus, ethmoid sinus, sphenoidal sinus seems clear & normal. The mastoid air cells can also be seen. The position of the soft palate & tongue are normal. The cervical vertebrae C1, C2, C3 & C4 can be seen. The posterior borders of the vertebrae are parallel indicating normal alignment. There is deep concavity on the lower border of C2, C3 and C4. They are greater vertically than horizontally indicating completion stage. The hyoid bone can be seen in the submental region

Further examination of the cephalogram reveals normally positioned maxillary apical base in relation to the anterior cranial base as indicated by the SNA value of 82^0 and posterior positioning of the mandibular apical base in relation to the anterior apical base as indicated by SNB value of 80^0, ANB of 2^0 is suggestive of Class I maxillomandibular skeletal relation. Effective Maxillary length of 101 mm and effective mandibular length of 122 mm with a differential of 21 mm is suggestive of disproportionate sizes between the apical bases. FMA value of 19^0 is suggestive of upward inclination of mandibular plane in relation to FHP and Go-Gn to SN of 21 suggestive of upward inclination of mandibular plane in relation to SN plane. Anterior facial height is 124 mm and posterior facial height is 87 mm with Jarabak ratio of 70 % suggestive of upward rotation of mandible. U1 to NA of 6^0 /-1 mm is suggestive of retroclined and backwardly placed upper incisors to NA line. L1 to NB of 10^0 /-3mm is suggestive of backwardly placed lower incisors to NB line. IMPA value of 86^0 shows retroclination of lower incisor in relation to the mandibular plane. L1 to A Pog of -2 mm is suggestive of backwardly positioned lower incisors.

Model analysis:

Ashley Howes analysis shows TTM (6 – 6) = 98 mm, PMBAW = 44 mm, PMD = 46 mm. PMBAW < PMD which suggests expansion is required; PMBAW % = 50.7% - non extraction case

Carey's analysis shows tooth material - arch length discrepancy of -1 mm and arch perimeter analysis shows -7 mm in maxillary arch.

Bolton's analysis shows overall ratio of 87.7 % which suggests maxillary tooth material excess by 3.8 mm; Anterior Ratio of 75 % which suggests maxillary anterior tooth material excess by 1.36 mm

Diagnosis with probable etiology

Angles class Il division II subdivision right malocclusion on a Class I skeletal base with retroclined upper and lower incisors and severe upper crowding and deep bite, lower midline shift towards left side by 2 mm with horizontal growth pattern.

Problem List

Soft tissue

1. Concavity of face
2. Lower lip behind of E plane
3. Incompetent lips

Dental

1. Backwardly placed upper & lower anterior
2. Retroclined upper & lower anterior
3. Crowding in upper anteriors

4. Deep bite

Treatment Objectives

➢ Soft tissue: To achieve a pleasing soft tissue profile

➢ Dental: To correct axial inclination of all teeth to correct crowding and deep bite

Treatment Plan

• Non extraction.

• Aligning & Leveling

• Space consolidation

• Finishing & detailing.

• Retention

Mechanotherapy

▪ Self-Ligating System-Damon Q

▪ Wire sequence:

Stage 1:

• 0.014" NiTi

▪ 0.016" NiTi

▪ 0.018" NiTi

▪ 14 x 25" SS

▪ 18 x 25 SS

▪ 0.019" x 0.025" NiTi

Stage 2:

• 0.019" x 0.025" SS

• Upper 0.014" SS

• Lower 0.014" NiTi

Prognosis: Good

Retention appliance

• Upper Wrap around retainer

• Lower fixed retention

Duration of treatment

Stage 1: 11 months

Stage 3: 5 months

Total: 16 months

Critical appraisal

Patient had a concave profile with anterior divergence and deep mentolabial sulcus. Dentally, the upper and lower incisors were retroclined with deep overbite. The case was started with non-extraction followed by unilateral distalization on left side to correct class 2 molar relation. On camoflauge treatment, we have achieved Andrews Six keys of occlusion. The profile and smile are pleasing in appearance. However, she has a protruded chin with a golf ball like appearance which could be treated surgically by reduction genioplasty.

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Legends Figures

Fig.1a: Pretreatment- extraoral -frontal view.

Fig.1b: Pretreatment- extraoral profile view.

Fig.1c: Pretreatment- extraoral frontal smile view.

Fig.1d: Pretreatment- extraoral three quarter smile view.

Fig.1e: Pretreatment-intraoral-frontal view.

Fig.1f: Pretreatment-intraoral-upper occlusal view.

Fig.1g: Pretreatment-intraoral-lower occlusal view.

Fig.1h: Pretreatment-intraoral-left lateral view.

Fig.1i: Pretreatment-intraoral-right lateral view.

Fig.2a: End of Stage 2-right lateral view.

Fig.2b: End of Stage 2-upper arch.

Fig.2c: End of Stage 2-left lateral view.

Fig.2d: End of Stage 2-lower arch.

Fig.3 a: Post treatment- extraoral -frontal view.

Fig.3b: Post treatment- extraoral -frontal smile view.

Fig.3c: Post treatment- extraoral profile view.

Fig.3d: Post treatment- extraoral three quarter smile view

Fig.4: Posttreatment-intraoral-frontal view.

Fig.5: Posttreatment-left lateral view.

Fig.6: Posttreatment-right lateral view.

Fig.7:Posttreatment-upper occlusal view.

Fig 8: Posttreatment-lower occlusal view.

S no	Measurement	Pre treatment	Mid treatment	Post treatment
Maxilla				
	SNA	82^0	81^0	81^0
	Na per PtA	-2 mm	-1 mm	-1 mm
	Co-A	101 mm	98 mm	98 mm
	PP to SN	11^0	8^0	9^0
Mandible				
	SNB	80^0	80^0	80^0
	Na per Pog	2 mm	0 mm	0 mm
	Co-Gn	122 mm	121 mm	128 mm
	Y axis	54^0	54^0	54^0
Max-man relation				
	ANB	2^0	1^0	1^0
	WITS	3 mm	2 mm	2 mm
	McNamara diff	21 mm	23 mm	25mm
Vertical				
	FMA	19^0	18^0	18^0
	SN to Go-GN	18^0	18^0	18^0
	Sum of POSTERIOR ANGLES	378 mm	381 mm	380 mm
	Jarabak Ratio	70%	73%	73%
Dental	1 to NA (angle)	6^0	23^0	23^0
	1 to NA (mm)	-1 mm	5mm	5mm
	1 to SN	88^0	106^0	106^0
	1 to NB (mm)	-2 mm	5mm	5mm
	1 to NB (angle)	10^0	23^0	23^0
	1 to A Pog(angle)	6^0	26^0	25^0
	1 to A Pog (mm)	-2 mm	-1mm	-1mm
	Interincisal angle	19^0	132^0	132^0
	IMPA	86^0	98^0	98^0
	6 TO Ptv	26 mm	26 mm	26 mm
Soft tissue				
	E line to lower lip	-9 mm	-4mm	-4mm
	S line to upper lip	2 mm	3mm	3mm
	S line to lower lip	-3 mm	1 mm	1 mm
	Nasolabial angle	92^0	86^0	86^0

Table 1