Spaced Dentition: A case report

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***Abstract*: Spaced dentition is one of the common aesthetic problems because of which patients seek orthodontic treatment. It can be manifested because of various etiological factors such as abnormal frenal attachment, genetics, tongue thrusting etc. Treatment of spaced dentition is done by identifying the etiology and planning appropriately to achieve long term stable results with aesthetic outcome.**

***Index Terms*: Spaced dentition, Tongue thrusting.**

INTRODUCTION

Spaced dentition is the presence of spaces between the teeth and a lack of contact points. Spacing can be localized or generalized due to the number of teeth included [1]. About one-third of the population has spaced dentition [2]. Spaced dentition in young children is more common in boys than girls [3,4] however in older groups the ratio between males and females is equal [3].

The etiology of spacing might be because of hereditary, acquired, or functional reasons [5,6]. Hereditary causes include macroglossia, tooth size-arch size discrepancies, small teeth, supernumerary teeth, congenitally missing teeth, and hypertrophic frenum. Functional causes include oral habits. Acquired conditions include periodontal disease, increasing tongue size, missing teeth, and delayed eruption of permanent teeth.

Management of spaced dentition is done based on etiology and clinical features. It can be treated either with orthodontic treatment or aesthetic build-up or a combination [1].

CASE REPORT:

A 24-year-old patient came to the department of orthodontics with a chief complaint of gaps in the upper and lower front teeth region. There was no relevant past medical history but the past dental history revealed restorations in the lower left back tooth region. On extraoral examination (Figure 1) patient had a dolichocephalic head with a leptoprosopic face, smile was asymmetrical with disproportional lip elevation, and complete incisal visibility. The upper dental midline was coinciding with the facial midline. The patient showed a straight profile with acute nasolabial angle, small nose, average mentolabial sulcus, and average clinical Frankfort mandibular angle. Functional examination revealed the nasal type of respiration, no temporomandibular joint dysfunctions, normal speech, and tongue thrusting habit was seen while swallowing.

Intraoral examination (Figure 2) shows fair oral hygiene status, melanin pigmentation on attached gingiva, and gingival biotype is thick and blunt. The patient has all teeth up to 2nd molars. Impacted 3rd molars in all quadrants. The lower dental midline is 1mm left to the upper dental midline. Maxillary and mandibular arches were 'U' shaped and symmetrical with generalized anterior spacings, amalgam restoration irt 47, rotations irt 32,35,43,45. Overjet and overbite were 1mm each and class I incisor relation was seen. The patient has superclass I molar relation and class III canine relation.

Bolton's discrepancy showed mandibular anterior excess of 4.1mm and overall, 4.4mm mandibular excess. Cephalometric analysis (Figure 3) showed class I skeletal base with orthognathic maxilla and mandible with hypodivergent growth pattern, proclined upper and lower incisors.

Diagnosis:

A 24-year-old adult male presented Angle's class I malocclusion with skeletal class I base due to orthognathic maxilla, orthognathic mandible, hypodivergent growth; proclined upper and lower incisors, generalized upper and lower anterior spacing, decreased overjet, decreased overbite, mesiobuccal rotations irt 32, mesiolingual rotations irt 35,43,45.

Treatment plan 1: Non-extraction protocol. Tongue crib for tongue-thrusting habit. Fixed mechano-therapy with 0.022" MBT slot for alignment and space closure, followed by the upper anterior buildup to correct the Bolton's discrepancy.

Treatment plan 2: Extraction protocol with lower incisor extraction (31-mandibular left central incisor). Tongue crib for tongue-thrusting habit. Closure of spaces using sliding mechanics. Fixed mechano-therapy with 0.022" MBT slot for alignment and space closure.

Figure 1: Extra oral pictures.

Figure 2: Intra oral pictures.

Treatment:

Treatment plan 1 was selected as the mesiodistal width of teeth was less and would improve the aesthetics with the esthetic buildup. Fixed tongue crib was soldered to 1st molar bands and cemented on upper 1st molars. Bonding was done using 0.022" slot MBT prescription brackets. Leveling and aligning was done starting with 0.012" Niti (Figure 4) to 0.019X0.022" Stainless steel wire (Figure 6). Space closure was mostly accompanied by relieving tongue thrusting and minute spaces in the lower arch were closed using elastomeric chains (Figure 5). Upper complete spaces were not closed because of Bolton's discrepancy. So spaces were distributed equally between upper central and lateral incisors (Figure 6) for the esthetic buildup of 4 anterior teeth. Then debonding was done followed by esthetic buildup of upper anteriors and fixed lingual bonded retainers were placed in the upper and lower arch (Figure 9). Aesthetics on smile were improved (Figure 8) and proclination of teeth was reduced (Table 2) as seen in the superimpositions (Figure 7).

Figure 3: Pre-treatment lateral cephalogram.

Table 1: Pre-treatment cephalometric summary.

MEASUREMENT	MEAN	PRE-TREATMENT	INFERENCE
SNA	82º ± 2º	82º	Orthognathic maxilla
SNB	80º ± 2º	82º	Orthognathic mandible
ANB	2º ± 2º	0º	Class I
SN MP	32º ± 4º	21º	Hypodivergent growth
FMA	25º ± 3º	22º	Hypodivergent growth
U1 NA	22º ± 2º, 4.0 ± 1.0	40º, 11.1mm	Proclined and forwardly placed upper incisors
U1 PP	110º ± 5º	127º	Proclined upper incisors
L1 MP	90º ± 3º	105º	Proclined lower incisors
L1 NB	25º ± 2º, 4.0 ± 1.0	34º, 8.2mm	Proclined and forwardly placed lower incisors
E plane	-4.4 ± 2.0mm	-1.9mm	Protrusive lip

DISCUSSION:

Smile plays an important role in pleasant aesthetics. One of the most common aesthetic problems in adults is spacing between teeth which has a negative effect on the smile. Treatment of spacing improves the smile as well as the confidence of the person [7]. Spacing might look similar in various people but the etiology of it might vary because of which different treatment approaches are planned. Tongue thrusting habit is one of the common etiological factors for spaced dentition. Tongue thrusting can be defined as a behavioral pattern in which the tongue makes contact with any teeth anterior to the molars during swallowing. Redirecting the tongue's resting position can help in correcting tongue thrust and the fixed palatal crib is one of the effective treatment modalities to achieve it [8]. The patient presented with spacing with a tongue-thrusting habit along with mandibular Bolton's excess might be the etiology. Hence to correct the tongue thrusting a fixed palatal crib was used in the patient.

Bolton's Index serves as a diagnostic aid in the planning of orthodontic cases [9]. These ratios allow the orthodontist to access the functional and aesthetic outcomes without any diagnostic setup. Clinically, these ratios have been used to determine the need for reduction of tooth size by interproximal stripping or the addition of tooth size by prosthetic restoration [10]. In the present case, the patient presented with 4.1mm of mandibular anterior excess which might require a lower incisor extraction to correct it but would have resulted in compromised aesthetics because of narrow upper incisors as the width is less than 80% of the crown height. Thus, Bolton's discrepancy was corrected by the aesthetic buildup of upper anterior teeth.

The drawbridge effect is an increase in the overbite as the incisors are uprighted, which is beneficial in open bite cases [11]. The present case had an open bite tendency, and the overbite has improved because of drawbridge effect on incisors.

CONCLUSION:

A good understanding of the etiology and esthetics helps in constructing a proper treatment plan and mechanics. And a long-term retention should be planned along with correction of etiology to prevent the relapse.

Figure 4: Strap up pictures.

Figure 5: Space closure.

Figure 6: Upper spaces not closed because of Boltan's discrepancy.

Table 2: Pre and post-treatment cephalometric comparison.

MEASUREMENT	MEAN	PRE-TREATMENT	INFERENCE	POST-TREATMENT	POST-TREATMENT INFERENCE
SNA	82º ± 2º	82º	Orthognathic maxilla	83º	Orthognathic maxilla
SNB	80º ± 2º	82º	Orthognathic mandible	83º	Orthognathic mandible
ANB	2º ± 2º	0º	Class I	0º	Class I
SN MP	32º ± 4º	21º	Hypodivergent growth	23º	Hypodivergent growth
FMA	25º ± 3º	22º	Hypodivergent growth	22º	Hypodivergent growth
U1 NA	22º ± 2º, 4.0 ± 1.0	40º, 11.1mm	Proclined and forwardly placed upper incisors	36º,7.7mm	Uprighted upper incisors
U1 PP	110º ± 5º	127º	Proclined upper incisors	123º	Uprighted upper incisors
L1 MP	90º ± 3º	105º	Proclined lower incisors	92º	Uprighted lower incisors
L1 NB	25º ± 2º, 4.0 ± 1.0	34º, 8.2mm	Proclined and forwardly placed lower incisors	21º, 4.7mm	Uprighted lower incisors
E plane	-4.4 ± 2.0mm	-1.9mm	Protrusive lip	-2.5mm	Normal

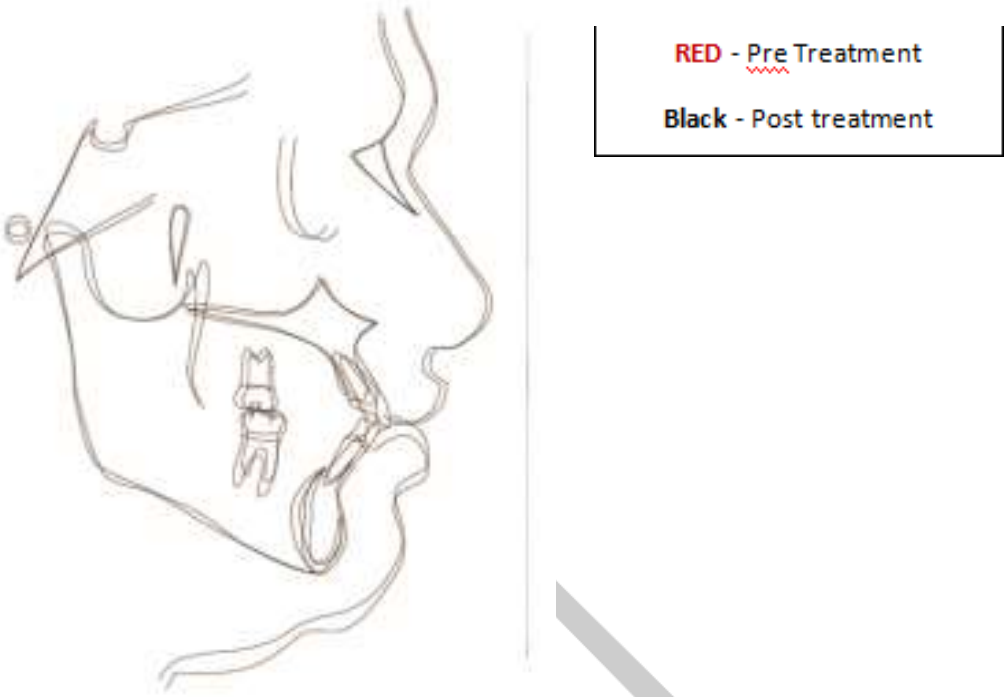

Figure 7: Superimposition.

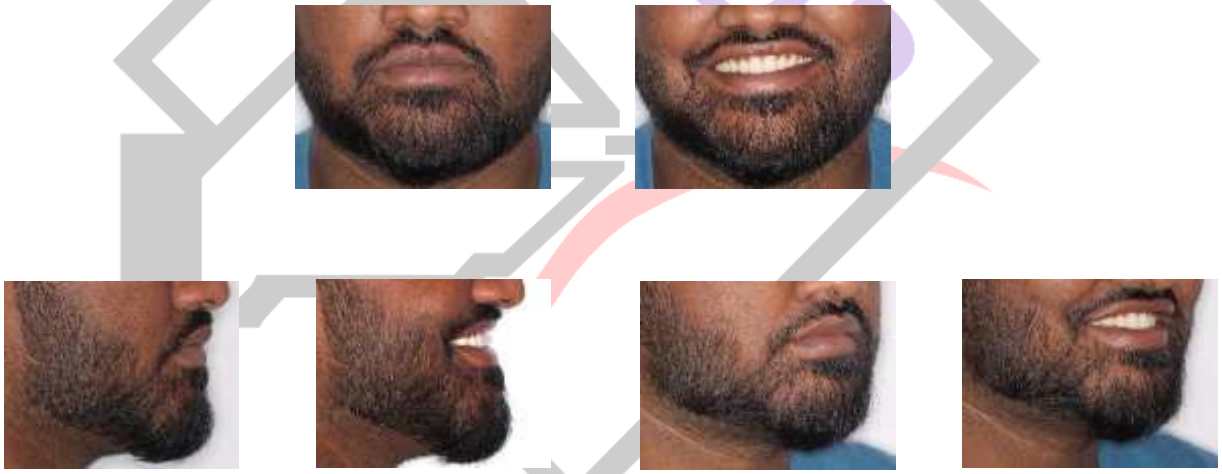

Figure 8: Post treatment extra oral pictures.

Figure 9: Aesthetic restoration of anteriors and fixed lingual bonded retainer (Post treatment).

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