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Revisiting the Anterior Maxillary Subapical Osteotomy and Advancement Procedure

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Case Report

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Abstract

Anterior maxillary subapical osteotomy (AMSO) followed by Premaxillary advancement, is an orthognathic surgical procedure which has been undertaken rather infrequently in the recent past, owing to its being overtaken by Premaxillary Distraction Osteogenesis (DO). This Case Report attempts to re-popularise this procedure, by elaborating its ease, efficacy, reliability, predictability, expedient outcome as well as long term stability. It offers several advantages in treating mild to moderate Skeletal Class III Dentofacial Disharmony cases with marked Anterior Crossbite & Reverse Overjet, over the relatively long-drawn management by DO. Its results, in terms of correction of both, the esthetic deformity as well as functional impairment (in speech and mastication), are almost immediately apparent. Additionally, it can be modified to a 'Surgery First, Orthodontics After (SFOA)' protocol, to further reduce the total treatment duration, and yield a speedy outcome, which is of particular benefit in young adult patients with an active lifestyle, offering a distinct psychological advantage by an immediate improvement in facial appearance, enunciation as well as masticatory function. This facilitates a ready patient acceptance for treatment, and also encourages optimal patient compliance during the post-surgical orthodontic phase.

Keywords: Dentofacial Disharmony; Skeletal Cl III Malocclusion; Anterior Crossbite and Reverse Overjet; Anterior Maxillary Subapical Osteotomy; Premaxillary Advancement

Abbreviations: DFD: Dentofacial Disharmony; AMSO Anterior Maxillary Subapical Osteotomy; DO: Distraction Osteogenesis; SFOA: Surgery-first Orthodontics After; NCCT: Non Contrast Computed Tomographic; CVMI: Cervical Vertebral Maturation Index; SNO: Sella-Nasion-Orbitale.

Introduction

Skeletal Class III malocclusion is a dentofacial disharmony (DFD) that is usually quite easy to identify and is characterised by considerable impairment of facial esthetics, distortion in speech and reduction in masticatory performance [1].

This dentofacial anomaly is often represented clinically by a conspicuous anterior crossbite, with patients reporting difficulty in incising and mastication. Obligatory as well as compensatory distortions in articulation and abnormalities in speech, with significant spectral distortions in consonants, result from the premaxillary deficiency and retrognathism, reducing the available tongue space [2].

These patients seek orthodontic care and orthognathic surgery to address issues with esthetics, speech and mastication. In this day's contemporary lifestyle scenarios, it is observed that patients greatly appreciate swift and expedient modalities of correction of dental malocclusions, jaw asymmetries and facial deformities, favouring them over protracted and long-drawn treatment plans [3].

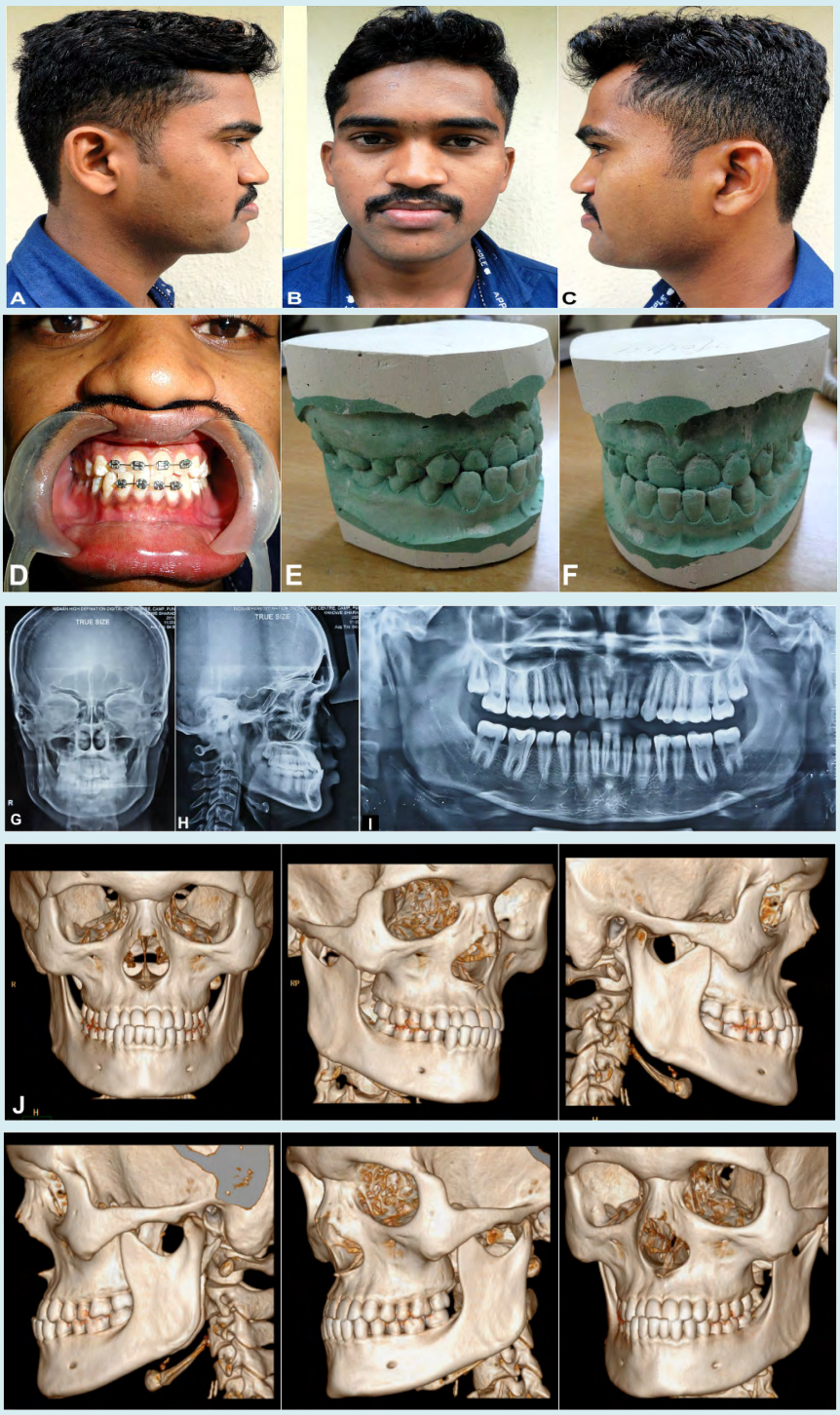

Figure 1: (A-C) 21-year-old patient with impaired facial esthetics resulting from a mid-face deficiency, non-consonant smile arc and a concave profile. The upper lip appeared pursed and inverted, while the lower lip appeared prominent and everted. (D-F) Intraoral examination and model analysis revealed an anterior crossbite and reverse overjet of 2mm. (G&H) Frontal and Lateral Cephalogram revealed Class III Skeletal bases, retrognathic maxilla, prognathic mandible and a reduced Nasolabial angle. (I) Orthopantomogram revealed congenitally missing lower third molars and impacted upper third molars. (J) NCCT demonstrated the premaxillary deficiency and proclined upper anteriors, in reverse overjet. The concave skeletal profile is evident.

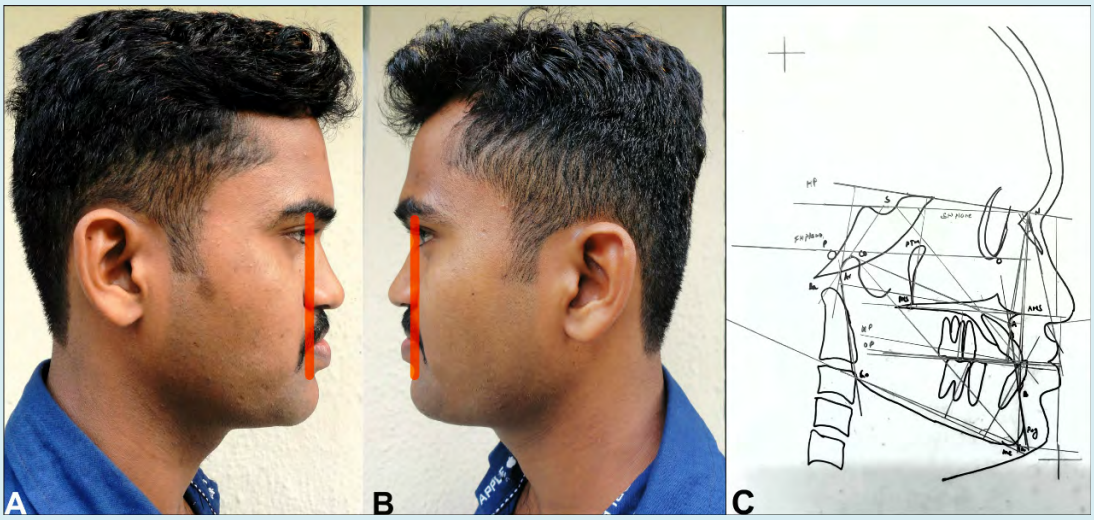

Figure 2: (A&B) Anterior corneal plane of the globes found to be anterior to the malar eminences and anterior cheek mass, thus demonstrating a negative vector relation between the two, indicative of maxillary hypoplasia. (C) Pre-treatment Lateral Cephalometric analysis.

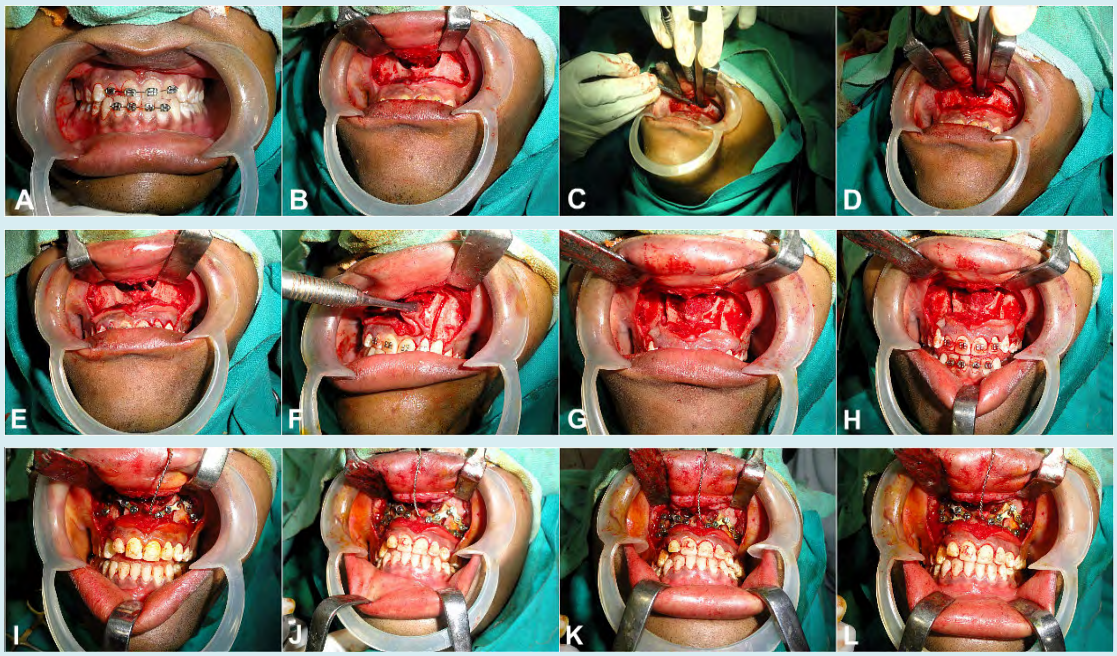

Figure 3: Intra Operative Photographs illustrating Anterior Maxillary Sub-Apical Osteotomy with Pre-Maxillary Advancement and Rigid Internal Fixation. (A, B) Upper incisors were bonded just before the surgery and 017X025 SS wire was inserted and ligated. Horse shoe shaped, high labio-vestibular circumferential incision placed, extending from 1st molar to 1st molar region of each side, to enable direct surgical vision. Mucoperiosteal flap raised exposing the premaxillary bone. (C-E) Nasal mucoperiosteum stripped and reflected from the pyriform rims, Nasal septal osteotomy carried out. (F-G) Premaxillary osteotomy lines marked. Horizontal osteotomy carried out, taking care to stay well above the apices of the anterior teeth, vertical osteotomies carried out carefully between the lateral incisor and canine teeth on each side. (H) Premaxillary segment down fractured, mobilised and anterior traction applied using a stainless steel wire braided through bone just below the anterior nasal spine. (I-L) Premaxillary segment anteriorly repositioned and fixed in place using Titanium minibone plates and screws. (L) Anterior crossbite thus successfully corrected by the premaxillary advancement.

Figure 4: (A-D) Facial appearance on the Seventh Postoperative day, showing marked improvement in the facial balance, proportions and symmetry. The upper and lower lips appeared relaxed, full and symmetrical, with a pleasant appearance. (E-G) Orthopantomogram and Intraoral appearance, showing successful advancement of the Premaxillary segment by 5 mm. (H-K) Twelve months' Postoperative appearance (Front and Profile) showing a definite improvement in the lower third facial proportions and relation, with achievement of a good facial balance, symmetry and esthetics. (L-O) Successful post-surgical orthodontic levelling and alignment, with closure of the spaces between the upper lateral incisor and canine bilaterally, and achievement of a stable Class I Occlusion at the end of treatment.

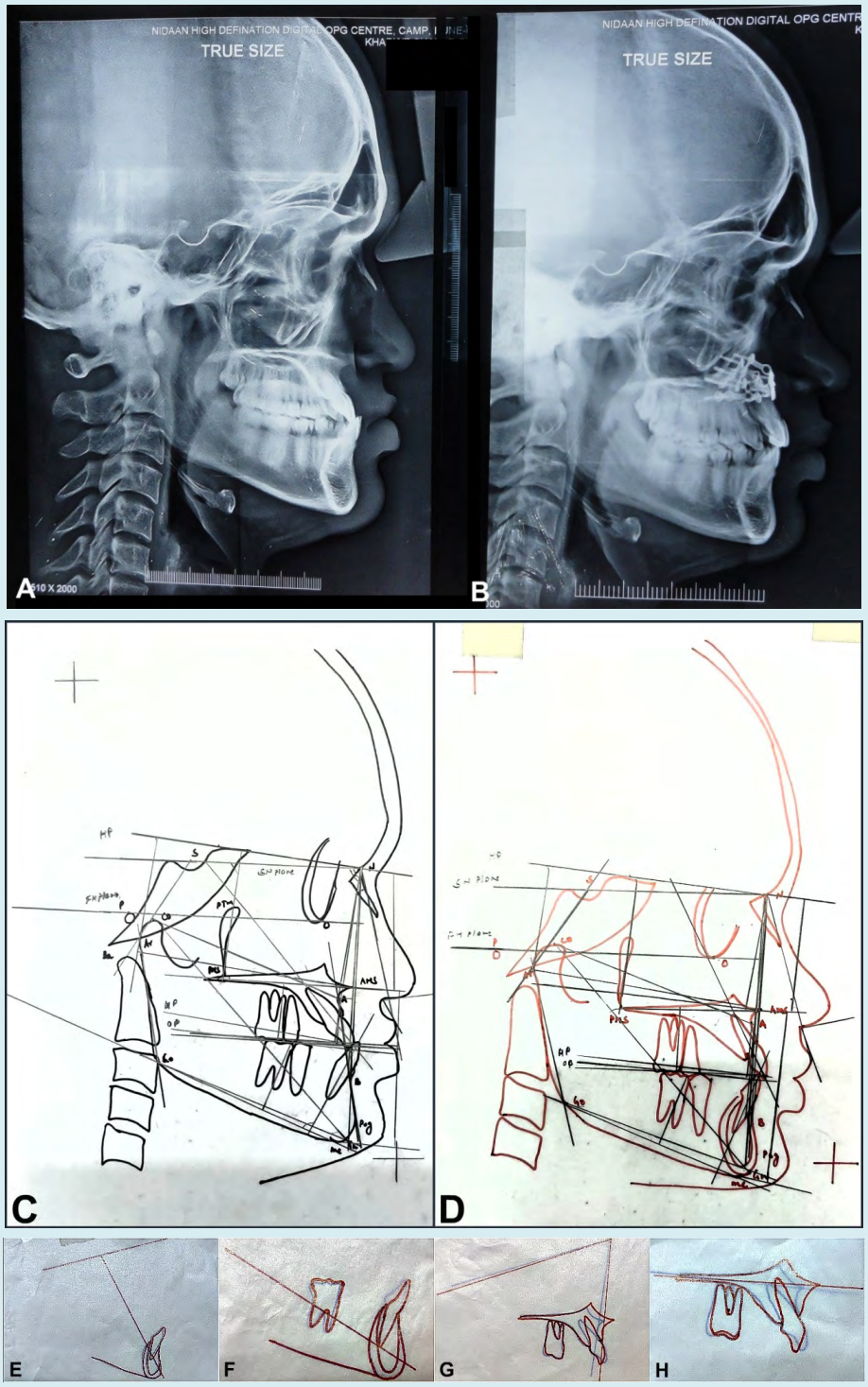

Figure 5: (A, B) Comparison of the Lateral Cephalograms before and after Premaxillary Advancement. (C, D) Comparison of the Pre-(Black) and Post-treatment (Red) Lateral Cephalometric Tracings and Analyses. (E-F) Four Positional Superimpositions on Lateral Cephalogram, demonstrating the changes achieved at the end of the Ortho-surgical management, Blue tracings indicating pre-treatment outlines and Red at completion of treatment. The mildly retroclined lower anteriors have been orthodontically uprighted, the premaxillary component surgically advanced and the proclined upper incisors orthodontically uprighted at the end of twelve months.

This case report illustrates the swift and successful management of a young adult male suffering from an aesthetically debilitating Skeletal Class III facial deformity with significant anterior maxillary retrusion and reverse overjet (Figures 1 & 2). A 'Surgery First, Orthodontics After (SFOA)' protocol was followed, employing an Anterior Maxillary subapical osteotomy with anterior repositioning of the premaxillary segment, maintaining the existing Cl I molar relationship, to effectively correct the cosmetic and functional deformity resulting from the significant anterior crossbite (Figure 3). The surgical premaxillary advancement, was followed by conventional orthodontic treatment to correct the dental spacing and inclinations, and to achieve a Class I Incisor relationship and a stable occlusion, all of which was efficaciously completed in merely twelve months (Figures 4 & 5). This ortho-surgical management protocol produced gratifying results, effectively and expeditiously correcting the significantly impaired facial esthetics, restoring effective masticatory function as well as correcting the impaired speech in the patient. Its speedy execution with quickly appreciable results produced a favourable psychological impact on the patient, and contributed greatly to restoring his confidence and self-esteem, as well as in regaining his drive, motivation and enthusiasm in life.

Case Report

A 21-year-old male patient reported with chief complaints of an unsatisfactory facial appearance caused by the lower jaw "being ahead of' the upper jaw". He also expressed difficulty in incising food. He was mostly concerned and affected by his facial appearance and unesthetic smile, which had made him shy, introverted, reticent and unwilling to meet and interact with people. He had difficulty in making friends and shunned large gatherings and social functions for fear of being ridiculed for his unsightly appearance. The impact of this malocclusion on his day to day life, revealed how much it had affected his psychosocial wellbeing. His past medical history and dental history were non-contributory. He presented with no familial history of Class III malocclusion or any other genetic disorder.

Extra oral Frontal examination revealed competent lips, a non-consonant smile arc, with no gross facial asymmetry in vertical thirds and horizontal fifths of the face (Figure 1A). Profile examination revealed a concave profile with mid-facial deficiency and a reduced nasolabial angle (Figure 1B). Non Contrast Computed Tomographic (NCCT) Scans demonstrated the premaxillary deficiency and proclined upper anteriors, in reverse overjet. The concave skeletal profile was evident (Figures 1C & D). Intraoral Examination and Modal Analysis (Figures 2A &B) revealed presence of 30 teeth of permanent dentition with Class I molar and Class III canine and incisor relation bilaterally. There was seen an anterior crossbite with 11,12,21,22 positioned behind their counterparts of the lower anterior quadrant; and a reverse overjet of 02 mm. The panoramic radiograph showed no gross abnormality, other than congenitally missing lower third molars and impacted upper third molars. Frontal and Lateral Cephalogram revealed Class III Skeletal bases, retrognathic maxilla, prognathic mandible and a reduced Nasolabial angle (Figure 5).

The relationship of the patient's anterior cheek mass to the anterior corneal plane was evaluated to check for bony support along the malar eminence (Figure 1B). The globe was observed to be positioned anterior to the malar eminence, producing a negative vector relationship between the malar eminence and corneal plane, a feature which is commonly seen in patients with maxillary hypoplasia [5].

A thorough functional analysis of the patient revealed that the patient suffered from difficulty in mastication, in particular, in incising using the maxillary and mandibular anterior teeth. Speech analysis revealed distortion in production of the labiodental consonants "f" and "v" and /s/, /z/, th/ and /I/ sounds.

Pre-Treatment Cephalometric and Skeletal Analysis

Pre-treatment Cephalometric Analysis (Figure 5B, Table 1) revealed that the patient had Class III Skeletal bases (SNA = 82°, SNB = 88°, ANB = –6°, Maxillomandibular differential = 29 mm); a Retrognathic maxilla (SNA = 82° and SN to FH Correction of 06°, Pt A to N perpendicular = –6 mm); a Prognathic mandible (SNB = 88°, Pog to N perpendicular = +1 mm); Proclined Upper Incisors (UI to NA= 40°/7 mm, UI to SN = 125°); Optimally placed Lower Incisors (IMPA = 89°), and a Reduced Nasolabial angle (89°). The Jarabak ratio was 79/104% = 75%, indicative of a Horizontal growth pattern). Wits Appraisal: -7 mm (BO is ahead of AO by 7 mm on functional occlusal plane), while the Normal value in Males is -01mm.

Parameter	Values	Norms
SNA	82°	82°
SNB	88°	80°

ANB	–6°	02°
UI-NA	40° (7 mm)	22° (4 mm)
LI-NB	22° (4 mm)	25° (4 mm)
SN-GoGn	20°	32°
FMA	18°	25°
IMPA	89°	100°
UI-SN	125°	102°
A-N perp	–6 mm	0 mm
Pog-N perp	+1mm	–6 mm to +2 mm
Lips to E line	–5 mm/+2 mm	–4 mm/-2 mm
Nasolabial angle	89°	102°

Table 2: Steiner's Analysis (Comparison of Pre- and Post-Treatment Cephalometric Values): Sn to FH – 01 degree.

The patient was in Stage 6 of skeletal maturity, indicative of the present craniofacial skeletal maturational stage as per the Cervical Vertebral Maturation Index (CVMI). Assessment of the Anterior Malar Projection using the Leonard ad Walker on the Lateral Cephalogram, showed the Sella-Nasion-Orbitale (SNO) angulation to be 49°. The negative vector relation of the corneal plane with the malar eminence (Figure 1B), was suggestive of Maxillary hypoplasia, a finding consistent with other Cephalometric and Visual Photographic findings [4].

Treatment

The Treatment Plan consisted of an Ortho-surgical management protocol employing a 'Surgery first - Orthodontics later' approach. The surgery comprised of Anterior Maxillary Subapical osteotomy for premaxillary advancement by 5mm (Figure 3), in order to correct the reverse overjet and maxillary anterior dental proclination. This would thereafter be followed by fixed mechanotherapy using 022X028 MBT preadjusted appliances for closure of spaces and dental levelling and alignment.

The upper incisors were bonded just before the surgery and 017X025 SS wire was inserted and ligated (Figure 3A). The patient was operated under General Anaesthesia. An upper vestibular incision was placed from molar to molar region and a full thickness mucoperiosteal flap raised, exposing the anterior maxilla. The nasal septum was separated from the segment to be mobilised, using the septal osteotome (Figure 3B & C). The horizontal osteotomy was planned extending from the pyriform rim bases to the canine region high enough so as to avoid the root apices of the maxillary anteriors, bilaterally. Vertical osteotomy was carried out on each side between the canine and lateral incisor, taking care to avoid damaging the roots of either (Figure 3C). The Anterior Maxillary Subapical Osteotomy followed by labial down fracture was completed and premaxillary mobilisation and advancement by 5 mm was carried out, followed by rigid fixation of the segment using Titanium minibone plates and screws (Figure 3D). The premaxillary advancement of 05 mm was needed to correct both, the reverse overjet and also allow space to correct the excessive maxillary anterior proclination. Surgery was followed by fixed mechanotherapy, using 022X028 MBT preadjusted appliances. Following surgery, the space was created at the distal aspect of lateral incisor bilaterally, was utilized to correct the maxillary anterior proclination. Routine orthodontic treatment including levelling and alignment and closure of spaces was carried out following the surgery (Figures 4C & D). Total treatment duration to complete the treatment was 12 months.

Results

Postoperative recovery following surgery was smooth and uneventful. There was an immediate and appreciable improvement in the patient's facial appearance (Figures 4A & B). The concave facial profile was successfully corrected. The upper and lower lips now appeared full, symmetrical, well-proportioned, relaxed and balanced, in contrast to the earlier appearance of pursed and inverted upper lip and everted and projecting lower lip, prior to the premaxillary advancement surgery. Orthopantomogram and Intraoral appearance, showed successful advancement of the Premaxillary segment by 5 mm. Successful post-surgical orthodontic levelling and alignment, with closure of the spaces between the upper lateral incisor and canine bilaterally, and a stable Class I Occlusion (anterior and posterior) was achieved at the end of twelve months (Figures 4C & D).

Parameters	Normal values	Pre-treatment	Post-treatment
SNA	82° + 2°	82°	87°
SNB	80° + 2°	88°	88°
ANB	2°	-6°	-1°
1 to N-A	4mm/22° + 2°	7mm/40°	5mm/30°
1 to N-B	4mm/25° + 4°	4mm/22°	4mm/23°
1 to 1	131°	136°	130°
Occ to S-N	14°	10°	10°
Go Gn to S-N	32°	20°	21°

Table 2: Steiner's Analysis (Comparison of Pre- and Post-Treatment Cephalometric Values): Sn to FH – 01 degree

Parameters	Normal value	Pre-treatment	Post-treatment
FMA	25° + 2°	18°	19°
IMPA	90° + 5°	89°	91°
FMIA	65° + 3°	82°	80°

Table 3: Tweed's Analysis (Comparison of Pre- and Post- Treatment Cephalometric findings).

Parameters	Normal value	Pre-treatment	Post-treatment
Saddle angle	123° + 5°	122°	122°
Articulare angle	143° + 6°	139°	139°
Gonial angle	128° + 7°	114°	114°
Bjork angle	394° + 4°	375°	375°

Table 4: Bjork's Analysis (Comparison of Pre- & Post-Treatment Cephalometric findings).

Parameters	Normal values				Pre-treatment	Post-treatment
	Males		Females			
	Mean	SD	Mean	SD		
Maxilla to Cranial base						
Nasion vert. to Point A (Maxillary Protrusion) (mm)	1.1	2.7	0.4	2.3	-6	-1
SNA Angle	83.9°	3.2°	82.4°	3°	82°	87°
Nasolabial Angle	102°	8°	102°	8°	89°	93°
Inclination of Upper lip	14°	7.8°	14°	8.2°	10°	11°
Mandible to Maxilla						
EL Max.(Co-A) (mm)	99.8	6	91	4.3	77	82
EL Mand (Co-Gn) (mm)	132.3	6.8	120.2	5.3	106	106
Maxillomandibular differential (mm)	32.5	4	29.2	3.3	29	34
Lower Ant. Facial height (mm)	74.6	5	66.7	4.1	59	59
Mand Plane (FH – Go Me)	21.3°	3.9°	22.7°	4.3°	17°	17°
Mandible to Cranial base						
Pog - Na Prep (mm)	-0.3	3.8	-1.8	4.5	1	1
Dentition						
Max. incisor protrusion (mm)	5.3	2	5.4	1.7	7.5	5
LI to A-Pog (mm)	2.3	2.1	2.7	1.7	3.5	4

Table 5: McNamara's Analysis (Comparison of Pre- and Post-Treatment Cephalometric findings).

Parameters	Normal values				Pre-treatment	Post-treatment
	Males		Females			
	Mean	SD	Mean	SD		
Cranial base						
Ar-PTM (HP) (mm)	37.1	2.8	32.8	1.9	33	33
PTM-N (HP) (mm)	52.8	4.1	50.9	3	46	46
Horizontal (Skeletal)						
N-A-Pg angle (deg)	3.9°	6.4°	2.6°	5.1°	-10°	-5°
N-A(HP) (mm)	0	3.7	-2	3.7	-3	0
N-B (HP) (mm)	-5.3	6.7	-6.9	4.3	5	5
N-Pg(HP) (mm)	-4.3	8.5	-6.5	5.1	9	9
Vertical (Skeletal, Dental)						
N-ANS(-HP) (mm)	54.7	3.2	50	2.4	44	44
ANS-Gn (-HP) (mm)	68.6	3.8	61.3	3.3	53	53
PNS- N (HP) (mm)	53.9	1.7	50.6	2.2	44	44
MP-HP angle (deg)	23.0°	5.9°	24.2°	5.0°	14°	14°
Upper incisor-NF (NF) (mm)	30.5	2.1	27.5	1.7	30	31
Lower incisor-MP (- MP) (mm)	45	2.1	40.8	1.8	40	40
Upper molar- NF (- NF) (mm)	26.2	2	23	1.3	21	21
Lower molar – MP (-MP) (mm)	35.8	2.6	32.1	1.9	32	32
Maxilla, Mandible						
PNS-ANS (HP) (mm)	57.7	2.5	52.6	3.5	49	54
Ar-Co (linear) (mm)	52	4.2	46.8	2.5	48	48
Go-Pg (linear) (mm)	83.7	4.6	74.3	5.8	71	71
B- Pg (MP) (mm)	8.9	1.5	7.2	1.9	10	10
Ar-Go-Gn angle (deg)	119.1°	6.5°	122°	6.9°	116°	116°
Dental						
OP upper-HP angle (deg)	6.2°	5.1°	7.1°	2.5°	--	--
OP lower- HP angle (deg)	--	--	--	--	--	--
A-B (OP) (mm)	-1.1	2	-0.4	2.5	2	2
Upper incisor-NF angle(deg)	1110	4.7	112.5	5.3	1230	1120
Lower incisor-MP angle(deg)	95.9	5.2	95.9	5.7	970	980

Table 6: Legan & Burstone's C O G S (Comparison of Pre- and Post- Surgery Cephalometric findings).

Parameter	Pre-treatment Values	Post-treatment Values	Norms
SNA	82°	87°	82°
SNB	88°	88°	80°
ANB	–6°	–1°	02°
UI-NA	40° (7 mm)	30° (5 mm)	22° (4 mm)
LI-NB	22° (4 mm)	23° (4 mm) .	25° (4 mm)
SN-GoGn	20°	20°	32°

FMA	18°	19°	25°
IMPA	89°	91°	100°
UI-SN	125°	115°	102°
A-N perp	–6 mm	–1mm	0 mm
Pog-N perp	+1mm	+1mm	–6 mm to +2 mm
Lips to E line	–5 mm/+2 mm	–3 mm/+2 mm	–4 mm/-2 mm
Nasolabial angle	89°	93°	102°

Table 7: Comparison of the Pertinent Pre- and Post-Treatment Cephalometric Values.

Pre- and Post-treatment Cephalometric Analyses:
(Tables 2-7; Figures 5A-H)
Steiner's Analysis (Table 2)
Tweed's Analysis (Table 3)
Bjork's Analysis (Table 4)
McNamara's Analysis (Table 5)
Legan & Burstone's COGS (Table 6)
Comparison of Pertinent Pre-& Post-treatment Cephalometric Analysis (Table 7)

Discussion

Management of Class III malocclusion, whether it is due Maxillary deficiency or Mandibular excess or a combination of both, is always a challenging and daunting task. The treatment plan varies depending on the patient's age and skeletal maturity. According to Ellis E, et al. [5], the most common presentation of Skeletal Class III malocclusion is maxillary skeletal retrusion. Other studies Proffit WR, et al. [6] have reported that maxillary deficiency is the primary problem in 40% of the cases, mandibular excess in 42%, and a combination of both in 18% of the cases. Although the prevalence of Skeletal Class III malocclusion is less as compared to Skeletal Class II malocclusion, it is widely acknowledged that a significantly greater number of Class III patients are adversely affected aesthetically and psychologically by their condition, and are hence more likely to seek treatment. Existing data on the management of Class III patients indicates that a large proportion, i.e. greater than one-third of Class III patients, require orthognathic surgery, whereas only 5% of Class II patients require surgical intervention [7].

As our patient presenting with a Skeletal Cl III deformity was a young adult male, who had reached a marriageable age, his facial deformity and speech difficulties had significantly impacted him psychologically, and created in him a deep sense of inferiority and dissatisfaction. He was visibly shy, reticent, uncommunicative and introverted. He had attempted to mask his retruded maxilla, albeit unsuccessfully, by growing a moustache. His unsatisfactory facial appearance and unclear enunciation had made him seek urgent treatment.

Anterior crossbite or negative overjet influences articulation owing to anterior positioning of tongue relative to maxilla [2]. Speech distortions, including articulation errors and spectral distortions in consonants, are seen 18 times more frequently in Class III dentofacial disharmony patients than the general population. These Speech abnormalities accompanying Skeletal Cl III MO include significant differences in spectral properties of stop (/t/ or /k/), fricative (/s/ or /ʃ/), and affricate (/tʃ/) consonants. Class III patients appear to have a more anterior constriction location for speech and this could be possibly related to their maxillary deficiency. Anterior crossbite or negative overjet could influence articulation with positioning of tongue anteriorly relative to maxilla and as the maxilla is retrognathic, this may make it harder for the patient to produce labiodental consonants. In our patient too, the retrognathic maxilla and retro positioning of the upper incisors made it harder for him to produce labiodental consonants.

Most Skeletal Class III patients exhibit dental compensations in the form of proclined maxillary incisors and retroclined mandibular incisors, accompanying the reverse overjet / anterior crossbite. So was the case in our patient. In addition, the skeletal Cl III presentation was largely due to a Premaxillary retrusion. Although the posterior teeth were in Cl I Occlusion, the anterior teeth were in crossbite, making him an ideal candidate for Anterior Maxillary Subapical Osteotomy and advancement, whilst maintaining the Cl I molar relationship.

The presently popular approaches to manage such patients include either Premaxillary Distraction Osteogenesis or the standard Orthodontic treatment first, followed by Orthognathic surgery. In recent past, the 'Surgery-first Orthodontics after (SFOA)' approach has gained widespread support and popularity, as it propounds an early correction of skeletal malformation / deformity, which allows a quicker improvement of the patient's facial esthetics and dental function, thus more effectively alleviating the patient's psychosocial trauma associated with the skeletal deformity.

This also leads to better patient compliance throughout the subsequent orthodontic phase, with good overall treatment outcomes. Most importantly, the total treatment duration is substantially and significantly shorter in this contemporary surgery-first approach, which is of tremendous benefit for and greatly appreciated by today's patients in their fast paced and active lifestyles.

The Anterior Maxillary Subapical Osteotomy (AMSO) is a surgical procedure employed primarily to reposition the anterior dento-osseous segment anteriorly or posteriorly [8,9]. This procedure has a number of advantages, such as a relatively less invasive and simple surgical procedure, good access and direct vision of the operative field, a profuse blood supply of the anterior maxillary segment /pedicle, a low incidence of intra- or post-operative complications, nil alteration of occlusal molar relation, almost no impact on the temporomandibular joint, and a very low rate of relapse [10]. Several approaches for AMSO have been advocated like Wassmund's technique introduced in 1927 [11], Wunderer's technique [12] in 1963 and Cupar's technique [13] in 1954

This ortho-surgical procedure also offers several advantages in advancement of the premaxilla, over the hitherto popular Distraction Osteogenesis (DO) [14]. As the post-surgical results obtained are apparent immediately, this procedure provides a distinct psychological advantage over DO, in which appreciable changes would be apparent only after the distraction phase is complete. There is better acceptance by the patient as the results are apparent immediately following surgery, and do not depend upon continuing compliance on the part of the patient all through the distraction procedure. In DO, any interruption of treatment during the latency, distraction or consolidation phase, could jeopardise the entire procedure and compromise the results thereof [15]. DO is technique sensitive and needs strict adherence to the timelines of the various phases of the distraction stages, unlike orthognathic surgery, in which the entire premaxillary movement (advancement or setback) is completed intraoperatively by the surgeon [16,17].

Discomfort caused to the patient during the distraction phase, brought about by the stretching apart of the hard and soft tissues during the controlled fractional traction, is avoided in orthognathic surgery as postoperatively there is no manipulation required and the soft tissue healing and bone callus formation and consolidation at the osteotomy site proceeds unhindered. Profuse blood supply of the palatal pedicle ensures ample and good perfusion to the anterior maxillary segment, making this mildly invasive orthognathic procedure reliable, efficacious and with least chances of relapse, more so as the advanced premaxillary segment is held firmly and rigidly in place by minibone plates and monocortical screws [18].

Another factor weighing down on DO is that the Premaxillary rotation which almost invariably occurs during both tooth-supported and bone supported DO, is avoided in Orthognathic surgery, as the osteotomised premaxillary segment is moved, positioned and fixed with plates and screws in exactly the position that is desired, leaving no room for developing discrepancies in segment position [19].

Conclusion

The efficacy, predictability and stability of the Anterior Maxillary Subapical Osteotomy with Premaxillary mobilisation & advancement procedure followed by Post-Surgical Orthodontics, has made it a viable and in fact, a favourable option in expeditious correction of select cases of CL III Dentofacial Disharmony with maxillary retrognathism and anterior crossbite. As compared to conventional Orthognathic surgical procedures as well as Distraction Osteogenesis, the complete treatment time of this protocol is relatively shorter, results are apparent earlier, improvement in facial esthetics is gratifying, and patient motivation as well as compliance is higher, yielding an overall highly satisfactory outcome.

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Ethical Statement

This research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The ethics review committee of the Command Hospital Eastern Command, Indian Army approved this study on Month 11, 2022. Number: 11123. Date: 03.11.2022.

Declaration of Interest Statement

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

Credit Authorship Statement

We herewith assure that we conducted and wrote the present Paper, that the Study has not been partially or fully submitted as graded academic work and that we have used no other means than the ones indicated.

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