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## Orthodontic Camouflage of Skeletal Class I, Class II and Class III Malocclusion in Borderline Cases—Report of Three Cases

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### Case Report

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#### ABSTRACT

Orthodontic camouflage treatment is a favourable option when orthognathic surgery is not preferred in borderline cases. It involves creating space by proximal stripping, incisor triangulation or extraction and then moving the teeth in to this space to improve the facial profile. Camouflage with proximal stripping can be done to avoid extraction. In this article we have discussed three case reports treated with orthodontic camouflage and have achieved a favourable dental and soft tissue profile within a year.

### INTRODUCTION

Orthodontic camouflage means creating dental compensation for underlying skeletal discrepancy without actually correcting the underlying skeletal discrepancy<sup>[1]</sup>. Interproximal enamel reduction is a clinical procedure involving the reduction of proximal enamel surfaces of teeth. The aim of reduction is to gain space for orthodontic treatment. In literature, this clinical act normally referred as “stripping” although the other names such as slicing, Hollywood trim, selective grinding, mesiodistal reduction, re-approximation, interproximal stripping (IPS), coronoplastia and air-rotor stripping<sup>[2]</sup>. The use of this procedure has increased in the recent years with the desire of orthodontist to treat variety of malocclusion with less of extractions.

#### Indications

1. Patient is too old for growth modification.
2. Mild to moderate skeletal discrepancy.
3. Good vertical facial proportions neither extreme short face nor long face.

#### Contraindications

1. Severe class I, class II, class III and vertical skeletal discrepancies.
2. Severe crowding and protrusion of incisors.
3. Patients with excellent remaining growth potential.

IPS was first used only for stripping mandibular incisors with the aim of preventing and correcting crowding. Areas of application have continued to grow [2]. Following are three case reports which were treated by camouflaging of underlying skeletal discrepancy.

## CASE 1

A 15 year female reported with complaint of malalignment and forwardly placed upper teeth. the patient had an apparently symmetrical mesoprosopic face, competent lips with non-consonant type with 80% upper incisors, some amount of lower incisors visible. She revealed full complement of permanent teeth except third molars. Periodontium appeared healthy with melanin pigmentation of attached gingiva. Moderate crowding in upper and lower incisors with lingual non-occlusion in 1st molar on right side and 2nd premolar on left side. Over jet and overbite were increased. Lower dental midline deviated towards left side. She had class I molar and canine relation except on left side had class II canine relation.

Patient showed normal speech pattern, nasal breathing and typical swallowing pattern. The path of closure of mandible was normal without any deviation and there were no other associated signs or symptoms of TMD. Examination of study casts showed symmetrical, square shaped upper and lower arches. The Overjet was 5.5 mm and overbite was 4.5 mm. Curve of spee is exaggerated. Lingual non-occlusion with 1st molar on right side and 2<sup>nd</sup> premolar on left side. Lower midline shifted towards left. The Discrepancy in upper arch was 18 mm due to proclination and crowding and in lower arch was 10 mm.

After thorough evaluation of study models and cephalogram (**Table 1**), she was diagnosed to have skeletal class I malocclusion with increased over jet and overbite, non-consonant smile. It was decided to do non extraction treatment with Edgewise Appliance .Treatment started with initial nitinol wires. IPS in both upper and lower arch was done and cross bite correction elastic was used to correct the lingual non-occlusion. All corrections were achieved in 18 months. Patient is in retention phase (**Figures 1A-1D**).

**Table 1.** Cephalometric parameter measured of the case 1 before and after treatment.

Measurements	Normal	Pre	Post
SNA	83.4 ± 1.9°	81°	86°
N-perpendicular to Point-A	-1.5 ± 2.7 mm	-4.5 mm	-2 mm
Effective maxillary length	93.6 ± 3.2 mm	85 mm	87 mm
Angle of convexity	0°	10.5°	8.5°
SNB	81.1 ± 2°	77.5°	82°
N-perpendicular to Point-Pog	-3.5 ± 5.3 mm	14.5 mm	-3.5 mm
Effective mandibular length	121.6 ± 4.5 mm	111 mm	112 mm
Facial angle	87.8°	90°	88°
AO-BO	0 mm	-1.5 mm	0 mm
ANB	2.3 ± 3.2°	3.5°	4°
Mx-Md Differential	28.6 ± 3.2 mm	26 mm	25 mm
Basal plane angle	25° ± 5°	28°	29°
FMA	21.9°	29°	30°
SN-GoGn	32°	30°	33°
Y-axis	59°	62°	59°
Facial axis	90 ± 3.5°	-10	-2.5
Jarabak's ratio	62-66%	66.6	650
LAFH: UAFH	55:45°	56:44°	56:44°
Upper incisor to NA	22°/4 mm	30°	20°
		7 mm	4 mm
Upper incisor to A-Pog	2-7 mm	12 mm	7 mm
Upper incisor to SN	10 2°	114.5°	10 7°
Lower incisor to NB	25° / 4 mm	22°	90°
IMPA	10 2.4°	90°	95°
Lower incisor to A-Pog	1.2 ± 1.4 mm	+3 mm	3 mm
Lower incisor to N-Pog	0 mm	+3.5 mm	7 mm
Nasolabial angle	102 ± 8°	95°	98°
Upper lip to E line	-2 mm	-1 mm	-1.5 mm
Lower lip to E line	-1 mm	+2 mm	+1.5 mm
H angle	-	15.5°	15.5°



**Figure 1A.** Pretreatment front photo of case 1.



**Figure 1B.** Mid-treatment front photo of case 1.



**Figure 1C.** Pretreatment intraoral photo case 1.



**Figure 1D.** Mid-treatment intraoral photo of case 1.

## CASE 2

A 14-year-old female reported with the complaint of crowding in the upper and lower front teeth. She had typical features of class II division 2 malocclusion. The patient had an apparently symmetrical mesoprosopic face, potentially competent lips, with her smile was non-consonant with 100% upper incisor and some amount of gingival display.

Intra-Oral Examination revealed full complement of permanent teeth except third molars. Periodontium appeared healthy with melanin pigmentation of attached gingiva. Both retroclined upper and lower incisors with proclined upper lateral incisors with moderate crowding in lower anterior segment. Increased overbite and decreased overjet. She had class 2 molar and canine relations on both sides. Upper dental midline coinciding with facial midline.

Examination of study casts showed symmetrical square shaped upper arch and 'U' shaped lower arch. The overbite was 8

mm and curve of speemildly exaggrarated. Discrepancy in upper arch was 11 mm and in lower arch was 9 mm. crowding in lower arch was 5 mm and 3 mm in upper arch. After thorough evaluation of study model and cephalogram (**Table 2**), she was diagnosed to have skeletal class II malocclusion with discrepancy of 11 mm and 9 mm in upper-lower arch. Treatment was started with 0 .0 18” Roth prescription. Proximal stripping was done and class II elastic was used to correct the molar relationship. Treatment finished in 13 months with continuing retention phase (**Figures 2A-2F**).

**Table 2.** Cephalometric parameter measured of the case 2 before and after treatment.

Measurements	Normal	Pre	Post
SNA	83.4 ± 1.9°	84°	83°
N-perpendicular to Point-A	-1.5 ± 2.7 mm	-5 mm	-2 mm
Effective maxillary length	93.6 ± 3.2 mm	82 mm	83 mm
Angle of convexity	0°	13°	10°
SNB	81.1 ± 20	780	780
N-perpendicular to Point-Pog	-3.5 ± 5.3 mm	-16 mm	-12 mm
Effective mandibular length	121.6±4.5 mm	104 mm	108 mm
Facial angle	87.8°	81°	83°
AO-BO	0 mm	-3 mm	-2 mm
ANB	2.3 ± 3.2°	6°	5°
Mx-Md Differential	28.6 ± 3.2 mm	22 mm	25 mm
Basal plane angle	25° ± 5°	25°	25°
FMA	21.9	300	300
SN-GoGn	320	260	300
Y-axis	590	640	680
Facial axis	90 ± 3.50	-30	-40
Jarabak’s ratio	62-66%	64%	66%
LAFH: UAFH	55:45	56:44	56:44
Upper incisor to NA	22°/4 mm	02°	19°
Upper incisor to A-Pog	2-7 mm	3 mm	8 mm
Upper incisor to SN	102°	82°	101°
Lower incisor to NB	25°/4 mm	14°	30°
IMPA	102.4	82°	95°
Lower incisor to A-Pog	1.2 ± 1.4 mm	0 mm	3 mm
Lower incisor to N-Pog	0 mm	2 mm	5 mm
Nasolabial angle	102 ± 8°	86°	92°
Upper lip to E line	-2 mm	0 mm	1 mm
Lower lip to E line	-1 mm	+1.5 mm	+5 mm
H angle	-	220	22.5



**Figure 2A.** Pretreatment extraoral case 2.



**Figure 2B.** Finishing stage extraoral case 2.



**Figure 2C.** Pretreatment intraoral case 2.



**Figure 2D.** Mid-treatment intraoral photo of case 2.



**Figure 2E.** Pretreatment intraoral case 2.



**Figure 2F.** Mid-treatment intraoral photo of case 2.

### CASE 3

A 25 year male reported, with complaint of poorly aligned upper and lower front teeth. The patient had an apparently symmetrical mesoprosopic face, competent lips His smile was non-consonant type with 50% upper incisors and some amount of lower gingival visible. Intra-Oral Examination revealed full complement of permanent teeth from third molar to third molar. Periodontium appeared healthy with mild melanin pigmentation of attached gingiva. Lower incisors were retroclined and crowded. Reverse over jet and mild increased overbite. He had half cusp Class III molar and class I canine relation on both sides. Lower dental midline was shifted on right side.

Examination of study casts showed symmetrical, square shaped upper and 'U' shaped lower arches. Reverse overjet and 3.5 mm of overbite. Curve of spee was normal. Moderate crowding in upper and lower anterior region. Discrepancy in upper arch was 6 mm and in lower arch was 9 mm. Rotation seen with upper right central incisor.

Clinical and cephalometric examination revealed a case of skeletal class III malocclusion (**Table 3**). Non-extraction treatment with proclination of upper incisors and proximal stripping for relieving crowding in lower anterior was planned with standard

edgewise (0.0 18" slot). Active phase got over in 18 months with continuing retention phase (Figures 3A-3F).

**Table 3.** Cephalometric parameter measured of the case 3 before and after treatment.

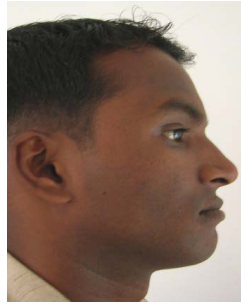
Measurements	Normal	Pre	Post
SNA	83.4 ± 1.9°	84°	81°
N-perpendicular to Point-A	-1.5 ± 2.7 mm	-2 mm	-3 mm
Effective maxillary length	93.6 ± 3.2 mm	94 mm	92 mm
Angle of convexity	0°	6°	400
SNB	81.1 ± 20	860	830
N-perpendicular to Point-Pog	-3.5 ± 5.3 mm	+2.5 mm	+2.5 mm
Effective mandibular length	121.6 ± 4.5 mm	126 mm	121.5 mm
Facial angle	87.8°	90°	88°
AO-BO	0 mm	+3 mm	+4 mm
ANB	2.3 ± 3.2°	2°	2°
Mx-Md Differential	28.6 ± 3.2 mm	32 mm	29.5 mm
Basal plane angle	25° ± 5°	20°	22°
FMA	21.9°	23°	26°
SN-GoGn	32°	22°	27°
Y-axis	59°	57°	67°
Facial axis	90 ± 3.5°	3.5°	1.5°
Jarabak's ratio	62-66%	70%	70%
LAFH: UAFH	55:45	56:44	56:44
Upper incisor to NA	22° / 4 mm	23.5°	37°
Upper incisor to A-Pog	2-7 mm	5 mm	7 mm
Upper incisor to SN	102°	2.5 mm	111°
Lower incisor to NB	25° / 4 mm	20°	19°
IMPA	102.4°	3 mm	3 mm
Lower incisor to A-Pog	1.2 ± 1.4 mm	87°	87°
Lower incisor to N-Pog	0 mm	6 mm	5 mm
Nasolabial angle	102 ± 8°	5 mm	3.5 mm
Upper lip to E line	-2 mm	97°	92°
Lower lip to E line	-1 mm	-6 mm	-3.5 mm
H angle	-	0 mm	+1 mm
		10°	12.5°



**Figure 3A.** Pre-treatment extraoral photo case 3.



**Figure 3B.** Post treatment front photo case 3.



**Figure 3C.** Pretreatment extraoral photo case 3.



**Figure 3D.** Post-treatment lateral photo of case 3.



**Figure 3E.** Pre-treatment intraoral case 3.



**Figure 3F.** Post treatment intraoral case 3.

## DISCUSSION

Patients with large skeletal discrepancies want dramatic change so greatly that the risk of surgery is perceived to be worth it. Others, like this patient with smaller skeletal discrepancies, felt surgery was not worth the cost, discomfort, inconvenience or risk. It has been shown that for adult Class II patients at the orthodontic/surgical borderline, orthodontic treatment alone produces an outcome that is well received aesthetically as that of the surgical alternative. Furthermore, there were no significant differences in craniomandibular function or incisor stability. It's noteworthy that 3 of 26 surgical patients studied by Cassidy et al experienced extensive relapse. They concluded that for borderline patients who can be treated either way, orthodontics probably is a better strategy<sup>[3]</sup>.

Prior to Interproximal reduction, intra-arch space was solely created by extraction, expansion or surgery. Clinicians have followed various methods to resolve a skeletal class I, class II, and class III by orthodontic Camouflage. In skeletal class I malocclusion, camouflage is done by doing extractions, incisor re-angulation and proximal stripping. Sheridan had done a study and evaluated that 8 mm to 12 mm of space can be gained in each arch by air-rotor stripping<sup>[4]</sup>. We have done the IPS in case 1 to achieve better dental and soft tissue results.

Camouflage in skeletal class II malocclusion includes use of elastics, differential and asymmetric extractions, retracting the

upper incisors, advancing the lower incisors, re-angulation of anterior, or by repositioning the chin and the nose. Study done by Proffit et al suggests that the selection of case should be done properly because total treatment out come along with treatment duration changes accordingly <sup>[5]</sup>. Colin and Bell also had the same results in their study. According to them an ideal patient for camouflage should have reasonably good facial esthetics initially. More severe the mandibular deficiency and greater the over jet, than greater is the need for surgery to obtain satisfactory clinical correction <sup>[6]</sup>. We have done proximal stripping and used inter arch elastics in skeletal class II malocclusion to achieve good dental and facial profile.

Costa et al reported a case which was treated orthodontically with extraction of mandibular premolars in a 15 year male leading to harmonious dental occlusion. But extraction of mandibular premolars carries the risk of over retraction of mandibular incisors thereby increasing the chin prominence <sup>[7]</sup>. Nikia et al. conducted a study on thirty classes III patients treated by orthodontic camouflage without extraction and found good improvement in dental as well as soft tissue profile <sup>[8]</sup>.

We have followed non-extraction method of treatment in all three cases described here. All of them were mild skeletal patients. Interproximal stripping was done in all the cases to relieve the crowding. Posterior bite plate was used in class III case till the correction of reverse over jet. Multi-loop arch wires, copper Ni Ti wires were used in the initial phases of the treatment.

## **SUMMARY AND CONCLUSION**

The goal of dental camouflage is to disguise the unacceptable skeletal relationships by orthodontically repositioning the teeth in the jaws so that there is an acceptable dental occlusion and an aesthetic facial appearance. Orthodontic Camouflage was used in three cases of different skeletal malocclusion in this report. Total treatment period was 12-18 months and at the end of which all the patients had harmonious dental occlusion and acceptable facial esthetics. Post orthodontic results of our 3 cases were justifying the statement given by David Turpin that “camouflage is not a compromise in treatment outcome” <sup>[9]</sup> and it has reduced the pain to both the patient and the orthodontist.

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