



## ORIGINAL-ARTICLE

# Importance of Maintenance of Oral Hygiene to Achieve Effective and Efficient Orthodontic Treatment Results- A Case Report on Ortho-Perio Interdisciplinary Relationship

Dr. Devika Umalkar<sup>1\*</sup> | Dr. Bhushan Jawale<sup>2</sup> | Dr. Lishoy Rodrigues<sup>3</sup> | Dr. Shilpa Jamenis<sup>4</sup> | Dr. Neeraj Kolge<sup>5</sup>

1. Associate Professor, Dept of Orthodontics and Dentofacial Orthopedics, Sinhgad Dental College and Hospital, Vadgaon Bk, Pune, Maharashtra, India

2. Private Practice, Smile and Shine Orthodontic Care, Pune, Maharashtra, India

3. Assistant Professor, Dept of Orthodontics and Dentofacial Orthopedics, Sinhgad Dental College and Hospital, Vadgaon Bk, Pune, Maharashtra, India

4. Professor, Dept of Orthodontics and Dentofacial Orthopedics, Sinhgad Dental College and Hospital, Vadgaon Bk, Pune, Maharashtra, India

5. Assistant Professor, Dept of Orthodontics and Dentofacial Orthopedics, MGM Dental College and Hospital, Navi Mumbai, Maharashtra, India

## Abstract

This case report evaluates management of a patient with class II skeletal pattern with Class I molar relationship and class II division 2 incisor relationship. The case required extraction of 1st premolars for correction of the crowding and proclination. Clinical and cephalometric evaluation revealed skeletal Class II malocclusion with crowding and a convex facial profile, an average to horizontal growth pattern, incompetent lips, a posterior divergent face, increased overjet and overbite. Following fixed orthodontic treatment by removal of 1st premolars in the upper and lower arch with retraction of anterior segment, a marked improvement in patient's smile, facial profile and occlusion was achieved and there was a remarkable increase in the patient's confidence and quality of life. The profile changes and treatment results were demonstrated with proper case selection and good patient cooperation with fixed appliance therapy. While patient was undergoing orthodontic treatment according to the treatment plan, generalized gingival overgrowth was seen because of extremely poor oral hygiene. Surgical intervention was done to contour gingiva and to remove all the infected tissue. Poor oral hygiene lead to bone loss and irreversible gingival recession.

**Keywords:** Ortho-Perio Relationship, Poor Oral hygiene, Therapeutic Extractions, Crowding, Class II malocclusion, Angles class I molar, Fixed Orthodontic treatment, 1st Premolar Extraction, Orthodontic Camouflage,

**Copyright:** © 2023 the Authors. Published by Publisher. This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0>)

## 1 | INTRODUCTION

Poor oral hygiene may lead to multiple issues like halitosis, gingivitis, plaque formation. If not

controlled and maintained at initial stage, within no time it may lead to an advanced stage where the loss is irreversible. In advanced stage, it may lead

to periodontitis, bone loss, pocket formation etc. Oral hygiene maintenance during Orthodontic treatment is a challenge to patients as brackets and wire make it difficult. (1), (2) it is an extremely important responsibility of a health care provider to make patient realize importance of oral hygiene. Toothbrushing, complementary aids (dental floss, single-tufted brushes, toothpicks, water irrigators, disclosing agents, salivary stimulation, tooth positioners) and chemical cleaning (urea peroxide, chlorhexidine) should be a part of maintenance. This was a case of correction of a Class II division 2 with 70% deepbite. The treatment was proceeded by extraction of all four 1st premolars. Ideal treatment plan would have been surgical intervention to advance chin. It eventually depends mainly upon the severity of the malocclusion (3), (4) and the amount of needed tooth movements. (3), (5) According to IOTN, majority of the patients seek Orthodontic Treatment for esthetics followed by improvement of oral hygiene. Many studies claim, the patients who had received orthodontic treatment displayed superior oral hygiene to those dental patients who had not received orthodontic treatment. Though, maintaining oral hygiene during Orthodontic Treatment is critical and at most important. Failed to maintain, may lead to irreversible damage.

**Supplementary information:** The online version of this article ([https://doi.org/10.52845/\(rrarjmcs/2023/9-5-2\)](https://doi.org/10.52845/(rrarjmcs/2023/9-5-2))) Contains supplementary material, which is available to authorized users.

**Corresponding Author:** Dr. Devika Umalkar, Associate Professor, Dept of Orthodontics and Dentofacial Orthopedics, Sinhgad Dental College and Hospital, Vadgaon Bk, Pune, Maharashtra, India

## 2 | CASE REPORT

### Extra-Oral Examination

A 22 year old female patient presented with the chief complaint of forwardly placed upper front teeth. On Extraoral examination, the patient had a convex facial profile, grossly symmetrical face on both sides with a retruded chin, reverse lip curve with increased lip strain, moderately deep mentolabial sulcus and an acute Nasolabial Angle, a Mesoprosopic facial form. The patient had no relevant prenatal, natal, postnatal history, history of habits or a family history. On Smiling, there was excessive show of maxillary anterior teeth. The patient had a toothy smile. On smiling presence of crowded anterior dentition and an unaesthetic smile was seen.



**Fig.1:** Pre Treatment Extra-Oral Photographs

### INTRA-ORAL EXAMINATION

Intraoral examination on frontal view shows presence of an increased over jet in lateral incisor region and a 70% overbite. On lateral view the

patient shows the presence of Class II Division 2 incisor relationship, Class I Canine & molar relationship bilaterally. There is crowding in the upper and lower anterior region with proclined lateral incisor and retro lined central incisors



**Fig.2: Pre Treatment Intra-Oral Photographs**

**Table 1: Pre Treatment Cephalometric Readings**

PARAMETERS	PRE- TREATMENT
SNA	85°
SNB	80°
ANB	5°
WITS	4 mm (AO ahead of BO)
NASOLABIAL ANGLE	86°
U1 TO NA DEGREES	35°
U1 TO NA mm	7mm
L1 TO NB DEGREES	34°
L1 TO NB mm	6mm
U1/L1 ANGLE	106°
FMA	22°

### 3 | DIAGNOSIS

This 22 year old female patient was diagnosed with a Angles class I malocclusion with a Class II skeletal pattern and an average to horizontal growth pattern, increased overjet and overbite, proclined upper lateral and retroclined central incisors with crowding in the upper and lower anterior region, protruded upper lip, a retruded chin, moderately deep mentolabial sulcus, incompetent lips

ARJMCS 09 (5), 1165-1172 (2023)

lips with increased lip strain and a convex facial profile with a posteriorly divergent face.

### LIST OF PROBLEMS

1. Proclined maxillary lateral incisor and retro lined central incisor
2. Crowding in maxillary and mandibular anterior region
3. Increased over jet and overbite
4. Convex facial profile
5. Retruded chin
6. Decreased Nasolabial angle
7. Incompetent lips
8. Increased lip strain

### TREATMENT OBJECTIVES

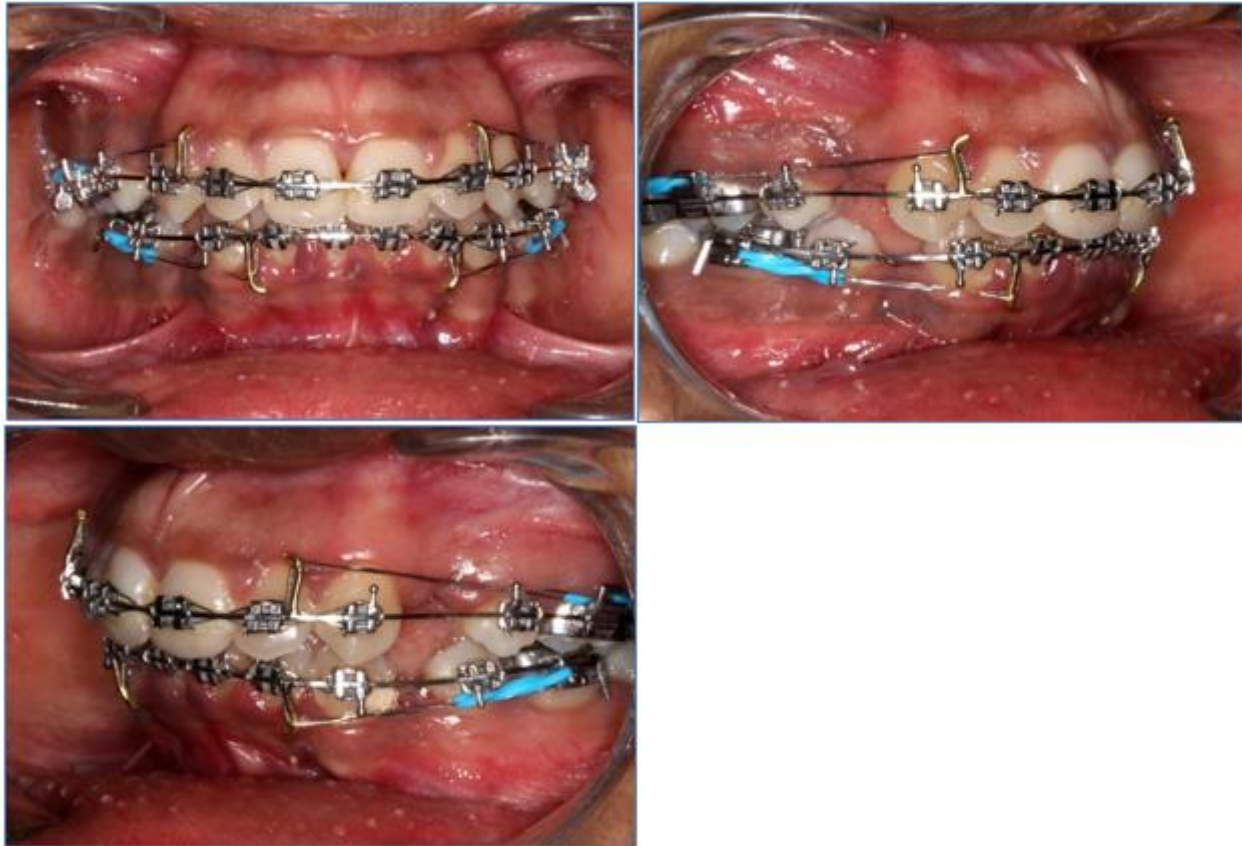
1. To correct proclined maxillary lateral incisor and retro lined central incisors
2. To correct crowding in the maxillary and mandibular anterior teeth
3. To correct increased over jet and overbite
4. To correct the decreased Nasolabial angle



5. To decrease the lip strain
6. To achieve a pleasing smile and a pleasing profile

### TREATMENT PLAN

- Extraction of 14, 24, 34 and 44
- Fixed appliance therapy with MBT 0.022 inch bracket slot
- Initial leveling and alignment with 0.012", 0.014", 0.016", 0.018", 0.020" Niti archwires following sequence A of MBT
- Retraction and closure of spaces by use of 0.019" x 0.025" rectangular NiTi followed by 0.019" x 0.025" rectangular stainless steel wires.
- Group An anchorage
- Final finishing and detailing with 0.014" round stainless steel wires
- Retention by means of Begg's Wrap-around retainers along with lingual bonded retainers in the upper and lower arch.



*Fig.3: Mid Treatment Intra-Oral Photographs*

### 4 | TREATMENT PROGRESS

Complete bonding & banding in both maxillary and mandibular arch done, using MBT-0.022X0.028" slot. Initially a 0.012" NiTi wire was used which was followed by 0.014", 0.016", 0.018", and 0.020" Niti archwires following sequence A of MBT. After 6 months of alignment and leveling NiTi round wires were discontinued. After inserting last wire 0.019 X0.025" stainless steel for retraction, every 5-6 weeks, and elastomeric chains for the patients were changed. Patient was

instructed about her poor oral hygiene on repeated occasions. As patient was undergoing exams, she did not visit for 2 months, hence there was neglect of oral hygiene seen. After 2 months, generalized gingival overgrowth was seen on buccal and palatal surface. She complained about discomfort and pain. On examination, pus discharge was seen with necrosed tissue. Flap Surgery with deep arch curettage was planned for the patient.



**Fig. 4:** periodontal intervention



**Fig. 5:** 10 days post periodontal surgery

**Table 2:** Post Treatment Cephalometric Readings

PARAMETERS	POST-TREATMENT
SNA	85°
SNB	81°
ANB	4°
WITS	4 mm (AO ahead of BO)
NASOLABIAL ANGLE	109°
U1 TO NA DEGREES	25°
U1 TO NA mm	2mm
L1 TO NB DEGREES	26°
L1 TO NB mm	2mm
U1/L1 ANGLE	133°
FMA	23°

## 5 | DISCUSSION

Patient's treatment was planned after thorough clinical examination, cephalometric analysis and photographic evaluation. Treatment was tracking according to the plan previously decided. Brushing technique modifications during Orthodontic treatment was explained well to her. Despite multiple counseling sessions, patient was not able to follow oral hygiene instructions appropriately. This led to periodontal bone loss and gingival recession. Though oral hygiene was compromised and she had to undergo periodontal surgery,



orthodontic treatment remained unchanged. Class I molar, canine and incisor relationship was achieved in addition to Ideal overjet and overbite at the end of the treatment.

Orthodontic treatment of a crowded Class II malocclusion with extractions of all 1st premolars was a challenge because of compromised oral hygiene. A well-chosen individualized treatment plan, undertaken with sound biomechanical principles and appropriate control of orthodontic mechanics to execute the plan is the surest way to achieve predictable results with minimal side effects. The patient's chief complaint was forwardly placed upper and lower front teeth with excessive show of front teeth. The selection of orthodontic fixed appliances is dependent upon several factors which can be categorized into patient factors, such as age and compliance, and clinical factors, such as preference/familiarity and laboratory facilities. The execution of all 1st premolar extraction followed by Fixed appliance therapy appropriately resulted in an improvement in the patient's convex profile in this case. The most important point to be highlighted here is the decision to extract the premolars. After analyzing the case thoroughly and reading all pretreatment cephalometric parameters along with evaluating the patients profile clinically, a decision was made of extracting the 1st premolars. Proximal stripping with retraction and closure of spaces could not be

executed in this case as this would not address all the patient problems at the end of the treatment. Mandibular midline doesn't match maxillary midline but no proximal reduction of lower anterior was planned intentionally to avoid any sensitivity as patient already had compromised oral hygiene. The overall treatment time was 18 months. After this active treatment phase, the profile of this 22 year old female patient improved significantly as seen in the post treatment extra oral photographs. Removable Bag's retainers were then delivered to the patient.



**Fig.6:** Post Treatment Extra-Oral Photographs



**Fig.7:** Post Treatment Intra-Oral Photographs



**Fig. 8: Retention**



**Fig. 9: Comparison of Pre and Post Treatment Dentition**

## 6 | CONCLUSION

This case report shows how poor oral hygiene can lead to bone loss and gingival recession. Patient needs to understand importance of oral hygiene maintenance. If oral hygiene is properly managed, no harmful or irreparable effects on teeth or tissues are seen. On the other hand, with Extraction of 4 premolars by means of appropriate use of simplified fixed orthodontic treatment and efficient conservation of anchorage at the same time, the planned goals set in the pretreatment plan were successfully attained. Good intercuspation of the teeth was achieved with a Class I molar, incisor and canine relationship. Treatment of the proclined and forwardly placed upper and lower anterior teeth included the retraction and retroclination of maxillary and mandibular incisors with a resultant decrease in soft tissue procumbency and facial convexity. The correction of the malocclusion was achieved, with a significant improvement in the patient aesthetics and self-esteem. The patient was very satisfied with the result of the treatment. Correction of black triangles of the patient was planned with papillary advancement surgery.

## REFERENCES

1. Savoldi F, Bonetti S, Dalessandri D, et al. Incisal apical root resorption evaluation after low-friction orthodontic treatment through two-dimensional radiographic imaging and trigonometric correction. *J Clin Diagn Res* 2015; 9:ZC70–ZC4.
2. Kiran J, Isaac A, Shanthraj R, Madannagowda S. Surgical-orthodontic treatment of Class I malocclusion with maxillary vertical excess--a case report. *International Journal of Orthodontics (Milwaukee, Wis.)*. 2012 Jan 1; 23(2):57-62.
3. Geiger AM, Gorelick L, Gwinnett AJ, et al. The effect of a fluoride program on white spot formation during orthodontic treatment. *Am J Orthod Dentofac Orthop*. 1988; 93:29–37.
4. Al-Anezi SA, Harradine NW. Quantifying plaque during orthodontic treatment: a systematic review. *Angle Orthod*. 2011;C82:748–53.
5. Zotti F, Pietrobelli A, Malchiodi L, et al. Apps for oral hygiene in children 4 to 7

- years: Fun and effectiveness. *J Clin Exp Dent*. 2019; 11:e795-801.
6. Lundström F, Krasse B. Streptococcus mutans and lactobacilli frequency in orthodontic patients; the effect of chlorhexidine treatments. *EJO*. 1987; 9:109–16.
  7. Duijster D, de Jong-Lenters M, Verrips E, et al. Establishing oral health promoting behaviours in children—parents’ views on barriers, facilitators and professional support: a qualitative study. *BMC Oral Health*. 2015; 15:157.s.
  8. Marini I, Bortolotti F, Incerti Parenti S, et al. Combined effects of repeated oral hygiene motivation and type of toothbrush on orthodontic patients. A blind randomized clinical trial. *Angle Orthod*. 2014; 84:896–901.
  9. Fjeldsoe BS, Marshall AL, Miller YD. Behavior change interventions delivered by mobile telephone short-message service. *Am J Prev Med*. c2009;36:165–73.
  10. Toniazzi MP, Nodari D, Gomes Muniz FWM, et al. Effect of mHealth in improving oral hygiene; a systematic review with meta-analysis. *JCP*. 2019; 46:297–309.
  11. Cozzani M, Ragazzini G, Delucchi A, et al. Oral hygiene compliance in orthodontic patients: a randomized controlled study on the effects of a post-treatment communication. *Prog Orthod*. 2016;17:17–41.
  12. Bowen BT, Rinchuse DJ, Zullo T, et al. The influence of text messaging on oral hygiene effectiveness. *Angle Orthod*. 2014; 85:543–8.
  13. Jadhav HC, Dodamani AS, Karibasappa GN, et al. Effect of reinforcement of oral health education message through short messaging service in mobile phones: a quasi-experimental trial. *Int J Telemed Appl*. 2016; 2016:7293516.
  14. Zotti F, Dalessandri D, Salgarello S, et al. Usefulness of an app in improving oral hygiene compliance in adolescent orthodontic patients. *Angle Orthod*. 2016;86:101–7.
  15. Harnacke D, Mitter S, Lehner M, et al. Improving oral hygiene skills by computer-based training: a randomized controlled comparison of the modified bass and the fones techniques. *PLoS ONE*. 2012; 7:e37072.
  16. Scribante A, Gallo S, Bertino K, Meles S, Gandini P, Sfondrini MF. The effect of chairside verbal instructions matched with instagram social media on oral hygiene of young orthodontic patients: a randomized clinical trial. *Appl Sci*. 2021; 11:706.