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Case Report

Successful Camouflage Orthodontic Treatment of Class II Malocclusion with Maxillary Severe Crowding: A Case Report

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Abstract

There are some limitations of conventional orthodontic treatment in class II skeletal malocclusion. Ideally, skeletal malocclusion needs surgical orthodontic treatment, but mild to moderate class II skeletal malocclusion can be treated with camouflage orthodontic treatment. This report aims to present that the goal of camouflage treatment of skeletal class II is to disguise the unacceptable skeletal relationship by orthodontically moving teeth, such as extraction of upper premolars followed by anterior retraction. Confidence issues brought a 19-year-old female to RSGM Universitas Padjadjaran. She exhibits skeletal malocclusion symptoms such as a convex facial profile, SNA: 84°, SNB: 78° with ANB: 6°, moderate crowding in the mandibular arch, palatoversion and rotation of the second premolars, a deep overbite (5 mm), a large overjet (5,5 mm), and a shifted midline in the maxillary and mandibular, measuring 2 mm and 1.5 mm, respectively. The first course of therapy was removing the lower left second premolar and the upper two-second premolars—a prescription for braces with MBT 0.022 inch pre-adjustments. Anchorage was strengthened by placing TPA in the maxillary arch. Treatment was finished in 22 months. This case report presents the successful management of camouflage orthodontic treatment of class II skeletal malocclusion by extracting maxillary premolars and unilateral extraction of mandibular premolars to create space and relieve crowding teeth. This treatment was able to change the overbite, overjet, and convexity of the patient's profile to normal. The patient was delighted with the treatment results because she had more confidence when smiling.

Keywords: unilateral extraction; severe crowding; class II skeletal malocclusion; camouflage orthodontics; MBT prescription

INTRODUCTION

Malocclusion is a disharmony of maxillary and mandibular teeth related to an abnormal function of the masticatory system.[1] Malocclusion has been classified in the sagittal plane as Class I, Class II, and Class III malocclusion. In the vertical plane, it is classified as open bite and deep bite. In the transverse plane, it is classified as a crossbite.[2] Class II malocclusion is a frequent dental issue that typically leads patients to seek orthodontic treatment.[3] Mandibular retrognathia, a condition in which the mandible is positioned posteriorly to the maxillary, caused Class II malocclusion, a condition that may have an impact on both the appearance and the functionality of the bite.[4]

There are various techniques to address class II malocclusion, depending on the age group. Treatment approaches for growing patients usually involve growth modification.5 However, there are some limitations of conventional orthodontic treatment in class II skeletal malocclusion for adult patients.

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Camouflage orthodontic therapy is an option for mild to moderate class II skeletal malocclusions, but surgical orthodontic is the best option for severe cases.[6] To accomplish camouflage therapy, premolars may be extracted from either the upper or lower jaws or from both the upper and lower jaws.[5]

Since adult patients no longer undergo growth, the only choices for treating skeletal Class II malocclusion are orthognathic surgery and camouflage orthodontic therapy, which involves the selective extraction of permanent teeth.[7] Camouflage treatment can usually lead to an ideal occlusion, but it is very difficult to improve the subject's profile.[6] Class II skeletal malocclusion treatment plan of non-growing patients is challenging.[8]

CASE REPORT

Confidence issues and crowding of the teeth were the main reasons a 19-year-old female patient visited the Orthodontic Clinic of RSGM Universitas Padjadjaran. On extraoral examinations, the patient had a convex facial profile. Ricketts's aesthetic E-line analysis showed abnormality in the presence of lower lip and upper lip protusion. Pre-treatment cephalometric analysis showed SNA: 84°; SNB: 78°; ANB; 6 °. Wit's appraisal: 4 mm; I-NB: 33° (Table 1).

Orthodontists often encounter cases of class II malocclusion. In Europe, 37% of school children have class II skeletal malocclusion, and in the USA, it affects 33% of all orthodontic patients. This type of malocclusion may involve craniofacial discrepancies, which can altered during adolescence through growth modification.[9]

The goal of camouflage treatment of skeletal class II is to disguise the unacceptable skeletal relationship by orthodontically moving teeth, such as the extraction of upper premolars followed by anterior retraction. Additional trans palatal arch or miniscrew are often needed to get maximum anchorage in skeletal class II malocclusion.[6]

Pre-treatment clinical examinations showed the patient had dust occlusion, 5,5 mm overjet on the maxillary central incisor with a deep overbite of 5 mm. The midline moved to the right by 2 mm on the maxillary and 1.5 mm on the mandibular. The mandibular arch is mildly crowded, whereas the maxillary arch is severely crowded. The maxillary arch is -12 mm, and the mandibular arch is -5 mm, according to the examination of arch-length discrepancy. The curves of the speed on the right and left sides are 2.5 mm deep.

Table 1. Cephalometric Analysis

Measurement	Normal	Pre Treatment	Post Treatment
Skeleton Pattern			
SNA (°)	82 ± 2	84	84
SNB (°)	80 ± 2	78	78
ANB (°)	2 ± 2	6	6
Wits Appraisal (mm)	1 ± 2	4	3
The angle of Convexity (°)	0 ± 10	14	14
Y-Axis (°)	60 ± 6	65	66
Facial angle (°)	87 ± 5	84	84
Dental Pattern			
U1-NA (°)	22 ± 10	28	22
U1-NA (mm)	4 ± 2	5,5	3
U1-NB (°)	25 ± 10	33	34
U1-NB (mm)	4 ± 2	8	9
Interincisal angle (°)	131 ± 10	115	120
Soft Tissue			
UL - E-line (mm)	2-3 mm behind E-line	0	0,5 behind E-line
LL - E-line (mm)	1-2 mm behind E-line	1 in front of E-Line	0.5 in front of E-Line

Note the significant improvements on <U1-NA, Wit's appraisal, *UL E-line and LL E- Line.*

Following clinical and radiographic assessments, the patient was diagnosed with a Class II cytoskeletal malocclusion, accompanied by maxillary severe crowding and mild crowding of the mandibular incisors, deep curve of spee, normal maxillary incisors and protrusive mandibular incisors (Fig.2).

The consent for a fixed orthodontic appliance was received with an extract of the upper second premolars and lower left second premolars. This case used pre-adjusted brackets with an MBT of 0.022 inches. TPA was placed in the maxillary arch to reinforce anchorage. Extraoral examination showed that the patient's cranial index was classified as microcephaly, while the patient's face shape was misoprostol with a convex facial profile. The buccal corridor was narrow (18,5%), and the nasolabial angle was normal (107°).

The temporomandibular joint (TMJ) examination was normal, and the patient's upper and lower lips have normal muscle tone. Intraoral examination showed that the first left molar relations were classified as Angle Class I malocclusion, and the right and left canine relations were classified as Class II canine relationships.

(a) (b) (c)

Figure 1. Extraoral pictures before the treatment (a,b), Frontal view (c), Lateral view

(a) (b) (c)

(d) (e)

Figure 2. Intraoral pictures before the treatment (a) Right view of teeth relations, (b) Anterior view, (c) Left view of teeth relations, (d) Occlusal view of the upper teeth, (e) Occlusal view of the lower teeth

The panoramic radiograph (Figure 3) showed supporting tissues and alveolar bone within normal limits. Tooth 46 was missing. Moreover, teeth 48 is fully formed, and 38 is partially formed.

Figure 3. Panoramic radiograph.The radiograph showed that tooth 46 was missing, and 18 and 28 had not erupted yet.

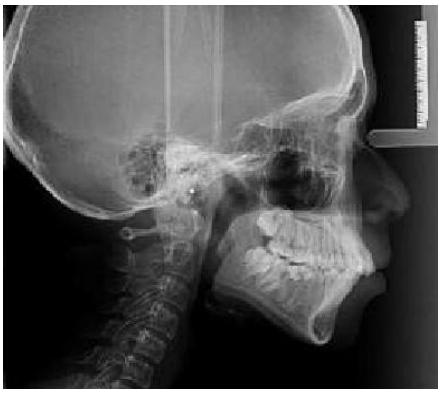

Figure 4. Cephalometric radiograph. Lateral cephalometric showed that the patient had normal maxillary incisors and protrusive mandibular incisors.

CASE MANAGEMENT

The treatment plan involved extracting the upper second premolars and the lower left second premolar, using pre-adjusted brackets MBT 0.022 inch (Fig. 2). Bracket placement was guided by the MBT bracket placement chart. TPA was placed in the maxillary arch to reinforce anchorage (Fig. 5).

The treatment began with the leveling and alignment phase, starting with NiTi 0.012-inch wire for two months, followed by NiTi 0.014-inch wire. After another two months, the wire sequence progressed to NiTi 0.016 inch wire, and two months later, moved onto Niti 0.018 inch wire. Finally, the wire size changed to 0.016x0.022 inch, which was used for a month in both maxillary and mandibular arches until the teeth were leveled and aligned in the arches.

Figure 5. Transpalatal arch placement (TPA)

The leveling and alignment phase lasted for 8 months, during which the crowding was resolved, and the desired initial alignment was achieved in both arches (Fig. 3). Once the initial alignment was completed, the 0.016x0.022 inch stainless steel wire was placed before transitioning to the working phase.

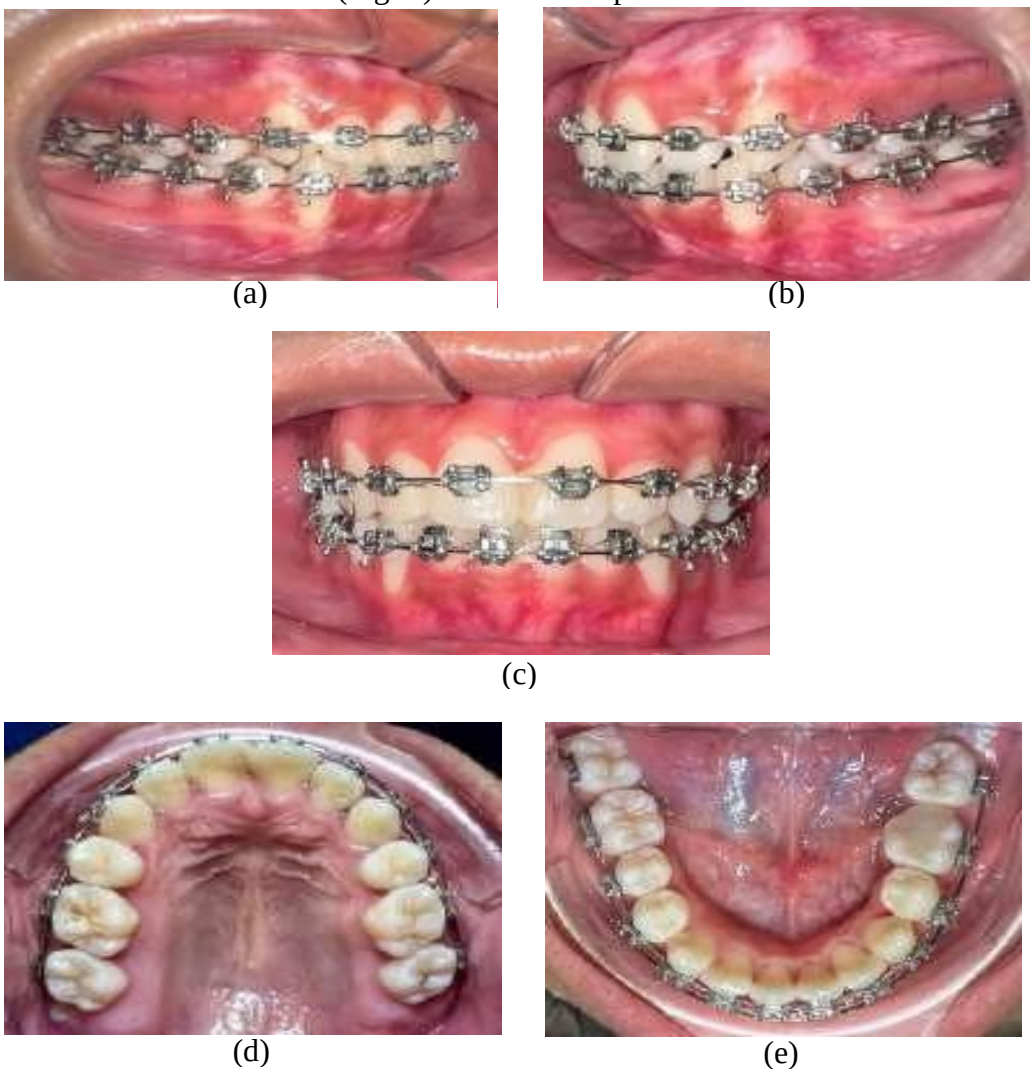

Figure 6. (a, b, c, d and e)
The end of *working* phase treatment. *A torque spring was used on the upper right canine to correct the inclination.* The teeth were well-aligned and *levelled.*

The working phase involved using 0.019x0.025 inch stainless steel wire to correct the midline and overjet. The midline shift was addressed by retracting the upper left segment teeth and protracting the upper right segment teeth. The space in the lower region was corrected by protracting the posterior teeth, while the space in the upper region was resolved through en masse retraction of the anterior teeth. A torque spring was placed on the upper right canine to correct the inclination (Fig. 6.a). The space in both arches was closed, and the midline shift was corrected. The overjet and overbite were normalized to 2 mm. Treatment was completed in 22 months, and the retention phase was managed with a fixed retainer. The patient's cooperation contributed to the successful and smooth progression of the treatment.

(a) (b) (c)

Figure 7. Extraoral pictures after the treatment. (a, b) Frontal view. (c) Lateral view

(a) (b) (c)

Figure 8. Post-treatment records. (a and b) Intra-oral showed good aligned teeth with good interdigitation and improvement in molar relation on both sides. (d) maxillary occlusal plane (e) mandibular occlusal plane

Figure 9. Panoramic radiograph after treatment

Figure 10. Cephalometric radiograph after treatment

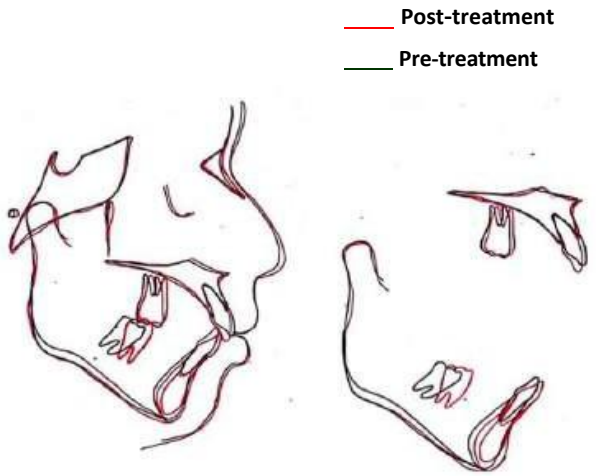

Figure 11. Pre- and post-treatment cephalometric superimpositions. (left); note the slight soft tissue changes. (right); note the favorable mandibular incisors proclination

After the procedure was finished and the brackets were removed, a fixed retainer was set on the mandibular and maxillary arches (Fig.12). The patient was instructed to go back to the dental office for a 1-month appointment interval. The patient expressed satisfaction with the treatment results and felt more confident.

Figure 12. Fixed retainer after treatment

DISCUSSION

Crowding is a common malocclusion that tends to be hereditary. Multifactorial factors, including environmental and genetic factors, cause the etiology of malocclusion. A lack of coordination between arch dimension and tooth size causes malocclusion and dental crowding.[10]

Class II malocclusions are cases frequently encountered in dental practice, especially orthodontic practice. Class II anomalies may occur together with the protrusive positioning of the maxilla, the retrusive positioning of the mandibular, or a combination of these two conditions in 20% of society.[11] Angle (1899) classified dental class II relationship according to the position of the first permanent molars. Maxillary first permanent molar has been chosen as the "key" of occlusion.[12]

The variable factor was with respect to the first molar in the upper jaw and the first molar in the lower jaw. When the central fossa of the mandibular first permanent molar is further posterior than the maxillary

mesiopalatal cusp, a molar distal relation is seen. Class II skeletal malocclusion is classified into two divisions. Division I presents protruded maxillary incisors, and division 2 shows retruded maxillary incisors.[12]

There are two possible treatments to correct skeletal Class II malocclusion for adult patients where growth has been completed. Class II skeletal malocclusion can be treated by camouflage treatment or orthognathic surgery for severe class II skeletal malocclusion.

Dental camouflage treatment aims to provide a more acceptable profile and to correct the maxillary and mandibular dentition teeth by masking skeletal relations. There are 3 methods of Class II camouflage treatment. There is backward maxillary tooth movement, forward mandibular tooth movement, the retraction of protruded maxillary incisors, and the jaw tip and/or nose repositioning. Class II elastics can be used for backward maxillary and forward mandibular tooth movement in fixed orthodontic treatment.[11]

Class II skeletal malocclusion treatment requires careful diagnosis and treatment plan to achieve the expected results, such as aesthetic, occlusal, and functional considerations.[13] The literature presents a plethora of therapy possibilities for skeletal class II malocclusion. As an alternative to traditional orthodontic treatment, camouflage orthodontics involves the evacuation of permanent teeth in order to realign the angle of the upper and lower jaws. To address crowding, dental protrusion, and misaligned bites in adult patients with skeletal Class II, extraction of premolars is often done as part of camouflage treatment.[14]

In this case, extraction of the maxillary second premolar was done to create spaces to release the crowding in the anterior segment of the teeth. Maxillary second premolars and mandibular left second premolar were chosen to be extracted because the malposition of those teeth is not favorable. Unilateral extraction of mandibular premolars was carried out because, in the right region, there was remaining space from missing teeth 46

Alternatively, space can be created through interproximal stripping of anterior teeth or destabilizing the maxillary molars posteriorly. There are traditional methods for moving these molars, including extraoral appliances such as headgear, pendulum appliances, or distalizing springs.[14] Numerical reduction of maxillary teeth can be an option to gain space in order to achieve a Class II molar and Class I canine relation. Ideal maxillary incisors position is more important than Class I posterior occlusion.[15]

During initial orthodontic alignment, laceback may needed to minimize unwanted incisor proclination, especially in the MBT prescription mechanism. Laceback allows controlling the anteroposterior position of the incisors during leveling alignment by regulating the angulation of the canines. It is placed in a passive configuration and activated intermittently during occlusal contact. The laceback is made from stainless steel ligature wire that extends from the first molars to the canines.[16]

To protect anchorage teeth and avoid anchorage loss, some additional anchorage may needed. The trans palatal arch was used in this case to protect spaces after maxillary second premolars extraction and avoid anchorage loss. TPA was studied for its effectiveness in the conservation of anchorage and its other uses. Dahlquist et al. found that TPA is effective in derotation of the maxillary first molar accompanied by a slight expansion—a large derotation results in contraction. Braun's application of TPA can gain 2.1 mm of arch length as it can exert a distal force equivalent to the maxillary first molar center of resistance.[17]

Midline deviation is a prevalent issue in orthodontic treatment. It can affect both function and aesthetics.

Treatment strategies for midline shifted correction is very varied, including midline elastics, unilateral extractions, and dental expansion.[18]

In order to fix the midline shift, the left canine, incisors, and first premolar of the maxilla were destabilized, while the right canine and incisors of the maxilla were medialized. In the mandibular arch, the midline shift was corrected by destabilizing the mandibular left first premolar, mandibular left canine, and mandibular left incisors and mesialisizing the mandibular right incisors.

The excess spaces in the mandibular arch were closed by protracting the posterior teeth, while the spaces in the maxillary arch were closed through anterior en masse retraction until normal overjet and overbite were achieved (overjet: 2 mm and overbite: 2,5 mm).

In the case of premolar extraction, retraction is needed to close the extraction space. This process is quite complicated and requires the knowledge, skill, and experience of the orthodontist. Sliding mechanics or closing loops can be used to close the space in orthodontic treatment.[21] The use of those two methods depends on the treatment plan of clinicians. Closing loops are usually used for standard edgewise appliances while sliding mechanics are used for straight wire techniques such as MBT prescription.[21] There are two methods of space closure with sliding mechanics. The first one is a two-phase retraction, which is accomplished by the retraction of the canine first, followed by the retraction of the four incisors. Meanwhile, en masse retraction can be achieved by retracting the whole anterior segment, including the canine.

In this case, a two-phase retraction of the sliding mechanic was used for anterior teeth retraction. In order to preserve the anchor teeth and prevent anchoring loss, it is acceptable to retract four incisors after canine retraction.[19] The difference in surface area of the periodontal ligament between the active unit and the anchor unit affects the strain on the anchor segment in the two-phase retraction technique, resulting in less strain.[19]

There are extraoral changes in this case, where the convexity of the facial profile appears to be reduced, as indicated by decreasing the distance of the upper and lower lip to the e-line. It is also caused by retrolination of the maxillary incisors. The narrow buccal corridor becomes normal, and the smile curvature improves as crowding is corrected.

Intraoral changes can be seen from normal overjet and overbite, parallel midline, the canine relationship moved to class I, and the left molar relationship became class I, but the right molar relationship remains class II. Interdigitation looks better and locks. With these improvements, it is hoped that stability after orthodontic treatment can be maintained.

The retention phase is needed after orthodontic treatment is done. The purpose of this phase is to maintain dental and periodontal stability after orthodontic treatment.[20] In this case, fixed retainers were used as they provide good aesthetics, do not require patient compliance, are effective, and are good for long-term stability.[21]

Treatment outcomes in adult patients are dependent upon a confluence of factors. In this specific case, the removal of upper and lower premolars was chosen to release the crowding of anterior teeth, and the excess spaces were used to correct the maxillary and mandibular midline. The trans palatal arch was used as additional anchorage to protect posterior teeth and avoid anchorage loss. The combination of the patient's cooperation and the protocol of the skeletal class II malocclusion treatment plan is the key to the successful treatment of this case.

CONCLUSION

Camouflage orthodontic treatment for class II skeletal malocclusion can be carried out to reduce overjet, overbite, and convexity of the patient's profile. Extraction of maxillary premolars and unilateral extraction of mandibular premolars were used to successfully treat class II skeletal malocclusion in this case report, which included moderate mandibular crowding and severe maxillary crowding.

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REFERENCES

1. Baskaradoss JK, Bhagavatula P. Measurement and Distribution of Malocclusion, Trauma, and Congenital Anomalies. In: Burt and Eklund's Dentistry, Dental Practice, and the Community [Internet]. Elsevier; 2021. p. 208–17. Available from: https://linkinghub.elsevier.com/retrieve/pii/B9780323554848000186
2. Toledo SML, Díaz RR, Uribe-Querol E. Tratamiento ortodóncico compensatorio para un paciente autista clase II con mordida abierta anterior: Caso clínico. Revista Mexicana de Ortodoncia [Internet]. 2015 Jan;3(1):47–55. Available from: http://revistas.unam.mx/index.php/rmo/article/view/54238
3. Neely ML, Miller R, Rich SE, Will LA, Wright WG, Jones JA. Effect of malocclusion on adults seeking orthodontic treatment. American Journal of Orthodontics and Dentofacial Orthopedics [Internet]. 2017 Dec 1;152(6):778–87. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0889540617306170
4. Basyouni ME, Ismail LO. Orthodontic Camouflage For Class II Malocclusion: A Case Study Using Miniscrew Implants And Strategic Extractions. IOSR Journal of Dental and Medical Sciences [Internet]. 2024 Nov;23(11):05–11. Available from: https://www.iosrjournals.org/iosr-jdms/papers/Vol23-issue11/Ser-4/B2311040511.pdf
5. Dahhas FY, Al-saif EM, Alqahtani AM, Al Farraj NF, Alshaikh MA, Almadhi BS, et al. The Potency of Invisalign® in Class II Malocclusion in Adults: A Narrative Review. Cureus [Internet]. 2023 Nov 29; Available from: https://www.cureus.com/articles/208137-the-potency-of-invisalign-in-class-ii-malocclusion-in-adults-a-narrative-review
6. Raposo R, Peleteiro B, Paço M, Pinho T. Orthodontic camouflage versus orthodontic-orthognathic surgical treatment in class II malocclusion: a systematic review and meta-analysis. Int J Oral Maxillofac Surg [Internet]. 2018 Apr 1;47(4):445–55. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0901502717316132
7. Khan L, Halwai HK, Yadav R, Birring OJS. Orthodontic Camouflage Treatment of Class II Malocclusion in Non-growing Patient - A Case Report. Orthodontic Journal of Nepal [Internet]. 2015 Feb 7;5(1):46–9. Available from: https://www.nepjol.info/index.php/OJN/article/view/14501

8. Robertson LJ, El-Bialy T. Non-surgical Treatment of a Late Adolescent Patient with Skeletal Class II Malocclusion Using Clear Aligners: A Case Report. Open Dent J [Internet]. 2022 Nov 24;16(1). Available from: https://opendentistryjournal.com/VOLUME/16/ELOCATOR/e187421062206276/
9. Papadopoulos MA. Non-compliance approaches for management of Class II malocclusion. In: Skeletal Anchorage in Orthodontic Treatment of Class II Malocclusion [Internet]. Elsevier; 2015. p. 6–21. Available from: https://linkinghub.elsevier.com/retrieve/pii/B9780723436492000026
10. Patano A, Malcangi G, Inchingolo AD, Garofoli G, De Leonardis N, Azzollini D, et al. Mandibular Crowding: Diagnosis and Management—A Scoping Review. J Pers Med [Internet]. 2023 Apr 29;13(5):774. Available from: https://www.mdpi.com/2075-4426/13/5/774
11. Çınarsoy Ciğerim S, Kotan S, Dinç G. Fixed Orthodontic Treatment of a Patient with Skeletal Class II Malocclusion with Infrazygomatic Anchorage and En-Masse Retraction. Eastern Journal Of Medicine
12. [Internet]. 2020;25(4):586–90. Available from: https://jag.journalagent.com/z4/download_fulltext.asp?pdir=ejm&plng=eng&un=EJM-00377
13. Retto PF. Non-Surgical Clinical Protocol for the Treatment of a Class II Malocclusion in an Adult. Journal of Stomatology & Dental Research [Internet]. 2023 Dec 31;1–10. Available from: https://oaskpublishers.com/assets/article-pdf/non-surgical-clinical-protocol-for-the-treatment-of-a-class-ii-malocclusion-in-an-adult.pdf
14. Yan Y, Ouyang Z, Tong F. Treatment of a severe skeletal Class II malocclusion through growth modification: a problem-oriented case report. Australasian Orthodontic Journal [Internet]. 2023 Jul 1;39(2):82–95. Available from: https://www.sciendo.com/article/10.2478/aoj-2023-0027
15. Ahuja D, Batra P, MV A, Singh AK. Orthognathic-Like Orthodontics: Management of Skeletal Class II Malocclusion in an Adult Patient. Cureus [Internet]. 2024 Sep 18; Available from: https://www.cureus.com/articles/291255-orthognathic-like-orthodontics-management-of-skeletal-class-ii-malocclusion-in-an-adult-patient
16. Mocanu RM, Romanec C, Ionescu A, Zetu IN. MANAGEMENT OF CLASS II MALOCCLUSION-ORTHODONTIC CAMOUFLAGE TREATMENT: CASE REPORT [Internet]. Vol. 5, Romanian Journal of Oral Rehabilitation. [cited 2025 Mar 4]. Available from: https://rjor.ro/management-of-class-ii-malocclusion-orthodontic-camouflage-treatment-case-report/
17. Elhussein M, Sandler J. Stainless steel ligatures in orthodontic treatment. Orthodontic Update [Internet]. 2021 Jan 2;14(1):44–7. Available from: http://www.magonlinelibrary.com/doi/10.12968/ortu.2021.14.1.44
18. Kharche A, Durkar S, Kawale P, Yerawadekar S, Jethe S, Professor A, et al. Transpalatal Arch: An Overview of Literature. Journal of Advanced Medical and Dental Sciences Research

|Vol [Internet]. 2019 Feb;7(2):7–9. Available from: www.jamdsr.comdoi:

19. Shirchie Iris G. Journal of Dentistry and Oral Hygiene Midline deviation treatment mechanics: A systematic review. 2024 Feb;13(1):1–11. Available from: http://www.academicjournals.org/JDOH
20. Rizk MZ, Mohammed H, Ismael O, Bearn DR. Effectiveness of en masse versus two-step retraction: a systematic review and meta-analysis. Prog Orthod [Internet]. 2017 Dec 5;18(1):41. Available from: https://progressinorthodontics.springeropen.com/articles/10.1186/s40510-017-0196-7
21. Kartal Y, Kaya B. Fixed Orthodontic Retainers: A Review. Turk J Orthod [Internet]. 2019 Jun 27;32(02):110–4. Available from: https://turkjorthod.org/articles/doi/TurkJOrthod.2019.18080
22. Quinzi V, Carli E, Mummolo A, De Benedictis F, Salvati SE, Mampieri G. Fixed and removable orthodontic retainers, effects on periodontal health compared: A systematic review. J Oral Biol Craniofac Res [Internet]. 2023 Mar 1;13(2):337–46. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2212426823000271