Content available at: https://www.ipinnovative.com/open-access-journals

IP Indian Journal of Orthodontics and Dentofacial Research

Journal homepage: https://www.ijodr.com/

Case Series

Orthosurgical management of deckbiss malocclusion (Class-II Div 2) in adult patients: A case series

Ashish Kamboj[1,*], SS Chopra[2], Amrit Thapa[3], Gagandeep Kochar[4], Pritam Mohanty[5], Nishant Sinha[1]

[1]*Dept. of Orthodontics and Dentofacial Orthopedics, Government Dental Centre, Leh (UT of Ladakh), Jammu & Kashmir, India*
[2]*Dept. of Dental Surgery, Armed Forces Medical College, Pune, Maharashtra, India*
[3]*Government Dental Centre, Jabalpur, Madhya Pradesh, India*
[4]*Army Dental Corps, India*
[5]*Dept. of Orthodontics, KIDS, KIIIT-DU, Bhubaneswar, Odisha, India*

ARTICLE INFO

Article history:
Received 30-04-2022
Accepted 14-05-2022
Available online 30-05-2022

Keywords:
Deckbiss malocclusion
Deep bite
Orthosurgical
BSSO

ABSTRACT

Class II malocclusion cases are of interest to orthodontists since they constitute a significant chunk of cases they treat. Still, they're one of the most grueling malocclusions to diagnose and treat.

There lies a significant difference in the frequency of Class II malocclusion among various populations. The frequency of Class II malocclusion in India varies from 1.9% in Rajasthan to 8.37% in South India. Class II division 2 (Deckbiss) malocclusion is characterized by mandibular incisors positioned posterior to the cingulum of retroclined maxillary incisors. It usually presents with reduced overjet and increased overbite.

The treatment approach of Class II division 2 malocclusion is different for different age groups. In growing cases, growth modulation with myofunctional appliances is recommended but in adult cases, orthodontic camouflage or orthognathic surgery is the recommended treatment modality. When orthodontic treatment alone is ineffective or when facial aesthetics is grossly undermined, orthognathic surgery is the choice of treatment

In the present case series, two adult cases of severe Class II division 2 (Deckbiss) malocclusion were treated orthosurgically with BSSO. This case series demonstrates that treatment of Class II division 2 (Deckbiss) malocclusion in adult patients is a challenging task and a combined orthodontic-surgical approach can be used to obtain optimum aesthetics & functional efficiency.

1. Introduction

Class II malocclusion cases are of interest to orthodontists since they constitute a significant chunk of cases they treat. Still, they're one of the most gruelling malocclusions to diagnose and treat.

There lies a significant difference in the frequency of Class II malocclusion among various populations. Emmanuel[1] observed 1.1% frequency in Nigerian, whereas Silva et al[2] observed as high as 21.5% presence of Class II malocclusion in Latino adolescents. Frequency of Class II malocclusion in India varies from 1.9% in Rajasthan to 8.37% in South India.[3,4] Class II division 2 (Deckbiss) malocclusion is characterized by mandibular incisors positioned posterior to the cingulum of retroclined maxillary incisors. It usually presents with reduced overjet and increased overbite. Classically, the maxillary central incisors are retroclined and the maxillary lateral incisors are

* *Corresponding author*.
E-mail address: aashishkamboj@ymail.com (A. Kamboj).

https://doi.org/10.18231/j.ijodr.2022.023

proclined.[5]

Combination of hyperactivity of the labial musculature and a superiorly positioned resting lip line is believed to be the genesis of maxillary incisor retroclination. The majority of the Class II division 2 malocclusions are present with a severe deep bite.[6]

Class II malocclusions have dental or skeletal or both components. Likewise, they can be attributed to maxillary prognathism, mandibular retrognathism or a combination of both along with problems in the transverse and vertical dimensions. The treatment approach of Class II division 2 malocclusion is different for different age groups. In growing cases, growth modulation with myofunctional appliances is recommended but in adult cases, orthodontic camouflage or orthognathic surgery is the recommended treatment modality.

Nevertheless, in grown-ups, aesthetics is the major concern in Class II division 2 cases. The treatment of severe dentofacial abnormalities in adult cases is a gruelling task for both the orthodontist and the maxillofacial surgeon. Treatment is arduous because of the facial discord, absence of jaw growth and a tendency to regress back to the original state of malocclusion.[7] Critical analysis and ortho-surgical combination treatment approach are to be reckoned on for gaining optimum aesthetic harmony and functional effectiveness. Likewise, acceptance of a pleasing facial appearance is the most eloquent factor in determining social relationships.[8]

2. Case 1

The first case describes a 19 years old girl who reported to orthodontic OPD with the principal complaint of backwardly placed maxillary front teeth.

2.1. Clinical examination

The case had a roughly square face with a convex profile, inadequate lip competency and a deep mentolobial sulcus in pretreatment extraoral photographs (Figure 1). The patient had a Class II molar and canine relationship on both sides with retroclined incisors, a deep bite and a reduced overjet. Pretreatment intraoral photographs also showed that patient had a deep Curve of Spee, with moderate crowding in both the maxillary and mandibular arches (Figure 2). Lateral Cephalogram reveals that the case had a normal maxilla and retrognathic mandible giving a clear indication of skeletal Class II jaw bases (Figure 3).

2.2. Problem list

1. Flourosis w.r.t 11,12,21,22,31,32,41,42
2. Gingival recession w.r.t 31,41
3. Convex profile
4. Inadequate lip competency
5. Deep mentolabial sulcus
6. Rotation w.r.t 13,15,16,25,26
7. Crowding in maxillary and mandibular arch
8. Molar relation Class-II on both sides
9. Canine relation Class-II on both sides
10. Reduced overjet
11. Deep bite

2.3. Treatment objectives

The treatment's main goals were to ameliorate facial aesthetics, achieve a pleasing facial profile, achieve lip competency, correct mandibular retrognathism, align maxillary & mandibular incisors, achieve normal bilateral Class I molar and canine relationship and correct overjet and overbite relationship.

3. Treatment Plan and Progress

3.1. Presurgical orthodontic phase

0.022" MBT PEA was used to band and bond the maxillary arch and thereafter 0.012" NiTi was ligated in the upper arch. Lower arch banding and bonding was done after the maxillary arch was levelled and aligned. The case's presurgical pictures (Figures 4 and 5) and radiographs (Figure 6) were re-recorded and the case was re-evaluated. A mock surgery was planned, prediction tracing was performed and a surgical wafer splint (Figures 7 and 8) was made. At the conclusion of the presurgical phase, 0.021" X0.025" SS wires with soldered interproximal spurs were inserted in the maxillary and mandibular arches.

3.2. Surgical phase

To rectify anterioposterior skeletal discrepancy, the orthognathic BSSO procedure (Figure 9) was performed with a 6 mm mandibular advancement. The lower jaw was stabilized with I-plates using the surgical wafer splint as a guide (Figure 10).

3.3. Postsurgical orthodontic phase

The stabilising archwires and wafer splint were removed four weeks after surgery. Occlusal settling was commenced in the maxillary and mandibular arches using 0.014" Australian super plus wires and short Class II elastics (3/16") were applied in quadrangular form (Figure 11). The fixed orthodontic appliance was removed after all of the treatment goals were met. For post-treatment retention, the case was given Hawley's retainers.

3.4. Treatment results

The facial and occlusal results were excellent. There was an appreciable improvement in the facial profile (Figure 12). Intraorally, a normal overjet and overbite relation was accomplished with a bilateral Class I molar and canine

Fig. 1: Pretreatment extraoral photographs

Fig. 2: Pretreatment intraoral photographs

Fig. 3: Pretreatment opg & lateral cephalogram

Fig. 4: Presurgical extraoral photographs

Fig. 5: Presurgical intraoral photographs

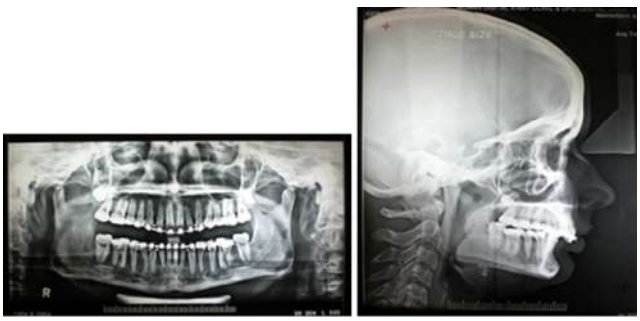

Fig. 6: Presurgical opg & lateral cephalogram

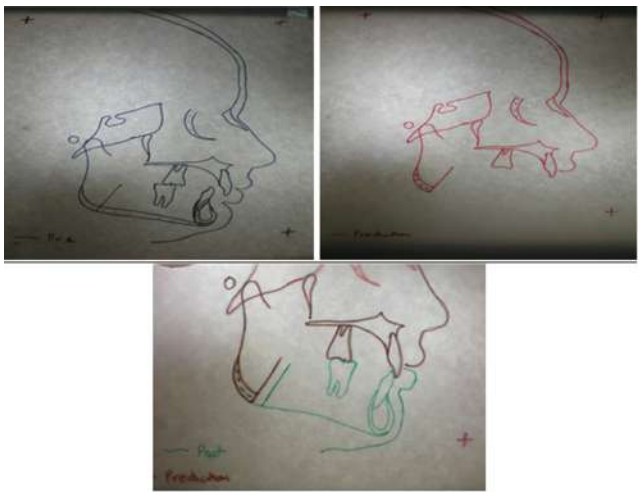

Fig. 7: Presurgical prediction tracing (6mm Advancement)

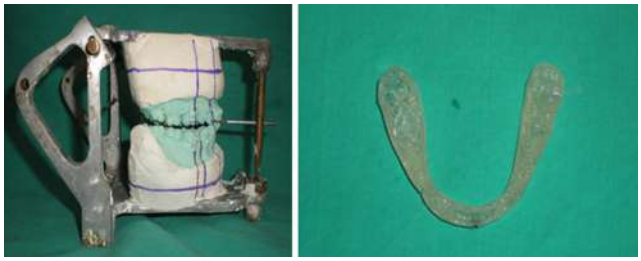

Fig. 8: Model surgery & splint fabrication

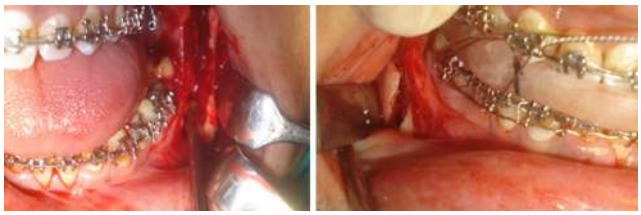

Fig. 9: Bilateral sagittal split osteotomy

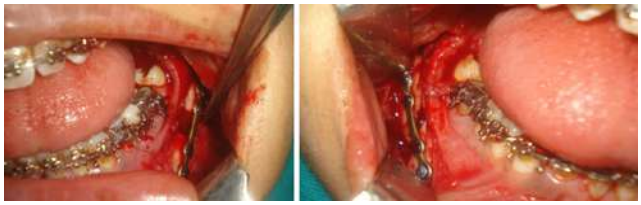

Fig. 10: Rigid internal fixation

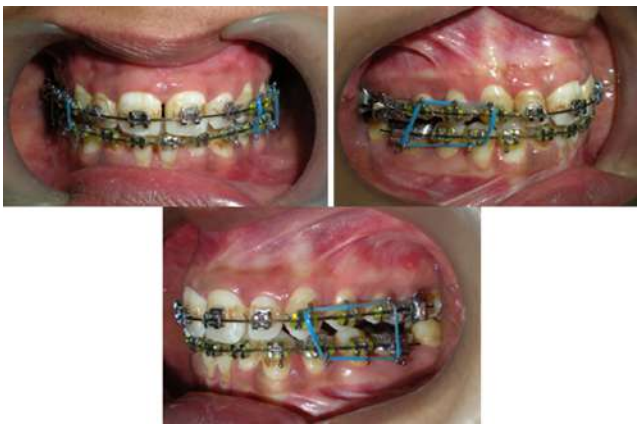

Fig. 11: Post surgical settling

Fig. 12: Post treatment extraoral photographs

Fig. 13: Post treatment intraoral photographs

relationship (Figure 13). The deep mentolabial sulcus was corrected. Mandibular retrognathism was corrected from ANB 6 ° TO 3 ° (Tables 1 and 2) Before debonding, post-treatment radiographs (Figure 14) revealed an increase in lower anterior face height.(Figure 15) depicts cephalometric superimposition before and after treatment. Overall, the case was satisfied with the treatment results.

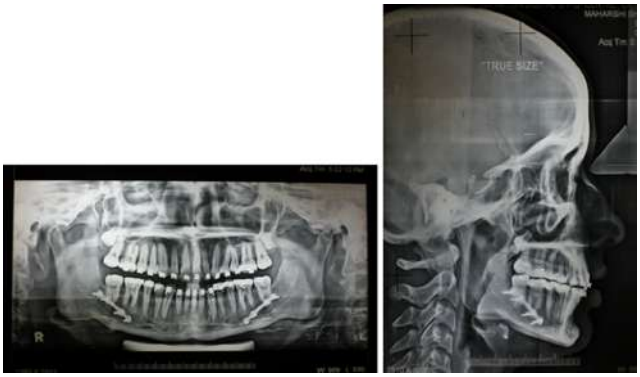

Fig. 14: Pre debonding opg & lateral cephalogram

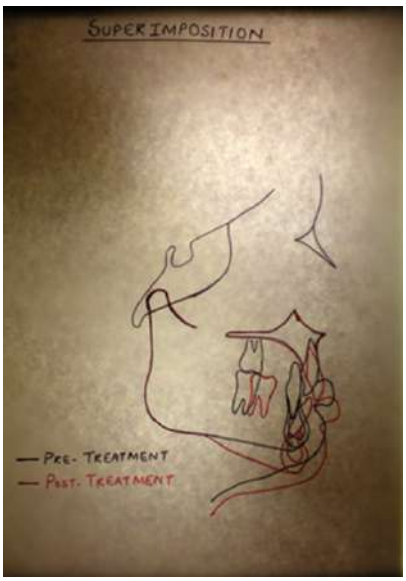

Fig. 15: Pre and post treatment cephalometric superimposition

4. Case 2

The second case describes an 18 years old girl who reported to orthodontic OPD with the principal complaint of backwardly placed upper front teeth.

4.1. Clinical examination

The case had a roughly square face with a convex profile, competent lips and a deep mentolobial sulcus in pretreatment extraoral photographs (Figure 16). Patient had a Class II molar and end on canine relationship on both sides with retroclined incisors, a deep bite and a reduced overjet. Pretreatment intraoral photographs also showed that patient had a deep Curve of Spee, with mild crowding in both the maxillary and mandibular arches (Figure 17). Lateral Cephalogram reveals that the case had a normal maxilla and retrognathic mandible giving a clear indication of skeletal Class II jaw bases (Figure 18).

4.2. Problem list

1. Non consonant smile arc
2. Deep mentolabial sulcus
3. Reduced LAFH
4. Tongue-tie
5. Crowding (2.5 mm in upper arch, 3 mm in lower arch)
6. Retroclined upper and lower incisors
7. Rotation w.r.t 11, 12, 13, 21, 22, 31, 32, 41, 42
8. Impacted 18, 28, 38, 48
9. Deep bite
10. Reduced overjet
11. Molar relation Class-II on both sides
12. Canine relation end on bilaterally
13. Class II jaw bases with a horizontal growth pattern

4.3. Treatment objectives

The treatment's main goals were the enhancement of profile, enhancement of her smile aesthetics, levelling and alignment of both the upper and lower arches, correction of deep bite, correction of molar and canine relation bilaterally, correction of LAFH & correction of Class II jaw bases.

5. Treatment Plan and Progress

5.1. Presurgical orthodontic phase

0.022" MBT PEA was used to band and bond the maxillary arch and thereafter 0.012" NiTi was ligated in the upper arch. Lower arch banding and bonding was done after the maxillary arch was levelled and aligned. The case's presurgical pictures (Figures 19 and 20) and radiographs (Figure 21) were re-recorded and the case was re-evaluated. A mock surgery was planned, prediction tracing was performed and a surgical wafer splint (Figures 22 and 23) was made. At the conclusion of the presurgical phase, 0.021" X0.025" SS wires with soldered interproximal spurs were inserted in the maxillary and mandibular arches

5.2. Surgical phase

To rectify anterioposterior skeletal discrepancy, the orthognathic BSSO procedure (Figure 24) was performed with a 7mm mandibular advancement. The lower jaw was stabilized with I-plates using the surgical wafer splint as a guide.

5.3. Postsurgical orthodontic phase

The stabilising archwires and wafer splint were removed five weeks after surgery. Occlusal settling was commenced in the maxillary and mandibular arches using 0.016" Australian super plus wires and short Class II elastics (3/16") were applied in triangular form (Figure 25). The fixed orthodontic appliance was removed after all of the treatment goals were met. For post-treatment retention, the

case was given Begg's wrap-around retainer in the maxillary arch and FSW retainer in the mandibular arch.

Fig. 16: Pretreatment extraoral photographs

Fig. 17: Pretreatment intraoral photographs

Fig. 18: Pretreatment opg & lateral cephalogram

5.4. Treatment results

The facial and occlusal results were excellent. There was an appreciable improvement in the facial profile (Figure 26). Intraorally, a normal overjet and overbite relation was

Fig. 19: Presurgical extraoral photographs

Fig. 20: Presurgical intraoral photographs

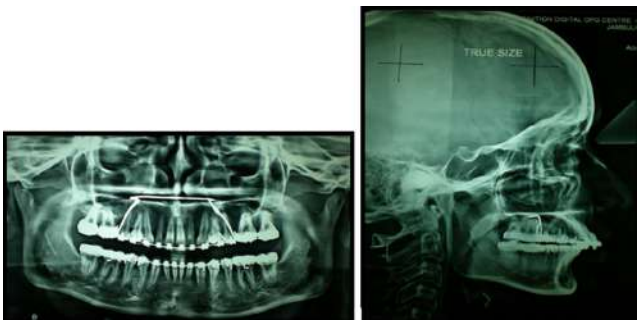

Fig. 21: Presurgical OPG & lateral cephalogram

accomplished with a bilateral Class I molar and canine relationship (Figure 27). The deep mentolabial sulcus was corrected. Mandibular retrognathism was corrected from ANB 6 ° TO 2 ° (Tables 3 and 4). Post-treatment radiographs (Figure 28) revealed an increase in lower anterior facial height. (Figure 29) depicts cephalometric superimposition before and after treatment. The total treatment duration was 18 months. The treatment goals set in the pretreatment planning stage were achieved.

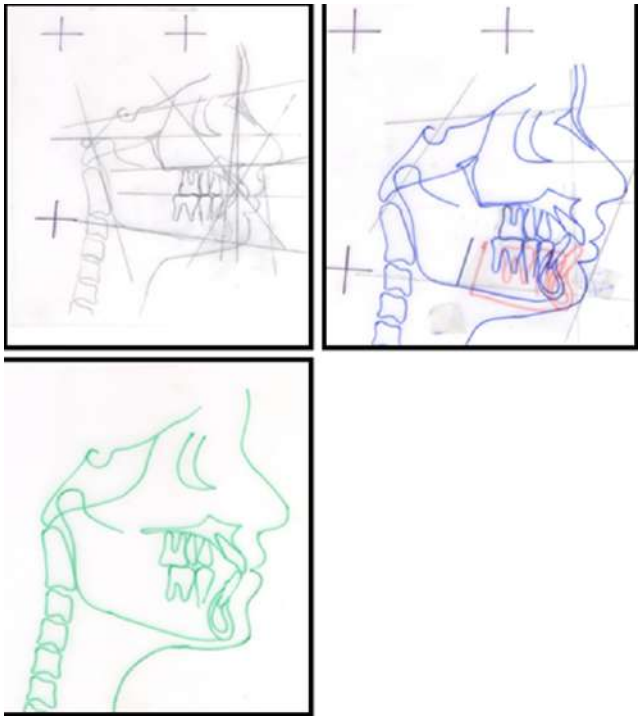

Fig. 22: Presurical prediction tracing (7mm Advancement)

Fig. 23: Model surgery & splint fabrication

Fig. 24: Bilateral sagittal split osteotomy

Fig. 25: Post surgical settling

Fig. 26: Post treatment extraoral photographs

Fig. 27: Post treatment intraoral photograph

Table 1: Cephalometic reading (Patient-1)

Parameters	Norms	Pre-Treatment	Mid-Treatment	Post-Treatment
SNA	82	81	81	81
SNB	80	75	75	78
ANB	2	6	6	3
ß Angle	27-34	11	14	24
W Angle	51-55	48	51	56
Facial of Convexity	87.8	87	88	88
Angle of Convexity	0	9	8	1
SN-MP	32	22	22	28
FH-AM	21.9	12	12	19
FMPA	25	10	10	18
Y-Axis	59.4	56	54	56
IMPA	90-95	99	103	104

Table 2: Linear measurement oncephalogram (Patient-1)

Parameters	Pre-Treatment	Mid-Treatment	Post-Treatment
Effective Mandibular Length	100 mm	100mm	106
Jaraback's ratio	52	53	60
U1-NA	75.4	75.2	69.4
U1-A Pog	-4mm	4mm	4mm
L1-NB	-2mm	1mm	4mm
L1-A Pog	-3mm	4mm	4mm
S Line-upper lip	0 mm	0mm	0mm
LAFH	57mm	58mm	60mm

Table 3: Cephalometic Reading (Patient-2)

Parameters	Norms	Pre-Treatment	Mid-Treatment	Post-Treatment
SNA	82	78		81
SNB	80	72	75	78
ANB	2	6	6	3
ß Angle	27-34	12	14	24
W Angle	51-55	46	51	56
Facial of Convexity	87.8	86	88	88
Angle of Convexity	0	8	8	1
SN-MP	32	21	22	27
FH-AM	21.9	11	12	18
FMPA	25	18	18	20
Y-Axis	59.4	55	54	55
IMPA	90-95	100	104	105

Fig. 28: Post treatment opg & lateral cephalogram

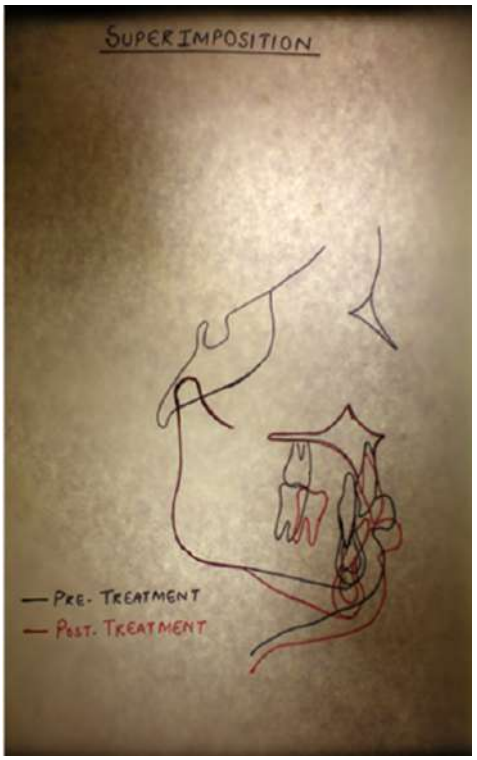

Fig. 29: Pre and post treatment cephalometric superimposition

Table 4: Linear measurement on cephalogram (Patient-2)

Parameters	Pre-Treatment	Mid-Treatment	Post-Treatment
Effective Mandibular Length	99 mm	99mm	106
Jaraback's ratio	51	52	59
U1-NA	75.4	75.2	69.4
U1-A Pog	-3mm	3mm	3mm
L1-NB	-1mm	1mm	3mm
L1-A Pog	-2mm	4mm	4mm
S Line-upper lip	0 mm	0mm	0mm
LAFH	58mm	59mm	61mm

6. Discussion

Depending on the patient's growth state and the severity of the situation, Class II malocclusion can be treated with different modalities. Fixed functional appliances can be used to correct orthodontic problems in adolescents.[9] In grown-ups' however, correction is achieved either through orthodontics alone (Camouflage) or an orthodontic-surgical combination. When orthodontic treatment alone is ineffective or when face aesthetics is grossly undermined, orthognathic surgery is recommended. There are numerous examples of adult cases with severe skeletal Class II Div 1 malocclusion with mandibular retrognathism that have been effectively corrected with BSSO.[10,11]

But, case reports of orthosurgical correction of severe Class II division 2 malocclusions are rare. In an adult patient with underlying dentoskeletal discrepancy, surgery is one of the treatment options if the dental defect cannot be corrected by orthodontics alone or if dental camouflage would involve technical or periodontal contraindications or would not produce a marked aesthetic improvement. It can therefore be reasonably said that the majority of adult Class-II patients require orthosurgical treatment, chiefly in order to provide an optimal solution to their aesthetic problems.[12]

In the present case series, two adult cases of severe Class II division 2 (Deckbiss) malocclusion were treated with orthodontic-orthognathic combination. The treatment was directed to relieve crowding, correct underlying skeletal antero-posterior disproportion and ameliorate facial aesthetics. Post-treatment results of both the cases showed marked improvement in facial aesthetics and dental occlusion. Convex facial profile and deep mentolobial sulcus were corrected and lower anterior facial height was increased.

7. Conclusion

Treatment of severe Class II division 2 malocclusion in adult cases is a gruelling task. Treatment can be done by camouflage or orthosurgical approach. But if the problem is too severe for orthodontic correction alone and when the underlying skeletal problem impairs facial appearance a combined orthosurgical approach should be used. BSSO surgery has proven to be of great success time and again when executed meticulously in such types of cases.

8. Conflict of Interest

The authors declare no relevant conflicts of interest.

9. Source of Funding

None.

References

1. Emmanual OA. Prevalence of malocclusion among school 'children in Benin City Negeria . *J Med Biomed Res*. 2008;7(1-2):58–65. doi:10.4314/jmbr.v7i1-2.44566.
2. Silva RG, Kang DS. Prevalence of malocclusion among Lathino adolescents. *Am J Orthod Dentafacial Orthop*. 2001;119(3):313–5.
3. Trehan M, Chugh VK, Sharma S. Prevalence of malocclusion in Jaipur. *Int J Clin Pediatr Dent*. 2009;2(1):23–5. doi:10.5005/jp-journals-10005-1036.
4. Kaur H, Pavithra US, Abraham R. Prevalence of malocclusion among adolescents in South Indian population. *J Int Soc Prev Community Dent*. 2013;3(2):97–102. doi:10.4103/2231-0762.122453.
5. British Standards Institute. British Standard Incisor Classification. Glossary of Dental Terms, BS 4492. London, UK: British Standards Institute; 1983.
6. Nanda R. Correction of deep overbite in adults. *Dent Clin North Am*. 1997;41(1):67–87.
7. Wieslander L, Logerstrom L. The effect of activator treatment on Class II Malocclusion. *Am J Orthod*. 1979;75(1):20–6. doi:10.1016/0002-9416(79)90136-2.
8. Jr JM, Bookstein FL, Shaugnessy TG. Skeletal and dental changes following functional regular therapy on Class II patient. *Am J Orthod*. 1985;88(2):91–110. doi:10.1016/0002-9416(85)90233-7.
9. Agarwal L, Singh K, Tandon R. Treatment of Class II Div 2 malocclusion using powerscope: A case report. *Orthod J Nepal*. 2018;8(1):63. doi:10.3126/ojn.v8i1.21352.
10. Hanumanth K, Krishnanayak US. Surgical Orthodontic Treatment of skeletal Class II malocclusion. *J Scientific Dent*;2013(3):33–44.
11. Mohite A, Krishnanayak R, Patankar, Pawar S, Singh V. Bilateral Saggital spilit osteotomy and genioplasty; A case report. *J Dent Med Sc*. 2017;27(1):119–22.
12. Ronchi P. Orthodontic-surgical treatment of dentofacial anomalies: an integratedesthetic-functional approach. Hanover Park IL: Quintessence Publishing Company; 2005. p. 136–85.

Author biography

Ashish Kamboj, Orthodontist https://orcid.org/0000-0002-1836-6786

SS Chopra, Professor

Amrit Thapa, Orthodontist

Gagandeep Kochar, Orthodontist

Pritam Mohanty, Professor

Nishant Sinha, Endodontist

Cite this article: Kamboj A, Chopra SS, Thapa A, Kochar G, Mohanty P, Sinha N. Orthosurgical management of deckbiss malocclusion (Class-II Div 2) in adult patients: A case series. *IP Indian J Orthod Dentofacial Res* 2022;8(2):132-140.