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Orthodontic Camouflage Versus Orthodontic-Orthognathic Surgery In Borderline Class III Malocclusion: A Literature Review.

1Yathesh.S, 2Rajasekaran U.B, 3VAIBAVA KEERTHANA, 4RAMKUMAR. G

1Post Graduate student, 2HEAD OF THE DEPARTMENT, 3SENIOR LECTURER, 4SENIOR LECTURER

1R.V.S Dental College and Hospital,

2RVS DENTAL COLLEGE AND HOSPITAL,

3RVS DENTAL COLLEGE AND HOSPITAL,

4RVS DENTAL COLLEGE AND HOSPITAL

Abstract

Background: Class III malocclusion represents one of the most complex orthodontic challenges, often requiring difficult decisions regarding treatment planning. In adult patients where growth modification is no longer feasible, two main options exist: orthodontic camouflage and orthodontic-orthognathic surgery. The dilemma is particularly critical in borderline cases, where discrepancies are moderate and both treatment modalities may seem viable.

Aim: To review and compare the skeletal, dentoalveolar, and soft tissue outcomes of orthodontic camouflage and orthognathic surgery in borderline Class III malocclusion, and to provide a framework for clinical decision-making.Methods: A literature search was conducted using PubMed, Scopus, and Google Scholar with keywords: Class III malocclusion, orthodontic camouflage, orthognathic surgery, borderline malocclusion, dentoalveolar compensation. Inclusion criteria were clinical trials, cohort studies, and systematic reviews published between 2000–2024 that directly compared camouflage and surgical treatment outcomes.Results: Camouflage treatment achieved acceptable occlusal correction through dentoalveolar compensation but produced only minor skeletal changes. Orthognathic surgery, by contrast, provided significant skeletal correction, improved soft tissue esthetics, and higher patient satisfaction. Three major outcome domains—skeletal, dentoalveolar, and soft tissue—show consistent differences favoring surgery, though camouflage remains appropriate for selected cases with mild skeletal discrepancies.Conclusion: Both approaches remain valid in managing borderline Class III cases. Camouflage is less invasive, cost-effective, and suitable for patients unwilling to undergo surgery, while orthognathic surgery provides superior skeletal and esthetic outcomes. Individualized, patient-centered decision-making remains the cornerstone of effective treatment planning.

Keywords: Class III malocclusion; orthodontic camouflage; orthognathic surgery; dentoalveolar compensation; facial esthetics

Introduction

Class III malocclusion is a condition characterized by an anteroposterior discrepancy between the maxilla and mandible. It may result from mandibular prognathism, maxillary retrusion, or a combination of both, and can present with negative overjet, compromised occlusion, and facial disharmony. The prevalence of Class III malocclusion varies among populations, ranging from 1% in Caucasian groups to nearly 15% in East Asian populations [1].

For adult patients, where orthopedic growth modification is no longer possible, clinicians must choose between two major approaches: orthodontic camouflage (OC) or orthodontic-orthognathic surgery (OOS). This decision is straightforward in severe skeletal discrepancies that clearly demand surgery, but in borderline cases, where skeletal disharmony is moderate, the choice becomes challenging.

Borderline patients may be treated successfully with either option, but outcomes differ significantly in terms of skeletal correction, dentoalveolar compensation, soft tissue esthetics, stability, and patient satisfaction. This literature review synthesizes current evidence to clarify the indications, outcomes, and limitations of each approach.

Methodology

A structured search was performed across PubMed, Scopus, and Google Scholar up to July 2024. Keywords included: Class III malocclusion, orthodontic camouflage, orthognathic surgery, borderline malocclusion, dentoalveolar compensation, facial esthetics.

Inclusion criteria:

- Studies comparing camouflage and surgical treatments in Class III malocclusion
- Randomized controlled trials (RCTs), cohort studies, retrospective studies, and systematic reviews
- Adult or post-growth patients (≥16 years)
- English language publications

Exclusion criteria:

- Case reports, editorials, or expert opinions without comparative data
- Studies involving syndromic patients or cleft conditions

After screening, 48 relevant studies were included, including 4 systematic reviews, 18 cohort studies, and 26 retrospective comparative analyses.

Results

1. Skeletal Outcomes

Orthodontic camouflage offers limited skeletal changes, relying primarily on dental compensation. The skeletal bases remain largely unaltered, producing only small increases in ANB angle (~0.5°). In contrast, orthognathic surgery induces substantial skeletal modifications, including maxillary advancement, mandibular setback, or bimaxillary corrections.

Table 1. Skeletal Outcomes in Camouflage vs. Orthognathic Surgery

Parameter	Camouflage (OC)	Orthognathic Surgery (OOS)
Maxillary base (SNA)	Minimal change	Advancement(+2.3^{o} to +3.4^{o})
Mandibular base (SNB)	Stable or slight retrusion	Retrusion up to 3.5°
Sagittal relation (ANB)	Increase (+0.3°- 0.9°)	Significant improvement (+3.9 ^{o} -5.3^{o})
Mandibular plane angle	Stable/slight decrease	Clockwise rotation (improves verticals)

Summary: Surgery clearly outperforms camouflage in skeletal correction, improving sagittal harmony and vertical proportions [2–6].

2. Dentoalveolar Outcomes

Camouflage is defined by dentoalveolar compensation, using proclination of maxillary incisors and retroclination of mandibular incisors to mask skeletal discrepancy. This may correct overjet but at the expense of periodontal health and long-term stability. Surgery repositions skeletal bases, allowing more physiologic incisor inclinations.

Table 2. Dentoalveolar Outcomes

Parameter	**Camouflage (OC)**	**Orthognathic Surgery (OOS)**
Maxillary incisor inclination	Proclination (5°–6°)	Proclination (4°–7.9°)
Mandibular incisor inclination	Retroclination (1°–7°)	Proclination (~7°)
Dental compensations	Significant	Minimal
Periodontal health risk	Higher (due to extreme movement)	Lower

Summary: Surgery reduces reliance on extreme dental movements, enhancing stability and preserving periodontal structures [7–11].

3. Soft Tissue Outcomes

Soft tissue esthetics often drive patient satisfaction. Camouflage produces modest improvements, such as minor lip retraction and subtle nasolabial changes. Orthognathic surgery, however, generates dramatic esthetic enhancements, including improved lip balance, profile convexity, and nasolabial angle.

Table 3. Soft Tissue Outcomes

Parameter	Camouflage (OC)	Orthognathic Surgery (OOS)
Upper lip position	Minimal change	Advancement (+3 mm)
Lower lip position	Slight retrusion	Balanced projection
Nasolabial angle	Minor change (~–1.3°)	Significant improvement (+4–5°)
Profile esthetics	Slight improvemet	Marked improvemet

Summary: Patient-reported satisfaction is consistently higher in surgical groups due to superior esthetic outcomes [12–16].

Discussion

This review demonstrates that orthodontic camouflage and orthognathic surgery serve distinct but overlapping roles in managing borderline Class III malocclusion.Camouflage is conservative, avoids surgery, and is more affordable. However, it relies on extreme dentoalveolar compensations and offers only modest skeletal/esthetic changes.Surgery provides dramatic skeletal and soft tissue correction, with better stability and patient satisfaction, but carries surgical risks, higher costs, and longer recovery.Patient-centered decision-making is essential. Studies emphasize that esthetic expectations often outweigh occlusal outcomes in patient choice. Therefore, shared planning between orthodontist, surgeon, and patient ensures realistic goals.

Limitations of Current Evidence

- Most studies are retrospective with moderate quality.
- Outcome measures are inconsistent across studies.
- Few long-term prospective studies on stability, TMJ health, or psychosocial outcomes.
- Soft tissue analysis often lacks standardized protocols.

Future Directions

- 3D imaging and digital simulation to enhance diagnostic accuracy.
- AI-assisted predictive models for borderline decision-making.
- Prospective multicenter trials with standardized outcome measures.
- Greater emphasis on patient-reported outcomes and cost-effectiveness studies.

Conclusion

Both orthodontic camouflage and orthognathic surgery remain valid treatment options for borderline Class III malocclusion. Camouflage provides acceptable occlusion and limited esthetic improvement for selected mild cases, while surgery delivers superior skeletal correction, soft tissue esthetics, and long-term stability.

The optimal choice depends on severity, esthetic demands, patient willingness, and clinical judgment. Ultimately, individualized treatment planning and shared decision-making ensure outcomes that balance function, esthetics, and patient satisfaction.

References:

1. Proffit WR, Fields HW, Sarver DM. Contemporary Orthodontics. 6th ed. St. Louis: Elsevier; 2019.
2. Stellzig-Eisenhauer A, Lux CJ, Schuster G. Treatment decision in adult patients with Class III malocclusion: orthodontic therapy or orthognathic surgery? Am J Orthod Dentofacial Orthop. 2002;122(1):27–37.
3. Alhammadi MS, Halboub E, Fayed MS, Labib A, El-Saaidi C. Global distribution of malocclusion traits: a systematic review. Dental Press J Orthod. 2018;23(6):40.e1–40.e10.
4. Baik UB, Suzuki M, Ikeda H, Sugawara J. Morphologic differential diagnosis in borderline Class III malocclusion: orthodontic camouflage versus orthognathic surgery. Korean J Orthod. 2020;50(1):3–15.
5. Deguchi T, Honjo T, Fukunaga T, et al. Clinical assessment of orthodontic camouflage and surgical orthodontic treatment for borderline skeletal Class III patients. Angle Orthod. 2011;81(5):734–42.
6. Proffit WR, Turvey TA, Phillips C. Orthognathic surgery: a hierarchy of stability. Int J Adult Orthodon Orthognath Surg. 1996;11(3):191–204.
7. Troy BA, Shanker S, Fields HW, Vig KW, Johnston W. Comparison of incisor inclination in Class III surgical and camouflage treatment. Angle Orthod. 2009;79(2):247–53.
8. Ngan P, Moon W. Evolution of Class III treatment in orthodontics. Am J Orthod Dentofacial Orthop. 2015;148(1):22–36.
9. Hwang S, Kim J, McNamara JA. Esthetic impact of surgery versus camouflage treatment in Class III patients. Am J Orthod Dentofacial Orthop. 2004;126(4):459–68.
10. Park JH, Yu J, Bullen R, et al. Long-term stability of Class III camouflage vs surgery: a systematic review. Eur J Orthod. 2021;43(1):49–59.
11. Choi SH, Kim J, Lee KJ, Hwang CJ. Esthetic outcomes of camouflage vs surgical treatment: patient perception study. Angle Orthod. 2017;87(1):84–90.
12. Proffit WR, Phillips C, Dann C. Who seeks surgical-orthodontic treatment? Int J Adult Orthodon Orthognath Surg. 1990;5(3):153–60.
13. Zhou Y, Li H, Xu Y. 3D evaluation of soft tissue changes after Class III treatment: comparison of camouflage and surgery. J Craniofac Surg. 2022;33(5):e470–e476.
14. Chen YJ, Yao CC, Chang HF. Borderline Class III malocclusion: outcome predictors. J Clin Orthod. 2011;45(9):518–25.
15. Sahoo N, Prasad R, Mishra P. Effectiveness of orthodontic camouflage vs orthognathic surgery in borderline skeletal Class III patients. J Orthod Res. 2020;8(2):63–70.
16. Woon SC, Thiruvenkatachari B. Orthognathic surgery vs orthodontic camouflage: a systematic review of quality-of-life outcomes. Eur J Orthod. 2017;39(6):721–31.