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Ukrainian Dental Journal

Advantages of using micro-implant during camouflaged treatment of the non-growing Class III malocclusion: case report with in-detail discussion

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article

Article Info

Abstract

Background. Camouflaged orthodontic treatment as a possible rehabilitation algorithm may be proposed for the Class III malocclusion patients without remaining growth potential.

Objective. To discuss clinically significant aspects of providing camouflaged orthodontic treatment for the non-growing Class III malocclusion with the usage of temporary-anchorage devices based on presented clinical case.

Materials and Methods. Primary cohort of the publications related with the camouflaged treatment of the non-growing Class III malocclusion was formed through the literature search within PubMed database using MESH-terms and the analogical keywords within Google Scholar search engine.

Results. In present case report it was possible to achieve pleasant facial profile, and Class I occlusion with normal anterior-posterior relationships in patient with initial Class III malocclusion. The mandible arch length deficiency was corrected within the mandibular dentition, and normal alignment was achieved without altering the arch form and width parameter due to the use of Class III elastics and micro-implants as absolute anchorage. Systematized advantages of using skeletal anchorage for Class III orthodontic treatment include following: minimized drawback of dental-based anchorage, possibility for greater maxillary advancement, maximization of skeletal effect and minimization of clockwise mandible rotation, forming conditions for elastics wear during whole day with possibility to employ smaller traction forces, while minimizing risk of unwanted changes in any craniofacial structures.

Conclusion. Camouflaged orthodontic correction is a reliable treatment option for Class III malocclusion patients without remaining growth potential. Micro-implants as skeletal anchorage devices represent reliable opportunity for camouflaged orthodontic treatment of Class III malocclusion patients and changes the need in orthognathic surgery.

Introduction

Due to the systematic review prevalence of Class III malocclusion could reach up to 26.7% in different population samples [1]. Recent assessment of different malocclusion traits prevalence worldwide revealed that Class III malocclusion prevalence is in the range of 1-20% within permanent dentition [2]. Development of Class III malocclusion may be contributed by the several factors and conditions: normal position and size of the maxilla, but with prognathic or macrognathic mandible; normal position and size of mandible, but with retrognathic or micrognathic maxilla; combination of two above-mentioned variants; reverse overjet under condition of centric relation-centric occlusion discrepancies even though skeletal jaw relationship is normal (pseudo-Class III malocclusion) [3].

Despite the fact that Class III remains the least prevalent malocclusion pattern compared to Class I and Class II, cases of such represent clinically complicated situations for treatment. Orthopedic approaches for Class III malocclusion impact residual growth of maxilla-facial structures and recommended for children and adolescents with present growth potential, but only limited number of treatment options available for non-growing patients with Class III malocclusion [4, 5, 6, 7, 8].

Due to the previously proposed classification orthognathic surgery, temporary anchorage device-based treatment and camouflage approaches including extractions may be used for the following categories of Class III malocclusion patients with limited or no growth potential: Class III Type 4 (prognathic mandible Class III), Class III Type 5 (retrognathic maxilla and prognathic mandible), Class II Type 6 (bimaxillary), Class II Type 7 (craniofacial malformations) [3].

Orthognathic surgery remains ideal solution for Class III malocclusion in adult patients from the functionally- and pathogenetically targeted points of view, but still there is a number of surgery-related disadvantages of such kind of intervention [5, 6, 7, 9].

Camouflaged orthodontic treatment as a possible rehabilitation algorithm may be proposed for the Class III malocclusion patients without remaining growth potential. Such approach is based on attempt to «conceal» skeletal malocclusion by interventions targeted on receiving partial correction through dento-alveolar compensation. Latter frequently associated with the retroclination of lower anterior teeth and proclination of maxillary incisors [7, 9].

As per orthodontic specialists' opinion orthodontic treatment of Class III characterized with significantly higher chances of pathology relapses, meanwhile post-operative complication rates for this treatment method could be minimal. On the other hand, combined orthodontic and orthognathic treatment of Class III malocclusion associated with greater chance to achieve close to ideal Class I relationship in shorter period of time [10].

Nevertheless, it should be kept in mind that final agreement regarding different treatment approaches that can be used for non-growing Class III malocclusion relies on the patients themselves, who frequently are scared of orthognathic operations, and tend to choose camouflage orthodontic approach to normalize facial profile and partially correct occlusal interrelations.

Objective

To discuss clinically significant aspects of providing camouflaged orthodontic treatment for the non-growing Class III malocclusion with the usage of temporary-anchorage devices based on presented clinical case.

Materials and Methods

Literature review

Primary cohort of the publications related with the camouflaged treatment of the non-growing Class III malocclusion was formed through the literature search within PubMed database using MESH-terms and the analogical keywords within Google Scholar search engine. Only studies written in English or at least with English abstract representing key findings were included into the study cohort, while no other exclusion criteria were used. There was no need for implementing any criteria regarding quality of selected publications as inclusion ones since objective of the literature search was just to gather maximum volume of the data regarding camouflaged treatment of the non-growing Class III malocclusion.

After reduction of primary cohort of publications by excluding studies, which were not associated with presented clinical case and formulated objective, remained publications included into study sample undergone relational content-analysis with using following topics of interest as research categories [11]:

• decision-making of providing either surgical or orthodontic camouflaged treatment for the non-growing Class III malocclusion cases;

• advantages, limitation, and specifics of providing non-growing Class III malocclusion patients with orthodontic camouflaged treatment;

• reasonability of using micro-implants as temporary anchorage devices during camouflaged treatment of the non-growing Class III malocclusion cases.

Data extraction was provided in incremental manner and structured due to the above-mentioned categories [11]. Relations among structured data complexes was assessed with the use of ER models principles with the following entities: criteria used for the argumentation of orthodontic camouflaged treatment provision among non-growing Class III malocclusion patients, clinically-reasoned advantages and specifics of camouflaged treatment approach in cases of Class III malocclusion, role and significance of micro-implants within orthodontic camouflaged treatment protocol used for Class III malocclusion cases and alternatives of such.

Clinical case presentation

A 16-years and two-month-old boy was brought into the dental clinic by his parents for evaluation of his dentofacial appearance. Medical history revealed mouth breathing since early childhood. During clinical examination it was found that patient exhibited skeletal Class III malocclusion and low position of the tongue (Figure 1-3).

There was no previous history of dental trauma or bad oral habits. The dentition was crowded in the anterior mandible, and bilateral cross bite was observed in the maxilla region. No significant signs or symptoms of temporomandibular disorders were noted during in-detail clinical examination. Range of mandibular movements and amount of mouth opening were categorized as normal.

Patient's face was symmetrical with normal lip competence. During smile a full display of incisors and disharmony in the posterior teeth were noted. Patient had a concave profile with high vertical lower facial dimension, and 2 mm reversed overjet and no overbite. Dental midline deviated 2 mm to the right from the facial midline.
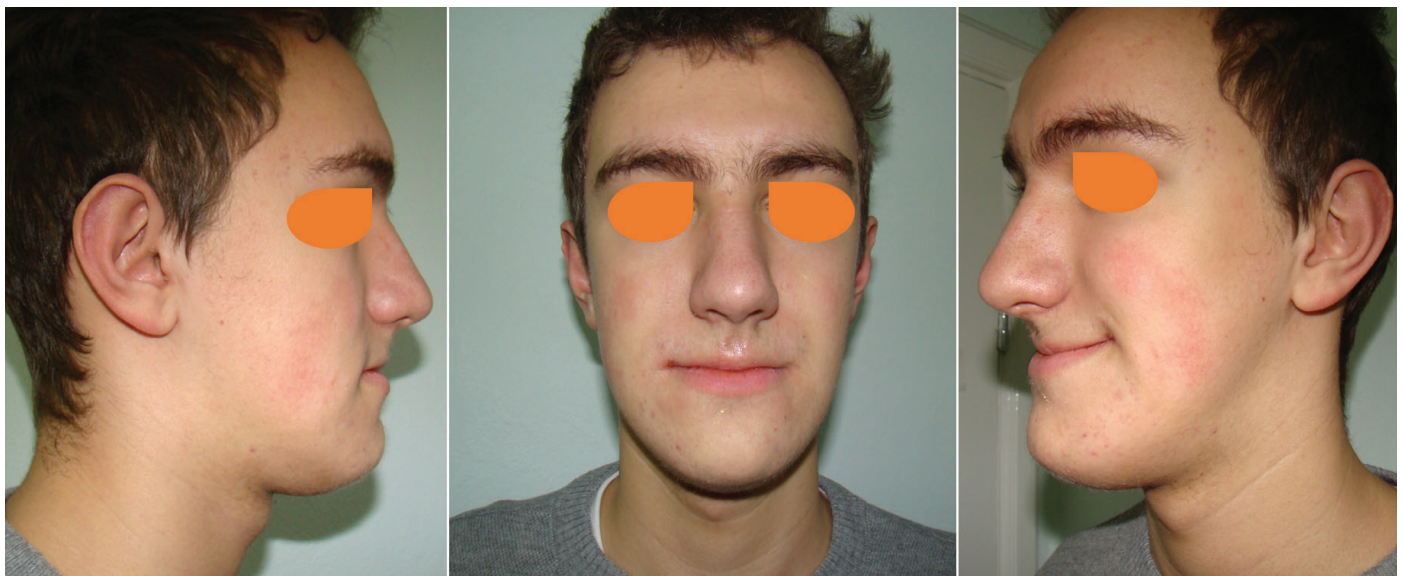

Figure 1. Pretreatment facial photographs

Figure 2. Pretreatment intraoral photographs
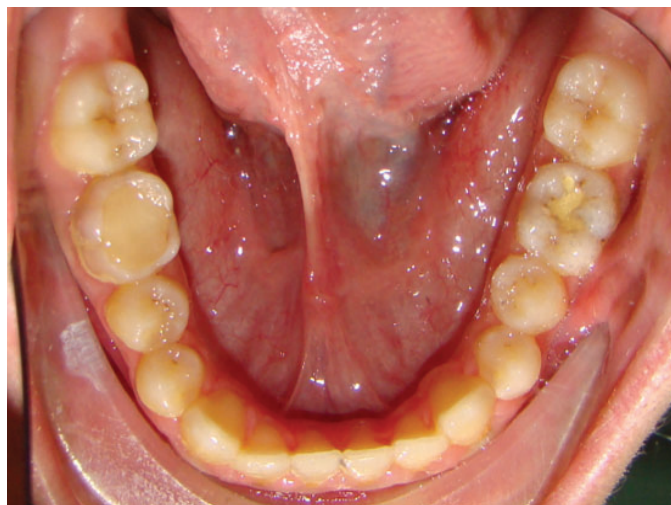
Figure 3. Diagnosed low tongue position

Pre-treatment cephalometric and diagnostic models analyses

Pre-treatment cephalometric analysis revealed following parameters (Figure 4):

	∠ SNA – 78,4°
	∠SNB – 80,1°
	∠ANB – -2,2°
	∠APDI – 96,3°
	∠FMA – 30,5°
	∠Go.A – 139,1°
	∠AFH/PFH – 80,9°
	∠IMPA – 61,4°
	∠FMIA – 89,0°
	∠ODI – 62,4°
	∠Z-angle – 82,1°

Figure 4. Pretreatment cephalometric radiograph and result of cephalometric analysis

Analysis of diagnostic models helped to register following information:

1. Arch length discrepancy (maxilla – 4,0 mm; mandible – 2,1mm)
2. Overjet – 3,1 mm; overbite – 0
3. Curve of Spee depth – 1.5 mm
4. Bolton Ratio: anterior ratio – 75,2% ± 1,2 and overall ratio – 91.3% ± 0,5

Maxillary arch was associated with a constricted palatal vault. In the mandibular arch moderate crowding in the anterior area was noted. The maxillary incisor inclination was good, but the occlusal plane characterized with the 1.5 mm depth of Spee's curve.

Cephalometric radiograph and tracing shown that patient was a Class III (ANB – -2,2°) with low angle. The FMA angle and the facial index confirmed the dolichofacial pattern. Parameter of Antero-posterior Dysplasia Indicator (APDI) equaled to 96,3° and Overbite Depth Indicator (ODI) equaled to 62,4° confirming skeletal Class III malocclusion with low angle. (Figure 4).

Orthopantomography revealed complete dentition including third molars in the left side of maxilla and right side of mandible (Figure 5).

Based on the clinical examination and anamnesis it was resumed that the etiology of the malocclusion was genetic. It was presumed that Class III and maxillary arch deformation were sequelae of skeletal Class III (brachyfacial pattern).

Problem list

1. Soft tissues: concave profile
2. Skeletal: brachyfacial pattern, mandibular prognathic position
3. Dental: Class III relationship with midline deviation

Treatment objectives

• Facial esthetics objectives: to obtain balanced profile and a normal Z angle.

• Functional objectives: to arrange all the teeth and achieve optimal functional efficiency within Class I occlusion with normal overbite and overjet.

• Dentition objectives: to arrange correct teeth position for positive periodontal and TMJ prognosis.

• Stability objectives: to position and arrange teeth for maximum stability of obtained treatment results.

Figure 5. Pretreatment orthopantomogram

Treatment plan

Treatment was realized in two phases.

Phase 1: Crossbite correction (rapid maxillary expansion), trans-palatal bar, frenectomy (for low tongue position)

Phase 2: placement of micro-implant in maxilla between premolar and molar upper and use of Class III elastics (for lower dentition distalization)

Treatment progress

Tweed-brassard brackets (0.22-0.28-inch nontipped, non-torqued edgewise appliance), were banded after extraction of the mandibular and maxillary third molars. Micro-implants (AbsoAnchor SH 1413- 8 mm, Dentos, Co Daegu, Korea) were used for mandibular dentition retraction. Micro-implants were placed between the second premolars and first molars on both sides (Figure 6).

Initial alignment begun with Ni-Ti archwire, and distal force was applied from micro-implant by connecting super thread (T-45 Dentos, Co Daegu, Korea) to the mandibular canine. The purpose of this force was to prevent round trip movement of anterior mandibular teeth during initial alignment.

After 2 months of treatment alignment was completed, and 0.16×0.25 mm SS archwires were inserted at maxilla and mandible, respectively. After 5 months of treatment 0.17×0.25 mm SS archwire with a hook was inserted and elastics 5/16 (5 oz) were placed from the microimplant in the maxilla to provide distal force to canine in the mandible. Elastics were used for 18-24 hours per day excluding mealtime.
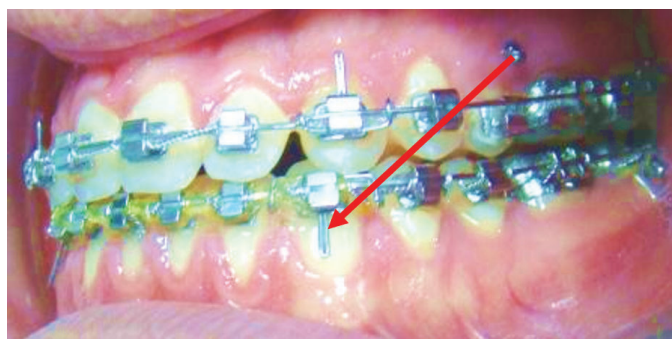
Figure 6. Placement of the temporary micro-implant anchors

After 7 months of treatment, 0.17×0.25 mm archwire was inserted at the maxilla and 0.18×0.25 mm archwire was inserted at the mandible, while Class III elastics were continuously used. After 9 months of treatment 0.18×0.25 mm archwire was inserted at the maxilla and 0.19×0.25 mm archwire was inserted at the mandible, while Class III elastics were continuously used. After 15 months of treatment maxillary and mandibular dental midline were coincided and proper overjet and alignment were achieved with Class I canine and molar relationships.

Treatment was completed at the 18 months period after initiation, and profile improvements with proper occlusion were obtained.
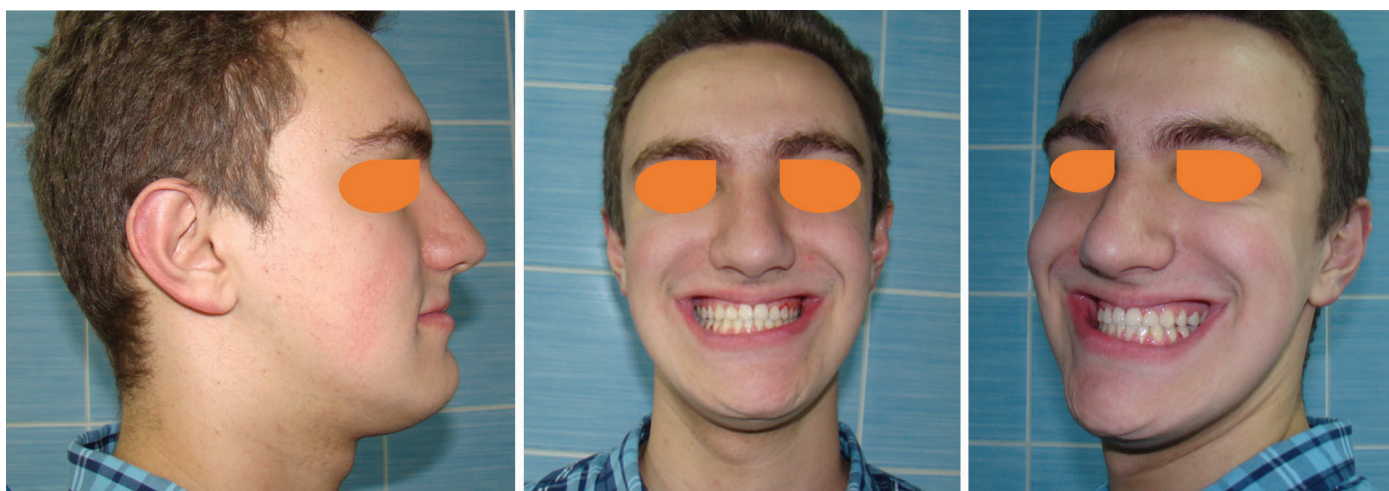
Figure 7. Post-treatment facial photographs

Figure 8. Post-treatment intraoral photographs

Figure 9. Post-treatment orthopantomogram

∠ SNA – 78,4°

∠SNB – 79,8°

∠ANB – –1,5°

∠APDI – 96,2°

∠FMA – 30,3°

∠Go.A – 139,1°

∠AFH/PFH – 76,2°

∠IMPA – 66,1°

∠FMIA – 83,0°

∠ODI – 64,1°

∠Z-angle – 79,6°

Figure 10. Post-treatment cephalometric radiograph and and result of cephalometric analysis

Treatment results

Patient cooperation was excellent. Clinical photographs shown symmetric, harmonious relationship of the facial soft tissue and pleasant facial profile. Class I occlusion with normal anterior-posterior relationship was obtained (Figures 7-8).

Mandibular arch length deficiency was corrected within the mandibular dentition, and normal alignment was achieved without altering the arch form and width parameter.

The panoramic radiograph revealed good root parallelism and bone integration in the maxillary right canine area, as well as normal roots lengths of the maxillary right incisors (Figure 9).

The facial, skeletal, and dental changes were visible on post-treatment cephalometric radiograph with tracing and superimposition with pre-treatment situation (Figure 10-11).

Figure 11. Cephalometric tracing and superimposition Pre-treatment and Post-treatment radiographs

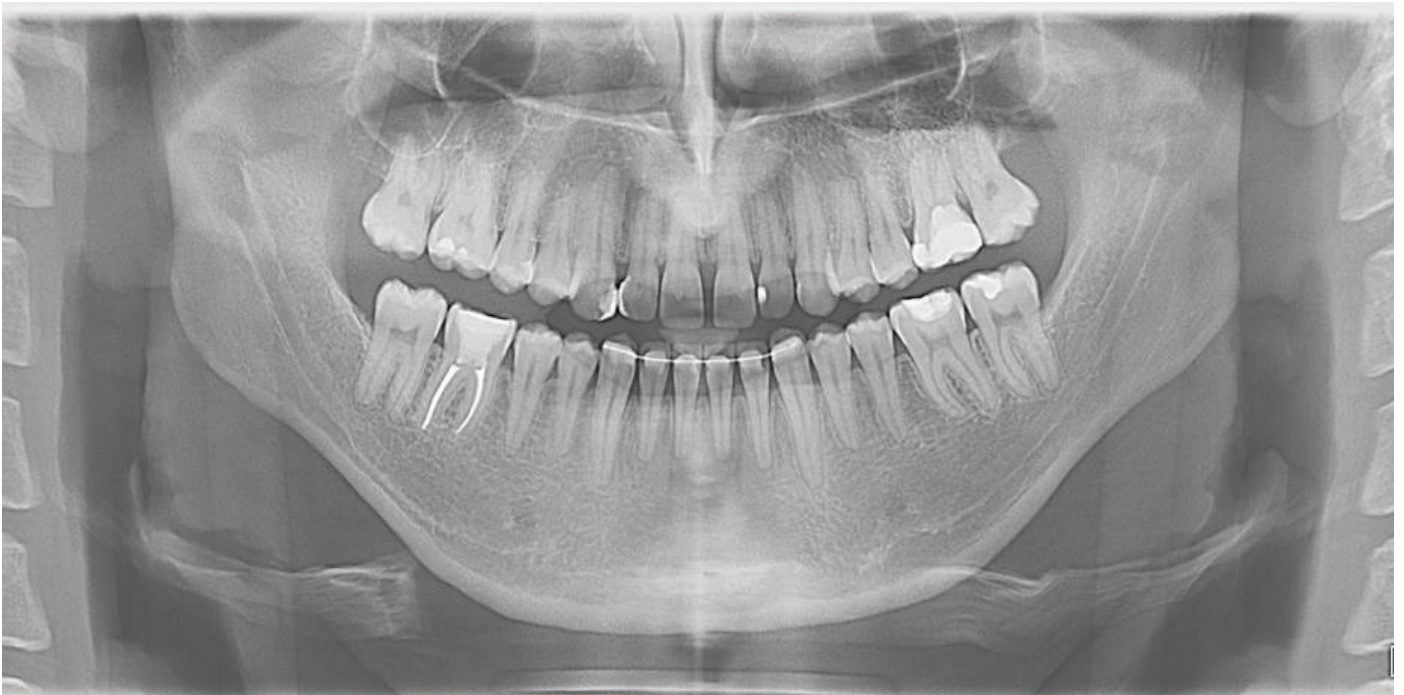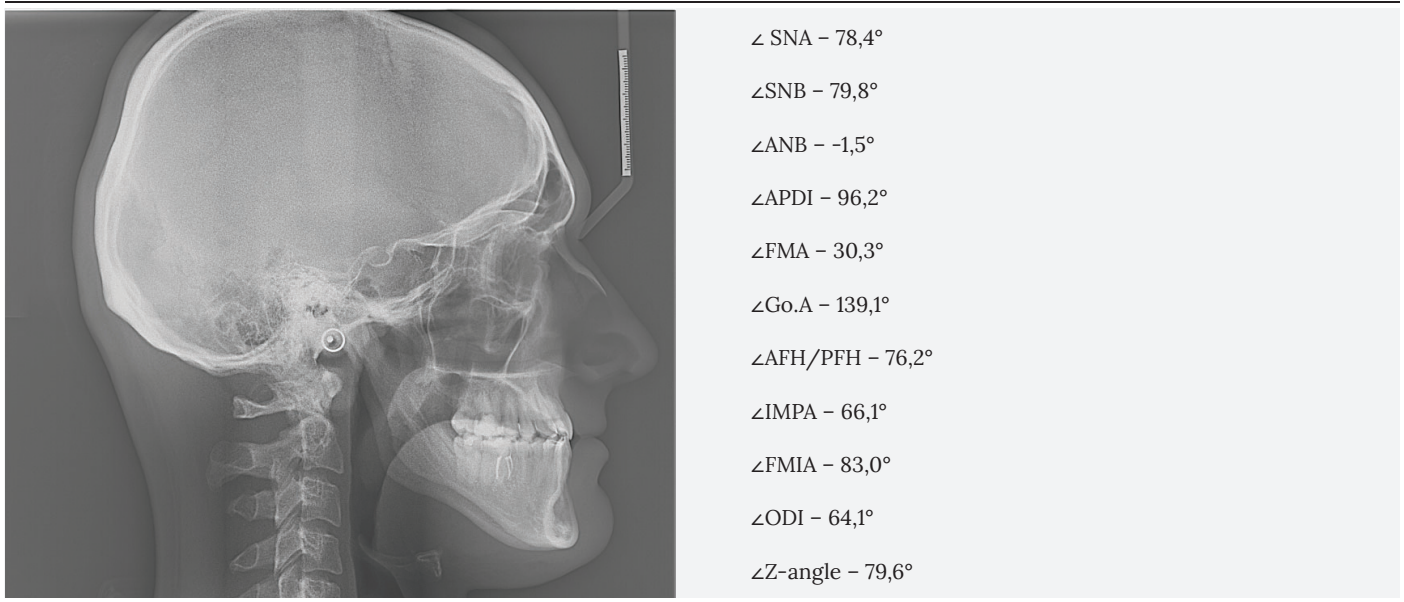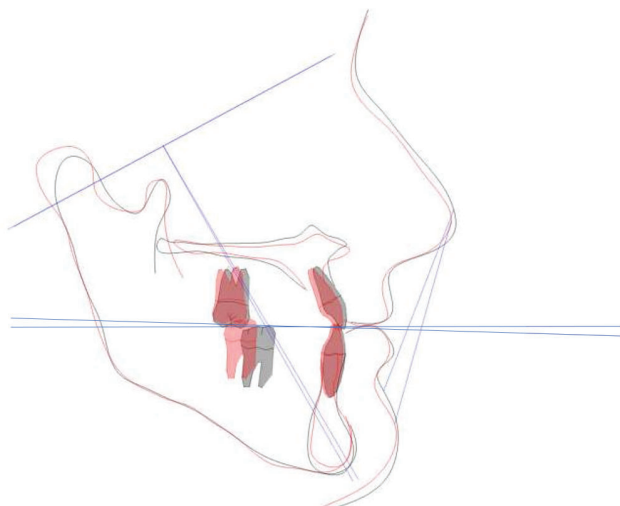Merrifield's Z-angle, FMA, occlusal plane, and the anterior facial height–posterior facial height ratio are the most significant values that describe the patient's facial, skeletal, and dental balance. The superimposition illustrated favorable mandibular spatial changes in downward and backward directions and proper control of the vertical dimension.

Discussion

Treatment of non-growing patients with Class III malocclusion and with high lower anterior facial height represents significant clinical challenge.

Recent systematic review revealed that quality of available evidences regarding effectiveness of using either orthognathic surgery or orthodontic approach for the treatment of Class III malocclusion remains low, while accessible data for comparison of above-mentioned interventions characterized with high level of heterogeneity [7]. One of the problems which limits the possibility to provide direct comparison between orthodontic and orthognathic treatment of Class III malocclusion is inability to provided true patients randomization considering ethical issues [7]. Also, analysis of available retrospective observational studies revealed that most of them were conducted on the Class III patients sample with minimal or no borderline condition regarding Class III malocclusion severity [7].

Set of case selection criteria has been previously proposed for camouflaged orthodontic treatment of Class III, which includes straight or slight concave profile, non-critically prominent retroclination of lower anterior teeth with the presence of adequate bone volume surrounding them, thick gingival biotype, sufficient bone parameters behind molar area in lingual projection to the second molars [12].

Wits appraisal of –6.0 mm due to its relation with masseter muscle activity could be used as predictor for choosing orthognathic or camouflaged approach for patients with Class III malocclusion [13]. Other study demonstrated that Holdaway angle greater than 10.3° and Wits appraisal greater than 5.8 mm could be use as determinants to choose camouflaged orthodontic treatment of Class III malocclusion with a high chance to reach successful outcome [14].

In previous research Holdaway H angle was categorized as sufficient discriminant with predictive power of 87.2% during process of choosing either orthognathic or camouflaged orthodontic treatment for Class III malocclusion cases [15]. The same statement was provided in systematic review, where Wits and Holdaway H angle were classified as the most reliable criteria for choosing correct treatment approach in cases of Class III malocclusion, while making decision between camouflaged treatment and orthognathic surgery [16].

Zere et al. systematized cephalometric criteria that potentially may be used as predictors for the successful outcome of Class III orthodontic camouflaged treatment [3]:
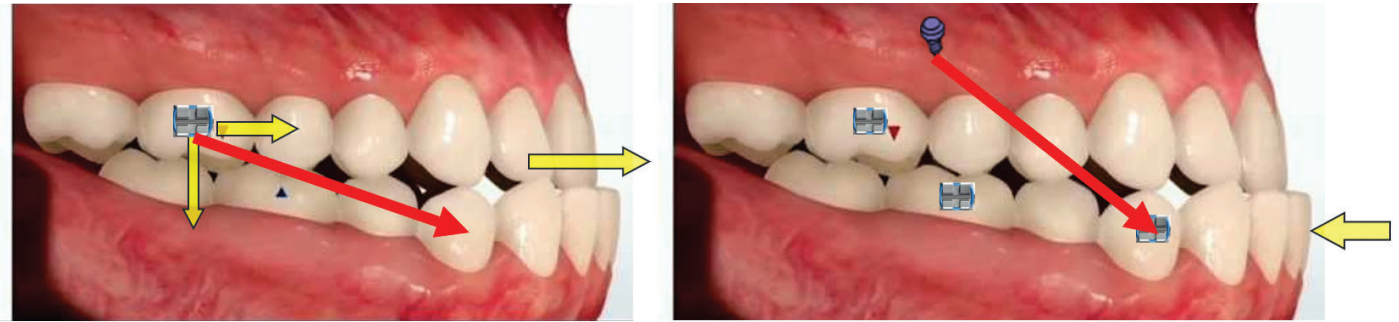
Figure 12. Absolute anchorage may be applied in the molar area to prevent unwanted changes during camouflaged treatment of Class III malocclusion

• ANB in the range of <−2° to −3°;
• Wits appraisal in the range of −2 to −6 mm;
• normal values of maxillomandibular differential and gonial angle [3].

Such predictors set may be expanded by the following parameters grouped within contemporary review: liner distance from condylion to A point and Gnathion; ratio of midfacial length to mandibular length; ratio of mandibular ramus height to mandibular body length [17]. Nevertheless, synthesis of the available evidences revealed no specific cephalometric cut-off levels that could be validated in full manner as markers to differentiate decision for using either orthognathic or camouflaged orthodontic treatment for Class III malocclusion cases [18]. Meanwhile such parameters as ANB angle, Wits appraisal, overbite and overjet, gonial angle and presence of asymmetry have been previously used as discriminant factors for choosing one of the above-mentioned treatment approaches [18].

In 2022 artificial intelligence models trained with random forest and logistic regression demonstrated possibility of 90% accuracy regarding correct treatment decision making for Class III malocclusion patients taking into account parameters of overjet, Wits appraisal, lower incisor angulation, and Holdaway H angle as reliable predictors to argument need in providing surgical intervention [19].

Comparative studies of results obtained after Class III malocclusion patients have been treated either with camouflage or orthognathic approach revealed following evidences [20]:
• patients selected for camouflage treatment are usually characterized with less severe initial dental and skeletal divergences;
• orthognathic approach is associated with much more pronounced skeletal changes, while orthodontic approach is not, but surgical intervention also provokes valuable decompensation of lower incisors but not maxillary ones;
• lip position changes during both orthognathic and camouflaged treatment characterized with various individual-related pattern, but surgical intervention with greater chance will resolve it in more desirable outcome [20].

Burns et al. highlighted that sagittal jaw relationship (ANB angle) is not significantly improving through realization of camouflaged treatment used for Class III malocclusion in young adults, but despite that substantive dental and soft tissue changes may be observed if correct planning and treatment performance were provided [9]. Use of orthodontic camouflage treatment for borderline cases of Class III malocclusion characterized with more pronounced effect of proclination for maxillary incisors and rectoclination on mandibular incision in comparison to orthodontic-orthognathic surgical treatment approach [6]. On the other hand, orthodontic-orthognathic surgical treatment associated with protrusive effect regarding maxillary base and retrusive effect regarding mandibular base, meanwhile improvement within sagittal plane were associated with clockwise rotation effect of mandibular plane [6].

Contemporary review grouped potential contraindications for Class III camouflaged orthodontic treatment, which includes:
• severe cases of Class III with pronounced vertical divergences;
• severe incisors crowding cases;
• in cases where surgical interventions could provide better long-term results;

• medically and periodontally compromised patients and mentally retarded persons;
• patients with the personal need to achieve immediate results [17, 21].

During camouflaged treatment of a patient with a "high angle" Class III malocclusion, it is very important to avoid the flare of anterior teeth in maxilla and the extrusion of maxillary posterior teeth with Class III elastics forces.

In presented clinical case report it was appropriate to avoid this kind of unfavorable reaction, an absolute anchorage source was used. On other hand there was a need to correct overbite and overjet, which was obtained by the distalization of entire lower dentition into its proper position with micro-implant anchorage. All of above-mentioned interventions contributed to the improvement in facial balance.

Due to the already available evidences, it may be also resumed that temporary anchorage devices significantly improves outcomes of Class III camouflaged orthodontic treatment, while helping to minimize need in extraction and optimizing treatment biomechanics [22]. Micro-implants help to enhance Class III orthodontic camouflaged treatment by forming reliable anchorage for mandibular dentition distalization. There are two options of placing temporary anchorage devices during Class III camouflaged treatment: either at mandibular retromolar or between 1st and 2nd molar area, or in maxilla in the interradicular area of 2nd premolar and 1st molar. The last strategy used to employ Class III elastics to anterior mandibular dentition, and greatly depends on patient's cooperation level [22].

Maxillary micro-implant anchorage combined with multiloop edgewise arch wire and modified Class III elastics support tip of the mandibular molars distally without extrusion effect, while also could tip incisors lingually with controlled extrusion to provide sufficient camouflage effect for Class III skeletal malocclusion cases. Such treatment stage helps to avoid clockwise rotation of mandible and proclination effect for maxillary incisors [23]. Also approach of placing extra-alveolar micro-implant into the buccal shelf of mandible with putting nickel-titanium springs from temporary anchorage to the hooks of frontal segment at lower archwire was proposed as variant of camouflaged treatment for Class III [22]. Venugopal A. et al. proposed micro-screw based "eight-point protocol" for achieving efficient and stable results of Class III malocclusion treatment [24]

Generally, TADs increase adaptability level of Class III malocclusion camouflaged orthodontic treatment, which was approved in number of clinical trials, while also in recent systematic review [25, 26, 27].

On the other hand, even though considering evidences that micro-screws may be used for the effective treatment of Class III malocclusion, but no distinctive evidences has been found regarding is such approach improves treatment outcomes compare to the traditional intervention methods, such as disjunction and face mask [28].

Systematized advantages of using skeletal anchorage for Class III orthodontic treatment include following: minimized drawback of dental-based anchorage, possibility for greater maxillary

advancement, maximization of skeletal effect and minimization of clockwise mandible rotation, forming conditions for elastics wear during whole day with possibility to employ smaller traction forces, while minimizing risk of vertical changes in any craniofacial structures and enhancing a chance to achieve needed maxillary advancement in older patients compare to dental anchorage [28].

Stability of results achieved with orthodontic treatment of Class III malocclusion in great manner relies on finishing outcome: patients with better treatment-based dental and skeletal relations characterized with decreased risk of pathology relapse. Nevertheless, more pronounced maxillary incisor inclination before treatment associated with higher chance of initial malocclusion recurrence [29]. On the other hand, it should be remembered that more severe skeletal discrepancies of Class III malocclusion cases require more intensive camouflaged approach for adequate compensation outcome [30]. Also, during Class III treatment outcome evaluation doctors should understand that improvement of profile rather than simple occlusion changes could be interpreted as focus criteria during treatment efficiency assessment [31].

Nowadays possibilities of 3D visualization, three-dimensional tracing and surface mapping functions help not only to compare pre- and post-treatment situation of Class III malocclusion cases, but alto to analyze it in dynamics during different treatment stages and verify specific changes within periodontium, soft tissues of face, bone structures and corpus variations of teeth, thus forming a complex pool of data which should be considered during treatment planning [32].

Conclusion

Camouflaged orthodontic correction represents reliable treatment option for Class III malocclusion patients without remaining growth potential. Proper diagnostic decisions and in-detail treatment planning should be provided to enhance a favorable coordination of changes within mandible and maxilla, optimize facial profile improvements and occlusal harmonization. Micro-implants as skeletal anchorage devices represent reliable opportunity for camouflaged orthodontic treatment of Class III malocclusion patients excluding the need in orthognathic surgery.

Conflict of Interest

Author does not have any financial or property interests that may concerning the materials presented in this article.

Funding

References

1. Hardy DK, Cubas YP, Orellana MF. Prevalence of angle class III malocclusion: A systematic review and meta-analysis. Open J Epidemiol. 2012;2(4):75-82. doi: 10.4236/ojepi.2012.24012

2. Alhammadi MS, Halboub E, Fayed MS, Labib A, El-Saaidi C. Global distribution of malocclusion traits: A systematic review. Dental Press J Orthod. 2018;23:40.e1-40.e10. doi: 10.1590/2177-6709.23.6.40.e1-10.onl.

3. Zere E, Chaudhari PK, Sharan J, Dhingra K, Tiwari N. Developing Class III malocclusions: challenges and solutions. Clin Cosmet Investig Dent. 2018;10:99-116. doi: 10.2147/CCIDE.S134303

4. Toffol LD, Pavoni C, Baccetti T, Franchi L, Cozza P. Orthopedic treatment outcomes in Class III malocclusion: a systematic review. Angle Orthod. 2008;78(3):561-73. doi: 10.2319/030207-108.1

5. Woon SC, Thiruvenkatachari B. Early orthodontic treatment for Class III malocclusion: A systematic review and meta-analysis. Am J Orthod Dentofacial Orthop. 2017;151(1):28-52. doi: 10.1016/j.ajodo.2016.07.017

6. Alhammadi MS, Almashraqi AA, Khadhi AH, Arishi KA, Alamir AA, Beleges EM,

Halboub E. Orthodontic camouflage versus orthodontic-orthognathic surgical treatment in borderline class III malocclusion: a systematic review. Clin Oral Investig. 2022;26(11):6443-55. doi: 10.1007/s00784-022-04685-6

7. Alam MK, Nowrin SA, Shahid F, AlHarby H, Abutayyem H, Alswairki HJ, El-Din Mohamed SK. Orthognathic versus Camouflage Treatment of Class III Malocclusion: A Systematic Review and Meta-Analysis. Appl Sci. 2022;12(7):3314. doi: 10.3390/app12073314

8. Rodriguez de Guzman-Barrera J, Saez Martinez C, Boronat-Catalá M, Montiel-Company JM, Paredes-Gallardo V, Gandía-Franco JL, Almerich-Silla JM, Bellot-Arcis C. Effectiveness of interceptive treatment of class III malocclusions with skeletal anchorage: a systematic review and meta-analysis. PLoS One. 2017;12(3):e0173875. doi: 10.1371/journal.pone.0173875

9. Burns NR, Musich DR, Martin C, Razmus T, Gunel E, Ngan P. Class III camouflage treatment: what are the limits?. Am J Orthod Dentofacial Orthop. 2010;137(1):9.e1-9.e13. doi: 10.1016/j.ajodo.2009.05.017

10. Kauser A, Tiwari RV, Khandelwal A, Tiwari H, Joshi SR, Baig FA, Managutti A. Preference Of Orthodontic Treatment Versus Orthognathic Surgery In Class Iii Malocclusion Cases: A Research Survey. Eur J Mol Clin Med. 2021;8(1):1271-7.

11. Erlingsson C, Brysiewicz P. A hands-on guide to doing content analysis. Afr J Emerg Med. 2017;7(3):93-9. doi: 10.1016/j.afjem.2017.08.001

12. Bhaskar V. Diagnosis and treatment considerations of orthodontic miniscrews in camouflage treatment of adult Class III malocclusions by distalization of the mandibular dentition-A review of literature. Ann Dent UM. 2019;26:62-8. doi: 10.22452/adum.vol26no10

13. Kawai N, Watanabe M, Shibata M, Horiuchi S, Fushima K, Tanaka E. Treatment decision of camouflage or surgical orthodontic treatment for skeletal Class III patients based on analysis of masticatory function. J Dent Sci. 2022;17(2):822-30. doi: 10.1016/j.jds.2021.09.036

14. Eslami S, Faber J, Fateh A, Sheikholaemmeh F, Grassia V, Jamilian A. Treatment decision in adult patients with class III malocclusion: surgery versus orthodontics. Prog Orthod. 2018;19(1):1-6. doi: 10.1186/s40510-018-0218-0

15. Benyahia H, Azaroual MF, Garcia C, Hamou E, Abouqal R, Zaoui F. Treatment of skeletal Class III malocclusions: orthognathic surgery or orthodontic camouflage? How to decide. Int Orthod. 2011;9(2):196-209. doi: 10.1016/j.ortho.2011.03.005

16. Grinkevičienė D, Astramskaitė-Januševičienė I. Cephalometric data differences in Angle III patients selected for camouflage treatment and orthognathic surgery: a systematic review. Eur Int J Sci Technol. 2020;9(4):1-11.

17. Tekale PD, Vakil KK, Vakil JK, Parhad SM. Orthodontic camouflage in skeletal Class III malocclusion: A contemporary review. J Orofac Res. 2014;4(2):98-102.

18. Sivarajan S, Zakaria NN, Azmily NA, Wey MC, Abd El-Ghafour M, Fayed MM. Determination of treatment options for Class III malocclusions in adult patients based on cephalometric values: a systematic review. Australas Orthod J. 2022;38(2):183-93. doi: 10.2478/aoj-2022-0021

19. Lee H, Ahmad S, Frazier M, Dundar MM, Turkkahraman H. A novel machine learning model for class III surgery decision. J Orofac Orthop. 2022;1-1. doi: 10.1007/s00056-022-00421-7

20. Georgalis K, Woods MG. A study of Class III treatment: orthodontic camouflage vs orthognathic surgery. Aust Orthod J. 2015;31(2):138-48.

21. Araujo MT, Squeff LR. Orthodontic camouflage as a treatment alternative for skeletal Class III. Dental Press J Orthod. 2021;26(4):e21bbo4. doi: 10.1590/2177-6709.26.4.e21bbo4

22. Krishnaswamy NR. Contemporary solutions for managing Class III malocclusion. J Indian Orthod Soc. 2015;49:19-26. doi: 10.4103/0301-5742.171189

23. He S, Gao J, Wamalwa P, Wang Y, Zou S, Chen S. Camouflage treatment of skeletal Class III malocclusion with multiloop edgewise arch wire and modified Class III elastics by maxillary mini-implant anchorage. Angle Orthod. 2013;83(4):630-40. doi: 10.2319/091312-730.1

24. Venugopal A, Manzano P, Vaid NR. TAD driven Class III camouflage: Eight point protocol to optimize efficiency, aesthetics and stability. Semin Orthod. 2022;28(3):164-194. doi: 10.1053/j.sodo.2022.10.013

25. Almalki RA, Alhazmi A, Devanna R, Al-Subaie KS, Alanazi RK, Sawad AB, yahya Alneemi W. Evaluation of Skeletal Class III Treatment with Mini-Screw-A Systematic Review. Saudi J Oral Dent Res. 2022;7(10):261-9. doi: 10.36348/sjodr.2022.v07i10.002

26. Rivis O, Potapchuk A, Goncharuk-Khomyn M, Bokoch A. Use of Mini-Implant Anchorage For Second Molar Mesialization: Comprehensive Approach For Treatment Efficiency Analysis. Pesqui Bras Odontopediatria Clín Integr. 2020;20:e5262. doi: 10.1590/pboci.2020.018

27. Yasuda Y, Iijima M, Mizoguchi I. Camouflage treatment of severe skeletal Class III malocclusion with miniscrew anchorage. J World Fed Orthod. 2014;3(3):137-44. doi: 10.1016/j.ejwf.2014.07.001

28. Rodriguez de Guzman-Barrera J, Saez Martinez C, Boronat-Catalá M, Montiel-Company JM, Paredes-Gallardo V, Gandía-Franco JL, Almerich-Silla JM, Bellot-Arcis C. Effectiveness of interceptive treatment of class III malocclusions with skeletal anchorage: a systematic review and meta-analysis. PLoS One. 2017;12(3):e0173875. doi: 10.1371/journal.pone.0173875

29. Blagitz MN, de Araújo Almeida G, Normando D. Factors associated with the stability of compensatory orthodontic treatment of Class III malocclusion in the permanent dentition. Am J Orthod Dentofacial Orthop. 2020;158(5):e63-72. doi: 10.1016/j.ajodo.2020.06.030

30. Valarelli FP, Nascimento FE, Batista DM, Freitas KM, Cançado RH. Class III camouflage treatment with the Biofunctional technique. J Clin Orthod. 2018;52(6-7):351-358.

31. Rabie AB, Wong RW, Min GU. Treatment in borderline Class III malocclusion: orthodontic camouflage (extraction) versus orthognathic surgery. Open Dent J. 2008;2:38-48. doi: 10.2174/1874210600802010038

32. Ngan P, Moon W. Evolution of Class III treatment in orthodontics. Am J Orthod Dentofacial Orthop. 2015;148(1):22-36. doi: 10.1016/j.ajodo.2015.04.012

Переваги використання мікроімплантатів під час лікування скелетного III класу патології прикусу з метою камуфляжу у дорослих пацієнтів: детальне обговорення на основі клінічного випадку

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Стаття:

Анотація

Вступ. Ортодонтичне лікування з метою камуфляжу скелетного III класу патології прикусу за Енглем може бути запропоновано дорослим пацієнтам, як один з можливих алгоритмів реабілітації.

Мета. Обговорити клінічно значущі аспекти проведення камуфльованого ортодонтичного лікування у дорослих пацієнтів з скелетною патологією прикусу по III класу за Енглем з використанням тимчасово-фіксуючих пристроїв на основі представленого клінічного випадку.

Матеріали та методи. Первинна когорта публікацій, пов'язаних із ортодонтичним лікуванням з метою камуфляжу скелетного III класу патології прикусу за Енглем у дорослих пацієнтів, була сформована шляхом пошуку літератури в базі даних PubMed з використанням MESH-термінів та аналогічних ключових слів у пошуковій системі Google Scholar.

Результати. В представленому клінічному випадку вдалося досягти візуально-прийнятного профілю обличчя та класу I за Енглем по прикусу з нормальним передньо-заднім співвідношенням у дорослого пацієнта, який мав на початку лікування патологію прикусу III класу. Дефіцит довжини дуги нижньої щелепи виправлено в межах зубного ряду нижньої щелепи, досягнуто нормального вирівнювання без зміни форми та параметрів ширини дуги завдяки використанню еластиків III класу та мікроімплантатів, як абсолютної опори (анкораж). Системні переваги використання скелетного анкоражу для ортодонтичного лікування класу III включають: мінімізація недоліків ортодонтичної опори на зуби, можливість більшого просування вперед верхньої щелепи, максимізація скелетного ефекту та мінімізація повороту нижньої щелепи за годинниковою стрілкою, створення умов для використання еластиків протягом цілого дня з можливістю використовувати менші сили тяги, зводячи до мінімуму ризик небажаних змін в будь-яких черепно-лицевих структурах.

Висновки. Камуфляжне ортодонтичне лікування є надійним варіантом лікування дорослих пацієнтів з III класом патології прикуса. Мікроімплантати, як скелетна опора, являють собою надійну можливість для камуфляжного ортодонтичного лікування дорослих пацієнтів з III класом патології прикусу за Енглем, що зменшує потребу в проведенні ортогнатичної хірургії.

Заява про конфлікт інтересів
Автори не мають жодних фінансових чи майнових інтересів, щодо матеріалів, представлених у цій статті.