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Treatment of anterior deep bite with fixed appliances and microimplants for incisor intrusion – a case report

Leczenie zgryzu głębokiego przedniego z wykorzystaniem aparatów stałych cienkołukowych i mikroimplantów ortodontycznych w celu intruzji siekaczy – opis przypadku

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ABSTRACT

Anterior deep bite is a malocclusion characterized by excessive vertical overlap of the maxillary incisors over the mandibular incisors. It often leads to functional and aesthetic concerns, as well as an increased risk of periodontal and temporomandibular joint problems. This case report illustrates the successful treatment of an anterior deep bite using fixed orthodontic appliances and two microimplants for bite correction. The combination of these approaches allowed for significant improvement in both function and appearance, showing the effectiveness of modern orthodontic techniques in managing complex bite problems.

Keywords: anterior deep bite, microimplants, miniscrew, incisor intrusion.

STRESZCZENIE

Zgryz głęboki przedni cechuje się nadmiernym pionowym nachodzeniem przednich zębów górnych na dolne. Często prowadzi do problemów zarówno funkcjonalnych, jak i estetycznych, a także zwiększonego ryzyka chorób przyzębia i zaburzeń w stawie skroniowo-żuchwowym. Niniejszy opis przypadku ilustruje udane leczenie ortodontyczne zgryzu krzyżowego przedniego przy użyciu stałych aparatów i dwóch mikroimplantów ortodontycznych. Wykorzystanie w leczeniu zakotwienia szkieletowego pozwoliło na znaczną poprawę zarówno funkcji, jak i estetyki uśmiechu, pokazując skuteczność nowoczesnych technik ortodontycznych w radzeniu sobie ze złożonymi problemami zgryzowymi.

Słowa kluczowe: zgryz głęboki przedni, mikroimplanty, miniśruby, intruzja siekaczy.

Introduction

Anterior deep bite is one of the most common vertical discrepancies in orthodontics. The condition is typically caused by excessive eruption or overgrowth of the maxillary or mandibular incisors, a retroclined or underdeveloped mandible, or a combination of both. A deep bite can lead to multiple clinical complications, including impaired speech, difficulty in chewing, discomfort, and esthetic concerns. In severe cases, it may contribute to temporomandibular joint (TMJ) dysfunction or periodontal disease due to the increased force on the anterior teeth.

Depending on the diagnosis and treatment objectives, a deep overbite can be corrected by intruding the incisors, extruding the buccal segments, or combining these treatments [1]. Correcting anterior deep bite presents a challenge, particularly in adult patients or cases with skeletal involvement. Traditional approaches, including fixed orthodontic appliances, often require adjunctive procedures like microimplants (also known as temporary anchorage devices, or TADs) to achieve more controlled and efficient tooth movement. Microimplants provide the necessary anchorage for achieving significant dental movement with-

out the need for extraoral appliances or the risk of unwanted teeth movements.

Case report

A 13-year-old male patient presented in our office with his parents with a chief complaint of "distema" and expressed concern about the appearance of his smile. Upon clinical examination, he was diagnosed with an anterior deep bite, characterized by the following:

- A vertical overlap of 10 mm between the maxillary and mandibular incisors.
- Mild crowding in the upper and lower arch, with a Class I molar relationship.
- Moderate lower facial height with a 2 mm overjet.

The anterior deep bite was primarily dental in origin, with excessive eruption of the maxillary and mandibular anterior teeth (**Figures 1–5**).

Figure 1. Intra-oral patient's examination. (A) front view in occlusion, (B) front view – open mouth (C) left lateral occlusion, (D) right lateral occlusion

Rycina 1. *Fotografie wewnątrzustne przed leczeniem. (A) widok przedni w okluzji (B) widok przedni – otwarte usta (C) lewa strona pacjenta (D) prawa strona pacjenta*

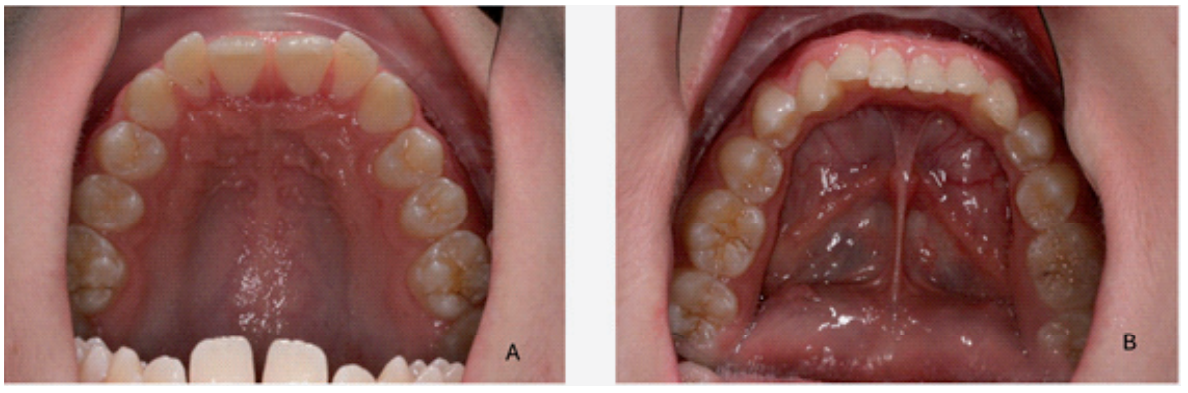

Figure 2. Intra-oral patient's examination. (A) occlusal view of the maxillary arch, (B) occlusal view of the mandibular arch

Rycina 2. *Fotografie wewnątrzustne przed leczeniem. (A) zdjęcie okluzyjne szczęki, (B) zdjęcie okluzyjne żuchwy*

Figure 3. Extra-oral patient's examination. (A) right lateral profile at rest, (B) frontal view smiling, (C) frontal view rest

Rycina 3. *Zdjęcia zewnątrzustne. (A) prawy profil w spoczynku, (B) zdjęcie w uśmiechu (C) zdjęcie en face*

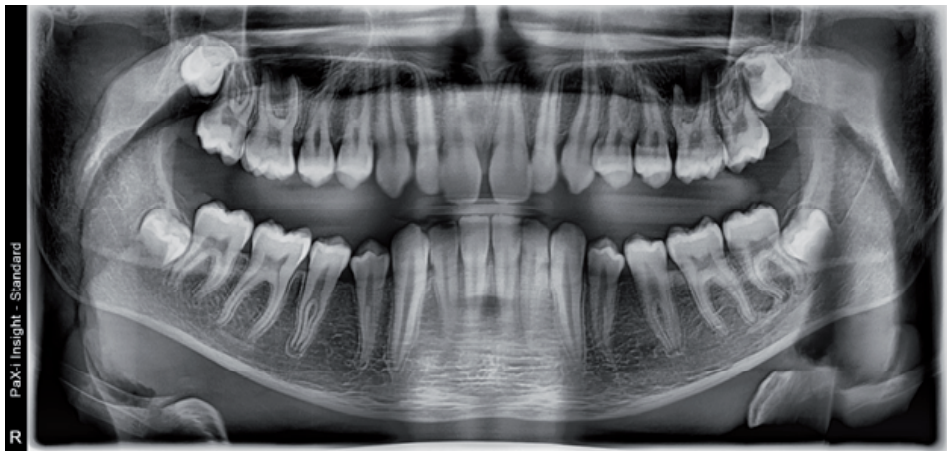

Figure 4. Panoramic X-ray

Rycina 4. *Zdjęcie pantomograficzne*

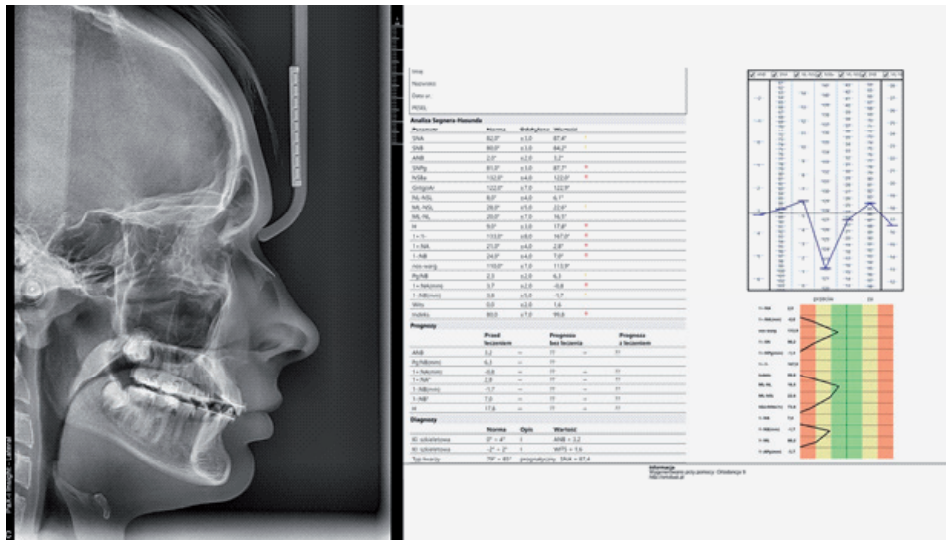

Figure 5. Cephalometric X-ray and Segner-Hasund analysis

Rycina 5. *Zdjęcie cefalometryczne oraz analiza cefalometryczna Segnera-Hasunda*

Treatment plan

The primary goal of treatment was to reduce the vertical overlap and improve both occlusion and esthetics. Based on the clinical examination and radiographic findings, the treatment plan was designed as follows:

1. Correction of the deep bite: The primary objective was to intrude and procline the mandibular incisors and uprighting the maxillary incisors and upper and lower posterior teeth to reduce the vertical overlap [2, 3].
2. Crowding resolution: The patient exhibited mild crowding in upper and lower arch that would require space creation and alignment.
3. Anchorage enhancement: Given the need for controlled intrusion and the vertical component of treatment, microimplants were planned from the buccal side between roots of teeth 32–33 and 43–42.
4. Fixed appliances: Traditional fixed orthodontic appliances (brackets and wires) were selected as the main method of treatment.

Treatment approach

Step 1: Initial alignment and leveling

The treatment began with the placement of fixed appliances in both the upper and lower arches (Chic ceramic brackets; GC; 022 MBT). The brackets were placed on all teeth, and the initial archwires (0.014" NiTi) were selected to allow for gentle alignment of the teeth. Over a period of 6 months, the patient's mild crowding was resolved, and initial leveling of the dental arches took place.

Step 2: Incorporation of microimplants for anchorage

After the initial alignment phase, the next step focused on the correction of the deep bite. Intrusion of the lower incisors and canines were necessary to correct the excessive vertical overlap. Microimplants were inserted from the buccal side between roots of teeth 32–33 and 43–42 (Ortho Traiding) under local anesthesia.

These microimplants provided fixed anchorage, allowing for controlled tooth intrusion and proclination movement without relying on the patient's compliance [2, 3]. A custom intrusion mechanics was used, connecting the microimplants to the archwire via elastic chains. This approach allowed for efficient vertical correction with minimal risk of unwanted side effects [4] (**Figure 6**).

Figure 6. Localization of microimplants – front view in occlusion

Rycina 6. *Lokalizacja mikroimplantów – zdjęcie przednie zgryzowe*

Step 3: Vertical bite correction

The vertical correction of the deep bite was achieved gradually over the next 7 months. The intrusion of the maxillary anterior teeth resulted in a reduction of the vertical overlap from 10 mm to approximately 3 mm, bringing the bite into a more functional and esthetically pleasing position.

Step 4: Finishing and retention

Once the deep bite was sufficiently corrected, finishing procedures were undertaken, which included detailing the occlusion and final alignment of the arches. A 0.019" x 0.025" stainless steel wire was used for detailing, providing rigidity and finishing the occlusal contacts.

At the end of the active treatment phase, the anterior deep bite was corrected, and the patient demonstrated an improved bite and enhanced smile esthetics. The patient was provided with removable retainers for both the upper and lower arches to maintain the correction. The microimplants were removed after completion of the vertical correction phase.

Results

The treatment was completed successfully with significant improvements in both function and appearance. The anterior deep bite was corrected. The patient's smile was more balanced, and the functional occlusion was optimized.

Post-treatment analysis showed improved alignment of the maxillary and mandibular arches, with no significant post-treatment relapse. The patient reported high satisfaction with both the aesthetic and functional outcomes of the treatment (**Figures 7–9**).

Figure 7. Intra-oral post treatment. (A) front view in occlusion, (B) front view – open mouth (C) left lateral occlusion, (D) right lateral occlusion

Rycina 7. *Fotografie wewnątrzustne po leczeniu. (A) widok przedni w okluzji (B) widok przedni – otwarte usta (C) lewa strona pacjenta (D) prawa strona pacjenta*

Figure 8. Intra-oral post-treatment. (A) occlusal view of the maxillary arch, (B) occlusal view of the mandibular arch

Rycina 8. *Fotografie wewnątrzustne po leczeniu. (A) zdjecie okluzyjne szczęki, (B) zdjęcie okluzyjne żuchwy*

Figure 9. Extra-oral patient's examination post-treatment. (A) right lateral profile at rest, (B) frontal view while smiling, (C) frontal view rest

Rycina 9. *Zdjęcia zewnątrzustne po leczeniu. (A) prawy profil w spoczynku, (B) zdjęcie w uśmiechu, (C) zdjęcie en face*

Discussion

Anterior deep bite is a common and challenging malocclusion, often requiring multidisciplinary intervention. While traditional orthodontic approaches can be effective, the use of microimplants has revolutionized the treatment of deep bite cases by providing reliable anchorage for controlled tooth movement [2–4]. The combination of fixed appliances and microimplants in this case allowed for a more precise and efficient correction of the deep bite [5].

Conclusion

This case report demonstrates the successful management of an anterior deep bite using fixed orthodontic appliances and microimplants. The combination of these techniques proved to be effective in achieving both functional and aesthetic goals, providing a reliable and efficient solution for complex deep bite cases. The use of microimplants in orthodontic treatment continues to show great promise, especially in adult patients requiring precise tooth movement and anchorage control.

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Conflict of interest statement
The authors declare no conflict of interest.

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