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PREFERENCES IN MINI-IMPLANT DIMENSIONS AMONG ROMANIAN ORTHODONTISTS

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ABSTRACT

Introduction. Anchorage in orthodontics is critical for managing malocclusions, traditionally achieved via intraoral appliances. Temporary Anchorage Devices (TADs) like mini-implants offer enhanced control by being temporarily fixed in bone. These devices, made from materials like titanium and stainless steel, vary in size and are selected based on multiple factors, including patient characteristics and anatomical considerations. This study explores the preferences of Romanian orthodontists concerning mini-implant dimensions and systems, addressing a gap in local data and aiming to align practices with evidence-based standards.
Materials and methods. This study employed a questionnaire distributed via social media to Romanian dental professionals from June to September 2024. Data on mini-implant usage, preferences for dimensions, and complications were collected. Ethical approval was secured from the Faculty of Medicine and Pharmacy at the University of Oradea, with participant consent implied through questionnaire completion. Statistical analysis was performed using IBM SPSS, focusing on the correlation between mini-implant dimensions and clinical outcomes.
Results. Mini-implants are widely used with preferences for specific dimensions varying by anatomical location. The most common sizes in the maxillary interradicular area were 1.6 x 8 mm and 1.6 x 10 mm. Complications were associated with the use of inappropriate mini-implant sizes, particularly in areas requiring precise dimensional fitting. The study found a notable preference for larger and longer mini-implants in regions like the infrazygomatic area, with a significant portion of orthodontists not using mini-implants in less common locations due to variability in training and resource access.
Conclusions. Proper selection of mini-implant sizes is crucial for optimizing clinical outcomes and minimizing complications. The study underscores the importance of comprehensive training and access to diverse mini-implant systems to accommodate varied clinical needs and preferences. Future initiatives should focus on standardizing orthodontic practices in Romania to enhance the success rates of orthodontic treatments involving TADs.

Keywords: Orthodontic Anchorage, Mini-Implants, Temporary Anchorage Devices (TADs), Orthodontic Treatment Outcomes

INTRODUCTION

Anchorage, defined as resistance to unwanted dental movement(1), is a primary requirement in the treatment of malocclusions and has traditionally been provided through intraoral and intramaxillary appliances (2). Anchorage remains a challenge for orthodontic specialists (1), and to achieve better control, temporary anchorage devices (TADs) have been proposed (2). These are defined as devices temporarily fixed in bone to enhance orthodontic anchorage and removed after use (3). Mini-implants offer predictable anchorage without requiring patient compliance and are generally well-accepted by patients, making them particularly valuable in diverse clinical

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settings.(4) TADs are also known by various terms, including miniscrews, microscrews, and mini-implants (1).

Mini-implants are primarily made of titanium alloy due to its biocompatibility with the hard and soft tissues of the oral cavity (5). However, stainless steel mini-implants are also available, offering a more affordable option with good mechanical properties, such as stiffness, ductility, and elasticity (6). Regardless of the material used, both types of mini-implants seem to provide adequate anchorage and stability throughout orthodontic treatment (6). In addition to these commonly used materials, mini-implants are also manufactured from cobalt-chromium-molybdenum alloys, ceramics, and other miscellaneous materials (7).

Orthodontic mini-implants continue to evolve, resulting in complex classifications based on factors such as their intended placement site, shape, composition, surface structure, head design, and biocompatibility (7). Their sizes also vary, with commonly used dimensions ranging from 1.3 mm to 1.8 mm in diameter and from 5 mm to 12 mm in length (8). The choice of mini-implant size largely depends on the intended insertion site and the space available for placement [7]. Generally, narrower mini-implants are used in the maxilla between two roots, while longer mini-implants may be required if stability relies on trabecular bone [7].

The selection of mini-implant type is influenced by factors such as the patient's age, periodontal status, systemic conditions, radiographic analysis (7), and the practitioner's individual preferences (9). Practitioner preference is particularly relevant when considering mini-implant failure. Failure rates can reach up to 40% in some studies (10), with numerous patient-related factors contributing to failure, such as gender, age, oral hygiene, bone condition, malocclusion type, and placement site (1). Implant-related factors, including size, design, force, and material, have also been considered (1). However, few studies explore the role of practitioner experience in mini-implant outcomes (1,11), and even fewer investigate orthodontists' preferences for mini-implant dimensions or systems used in different areas of the dental arches.

In Romania, no such studies have been identified in the scientific literature. Nonetheless, orthodontic mini-implants have become an essential tool for achieving anchorage, and their success depends on multiple factors, including proper selection of size and placement technique (1). Given the unique challenges in Romania, such as variability in product availability, cost considerations, and clinical training, understanding these preferences is crucial. This study seeks to address the existing knowledge gap, providing insights that can improve orthodontic practices, guide training programs, and align clinical approaches with evidence-based standards.

The primary objective of this study was to investigate the preferences of Romanian orthodontists regarding the diameter and length of mini-implants used for anchorage in various areas of the dental arch.

MATERIAL AND METHODS

Ethical Considerations

This study adhered to the ethical principles outlined in the 1964 Declaration of Helsinki and its subsequent revisions. Approval for the research was obtained from the Ethics Committee of the Faculty of Medicine and Pharmacy at the University of Oradea (Approval No. CEFMF/04, dated February 4, 2022). Participants were informed about the study's objectives, the voluntary nature of their involvement, and the anonymity of their responses. No financial compensation or other incentives were provided. Completion of the questionnaire was regarded as implicit consent to participate in the study.

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Participants and Data Collection

The study was conducted as a survey over a three-month period, spanning from June 1, 2024, to September 1, 2024. A custom-designed questionnaire, created by the authors, was hosted on the Survio platform (Survio s.r.o., Brno, Czech Republic). To ensure broad distribution, the questionnaire link was shared across multiple social media channels within Romanian dental and orthodontic professional groups.

The main independent variable analyzed was the practitioners' professional experience, stratified by duration in practice: less than 5 years, 5–10 years, 11–15 years, 16–20 years, and more than 20 years.

Additional covariates included:

- Gender (male, female);
- Specialization (e.g., orthodontics, dento-alveolar surgery);
- Geographic location (city of practice);
- Specific MI systems used (e.g., Dual Top, Benefit, OrthoEasy);
- Frequency of MI usage (e.g., very frequently, frequently, occasionally, rarely, very rarely);
- Preferred MI placement zones (e.g., interradicular, palatal, retromolar);
- Reported complications (e.g., MI mobility, soft tissue injuries, MI fracture) [8].

The questionnaire consisted of 24 items, organized into four main sections to gather comprehensive data from respondents:

- Section One (Items 1–4): This section aimed to collect demographic and professional information. Data were gathered on gender (male/female), specialization (orthodontics, dento-alveolar surgery, general dentistry, oral and maxillofacial surgery, other specializations, or resident doctor), years of professional experience (categorized as <5 years, 5–10 years, 11–15 years, 16–20 years, or >20 years), and the practitioner's city of practice in Romania. While the first three questions offered predefined response options, the fourth item allowed respondents to provide their city as an open-ended response [8].
- Section Two (Items 5–12): Focused on practitioners' experience with mini-implants (MIs), this section employed multiple-choice questions [8].
- Section Three (Items 13–19): This section gathered detailed information regarding the dimensions of mini-implants used in various anatomical regions. Respondents were asked to provide open-ended answers to describe the dimensions of MIs they employed in specific areas, including:
    - Maxillary interradicular area (Item 13),
    - Mandibular interradicular area (Item 14),
    - Infrazygomatic area (Item 15),
    - Midpalatal area (Item 16),
    - Palatal area (Item 17),
    - Maxillary retromolar area (Item 18),
    - Mandibular retromolar area (Item 19). By collecting open-ended responses, this section aimed to capture the variability in mini-implant dimensions based on anatomical sites and practitioner preferences [8].
- Section Four (Items 20–24): The final section explored operator satisfaction with mini-implants and assessed perceived risks of complications [8].

The study included Romanian doctors actively engaged in orthodontic practice, such as MI users, orthodontic specialists, and residents. The inclusion

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criteria ensured participation from professionals with direct or potential experience in MI usage to gather comprehensive insights into their application and challenges.

Exclusion criteria applied to practitioners not qualified in orthodontics, those working outside Romania, and non-orthodontic specialists who do not use Mis. Additionally, practitioners with no current or planned MI use were excluded, except for orthodontic residents or specialists.

Statistical Analysis

Data analysis was performed using IBM SPSS Statistics 25, with results visualized in Microsoft Excel and Word 2021. Qualitative variables were summarized as absolute values and percentages to describe data distribution. Group differences were assessed using Fisher's Exact Test or Pearson's Chi-Square Test, depending on data characteristics and sample sizes. For significant associations in contingency tables, Z-tests with Bonferroni correction were applied to account for multiple comparisons and minimize Type I errors. This combination of statistical methods ensured the robustness and reliability of the results.

RESULTS

Preferred MI dimensions by location. Complications and MI sizes.

The results pertaining to sections one, two, and four of our survey have been previously disseminated and are accessible for consultation to enrich the understanding of the prevailing preferences and practices regarding the utilization of mini-implants amongst Romanian orthodontists (9). Nevertheless, it remains pertinent to revisit the findings concerning the specific mini-implant systems favored by the participants in this study. As delineated in Figure 1, the Dual Top system by Jeil Medical emerges as the predominant choice, endorsed by 60% of respondents. It is followed by the BENEfit system from PSM, which exhibits a usage rate of 43.3%. Additionally, other systems such as OrthAnchor by OSSTEM and OrthoEasy by Forestadent are also significantly employed, with adoption rates of 23.3% and 14.4% respectively, underscoring a diverse range of preferences among Romanian orthodontists.

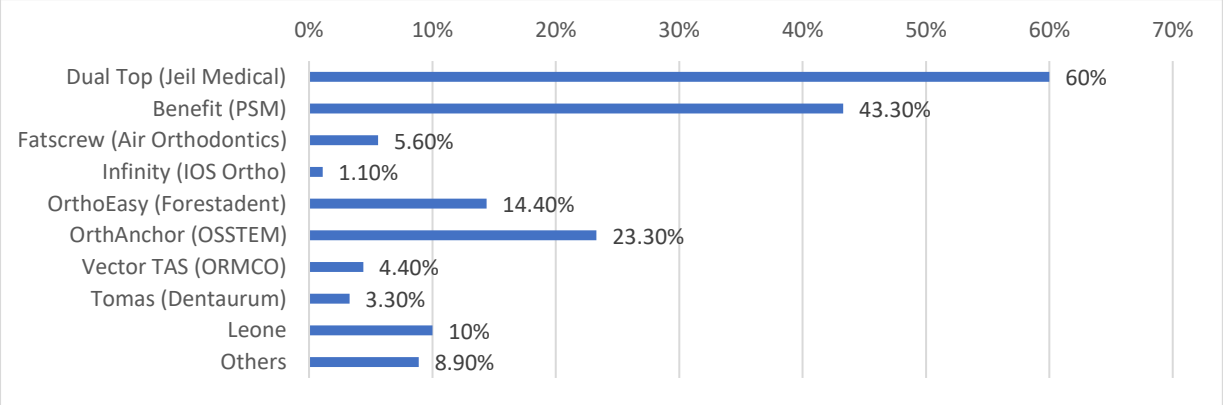

Figure 1. The distribution of study participants using mini-implants by the orthodontic mini-implant system used.

Section Three was designed to assess the dimensions of mini-implants employed by Romanian orthodontists across different anatomical sites, namely interradicular, infrazygomatic, midpalatal, palatal, and retromolar regions. This part of the study also explored potential correlations between the dimensions of the mini-implants utilized and the incidence of complications as reported by the

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respondents. The complications investigated included mini-implant mobility, fractures, and involvement of soft or hard tissues. For the purpose of clarity and relevance, only those results that achieved statistical significance are reported.

Maxillary Interradicular Area. Mandibular Interradicular Area

As documented in our earlier publication (9), the majority of survey respondents (60%) identified the interradicular space as the predominant site for mini-implant insertion in their clinical practice. Within the maxillary region, the 1.6 x 8 mm mini-implant was the most frequently utilized dimension, as indicated by 31.1% of participants. This was followed by the 1.6 x 10 mm size, preferred by 15.6% of respondents. Notably, a minimal proportion of participants (1.1%) employed advanced diagnostic tools such as Cone Beam Computed Tomography (CBCT) imaging to guide the selection of mini-implant size, underscoring a potential area for enhanced clinical practice (see Figure 2).

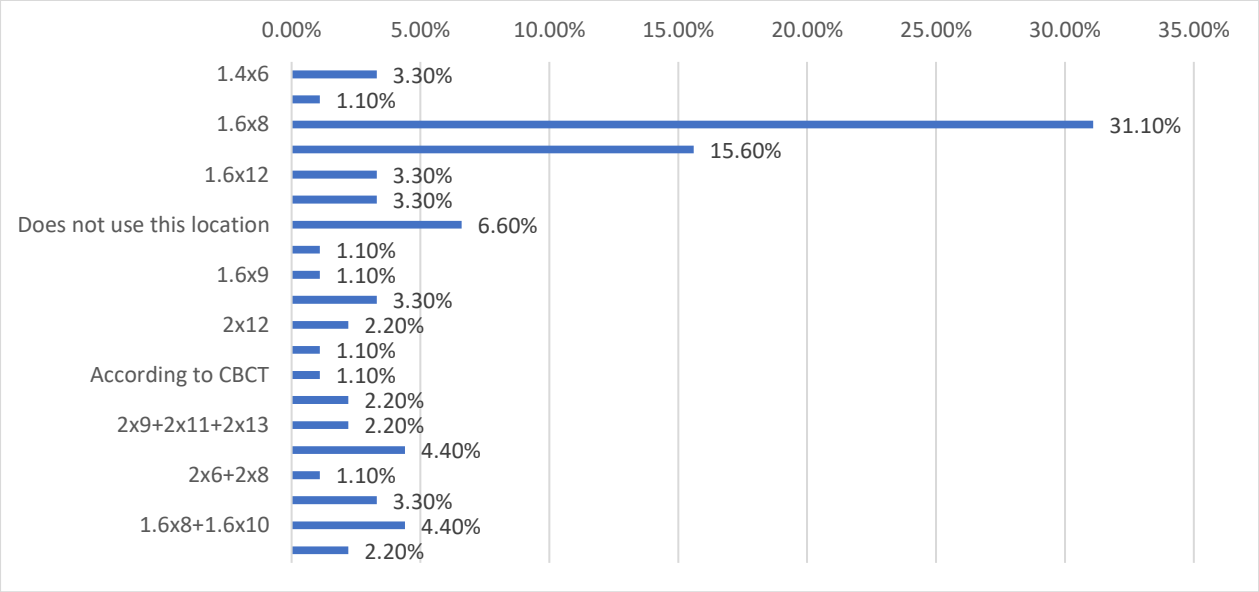

Figure 2. The distribution of study participants using mini-implants based on the sizes of mini-implants used in the maxillary interradicular area.

Similar results are shown in Figure 3 for the interradicular mandibular area, with a preference for 1.6 x 8 mm (22.2%) followed by 1.6 x10 mm (10%). Interestingly, some practitioners report using larger diameters such as 1.8 and 2 mm, for this localization, despite the potential for increased risk of hard tissue complications.

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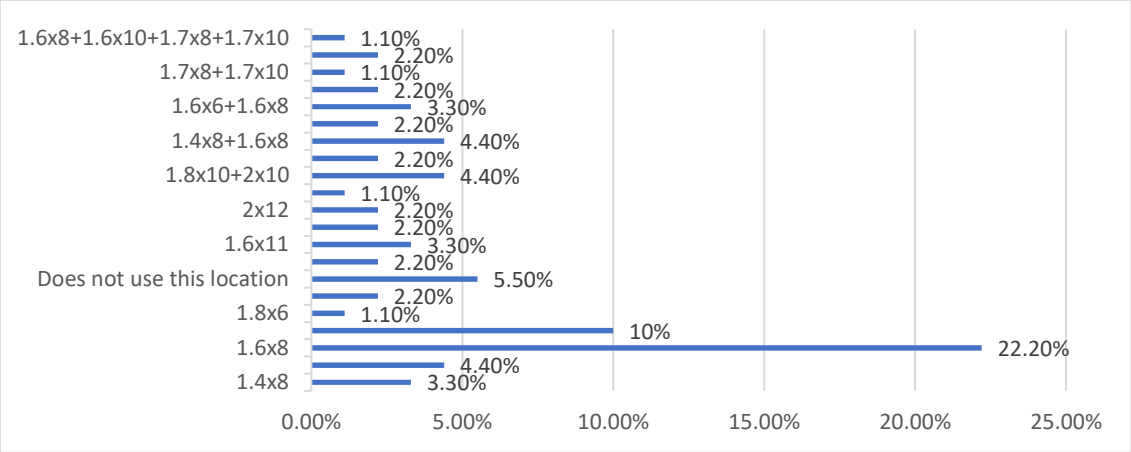

Figure 3. The distribution of study participants using mini-implants based on the sizes of mini-implants used in the mandibular interradicular area.

Figure 4 illustrates that cases of hard tissue involvement were significantly more prevalent when inappropriate mini-implant sizes were employed in the mandibular interradicular space, with a notable incidence of 30.4% compared to 5% in cases using the recommended sizes (p=0.004, Fisher's Exact Test). Current guidelines suggest that mini-implants for the mandibular interradicular region should generally measure between 1.2 mm to 1.6 mm in diameter and 6 mm to 8 mm in length (12). The ramifications of incorrect size selection and its clinical implications will be explored comprehensively in the discussion section.

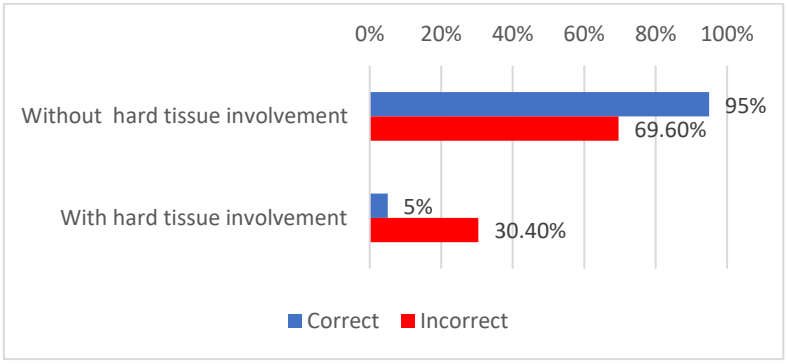

Figure 4. The distribution of participants based on the occurrence of hard tissue involvement as a complication and the use of correct mini-implant sizes in the interradicular area

Infrazygomatic Area

Figure 5 delineates the distribution of the mini-implant (MI) dimensions utilized by study participants in the infrazygomatic area. A significant segment of respondents (33.3%) indicated that they do not employ MIs in this region. Among those who do, the most commonly reported dimensions were 2 x 12 mm (10%), 2 x 14 mm (8.9%), and 1.6 x 10 mm (6.7%). Notably, for the infrazygomatic site, there is a pronounced preference among surveyed orthodontists for longer mini-implants, predominantly with a diameter of 2 mm and lengths varying between 10 mm and 16 mm. Furthermore, a subset of practitioners reported opting for even greater lengths, including 18 mm and 20 mm.

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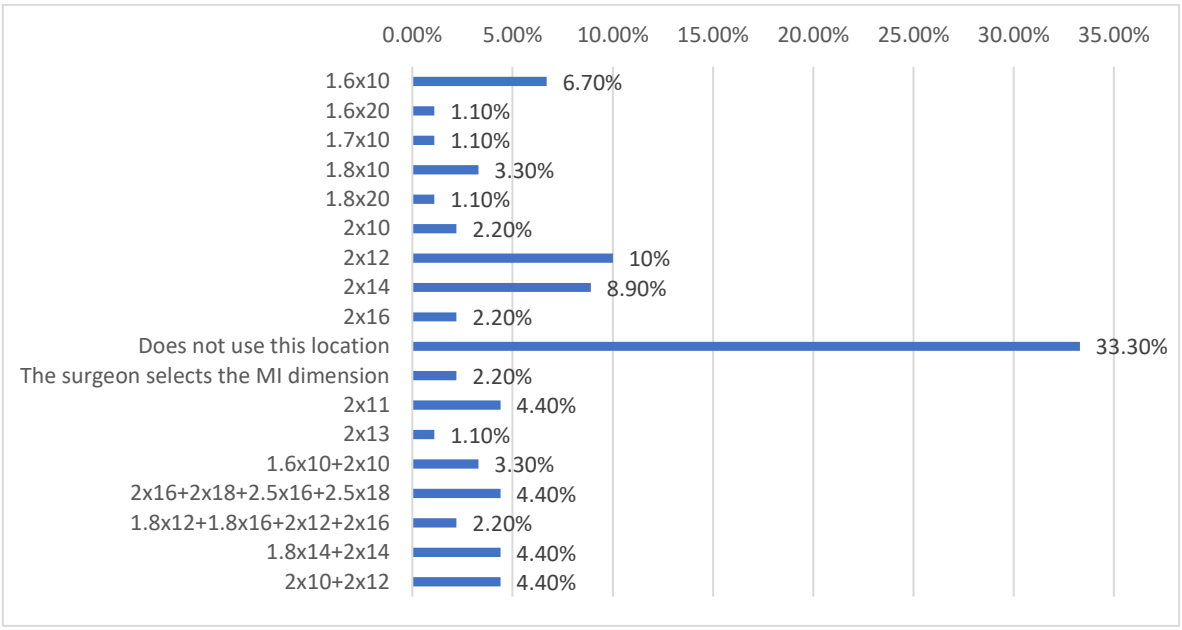

Figure 5. The distribution of study participants using mini-implants based on the sizes of mini-implants used in the infrazygomatic area.

Midpalatal and palatal area

Among the 105 respondents, 25.5% indicated that they do not utilize mini-implants in the midpalatal area, while 14.4% abstain from using them in the palatal area. Within the midpalatal region, the preferred dimensions for mini-implants ranged from 1.6 mm to 2 mm in diameter and 8 mm to 12 mm in length. The most frequently used sizes were 1.6 x 10 mm (10%), 2 x 12 mm (7.8%), and both 1.6 x 8 mm and 2 x 10 mm (4.4% each). In the palatal area, a similar preference for a 1.6 mm diameter was noted, with the most commonly reported dimensions being 1.6 x 8 mm (14.4%), 1.6 x 10 mm (12.2%), and both 2 x 10 mm and 2.3 x 11 mm (4.4% each). These findings are illustrated in Figures 6 and 7.

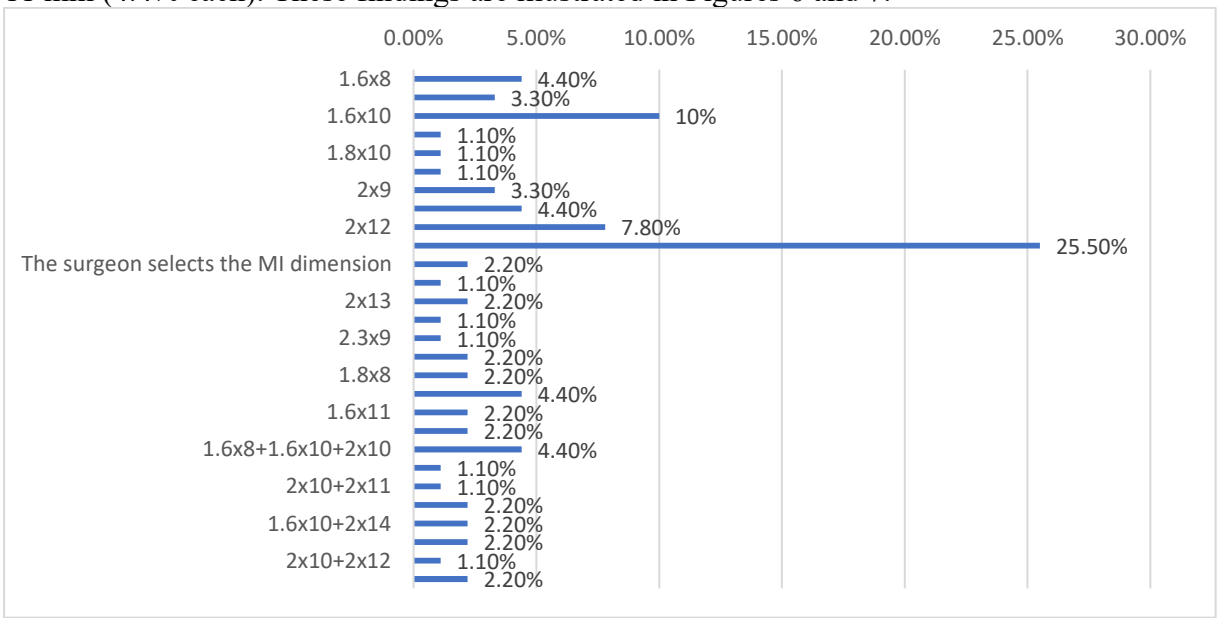

Figure 6. The distribution of study participants using mini-implants based on the sizes of mini-implants used in the midpalatal area.

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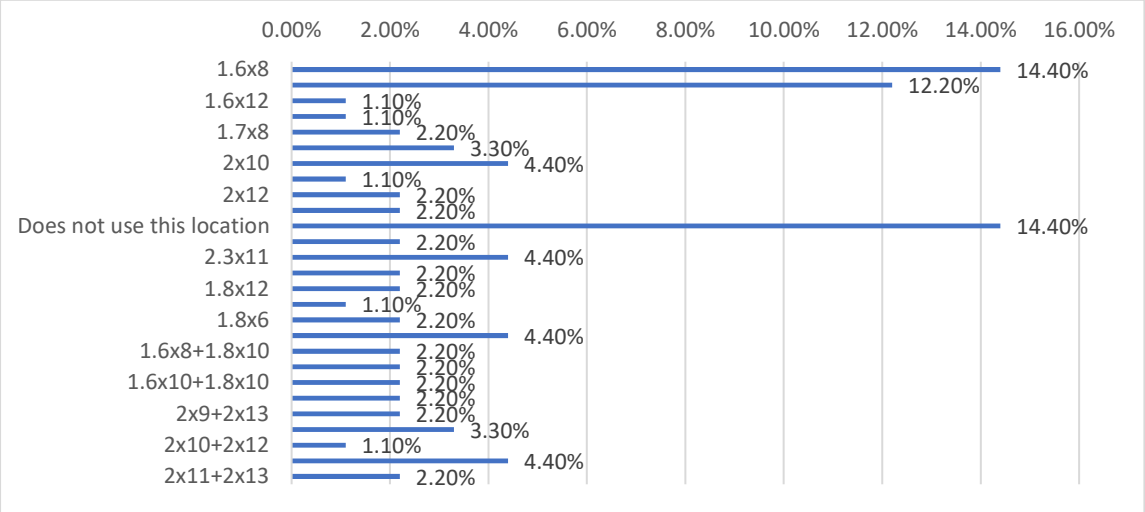

Figure 7. The distribution of study participants using mini-implants based on the sizes of mini-implants used in the palatal area.

Maxillary and mandibular retromolar area

In the maxillary retromolar area, 32.2% of survey participants indicated they do not employ mini-implants, with the dimensions most commonly chosen being 1.6 x 10 mm (13.3%) and both 1.6 x 8 mm and 2 x 12 mm (each at 10%). Smaller proportions of respondents reported using larger sizes, such as 2.5 x 16 mm/18 mm and 3.7 x 16/18 mm (4.4%). These data are depicted in Figure 8. In the mandibular retromolar area, 24.4% of respondents similarly reported abstaining from the use of mini-implants. Among those who do utilize them, there is a discernible preference for diameters between 1.6 mm and 2 mm, with lengths generally ranging from 8 mm to 12 mm. The most frequently utilized dimensions were 1.6 x 10 mm (14.4%), 2 x 12 mm (7.8%), and 1.6 x 8 mm (6.7%). Like in other locations, a smaller subset of orthodontists opted for larger dimensions, such as 2 x 14 mm (5.6%) and 2.5 x 10/12 mm (each at 4.4%), as shown in Figure 9. In both regions, 4.4% of participants reported that the surgeon determines the size of the mini-implant, and some relied on CBCT imaging for guidance in the selection process.

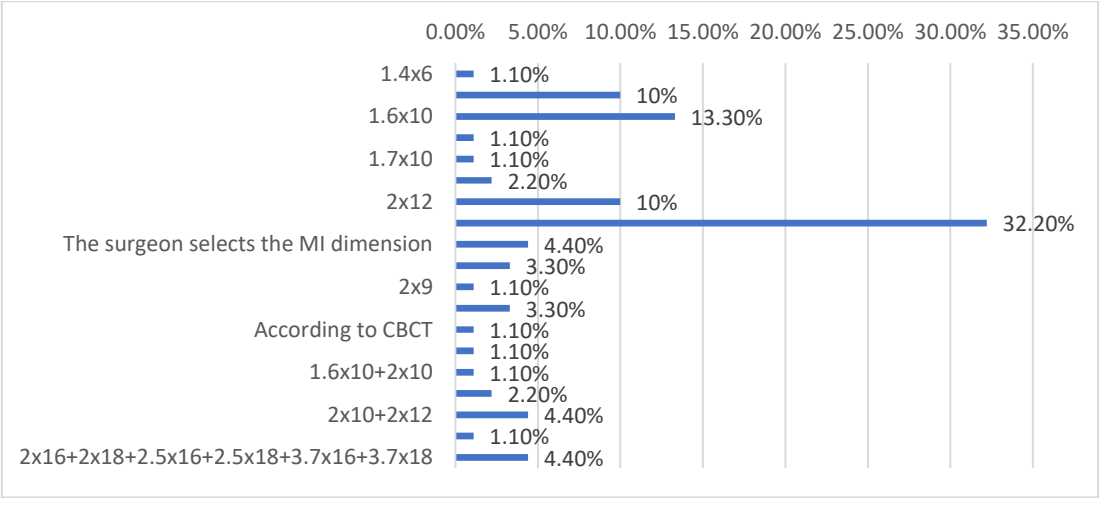

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Figure 8. The distribution of study participants using mini-implants based on the sizes of mini-implants used in the maxillary retromolar area.

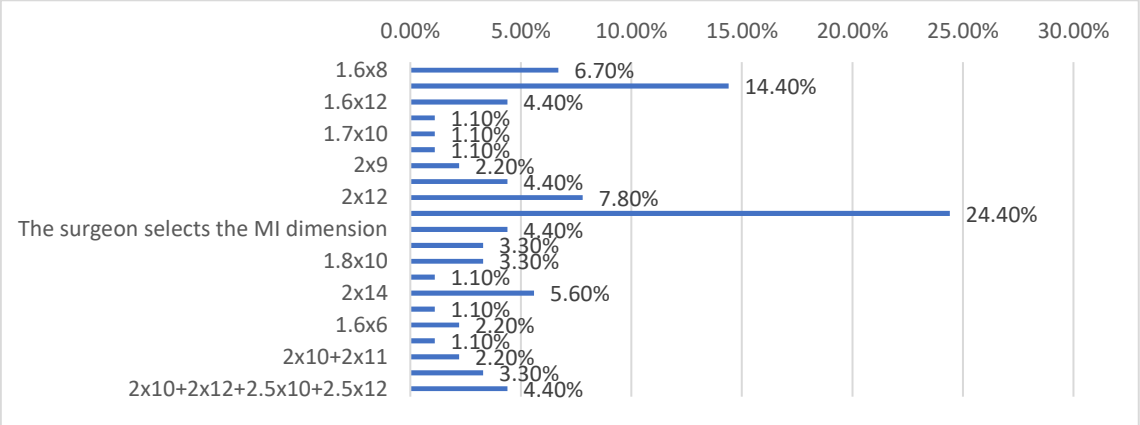

Figure 9. The distribution of study participants using mini-implants based on the sizes of mini-implants used in the mandibular retromolar area.

The data in Figure 10 represent the distribution of participants based on the occurrence of fractures as a complication and the use of correct mini-implant sizes in the maxillary retromolar area. The differences observed between groups were statistically significant according to the Pearson Chi-Square test (p=0.041). Cases where incorrect mini-implant sizes were used in the maxillary retromolar area were significantly more frequently associated with mini-implant fractures (47.4% vs. 21.1%).

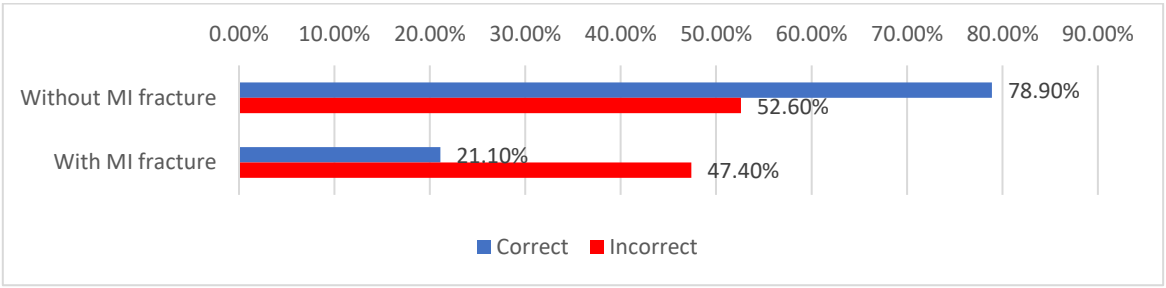

Figure 10. The distribution of participants based on the occurrence of fractures as a complication and the use of correct mini-implant sizes in the maxillary retromolar area

DISCUSSION

The selection of dental materials and techniques is often influenced by clinicians' preferences and experiences, as observed in the use of endodontic materials (13) and adhesive systems in Romanian dental practices (14), while psychological factors such as dental anxiety can also impact patient outcomes and overall quality of life (15). The findings of this study elucidate the preferences and practices among Romanian orthodontists concerning the dimensions of MI and highlight the complications stemming from incorrect size selection. Notably, the results underscore the paramount importance of achieving primary stability, a critical factor influencing the success of orthodontic MI. Primary stability is affected by a confluence of factors, including bone density, MI dimensions, insertion torque and angle, surgical technique, and preoperative planning (16–18). It is pertinent to mention that all MI systems discussed herein and available on the Romanian market are self-drilling and self-tapping. Additionally,

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certain systems offer pre-drilling instruments tailored for their larger diameter implants.

The preference for the interradicular area, reported by 60% of study participants as the most frequent site for MI placement, can be attributed to several anatomical and clinical factors that render this region particularly suitable. The interradicular area is often selected due to its accessibility, which enables clinicians to operate within a familiar field and simplifies the insertion process. This site also allows for the application of direct orthodontic forces in various directions, thereby facilitating desired tooth movements such as retraction, intrusion, or space closure. Additionally, this region provides stable anchorage by situating MI directly into the alveolar bone. While cortical bone thickness and density vary, these characteristics are conducive to successful MI integration, particularly when the appropriate sizes are chosen.

The determination of orthodontic MI diameter and length is contingent upon the insertion site, technique, and the amount of orthodontic force to be applied. Selecting the correct MI dimensions is crucial to avoid implant fractures or damage to vital anatomical structures (19–21). MI diameters range from 1.2 to 3.5 mm, depending on the manufacturer. A minimum diameter of 1.2 mm is typically required to achieve adequate stability (18,22–24). Generally, smaller diameter implants pose a lower risk of damaging adjacent roots, but are more susceptible to fractures during insertion or removal. As the diameter decreases, the internal stress exerted on the implant during placement increases, potentially compromising its structural integrity (18,24,25). MI are available in lengths ranging from 6 mm to 14 mm (26) with some manufacturers extending up to 24 mm (e.g., Fatscrew - Air Orthodontics). Achieving primary stability requires sufficient contact between the MI and the bone; stability is directly proportional to the depth at which the MI thread engages the bone. For instance, a minimum of 5 mm contact is recommended in the mandible where cortical bone is denser, whereas in the maxilla, a minimum of 6 mm contact is necessary due to the lower bone density (20,21).

In narrow interradicular spaces or areas characterized by thin cortical bone, such as those between the roots of the mandibular anterior teeth, smaller diameters are preferred, typically 1.3 or 1.4 mm. Conversely, diameters of 1.5 mm or 1.6 mm are commonly recommended for vestibular placement in the alveolar processes of the maxilla or the posterior of the mandible, as well as for palatal sites (27). Regarding length, most authors advise employing mini-implants between 6 mm and 8 mm for the interradicular mandibular area, due to the thinner mucosa and adequate bone density in these regions (28). In contrast, for the maxilla or areas with thicker mucosa, longer mini-implants, typically between 8 mm and 10 mm, are favored for the interradicular region (26).

The majority of survey respondents reported using interradicular MI dimensions that align with these guidelines, showing a preference for the 1.6x 8 mm and 1.6x10 mm sizes. A minority of practitioners (9%) reported using larger diameters (e.g., 1.8 mm and 2 mm) in the mandibular interradicular area. However, larger diameters, such as 1.8 mm and 2 mm, should be avoided in interradicular spaces due to the increased risk of root damage. Figure 4 illustrates that incorrect size selection significantly correlates with cases of hard tissue involvement in the mandibular interradicular area, with a notable difference in complication rates (30.4% vs 5%, p=0.004), highlighting the critical importance of precise size selection, particularly in anatomically sensitive areas.

In regions with dense and thick cortical bone, such as the infrazygomatic crest, mid-palatal zone, palatal region, or the retromolar area, these larger diameters are more appropriate (29). Moreover,

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longer MI are necessary in areas with thicker mucosa to compensate for this thickness and ensure optimal contact with the bone. For instance, in areas with fixed mucosa, such as the infrazygomatic, palatal, or retromolar regions, the total length of the mini-implant should be at least 8 mm, with a minimum of 5 mm for the threaded portion to achieve adequate stability (28).

A significant finding from our study is that 33.3% of participants reported not using MI in the infrazygomatic region. Among those who did, there is a clear preference for larger diameters (2 mm) and greater lengths (ranging from 10 mm to 16 mm), specifically 2x12 mm and 2x14 mm. The preference for longer and wider implants in the infrazygomatic area underscores its utility as a robust anchorage site for advanced orthodontic procedures such as maxillary molar distalization or intrusion. However, the considerable proportion of participants who did not utilize MIs in this region suggests variability in training, confidence, or access to resources, which underscores the need for targeted education and training to optimize the use of the infrazygomatic region in clinical practice.

In the midpalatal area, where practitioners preferred dimensions such as 1.6x10 mm (10%) and 2x12 mm (7.8%), the region offers adequate stability due to its dense cortical bone. Nevertheless, 25.5% of respondents reported not utilizing this site, likely influenced by the required orthodontic force. For example, a mini-implant with a diameter of 1.4 mm placed in cortical bone can tolerate forces up to 150 g, whereas an implant with a diameter of 1.8 mm can withstand up to 350 g (28). This consideration is crucial in the palatal and midpalatal areas, where higher forces are often necessary. Consequently, a diameter of 2 mm is generally preferred over 1.6 mm for procedures such as molar distalization or mini-implant assisted rapid palatal expansion. One study recommends dimensions of 2x9 mm and 2x11 mm for the midpalatal region, with 2x9 mm being preferred for its lower invasiveness (30).

In the palatal area, the dimension most frequently reported by respondents was 1.6 x 8 mm (14.4%). Although other size combinations in line with established guidelines were also employed, the preference for an 8 mm length in the palate is noteworthy. Despite this, lengths exceeding 8 mm, such as 10 mm and 12 mm, are recommended to ensure adequate anchorage in this region due to the thick mucosa, with these lengths showing popularity in several studies. Mini-screws with diameters ranging from 2 to 2.3 mm and lengths between 9 and 11 mm have demonstrated enhanced stability and higher survival rates in the palatal area (18,24,31–34).

For clinical scenarios necessitating bicortical anchorage, such as those involving miniscrew-assisted rapid palatal expansion, mini-implants ranging from 11 mm to 14 mm are commonly utilized (35). However, the selection of mini-implant length must be customized to each patient's specific anatomical needs to mitigate the risk of complications. The employment of digital planning and surgical guides is crucial, enhancing the precision of mini-implant placement. A recent study in the Journal of Clinical Medicine highlighted that digitally planned insertion guides substantially improve the accuracy of palatal MI placement compared to freehand techniques, thus reducing complications and bolstering treatment outcomes (36).

In the maxillary retromolar area, 32.2% of respondents indicated that they do not use MIs, with the most commonly selected sizes being 1.6 x 10 mm (13.3%) and 1.6 x 8 mm and 2 x 12 mm (10% each). A smaller proportion of participants opted for larger dimensions, such as 2.5 x 16/18 mm and 3.7 x 16/18 mm (4.4%). In the mandibular area, 24.4% refrained from using MIs, but preferred sizes generally ranged between 1.6-2 mm in diameter and

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8-12 mm in length. Larger sizes such as 2 x 14 mm (5.6%) and 2.5 x 10/12 mm (4.4% each) were less frequently chosen. The dimensions selected by study respondents for these regions align with existing research and guidelines. The primary benefits of placing MIs in the retromolar region include minimizing root contact and avoiding neurovascular damage, making this area particularly effective for mandibular molar uprighting, en-masse retraction, and distalization of posterior teeth (37). However, the challenges associated with MI placement in retromolar areas, particularly in the maxilla, are well documented. Factors such as variable bone density and limited space contribute to lower adoption rates in these regions (31,38,39).

Significantly, our study revealed a statistically important correlation between the use of incorrect mini-implant dimensions in the retromolar areas and an increased incidence of mini-implant fractures (47.4% vs. 21.1%, p=0.041). Fractures in these regions are often due to inadequate placement methods, such as excessive torque, incorrect angulations, or improper pre-drilling techniques. This is particularly common when self-drilling MIs are used without suitable preparation for dense cortical bone (40).

CONCLUSIONS

The judicious selection of orthodontic mini-implant sizes is pivotal for attaining optimal clinical outcomes, with primary stability being fundamental to success. The accuracy in choosing the appropriate mini-implant dimensions is vital not only to ensure stability but also to minimize complications and provide a dependable anchorage system. Employing Cone Beam Computed Tomography (CBCT) imaging to assess the insertion site proves invaluable, offering comprehensive insights into bone quality, density, and proximal anatomical structures. This advanced imaging facilitates the selection of optimal dimensions tailored to individual cases.

Moreover, the integration of digital planning and the application of surgical guides, when necessary, substantially enhance the precision of implant placement, diminish placement errors, and bolster overall treatment efficacy. Within the Romanian orthodontic landscape, it is imperative for practitioners to become well-acquainted with the features and specifications of available mini-implant systems. A profound understanding of these systems empowers clinicians to choose the most suitable options for their specific clinical scenarios, ensuring compatibility with the patient's anatomical profile and the intended orthodontic biomechanics.

By harnessing advanced diagnostic tools, engaging in meticulous planning, and making informed choices, Romanian orthodontists can significantly enhance the standard of care, achieving predictable and successful results in their clinical practice.

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