Attitudes of Iraqi Orthodontists Towards Tooth Extractions and Skeletal Anchorage Device (Mini-Implant)

Saya Mustafa Azeez[1]

[1]Orthodontics Department, Faculty of Dentistry, Tishk International University, Erbil, Kurdistan Region, Iraq
Correspondence: Saya Mustafa Azeez, Orthodontics Department, Faculty of Dentistry, Tishk International University, Erbil, Kurdistan Region, Iraq.
Email: saya.mustafa@tiu.edu.iq

Doi: 10.23918/eajse.v8i3p54

Abstract: Aim: The purpose of this study was to look into the attitudes of Iraqi orthodontists towards the extraction of maxillary second premolars rather than maxillary first premolars and the usage of skeletal anchoring devices.

Methods: 400 Iraqi orthodontists received an online questionnaire. The data was analyzed using descriptive and chi-square statistics.

Results: The poll received 89 responses from orthodontists (22.25 percent). The larger the carious lesion in the upper second premolar, the more likely it is to be extracted over the healthy upper first premolar. Furthermore, the duration of therapy was associated to the extraction decisions made by orthodontists. In this study, orthodontists determined that using a mini-implant as a temporary anchorage device was acceptable.

Conclusions: When orthodontists determined which teeth to extract for orthodontic therapy, the condition of the teeth was the most important factor to consider. Furthermore, while most orthodontists utilize mini-implants to improve anchorage during orthodontic treatment, there are still some elements of mini-implant use that orthodontists need to understand.

Keywords: Malocclusion, Treatment Time, Tooth Condition, Crowding, Protrusion

1. Introduction

One of the most common orthodontic problems is anterior crowding and protrusion (Tanne, 2016). Tooth extraction is one of the treatment options for creating room to correct the tooth size-arch length imbalance, allowing the remaining teeth to be aligned. Despite the fact that tooth misalignment occurs in the anterior esthetic zone, these anterior teeth should not be extracted due to their unique forms and aesthetic influence. As a result, orthodontists frequently choose to extract the first or second premolar since they have a lower influence on masticatory function and appearance than front teeth and molars (Profitt, 1994; Changsiripun & Phusantisampan, 2017).

Because it is close to the issue zone, the first premolar is the optimum choice for removal, as opposed to the second premolar, because closing the space created is easier. Furthermore, maintaining the second premolar while addressing anterior crowding would allow for better control of anchoring. In this case, most orthodontists would remove the first premolar to address anterior protrusion or crowding while also achieving two orthodontic treatment goals: shortening treatment time and limiting the distance the teeth must be moved (Profitt, 1994; Changsiripun & Phusantisampan, 2017).

Received: September 11, 2022
Accepted: December 12, 2022
Azeez, S.M. (2022). Attitudes of Iraqi Orthodontists Towards Tooth Extractions and Skeletal Anchorage Device (Mini-Implant). *Eurasian Journal of Science and Engineering*, *8*(3),54-66.

Anchorage loss management is a major concern when treating severe crowding, increased overjet, and bimaxillary protrusion. Adjunct appliances, including as the Nance holding arch, transpalatal bar, and extraoral traction, are commonly utilized to improve molar anchoring in this fashion (Nanda & Kuhlberg, 1996; Hart et al., 1996; Rajcich & Sadowsky, 1997). Due to esthetic and social concerns, grown-up patients frequently reject the use of a headgear and the insertion of a visible labial appliance (Kawakami et al., 2004). The viability of intraoral appliances, such as a Nance holding arch or a transpalatal bar, has, on the other hand, been investigated with prospective study indicating limited benefits during active appliance therapy (Feldmann & Bondemark, 2006).

Orthodontic implants or temporary intraoral skeletal anchoring devices, in contrast to more traditional anchorage types, provide a compliance-free option (TISADs). They are not linked directly to the teeth, unlike other anchoring reinforcement procedures. Because TISADs are simple to install and have survival rates ranging from 80% to 94%, they have been recommended as a feasible technique of option when anchorage reinforcement is needed during therapy (Kuroda et al., 2007; Antoszewska et al., 2009).

As a result, physicians can now choose extraction patterns based on the general health of the teeth rather than only the need for orthodontic biomechanics, without sacrificing the quality of the previous treatment results or complicating the biomechanics during active treatment. This study was undertaken because there is no information on the views of Iraqi orthodontists about maxillary second premolar extraction rather than maxillary first premolar extraction in class I malocclusion with anterior protrusion or crowding and the use of a mini-implant for anchorage.

2. Methodology

2.1 Questionnaire

The questionnaire was designed to determine whether severe dental caries in maxillary second premolars would prompt Iraqi orthodontists to extract maxillary second premolars rather than a healthy maxillary first premolar, as well as to assess awareness of the use and placement of mini-implants as a temporary anchorage device during orthodontic treatment.

A modified version of Mount and Hume (1998) caries categorization approach was used to determine the degree of the caries lesion. The lesions were divided into seven different sizes, ranging from 0 to 6, as follows:

- Size 0: A tooth that is in good health.
- Size 1: No cavitation, only demineralization. Treatment for remineralization can halt the progression of the condition.
- Size 2: Dentine involvement is minimal and can be treated with remineralization alone.
- Size 3: Dentine involvement is moderate. The remaining tooth structure is strong enough to hold the restoration in place and is unlikely to fail under typical occlusal pressure.
- V. Size 4: The cavity has enlargement that is greater than moderate. If left exposed to occlusal or incisal load, the remaining tooth structure is weakened to the point where cusps or incisal margins are split or prone to fail.
- Size 5: Extensive caries has already occurred, resulting in a large loss of tooth structure.
- Size 6: Exposed pulp caries with severe enamel and dentine loss. To keep the tooth, root canal therapy and crown restoration are required.

This classification led to the development of a three-part questionnaire:

Part 1: General information about the respondent, such as gender, age, and orthodontist experience.

Part 2: Perceptions of the maxillary second premolar being extracted rather than the maxillary first premolar in the scenario described above, as well as factors influencing the extraction decision.

Part 3: The final set of questions focuses on variables to think about throughout the installation process, as well as a comprehension of the mini-implant features.

The questions covered orthodontic attitudes toward the use and familiarity of the mini-implant, as well as knowledge of the diagnostic aids required for mini-implant, bracket type, loading, the relationship between mini-implant shape and stability, the maximum force of a mini-implant, and whether en-mass retraction can be achieved with a mini-implant.

2.2 Accumulation of Samples

An online form was used to disseminate the questionnaire to 400 members of the Iraqi Orthodontic Association.

2.3 Statistical Analysis

IBM's Statistical Package for Social Science (SPSS) application version 22 was used for data entry and analysis. We used descriptive statistics and chi-square analysis. Microsoft Excel sheets were used to make the charts.

3. Results

3.1 Demographic Data

The survey was completed by 89 orthodontists (22.25 percent). The respondents were mostly males (52.80%) (Fig. 1). Over half of the respondents (48.3 percent) were between the ages of 31 and 40 (Fig. 2), and nearly a third (31.5 percent) had up to 5 years of experience as an orthodontist, while the other third (31.5 percent) had up to 6-10 years of experience (Fig. 3).

3.2 Attitudes Towards the Extent of Caries

According to the survey scenario, 33.7 percent of orthodontists chose to extract a maxillary second premolar with a fourth-size caries lesion rather than a healthy maxillary first premolar, followed by 27 percent who chose to extract a maxillary second premolar with a size six carries lesion and 16.9% who chose to extract a maxillary second premolar with a fifth-size caries lesion.

Three orthodontists, on the other hand, preferred the extract healthy (size 0) maxillary second premolar over the healthy maxillary first premolar. The remaining respondents' responses to the other caries sizes are shown in (Fig. 4). The orthodontists judged the tooth condition to be the most important consideration in deciding whether to extract the second premolar rather than the first premolar (Fig. 5).

3.3 Orthodontists Attitude Towards Mini-Implant Usage for Anchorage

Mini-implants were used by 93.3 percent of orthodontists for anchoring (Fig. 6). The majority of orthodontists agreed that the primary rationale for utilizing mini-implants was to improve anchoring (Table 1). About 6.7 percent of orthodontists did not utilize mini-implant for anchorage (Fig. 6), with four of them stating that they were unaware of its use for anchorage, two stating that the process was too complicated, and one stating that mini-implant failure was the reason for not utilizing mini-implant (Table 2).

Table 1: Reasons of using mini-implant

If yes, why?	Responses		Percent of Cases
	N	Percent	
better anchorage	56	50.0%	68.3%
convenient to use	16	14.3%	19.5%
better than other mode of anchorage	40	35.7%	48.8%
Total	112	100.0%	136.6%

Table 2: Reasons of not using mini-implant

If no, Why?	Frequency	Percent
Not aware of mini-implant	4	4.5
Procedure is too complicated	2	2.2
Failure of mini-implants	1	1.1
N/A	82	92.1
Total	89	100.0

The majority of respondents believed that periapical radiographs (53.9%) should be used as diagnostic tools for mini-implants, followed by OPG (49.4%), and CBCT (14.6%), respectively (Table 3). When it came to brackets, 80.90 percent of orthodontists employed conventional brackets with mini-implants (Fig. 7). Approximately 60 percent of orthodontists promptly loaded the mini-implants (Fig. 8).

Table 3: Diagnostic aids needed for mini-implant

Diagnostic aids	Responses		Percent of Cases
	N	Percent	
peri apical	48	45.7%	53.9%
OPG	44	41.9%	49.4%
CBCT	13	12.4%	14.6%
Total	105	100.0%	118.0%

For greater primary stability, 56 percent of respondents agreed that conically shaped mini-implants should be used. While the majority (43.80%) thought cylindrically shaped mini-implants were better in terms of main stability (Fig. 9). Approximately 66% of orthodontists picked a maximum force of 200-300 grams for a mini-implant, followed by 250-450 grams (20 percent). The maximum force utilized by 13 percent of orthodontists was 100-200 grams (Fig. 10).

Figure (11) shows that 85.40 percent of participants were aware that en-masse retraction can be accomplished with a mini-implant. Approximately 80.90 percent of orthodontists put the mini-implants on their own (Fig. 12). As indicated by a p-value of 0.05, there was a significant relationship between the size of the carious lesion and treatment time (Table 4).

Table 4: Correlation between caries lesion size with treatment time

Size of caries lesion	Treatment time		Likelihood Ratio	Asymp. Sig. (2-sided)
	Selected	Not selected		
Size 0: A tooth that is in good health	0	3	13.066	.042*
Size 1: No cavitation, only demineralization	2	0		
Size 2: Minimal dentine involvement	0	9		
Size 3: Moderate dentine involvement	1	5		
Size 4: The cavity has enlargement greater than moderate	8	22		
Size 5: Extensive caries with large tooth structure loss	3	12		
Size 6: Exposed pulp caries with severe enamel and dentine loss	7	17		
Total	21	68		

*Significant alpha level (P= 0.05)

4. Discussion

4.1 Attitude of Orthodontist Towards Second Premolar Extraction Instead of Healthy First Premolar

Because tooth crowding is so widespread, orthodontists are frequently faced with the decision of whether or not to treat it with extractions. How many teeth should be pulled, and which ones? When first and second premolar extractions are involved, some aspects that are considered important parts of a diagnosis should be thoroughly reviewed during preparation. Some of these criteria include the maxillomandibular relationship, facial profile and pattern, skeletal maturation, dental asymmetries, tooth condition, distance to shift teeth, treatment time, expenditure, anchorage, and patient engagement (Ruellas et al., 2010). According to prior study, premolars are the most frequently excised teeth for orthodontic purposes because of their position between the anterior and posterior regions (Ruellas et al., 2010; Steyn et al., 1997; Boley at al., 2003).

Because of their proximity to the problem area, the first premolars are removed more frequently than the second premolars. As a result, when it comes to resolving the patient's fundamental concern, anchoring management is easier (Jackson et al., 2017). Second premolar extraction, on the other hand, causes the posterior teeth to migrate forward more than first premolar extraction, leaving insufficient space for crowding relief and anterior tooth retraction (Creekmore, 1997). This explains why, in the past, orthodontists excised the first premolars while leaving the second premolars in place, despite the fact that the second premolars were in far worse shape than the first.

This was not shown to be the case in the current investigation. Orthodontists chose to extract the 2nd premolar over the 1st premolar mostly owing to dental condition, rather than other factors such as tooth movement distance, treatment time, anchoring, or cost, according to our findings.

Most orthodontists prefer to remove a maxillary second premolar with a size four carious lesion, followed by a size six, and finally a size five carious lesion, rather than smaller carious lesions, according to our data. We noticed that the treatment time had a significant impact on their decision. On the other hand, orthodontists' use of mini-implants, their proficiency in installing mini-implants, or their years of work experience had no bearing on their extraction decision.

As a result, our findings may be valuable not only for orthodontists and orthodontic patients during the care preparation period, but also for general practitioners in avoiding unneeded treatment on a severely carious second premolar if the patient plans to get orthodontic treatment soon.

4.2 Knowledge of Orthodontists Towards the Skeletal Anchorage Device

The ability to choose teeth for extraction based on biologic demands and overall oral health rather than traditional biomechanical requirements will continue to be important in the advancement of oral health and orthodontic biomechanics in the future. Mini-implants are used by 93.3 percent of orthodontists for anchorage, and the majority of them (80.90 percent) always place the mini-implant personally, according to our research.

The inferior alveolar nerve canal in the mandible and the floor of the maxillary sinus in the maxilla, as well as the thickness of the buccal, lingual, or palatal bone plate, all play a part in the success of TAD insertion. The majority of TADs were implanted blind until recently, with no preoperative radiographic examination, which was one of the leading reasons of TAD failure. A periapical or panoramic radiograph was occasionally utilized to assess the possible TAD site, but while helpful, these radiographs did not contribute enough to the TAD site assessment.

With a low-dose, high-resolution 3-D imaging option, cone beam CT (CBCT) has proven to be a significant benefit in imaging the osseous structures of the craniofacial region. Smaller areas of interest, such as the TAD site, can now be captured selectively thanks to the introduction of CBCT (Nanda et al., 2021). In our study, only 14.6 percent of orthodontists used CBCT as a diagnostic method to evaluate the TAD site.

One of the marketed advantages of self-ligating brackets over traditional brackets is the retention of anchoring (Harradine, 2001; Pandis et al., 2007). Friction reduction in sliding mechanics is intended to lessen the reciprocal force on the anchor tooth or unit by reducing the force required to move teeth during orthodontic treatment. This procedure should increase anchoring and encourage natural tooth movement, resulting in a more stable treatment outcome. Self-ligating brackets with mini-implants were used by nearly one-fifth of orthodontists (19.10 percent).

Another advantage of orthodontic mini-implants is that they give absolute anchoring for retraction of all anterior teeth at once (Nanda et al., 2021). Approximately (85.40 percent) were aware that a mini-implant can be used to perform en-masse retraction. Because the upper and lower sections of a cylindrical and conical mini-implant have different diameters, conical mini-implants are more stable than cylindrical ones (Martinez et al., 2001; O'Sullivan et al., 2004).

Tapered implants have been shown to be successful in various clinical studies (palmer, 1997; Nordin et al., 1998). The conical shape was designed to improve the initial stability of mini-implant (Friberg er al., 1995). Excessive insertion torque, on the other hand, may cause microfracture and ischemia of the surrounding bone, delaying bone healing and increasing the risk of implant failure (Sakoh et al., 2006). Furthermore, a taper-shaped mini-implant has 20-30 percent smaller surface area than a cylindrical mini-implant. The conical mini-implant's surface area reduces the contact surface with the bone, potentially compromising stability (Drago & Del Castillo, 2006). Conical-shaped mini-implants were deemed to be more stable by 56.20 percent of orthodontists in this study.

Mini implants are commonly utilized for primary loading in orthodontics. Mechanical locking could be a critical support for mini-implant primary stability. The mechanical qualities of the contact between the mini-implant and the bone are a function of screw diameter, length, and design. Bone quality and amount, oral hygiene, and installation method all affect primary implant stability. The main stability of mini-implants has a significant impact on their survival rate (pan et al., 2012). We also discovered that mini-implants with quick loading were used by the majority of orthodontists (60.70 percent).

As a general rule, only a light (approximately 50 g) force should be applied to the mini-implant during the first six weeks. Following that, you can use a variety of attachments for direct loading with standard continuous orthodontic force levels, such as 200g (Cousley, 2013). A single mini-implant can withstand between 250 and 400 grams of force. When the implant is positioned 90 degrees' parallel to the long axis of the tooth, the best anchoring is achieved; however, this is not always attainable in practice, thus 45-60 degrees of angulation is sufficient (Suzuki & Suzuki, 2011). In this survey, more than half of orthodontists (66.30%) identified (200-300 grams) as the maximum force a mini-implant can withstand.

When mini-implants are used to gain skeletal anchoring, they require extensive knowledge of biomechanics and anatomy, as well as well-planned surgical planning, in order to achieve enough stability and effectiveness. As a result, the orthodontist must carefully choose the type of anchorage system based on the needs of the patient and the necessary mechanisms.

This study, however, has a few limitations that should be mentioned. To begin with, orthodontists' response rate was quite low; however, on-line surveys are known to have significantly lower response rates than paper-based questionnaires. There's also no reason to believe that non-response is tied to any kind of extraction prescription bias. Second, the data used to make extraction decisions in this study was confined to a single scenario: selecting whether to extract the maxillary first or second premolar in a Class I Angle classification with anterior crowding or protrusion and the need for appropriate upper arch support. As a result, using this data collection should be done with caution.

5. Conclusions

1. Tooth Condition was main consideration when deciding which tooth to extract in orthodontic treatment.
2. Treatment time influenced orthodontist extraction decision regarding 2nd premolar with different size of carious lesion over healthy second premolar.
3. Majority of the orthodontists used mini-implant for anchorage.
4. Regarding knowledge of orthodontists about the type of bracket to be used with mini-implant were not certain, while for other the features regarding mini-implant the knowledge of majority of orthodontists it is more than half of the frequencies.

References

Tanne, K. (2016). Current status of orthodontic professionals in the Asian Pacific Region. *APOS Trends in Orthodontics*, 6, 58–77. https://doi.org/10.4103/2321-1407.177959

Proffit, WR. (1994). Forty-year review of extraction frequencies at a university orthodontic clinic. The Angle orthodontist, 64, 407–414.

Changsiripun, C., Phusantisampan, P. (2017). Attitudes of orthodontists and laypersons towards tooth extractions and additional anchorage devices. *Prog Orthod*, 18, 19.

Nanda, R., Kuhlberg, A. (1996). Biomechanical basis of extraction closure. In: Nanda R, Kuhlberg A, eds. *Biomechanics in Clinical Orthodontics*. Philadelphia, Pa: WB Saunders, P: 156–187.

Hart, A., Taft. L., Greenberg, SN. (1996). The effectiveness of differential moments in establishing and maintaining anchorage. *American journal of orthodontics and dentofacial orthopedics*, 102, 434–442.

Rajcich, MM., Sadowsky, C. (1997). Efficacy of intraarch mechanics using differential moments for achieving anchorage control in extraction cases. *American journal of orthodontics and dentofacial orthopedics*, 112, 441–448.

Kawakami, M., Miyawaki, S., Noguchi, H., Kirita, T. (2004). Screw-type implants used as anchorage for lingual orthodontic mechanics: a case of bimaxillary protrusion with second premolar extraction. *The Angle orthodontist*, 74, 715–719.

Feldmann, I., Bondemark, L. (2006). Orthodontic anchorage: a systematic review. *The Angle orthodontist*, 76, 493–501.

Kuroda, S., Sugawara, Y., Deguchi, T., Kyung, HM., Takano-Yamamoto, T. (2007). Clinical use of miniscrew implants as orthodontic anchorage: success rates and postoperative discomfort. *American journal of orthodontics and dentofacial orthopedics*, 131, 9–15.

Antoszewska, J., Papadopoulos, MA., Park, HS., Ludwig, B. (2009). Five-year experience with orthodontic miniscrew implants: a retrospective investigation of factors influencing success rates. *American journal of orthodontics and dentofacial orthopedics*, 136, 158.e1–159.

Mount, GJ., Hume, WR. (1998). A new cavity classification. Australian dental journal, 43, 153–159.

Ruellas, ACO., Ruellas, RMO., Romano, FL., Pithon, MM., Santos, RL. (2010). Tooth extraction in orthodontics: an evaluation of diagnostic elements. *Dental Press J Orthod*, 15, 134-57.

Steyn, CL., du Preez, RJ., Harris, AM. (1997). Differential premolar extractions. *American journal of orthodontics and dentofacial orthopedics*, 112, 480–486.

Boley, JC., Mark, JA., Sachdeva, RC., Buschang, PH. (2003). Long-term stability of Class I premolar extraction treatment. *American journal of orthodontics and dentofacial orthopedics*, 124, 277–287.

Jackson, TH., Guez, C., Lin, FC., Proffit, WR., Ko, CC. (2017). Extraction frequencies at a university orthodontic clinic in the 21st century: Demographic and diagnostic factors affecting the likelihood of extraction. *American journal of orthodontics and dentofacial orthopedics*, 151, 456–462.

Creekmore, TD. (1997). Where teeth should be positioned in the face and jaws and how to get them there. *Journal of clinical orthodontics*: JCO, 31, 586–608.

Nanda, R., Uribe, F., Yadav, S. (2021). Temporary anchorage devices in orthodontics. 2nd ed. *Elsevier*, P: 3-19.

Harradine, NW. (2001). Self-ligating brackets and treatment efficiency. *Clinical orthodontics and research*, 4, 220–227.

Pandis, N., Polychronopoulou, A., Eliades, T. (2007). Self-ligating vs conventional brackets in the treatment of mandibular crowding: a prospective clinical trial of treatment duration and dental effects. *American journal of orthodontics and dentofacial orthopedics*, 132, 208–215.

Martinez, H., Davarpanah, M., Missika, P., Celletti, R., Lazzara, R. (2001). Optimal implant stabilization in low density bone. *Clinical oral implants research*, 12, 423–432.

O'Sullivan, D., Sennerby, L., Meredith, N. (2004). Influence of implant taper on the primary and secondary stability of osseointegrated titanium implants. *Clinical oral implants research*, 15, 474–480.

Palmer, RM., Smith, BJ., Palmer, PJ., Floyd, PD. (1997). A prospective study of Astra single tooth implants. *Clinical oral implants research*, 8, 173–179.

Nordin, T., Jönsson, G., Nelvig, P., Rasmusson, L. (1998). The use of a conical fixture design for fixed partial prostheses. A preliminary report. *Clinical oral implants research*, 9, 343–347.

Friberg, B., Sennerby, L., Roos, J., Johansson, P., Strid, CG., Lekholm, U. (1995). Evaluation of bone density using cutting resistance measurements and microradiography: an in vitro study in pig ribs. *Clinical oral implants research*, 6, 164–171.

Sakoh, J., Wahlmann, U., Stender, E., Nat, R., Al-Nawas, B., Wagner, W. (2006). Primary stability of a conical implant and a hybrid, cylindric screw-type implant in vitro. *The International journal of oral & maxillofacial implants*, 21, 560–566.

Drago, CJ., Del Castillo, RA. (2006). A retrospective analysis of osseotite NT implants in clinical practice: 1-year follow-up. *The International journal of periodontics & restorative dentistry*, 26, 337–345.

Pan, CY., Chou, ST., Tseng, YC., Yang, YH., Wu, CY., Lan, TH., Liu, PH., Chang, HP. (2012). Influence of different implant materials on the primary stability of orthodontic mini-implants. *The Kaohsiung journal of medical sciences*, 28, 673–678.

Cousley, R. (2013). The orthodontic mini-implant clinical handbook. 1st ed. *John Wiley & Sons, Ltd*., P. 12-13.

Suzuki, EY., Suzuki, B. (2011). Placement and removal torque values of orthodontic miniscrew implants. *American journal of orthodontics and dentofacial orthopedics*, 139, 669–678.

List of Figures

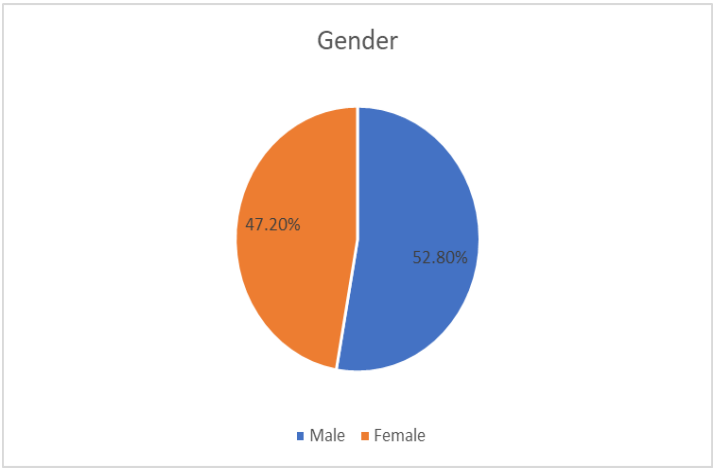

Figure 1: Gender

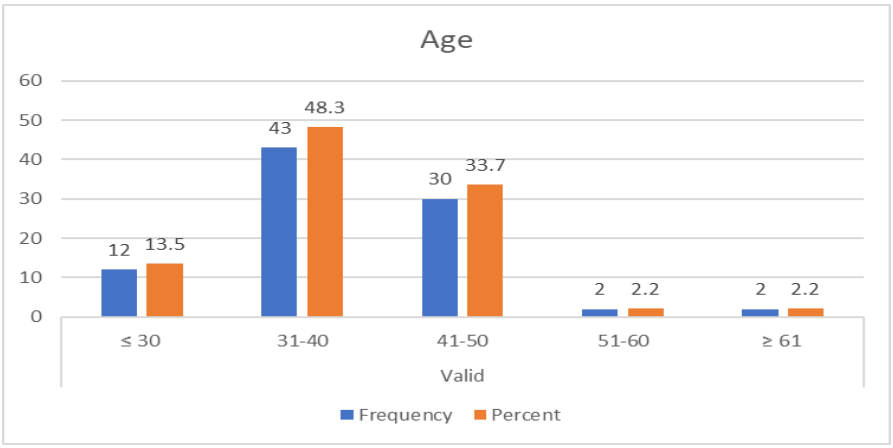

Figure 2: Age of the orthodontists

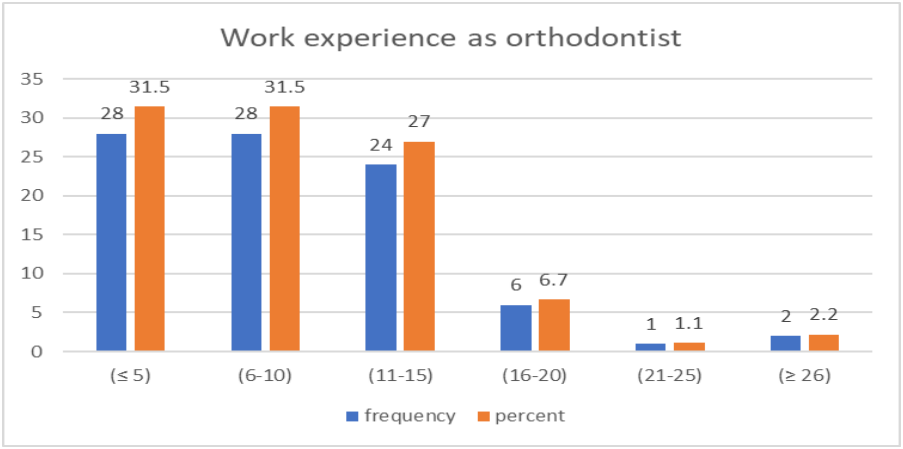

Figure 3: Work experience as orthodontist

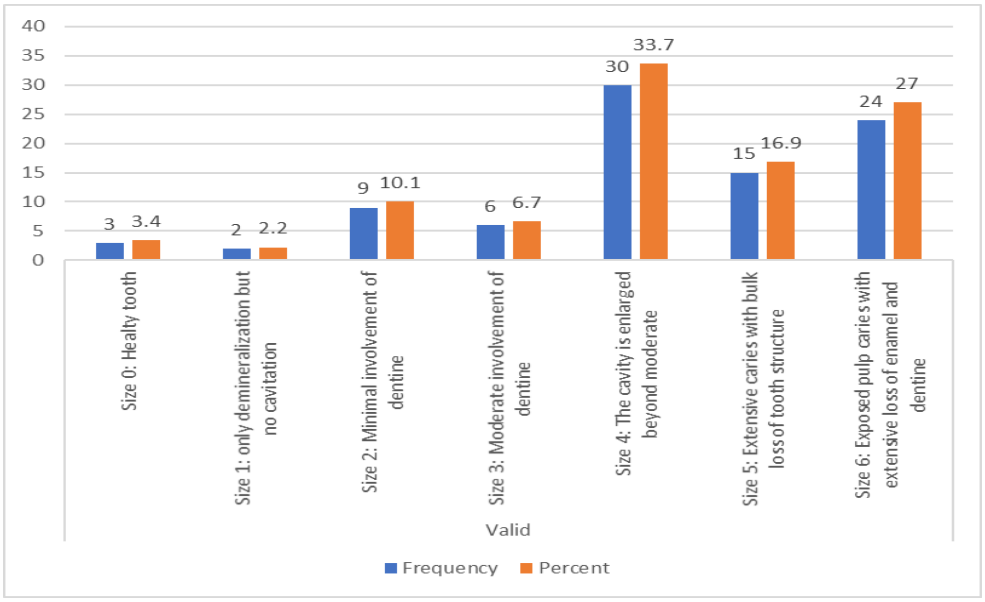

Figure 4: percent of orthodontists who extracted the maxillary 2nd premolar instead of sound maxillary 1st premolar

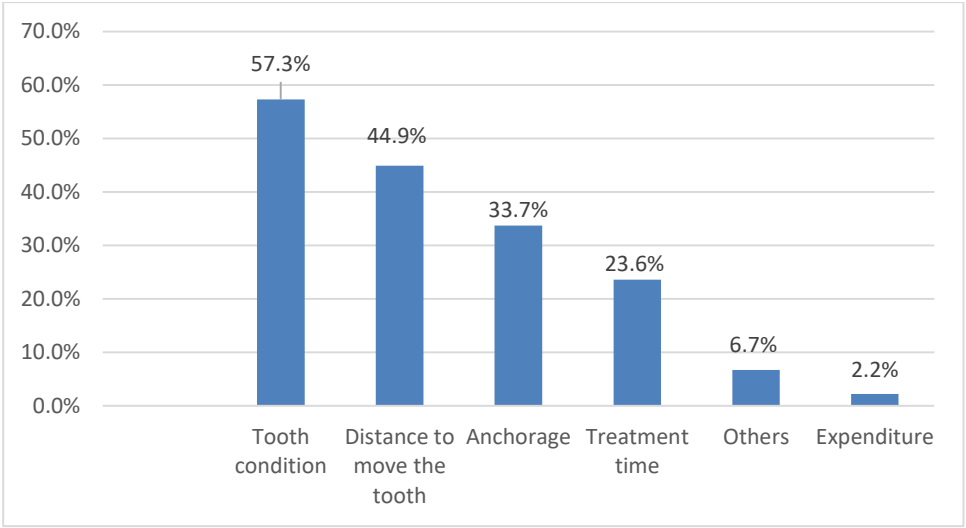

Figure 5: Factors mostly influences extraction decision

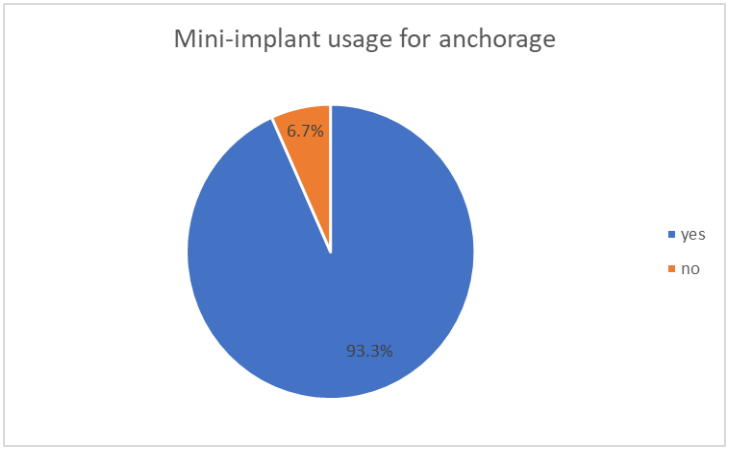

Figure 6: Mini-implant usage for anchorage

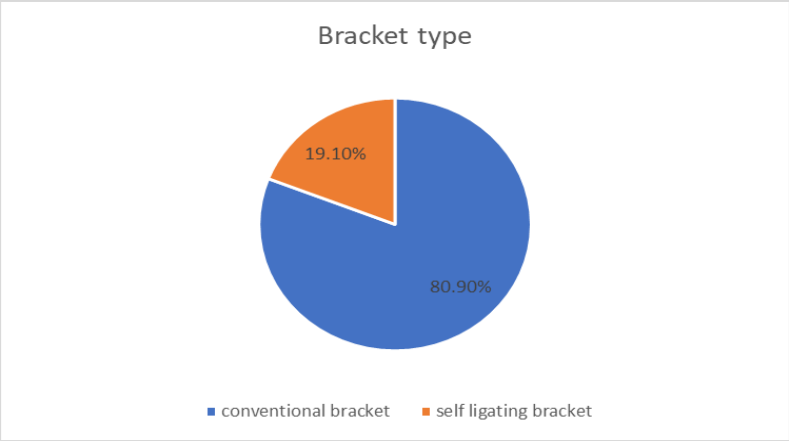

Figure 7: Bracket type

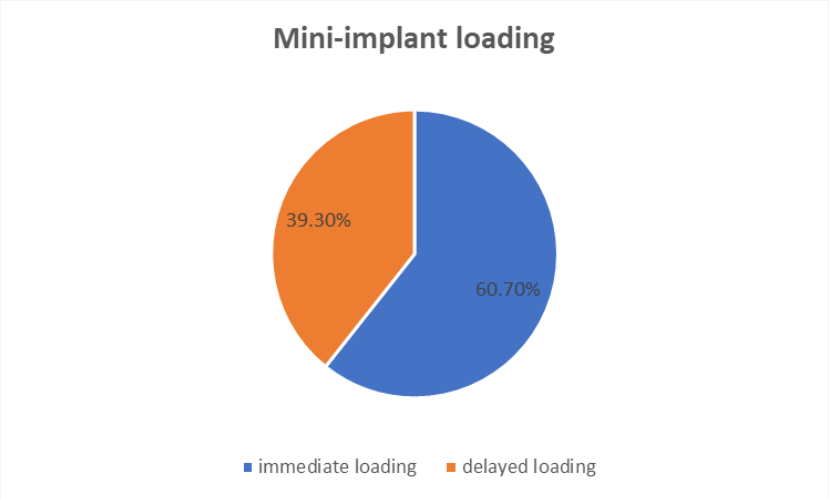

Figure 8: Mini-implant loading

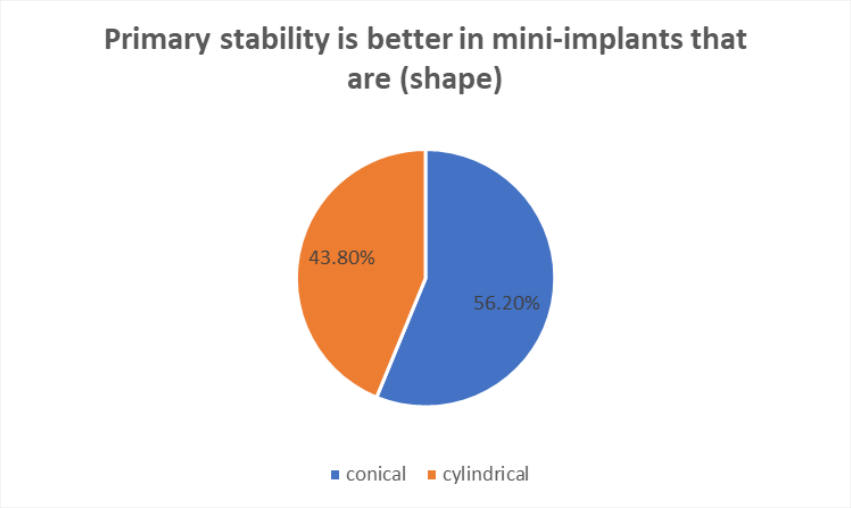

Figure 9: Mini-implant shape

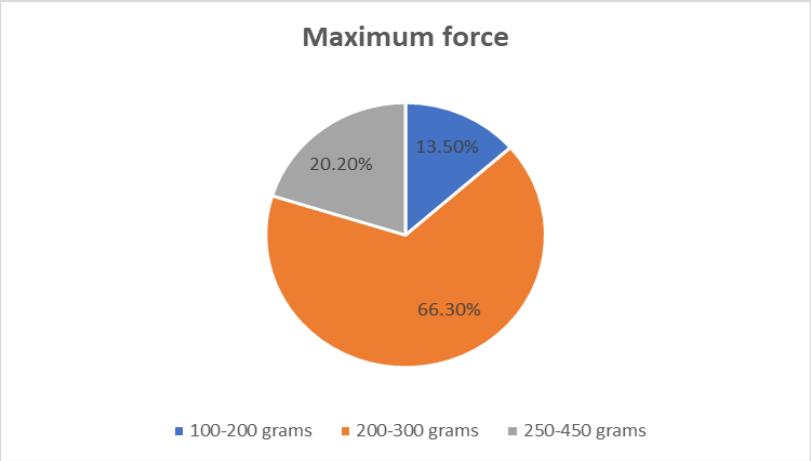

Figure 10: Maximum force a mini-implant can withstand

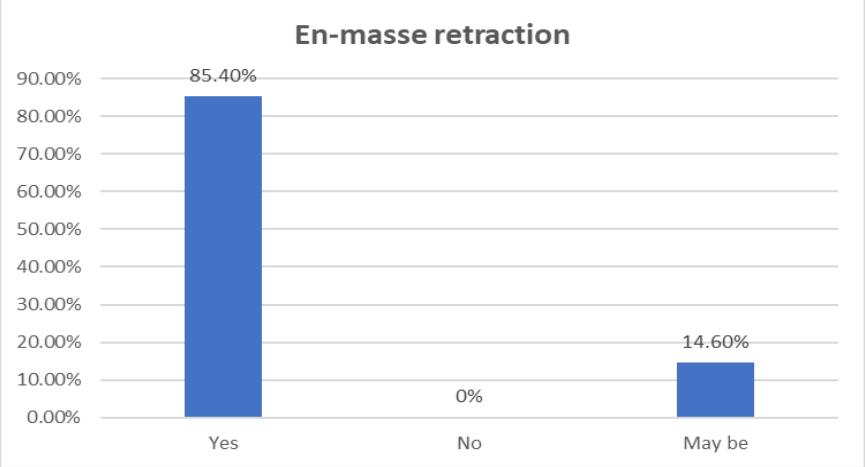

Figure 11: En-masse retraction with mini-implant

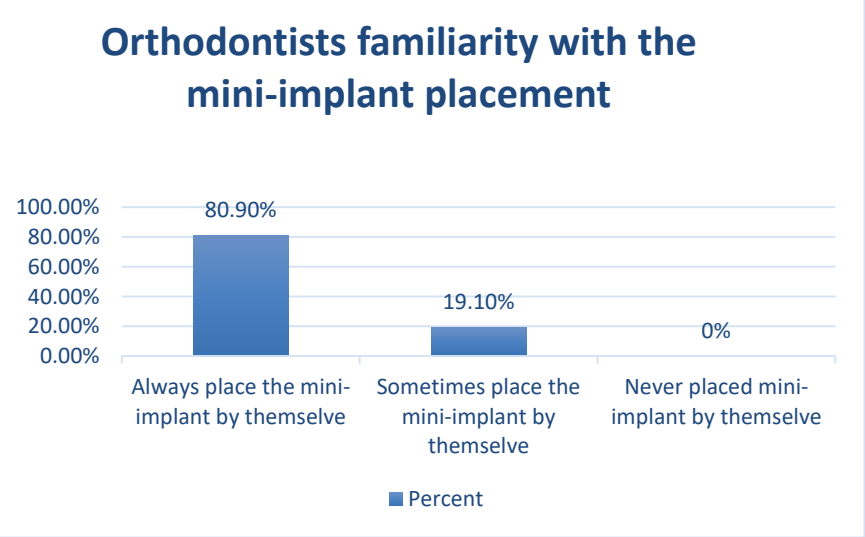

Figure 12: Orthodontists' familiarity with the mini-implant placement