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Original Research

Survey of Orthodontists' attitudes and experiences regarding mini- screw implants

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ABSTRACT:
Background: The present study was conducted to assess orthodontists' attitude and experience regarding mini- screw implants. **Materials & Methods:** 75 orthodontists of both genders were recruited for the study. All were provided with a questionnaire regarding their clinical experience, invisalign usage, esthetic bracket usage and use of mini- screw implants etc. **Results:** There were 30 males and 45 females, year of practice was <5 years in 15, 5-10 years in 25 and >10 years in 35 patients. 24 had rural and 51 had urban practice, invisalign usage was never seen in 25, occasionally in 10 and always in 30. Esthetic bracket usage was never seen in 42, occasionally in 13 and always in 20. Complications of mini- screw reported by orthodontists were mini- screw loosening by 45, mini- screw fracture by 24, soft tissue overgrowth by 50, aphthous ulcer by 35, infection by 20, slippage into periosteum by 32, irritation from auxiliary spring by 62 and root damage by 12 orthodontists. The difference was significant (P< 0.05). **Conclusion:** Mini- screw implants had higher rate of complications as reported by most of the orthodontists.
Key words: Mini- screw implants, Orthodontists, Invisalign.

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INTRODUCTION

Mini-screw implants, often referred to as temporary anchorage devices (TADs), have become an accepted component of orthodontic treatment. The comparatively simple technique for the placement of these mini- screws is described with emphasis on the importance of correct site selection as well as an understanding of the possible complications that may arise.[1] The application and description of appliances incorporating mini- screws are described with the aid of typodont models and clinical examples. While the technique is of primary relevance to orthodontists, the use of mini- screws as an aid for pre-prosthodontic tooth movement is also of relevance to prosthodontists.[2]

Mini- screw implants are available in varying lengths and diameters to accommodate placement at different sites in both jaws. Most mini- screw implants have a thread diameter ranging from 1.2 mm to 2.0 mm and a length ranging from 6.0 mm to 12.0 mm.[3] Potential sites for mini- screw implant placement in the maxilla include the area below the anterior nasal spine, the palate (either on the midpalate or the paramedian palate), the infra-zygomatic crest, the maxillary tuberosities, and the alveolar process.[4] The most common indication for treatment with mini-screw implants is molar protraction followed by indirect anchorage for space closure, intrusion of supraerupted teeth, intrusion of anterior open bite, anterior en-masse retraction, molar uprighting, intrusion of maxillary cant, molar distalization, traction on impacted canine, and attachment of protraction facemask. Other indications occur in a clear minority of cases.[5] The present study was conducted to assess orthodontists' attitude and experience regarding mini- screw implants.

MATERIALS & METHODS

The present study was conducted in the department of Orthodontics on 75 orthodontists of both genders. The study got approved from institutional ethical

committee. All were informed regrading the study and their written consent was obtained.
Particulars of the subjects such as name, age, gender etc. was recorded. All were provided with a questionnaire regarding their clinical experience, invisalign usage, esthetic bracket usage and use of mini- screw implants etc. Response was recorded in case history proforma. Results were tabulated and subjected to statistical analysis. P vale less than 0.05 was considered significant.

RESULTS

Table I Demographic profile

Variables	Number	P value
Gender		
Male	30	0.05
Female	45	
Years of practice		
<5 years	15	0.02
5-10 years	25	
>10 years	35	
Practice setting		
Rural	24	0.01
Urban	51	
Invisalign usage		
Never	25	0.03
Occasionally	10	
Always	30	
Esthetic bracket usage		
Never	42	0.01
Occasionally	13	
Always	20	

Table I shows that there were 30 males and 45 females, year of practice was <5 years in 15, 5-10 years in 25 and >10 years in 35 patients. 24 had rural and 51 had urban practice, invisalign usage was never seen in 25, occasionally in 10 and always in 30. Esthetic bracket usage was never seen in 42, occasionally in 13 and always in 20. The difference was significant (P< 0.05).

Table II Indications for treatment with mini- screws

Indications	Percentage	P value
Molar uprighting	67%	0.02
Molar protraction	70%	
Intrusion of supererupted tooth	54%	
Intrusion for anterior open bite	56%	
Molar distalization	72%	
Traction on impacted canine	61%	
Attachment of protraction facemask	35%	

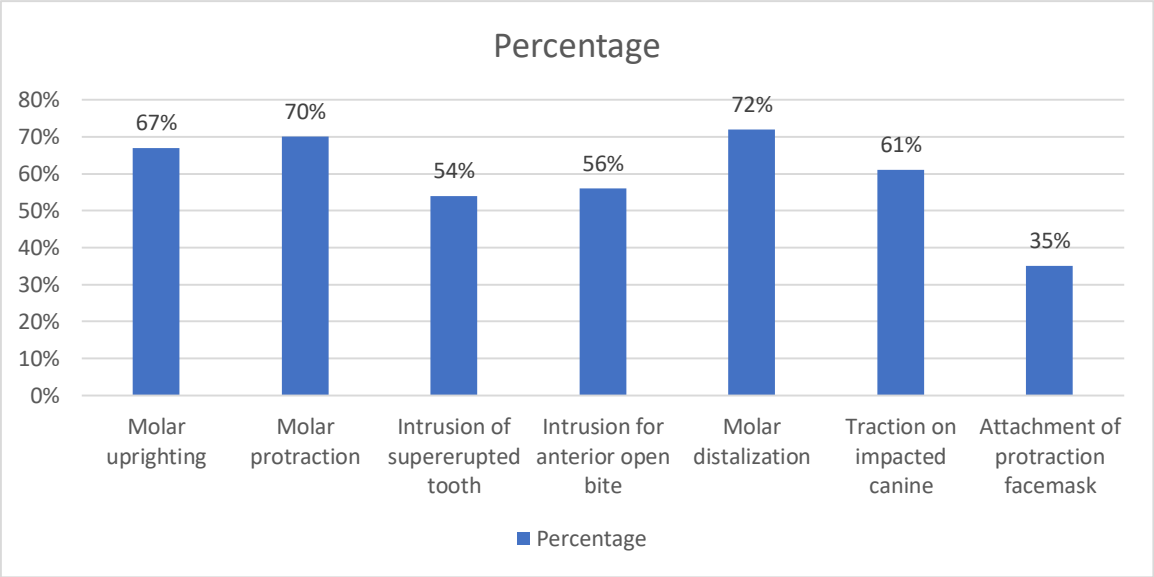
Table II shows that indications were molar uprighting were replied by 67%, molar protraction in 70%, intrusion of supererupted tooth in 54%, intrusion for anterior open bite in 56%, molar distalization in 72%, traction on impacted canine in 61% and attachment of protraction facemask in 35%. The difference was significant (P< 0.05).

Table III Evaluation of complications of mini- screw implants reported by Orthodontists

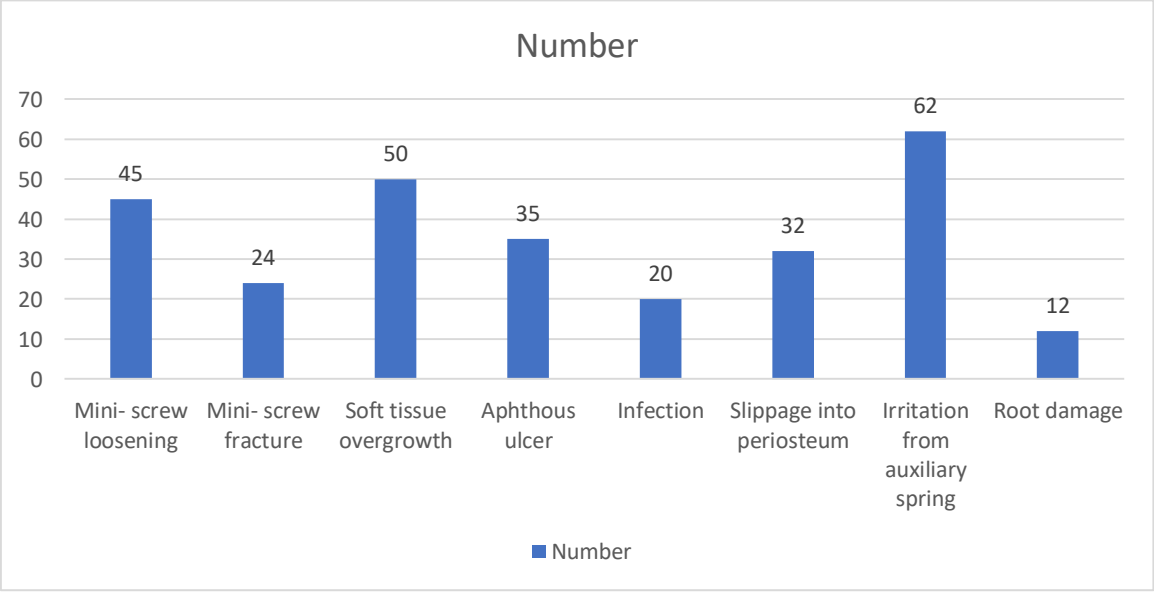
Complications	Number	P value
Mini- screw loosening	45	0.05
Mini- screw fracture	24	
Soft tissue overgrowth	50	
Aphthous ulcer	35	
Infection	20	
Slippage into periosteum	32	
Irritation from auxiliary spring	62	
Root damage	12	

Table III, graph II shows that complications of mini- screw reported by orthodontists were mini- screw loosening by 45, mini- screw fracture by 24, soft tissue overgrowth by 50, aphthous ulcer by 35, infection by 20, slippage into periosteum by 32, irritation from auxiliary spring by 62 and root damage by 12 orthodontists. The difference was significant (P< 0.05).

Graph I Indications for treatment with mini- screws



Graph II Complications of mini- screw implants reported by Orthodontists



DISCUSSION

Ensuring adequate anchorage is often challenging in orthodontics and dentofacial orthopedics, especially because many of the various methods developed for reinforcing anchorage depend on patient compliance.[6] A major advance in orthodontic treatment in recent years is the introduction of skeletal anchorage with mini- screw implants, which is widely used in orthodontic treatments for expanding the boundary of tooth movement and has no patient compliance requirements.[7] Mini- screw implants are now well-established auxiliary anchorage devices and are routinely used in orthodontic practice.[8] The present study was conducted to assess orthodontists' attitude and experience regarding mini- screw implants.

In present study, there were 30 males and 45 females, year of practice was <5 years in 15, 5-10 years in 25 and >10 years in 35 patients. 24 had rural and 51 had urban practice, invisalign usage was never seen in 25, occasionally in 10 and always in 30. Esthetic bracket usage was never seen in 42, occasionally in 13 and always in 20. Hyde et al[9] found that the most common reason cited for not placing mini- screws personally was the need to administer a local anesthetic (58%).

Other factors included longer chair- time (25%), the potential need to manage acute pain (20%), and lack of training (20%). Molar protraction was the most commonly reported treatment indication (64%), followed by indirect anchorage for space closure (55%) and intrusion of supererupted teeth (52%). A panoramic radiograph was the most requested or readily available diagnostic tool used to guide mini-screw placement. For pain management, most respondents (69%) reported using a combination of topical and local anesthetics; 38% said they administered only a strong topical agent, while 10% used a full nerve block.

We found that indications were molar uprighting were replied by 67%, molar protraction in 70%, intrusion of supererupted tooth in 54%, intrusion for anterior open bite in 56%, molar distalization in 72%, traction on impacted canine in 61% and attachment of protraction facemask in 35%. Garg et al[10] found that ten adult patients who required en masse retraction of upper and lower anterior teeth in first premolar extraction spaces were included in this study. After initial alignment of anterior teeth, the 0.019" ×0.025" stainless steel arch wire were placed in preadjusted edgewise appliance. The mini- screws (diameter - 1.3 mm, length - 7 mm) were inserted in between second premolar and the first molar in the maxilla (zygomatic buttress) and in mandible on the buccal side as direct anchorage. Immediately after placement of mini-screws without waiting period, NiTi coil springs (force of 150 g in the maxilla and 100 g in the mandible) were placed for the retraction. Denta Scans were taken immediately before force application (T1) and 6 months later (T2). The mean changes obtained at T1 and T2 in Denta Scans (axial plane, coronal plane, paraxial plane) were evaluated to determine any movement of different parts of mini- screws. On average, mini- screws were extruded and tipped forward significantly, by 1 mm at the screw head in the axial plane (Group III) and 0.728 mm in the coronal plane (Group IV). Tail of mini- screws showed average tipping of 0.567 mm in the axial plane (Group I) and 0.486 mm in the paraxial plane (Group V). Least average mobility was shown by screw body of 0.349 mm in the axial plane (Group II). Clinically, no significant mobility was observed.

We found that complications of mini- screw reported by orthodontists were mini- screw loosening by 45, mini- screw fracture by 24, soft tissue overgrowth by 50, aphthous ulcer by 35, infection by 20, slippage into periosteum by 32, irritation from auxiliary spring by 62 and root damage by 12 orthodontists. Two recent systematic reviews have suggested that implant diameters of less than 1.3mm or greater than 2mm, as well as lengths of less than 8mm, are more susceptible to failure.[11,12]

The limitation of the study is small sample size of Orthodontists included for the survey.

CONCLUSION

Authors found that mini- screw implants had higher rate of complications as reported by most of the orthodontists.

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