Current trend in mini implants usage among South Indian Orthodontics

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***Abstract*: There is no independent study directly on mini-screw placement patterns among private orthodontic practioners in the South Indian population. The present study was designed to investigate the current trends and protocols and especially the tendencies during mini-implant usage among South Indian orthodontists.**

Materials and Methods

The orthodontists were asked to click on a link to complete an automated questionnaire of 16 multiple-choice questions. Blinded, annotated data were extracted for statistical analysis. Questionnaire was sent to 300 certified orthodontists who are residing in south India (Karnataka, Kerala, Tamil nadu, Andra Pradesh and Goa).

Results

A total of 150 respondents practiced in an urban setup while 110 practiced in a semi urban or rural locality. Among the urban orthodontists, 120 had used miniscrews while among the orthodontists practicing in a semi urban/rural set up only 50 had used minimplant. Majority of responents (85%) used mini screw mainly for rteaction of anterior teeth in high anchorage cases followed by mini screw utlised for intrusion mechanics and only 5% of orthodontists used mini screw for occlusal cant corection.The reason given by orthodontists for not using miniscrews in their clinical practice were lack of training (70%).

Conclusion

Majorly mini screws are used for retraction of anterior teeth in high anchorage cases followed by intrusion mechanics among respondents and major complication faced by respondents were loosening of mini screws followed by soft tissue over growth and reason for not using miniscrew majorly because of lack of skills.

Keywords: Mini screw, TAAD, mini implant, survey, orthodontist.

Introduction

By Newton's third law any action has equal and opposite reaction. So, in orthodontics when anchorage is taken from dental units it will have side effects, to overcome such side effects earlier, extra oral anchorage like head gears, face mask etc were used but these appliance required patient compliance.[1-4]

Mini screws are used widely in orthodontic practice mainly due to their ability to provide skeletal anchorage, without requiring patient compliance. Other advantages include easy placement, less complication, less failure rates.[5,6]

Till date there are very few studies regarding implant success rate, placement techniques, and failure rates and there are no articles reported directly on mini-screw placement patterns among private orthodontic practioners in the south Indian population.

In this survey we explore the current trends in the use of mini implants among orthodontists in south India.

Materials and Method

Certified orthodontists from South Indian states was e-mailed a secure link to a web-based survey. The orthodontists were asked to click on a link to complete an automated questionnaire of 16 multiple-choice questions.

The respondents had used miniscrews in clinical practice, the questions required to be answered in the survey were; indications for treatment with miniscrews, miniscrew placement under topical or local anesthetic, personal placement or referral to other specialist, immediate or delayed loading of miniscrews, miniscrew complications, and utilization of surgical guide for miniscrew placement. If the respondents had never used miniscrews, the reasons for not employing miniscrews in their orthodontic practice were required to be filled in the questionnaire.

All of the questionnaires were automatically saved in an online account on the Google forms. The questionnaire was single blinded and did not require any personal information.

Three houndread orthodontists were asked to join the survey. A total of 269 orthodontists joined: 260 orthodontists answered all the questions, and 8 failed to complete the survey. Incomplete surveys were excluded from the study.

RESULTS

Practice Location

Respondents were distributed geographically among all the southern states of India. A total of 150 respondents practiced in an urban setup while 110 practiced in a semi urban or rural locality. Among the urban orthodontists, 120 had used miniscrews while among the orthodontists practicing in a semi urban/rural set up only 50 had used minimplants. There was more miniscrew usage among respondents of urban setup practice compared to semi-urban or rural locality practice(table 1)(graph1).

Table 1: Participants location

Total participants	Urban(150 participant)		Rural and semi urban(110)	
	USE TAD	Don't use TAD	Use TAD	Don't use TAD
260	120	30	50	60

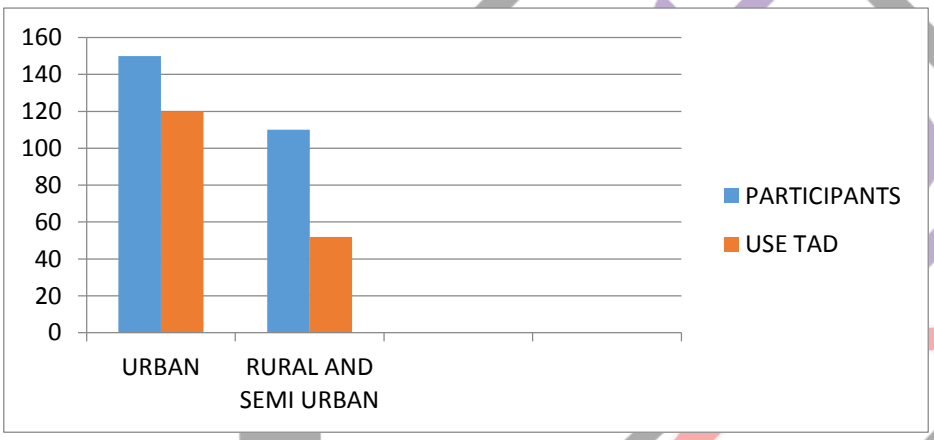


Figure 1: Participant location

Table 2 questionnaire and responds

Miniscrew Experience

Among the respondents 57% Orthodontists are using minimplant in their private practice and 34% had never used minimplant in their practice and 52% placed the miniscrews under topical anesthetia combined with local anesthetia, while 44% placed them under

1) Do you use mini-implants in your practice?	
A. Yes.	57.6%
B. No.	34.61%
2) How do you place mini-Implant?	
A. Tropical anasetia	4%
B. Local infiltration	44%
C. Combination of local and topical.	52%
3) When do you load mini-implant? (use force on mini- implant)	
A. Immediate loading	62%
B. After 1 week	13%
C. After 2 weeks	08%
D. After 1 month.	17%

4) How do you place mini-Implant?	
D. Tropical anasetia	4%
E. Local infiltration	44%
F. Combination of local and topical.	52%
5) Which diameter do you use more frequently in maxilla?	
A. 1.4mm	12%
B. 1.6	73%
C. 1.7	9%
D. 2mm	6%
6) Which diameter do you use more frequently in mandible?	
A. 1.4mm	38%
B. 1.6	47%
C. 1.7	8%
D. 2mm	7%
7) For which kind of cases do you use mini- implants in you practice (Choose multiple options if any)	
A. For mesial movement of molars (protaction)	30%
B. For retraction.	85%
C. Distalisation	10%
D. Intrusion	38%
E. Molar up righting.	9%
F. Cant correction	5%
G. Traction of impacted teeth	12%
7) How do you decide for mini-implant design?	
A. According to placement site	82%
B. According to amount of force	12%
C. Mechanics	05%
D. Other	01%
10) Approximately how many mini-implants failed during the last 6 months?	
A. Less than 5%	28%
B. 5-10%	68%
C. 10-15%	08%
D. 15 or more.	02%
11) When a mini-implant fails, how do you manage?	
A. Place the same implant in the neighboring place	48%
B. Place a thicker and longer implant	12%
C. New mini –implant in the neighboring place	14%
D. Remove the Mini-implant and place it after some time.	16%
12) What are the complications faced by the use of mini implants?	
A. Loosening of implant	75%
B. soft tissue irritation	48%
C. Implant breakage	2%
D. Sinus perforation	0%
E. Tooth perforations	1%
13) DO use same mini-implant for different patient?	
A) Yes	04%
B) No	85%
C) Rarely	11%

14) What is the reason for mini- implant failure from your clinical experience? (Most appropriate. can choose multiple option if any)	
A) Bad Oral hygiene.	56%
B) Poor insertion technique	42%
c) Wrong choice of mini implant	20%
D) Wrong force application.	11%
E) Other.	03%
Answer question (15- 16) only if you choose No for first question	
15) I don't use mini-implant because	
(Choose the most appropriate answer, can choose multiple option if any)	
A) Lack of skill	70%
B) Fear of risk factors like root damage and infection	40%
C) Patient refusal to accept mini screw	20%
D) Did not encounter any case requiring mini-screw placement	11%
E) Prefer traditional or conventional methods of treatments	10%
F) Cost factor	30%
16) If lack of skill is your reason for not using mini screw, do you believe hands on course would benefit you?	
A) Yes	92%
B) No	08%

local anesthetia and 4% placed them under only topical anesthetia (figure 2). Among the respondents who used miniscrews,62% applied force immediately on to the miniscrews, while 13% delayed force application for a week, 8%for 2 weeks and 17 %applied force only after a month.

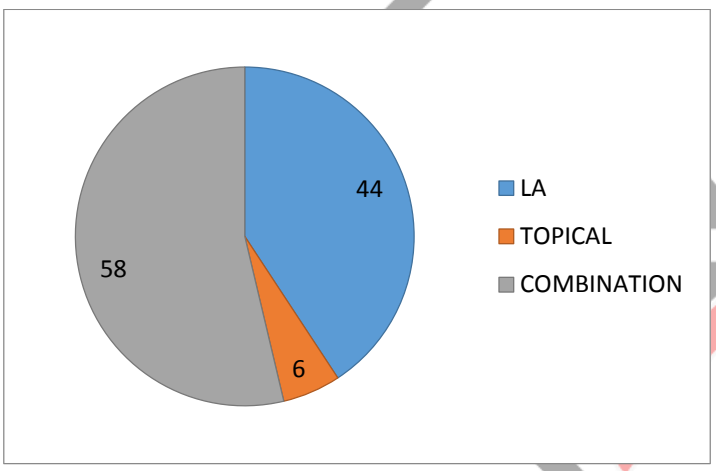
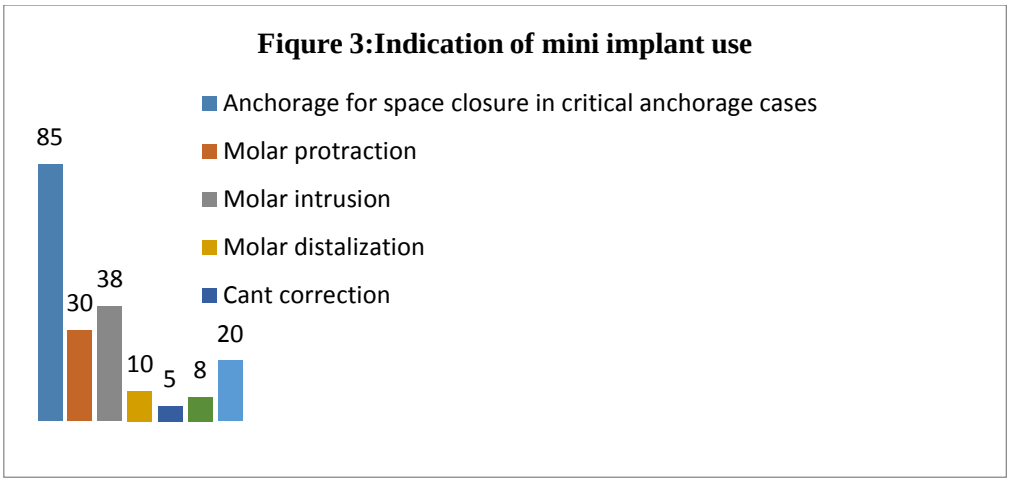


Figure 2: : Method of placement

Among practioners 73% used 1.6mm daimeter implant in maxilla but in mandible only 47 % used 1.6 mm daimeter while 38% used 1.4mm daimeter(table 2).

Majority of responents (85%) used mini screws mainly for rteaction of anterior teeth in high anchorage cases followed by mini screw utlised for intrusion mechanics and only 5% orthodontist used mini screw for occlusal cant correction (fiqure 3).



The reasons given by orthodontists for not using miniscrews in their clinical practice were lack of training (70%), fear of risk factors like root damage and infection (40%),cost was the problem for 30 % practioners, not encountering any case which require minimplant were 11% and 10 % prefered conventional treatment rather than invasive minimplant treatment.

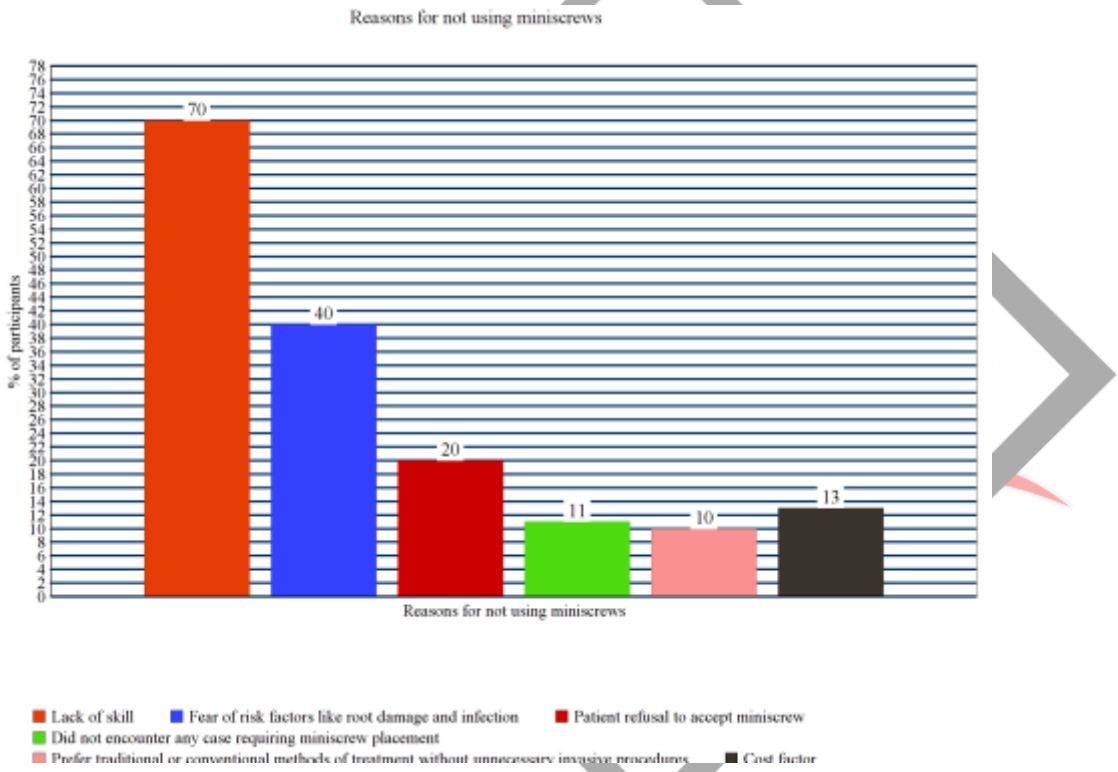


Figure 4: reason for not using minilpnt

Complication

Among the respondents 68% practioners had failure rate of (5-10%),28% had less than 5% failure rate and only 2% had more than 15% failure rate using min-implants for last 6 months.The most commonly reported complication or bilogical response of miniscrew treatment was screw loosening (75%), followed by soft-tissue overgrowth/irritation (48%),only 2% had minimplant fracture and there were no reported cases of sinus perforation.

DISCUSSION

89.6% orthodontists responded to our study, which was similar to the response rate of the survey done by Hyde et al.[7] It was much higher compared to the response rate of 7.7%[8] and 6%[9] in two other surveys.

Proportion of orthodontists using mini screw were 57% which was similar to 60.7%[8] but low compared to 80%[9]and 91%.[7]

Even though many studies concluded topical anaesthesia is enough for placing a mini screw and they offer a number of advantages when used for mini-implant insertion still majority of the responded combined local anesthetic and topical gel to place mini implant in our study.[10-12] .The main advantage is that the anaesthetic gel could be easily administered by the clinician and is easily tolerated by the patient compared to local anaesthesia .Among our respondents many of them utilised combination of LA and topical gel(52%)

,only 44% respondents used local anaesthesia and only 4% utilised topical gel only. This is similar to the result of the survey done by Buschang et al.[9]

Among the orthodontists who used miniscrews, most of them (62%)applied force immediately on to the miniscrews, which is similar to previous survey conducted by Buschang et al.[9]

The most common treatment indications for using mini screw were retraction of anterior teeth in high anchorage cases which is similar to other surveys[7,9] followed by molar protraction (30%),intrusion (38%) which is another major indication for mini screw usage in our study, which corresponds to the survey conducted by K. G. Venkatesh et al.[12] among indian orthodontists.

The most commonly reported complication or bilogical response of miniscrew treatment was screw loosening (75%), which is similar to the results of other surveys[13,7]and second major complication was soft tissue over growth(48%) ,which was first major complication in the survey done by Hyde et al.[7]

Loosening of miniscrews resulting in failure could be attributed to a number of factors. The main reason is improper surgical techniques such as lack of initial stability, overheating during placement and the use of large size pilot drill before miniscrew insertion. Operator experience and surgical skill also plays an important role in miniscrew success. Host factors responsible for failure includes uncontrolled diabetes, smoking and para-functional habits; miniscrews are best avoided in these patients.[14-15]

The major drawback while using miniscrews appears to be failure due to miniscrew loosening.[7] The reason for loose screws appears to be multi-factorial and is a disconcerting and unpredictable reality which we have to embrace in our clinical practice.[13]

Assuming that premature screw loosening is a failure rather than a complication, soft tissue irritation is the one of major complication with mini screw usage. A recent systematic review highlighted lack of published information on the character and duration of inflammation surrounding miniscrews.[13] Two studies have found soft-tissue overgrowth and inflammation to be significant risk factors for implant failure.[7,9]

Combined with our findings, these data suggest that orthodontists need to have adequate training in miniscrew insertion technique and knowledge of the factors responsible for clinical success of miniscrews. They must also be aware of the potential risk for soft-tissue complications, particularly when associated with poor oral hygiene and that this area provides ample scope for further investigation and research.

The major reason given by respondents in the survey, for not using miniscrews in their practice, is lack of training and fear of risk factors including root damage, this finding corresponds with other Indian survey conducted by K. G. Venkates et al.[12]A good hands on course can train south Indian orthodontists to improve skills in mini implant placement and thereby improving the efficiency of the orthodontic treatment.

Conclusion

Majorly mini screws are used for retraction of anterior teeth in high anchorage cases followed by intrusion mechanics among respondents and major complication faced by respondents was loosening of mini screws followed by soft tissue over growth and reason for not using miniscrew majorly because of lack of skills.

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