

Original Research

Assessment of clinical success of miniscrew implants

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ABSTRACT:

Background: Anchorage methods in a traditional orthodontic treatment can be external (headgear) and intraoral (transpalatal arch, lingual arch intermaxillary latex pulling) appliances. The present study was conducted to assess clinical success of miniscrew implants. **Materials & Methods:** 50 patients undergoing orthodontic treatment of both genders were enrolled. Clinical examination of all the patients was recorded. All were subjected to insertion of mini-screw implants. **Results:** Out of 50 patients, males were 22 and females were 28. Mini-implants were inserted in left side in 23 patients and right side in 27. Arch was maxillary in 34 and mandibular in 16 cases. There were 55 successful and 5 failure cases. **Conclusion:** There was high success rate of mini-screw implant in orthodontic patients. **Key words:** Anchorage methods, mini-screw implant, orthodontic

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INTRODUCTION

The keystone of a successful orthodontic treatment is assuring the proper anchorage. According to the definition by Proffit et al.¹ “anchorage is the prevention of unwanted dental dislocation.” Anchorage methods in a traditional orthodontic treatment can be external (headgear) and intraoral (transpalatal arch, lingual arch intermaxillary latex pulling) appliances.² Due to the disadvantages (patient cooperation, loss of anchorage, esthetic disadvantages, and overexertion of teeth) of external appliances, among the temporary anchorage devices, mini-screws have become more popular in recent times.³ The screws of a diameter of 1.4–2.5 mm and 6–12 mm length allow immediate loading thus shortening treatment time. Both their insertion and removal due to lack of osseointegration are simple. In self-tapping mini-screws, a pre-drilling is needed before insertion whereas in self-drilling mini-screws, there is no need for this.⁴

Due to their numerous advantages, they can be applied on a wide field of indications. Alignment of impacted canine teeth assisted with a skeletal anchorage is associated with a decreased risk of

complications and a shortened treatment time.⁵ Mini-screw implants have also been successfully used for intruding teeth because they make it possible to apply light continuous forces of known magnitudes. Better control of the forces could decrease external apical root resorption, which often associated with intrusive movements.⁶ The present study was conducted to assess clinical success of miniscrew implants.

MATERIALS & METHODS

The present study comprised of 50 patients undergoing orthodontic treatment of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Clinical examination of all the patients was recorded. All were subjected to insertion of mini-screw implants. All the surgical procedures were carried out under adequate septic conditions. All the patients were recalled on follow-up and success rate was recorded. Results were tabulated and assessed statistically. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 50		
Gender	Male	Female
Number	22	28

Table I shows that out of 50 patients, males were 22 and females were 28.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Side	Left	23	0.18
	Right	27	
Arch	Maxillary	34	0.01
	Mandibular	16	

Table II, graph I shows that min- implants were inserted in left side in 23 patients and right side in 27. Arch was maxillary in 34 and mandibular in 16 cases. The difference was significant ($P < 0.05$).

Graph I Assessment of parameters

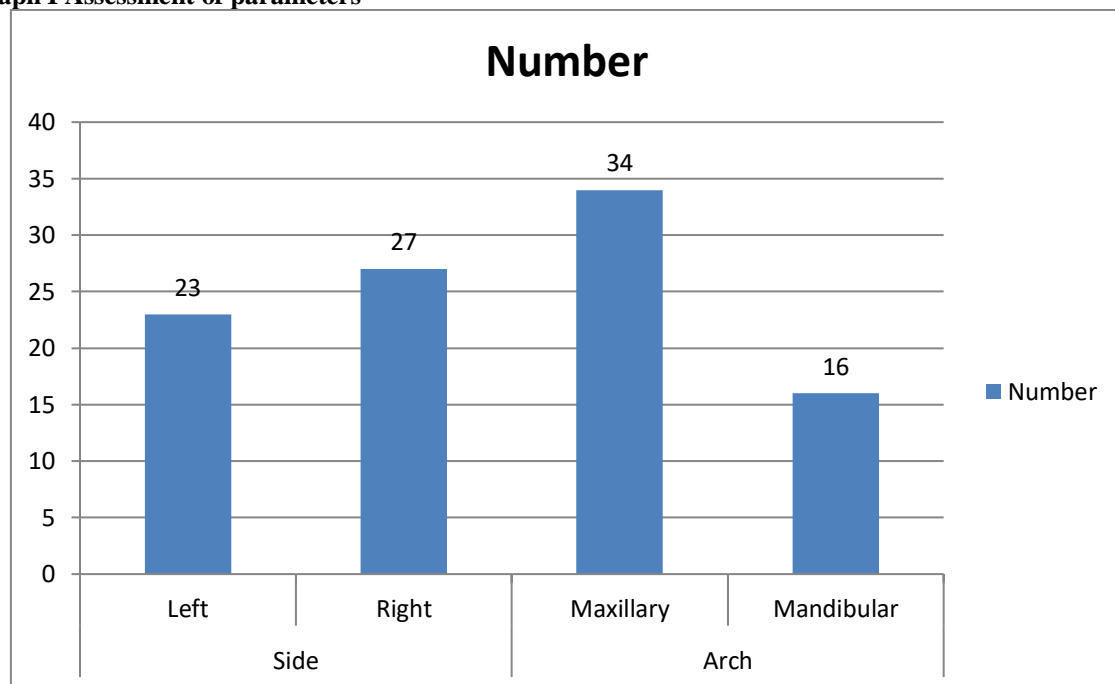


Table III Assessment of success rate

Total cases	Successful cases	Failure cases
60	55	5

Table III shows that there were 55 successful and 5 failure cases.

DISCUSSION

These implants have mechanical retention and provide short duration anchorage in orthodontics. The small diameter of these screws provides high versatility for placement site. Inter-radicular bone is the most common site for placement.⁷ These implants are absolute anchorage units. Conventional MSI has the following parts. Head is the orally exposed portion of the screw which provides attachment for the springs and elastics. It has a screw driver slot or a particular design to engage the miniscrew driver for implant placement.⁸ Numerous kinds of head design are available for different types of anchorage and for prevention of soft tissue irritation. Most common type

is the button like design with a sphere or double sphere-like shape or a hexagonal shape. A 0.8mm diameter hole in the head or neck of the screw is mostly used for direct anchorage.⁹ Screw neck or the trans-mucosal part passes through the mucosa and connects the screw with head. Variable lengths of neck are available for different mucosal thickness. Screw part gets embedded in the cortical or medullary bone to provide retention. The thread of the screw around shank or main body of the TAD has the cutting edge that facilitates insertion.¹⁰ The present study was conducted to assess clinical success of miniscrew implants.

We found that out of 50 patients, males were 22 and females were 28. Gurdan Z et al¹¹ found that the success rate of the orthodontic mini-implants was 89.8% while the average loading period was 8.1 months. Soft-tissue infections varied between 6.3% and 33.3% of the cases while screw mobility varied between 3.1% and 20.8% of the cases regarding the anatomic localization. Screw mobility was significantly more frequent in the buccal fold than in the palate ($P = 0.034$). Screw mobility was significantly more frequent in the buccal fold than in the palate ($P = 0.034$) and screw mobility was found more frequently in case of intrusions than by extrusions ($P = 0.036$). The overall success rate of mini-implants was found acceptable in this study, however, screw mobility in the buccal fold showed a high incidence, suggesting the thorough consideration of the immediate loading by buccal mini-implants.

We observed that mini-implants were inserted in left side in 23 patients and right side in 27. Arch was maxillary in 34 and mandibular in 16 cases. Motoyoshi et al¹² examined the success rate of mini-screws in 57 patients (aged 11.7–36.1) undergoing orthodontic treatment. The aim of skeletal anchorage was to retract the front teeth following the extraction of the upper premolar teeth, loaded with 2 N orthodontic forces. Poorest results (63.8%) were found in teenagers who received the force load within <1 month. In similar interventions, if the load to the mini-screw started only 3 months later, treatment was more successful (97.2%).

We found that there were 55 successful and 5 failure cases. Pan et al¹³ investigated the primary stability of mini-screws made of diverse materials having a diameter of 2 mm. The resonance frequency of the screws was determined when inserted into the bone (cortical 2 mm of thickness). The screws were of 10 and 12 mm length and made of titanium alloy. Measurements were registered at 2.2 and 6 mm of insertion depth.¹ Measurements failed to demonstrate a significant difference between mini-implants made of different materials. In contrast to this finding, however, insertion depth has a major role in providing stability. Deeper insertion is important not only for achieving better end results but also to lessen the stress between the bone and the surface of the mini-implant. This stress results from tipping movements on screw insertion.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that there was high success rate of mini-screw implant in orthodontic patients.

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