

Original Research

Assessment of outcome of orthodontic Mini dental implants: An observational study

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ABSTRACT:

Background: The keystone of a successful orthodontic treatment is assuring the proper anchorage. Mini-implant-enhanced anchorage has become a popular concept in orthodontics over the past years. Hence; the present study was undertaken for assessing the outcome of orthodontic Mini dental implants. **Materials & methods:** A total of 50 patients were enrolled. In all the involved patients, one or more self-drilling mini-screws were inserted. Orthodontic mini-implants were considered successful when they proved a perfect skeletal anchorage during the entire treatment period (independent from the period's length) without sign of mobility. In contrast, screws showing mobility or loosening (with or without subjective complaints), peri-implant infection, or neighbouring tooth injury occurred, were considered as failures. All the results were recorded and analysed using SPSS software. **Results:** Success was observed in 90 percent of the cases. Failure was seen in 10 percent of the cases. Among the failure cases, inflammation was the cause in 8 percent of the cases while screw fracture was seen in 2 percent of the cases. **Conclusion:** From the above results, the authors concluded that inflammatory complications frequently develop even with careful insertion as a result of the patient's poor oral hygiene.

Key words: Mini implants, orthodontic

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INTRODUCTION

The keystone of a successful orthodontic treatment is assuring the proper anchorage. Anchorage methods in a traditional orthodontic treatment can be external (headgear) and intraoral (transpalatal arch, lingual arch intermaxillary latex pulling) appliances. 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. 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 predrilling is needed before insertion whereas in self-drilling

mini-screws, there is no need for this. Due to their numerous advantages, they can be applied on a wide field of indications. Besides en masse retraction and intrusion of molar teeth, they are useful in the treatment of anterior open bite and deep bite.¹⁻³ Mini-implant-enhanced anchorage has become a popular concept in orthodontics over the past years. Although these systems are routinely used in university settings, there is some reservation because of lack of information in private practices.⁴⁻⁶ Hence; the present study was undertaken for assessing the outcome of orthodontic Mini dental implants.

MATERIALS & METHODS

The present study was undertaken for assessing the outcome of orthodontic Mini dental implants. A total

of 50 patients were enrolled. In all the involved patients, one or more self-drilling mini-screws were inserted. Smoking patients and patients with any general systemic diseases were excluded from this study. Orthodontic mini-implants were considered successful when they proved a perfect skeletal anchorage during the entire treatment period (independent from the period's length) without sign of mobility. In contrast, screws showing mobility or loosening (with or without subjective complaints), peri-implant infection, or neighboring tooth injury occurred, were considered as failures. Before screw insertions, the correct location of the implants was determined by physical and radiological investigations. All the results were recorded and

analysed using SPSS software. Chi-square test was used for evaluation of level of significance.

RESULTS

In the present study, a total of 50 patients were analysed. Mean age of the patients was 18.6 years. 28 patients were males while the remaining were females. In 84 percent of the patients, screw was placed in maxilla. In 58 percent of the patents, screw was placed on the right side. Success was observed in 90 percent of the cases. Failure was seen in 10 percent of the cases. Among the failure cases, inflammation was the cause in 8 percent of the cases while screw fracture was seen in 2 percent of the cases.

Table 1: Distribution of patients according to location

Screw location	Number of patients	Percentage
Maxilla	42	84
Mandible	8	16

Table 2: Distribution of patients according to side

Screw side	Number of patients	Percentage
Right side	29	58
Left side	21	42

Table 3: Outcome

Outcome		Number of patients	Percentage
Success		45	90
Failure	Inflammation	4	8
	Screw fracture	1	2

DISCUSSION

Defining specific indications where orthodontic mini-implants can successfully be used has 2 potential benefits. First, using mini-implants appropriately will lead to improved treatment results. Second, not using them when traditional mechanics could lead to equally satisfying results prevents overtreatment. However, because of the versatility of mini-implant-enhanced mechanics, some situations that could be resolved with traditional mechanics might be treated in a shorter time or at least with a more predictable outcome.⁷⁻¹⁰ Hence; the present study was undertaken for assessing the outcome of orthodontic Mini dental implants.

In the present study, a total of 50 patients were analysed. Mean age of the patients was 18.6 years. 28 patients were males while the remaining were females. In 84 percent of the patients, screw was placed in maxilla. In 58 percent of the patents, screw was placed on the right side. Success was observed in 90 percent of the cases. Y-C Tseng et al assessed their stability and the causes of failure. Forty-five mini-implants were used in orthodontic treatment. The diameter of the implants was 2mm, and their lengths were 8, 10, 12 and 14mm. The drill procedure was directly through the cortical bone without any incision or flap operation. Two weeks later, a force of 100-200g was applied by an elastometric chain or NiTi

coil spring. Risk factors for the failure of mini-implants were examined statistically using the Chi-square or Fisher exact test as applicable. The average placement time of a mini-implant was about 10-15min. Four mini-implants loosened after orthodontic force loading. The overall success rate was 91.1%. The location of the implant was the significant factor related to failure. In conclusion, the mini-implants are easy to insert for skeletal anchorage and could be successful in the control of tooth movement.¹⁰

In the present study, failure was seen in 10 percent of the cases. Among the failure cases, inflammation was the cause in 8 percent of the cases while screw fracture was seen in 2 percent of the cases. Yao CCJ et al analysed the potential factors affecting the failure rates of three types of mini-implants used for orthodontic anchorage. Data were collected on 727 mini-implants (miniplates, predrilled titanium miniscrews, and self-drilling stainless steel miniscrews) in 220 patients. The failure rate for miniplates was significantly lower than for miniscrews. All types of mini-implants, especially the self-drilling stainless steel miniscrews, showed decreased stability if the previous implantation had failed. The stability of predrilled titanium miniscrews and self-drilling stainless steel miniscrews were comparable at the first implantation. However, the failure rate of stainless steel miniscrews increased at

the second implantation. The univariate analysis showed that the following variables had a significant influence on the failure rates of mini-implants: age of patient, type of mini-implant, site of implantation, and characteristics of the soft tissue around the mini-implants. The generalized estimating equation analysis revealed that mini-implants with miniscrews used in patients younger than 35 years, subjected to orthodontic loading after 30 days and implanted on the alveolar bone ridge, have a significantly higher risk of failure. Their study revealed that once the dental surgeon becomes familiar with the procedure, the stability of orthodontic mini-implants depends on the type of mini-implant, age of the patient, implantation site, and the healing time of the mini-implant.¹¹

CONCLUSION

From the above results, the authors concluded that inflammatory complications frequently develop even with careful insertion as a result of the patient's poor oral hygiene.

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