

## Evaluation of clinical success of Mini-screw Implants for Orthodontic Treatment: An Observational Study

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### Abstract

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. Hence; the present study was undertaken for assessing the clinical success of Miniscrew Implants for Orthodontic Treatment.

**Keywords:** Orthodontic treatment, Miniscrew, Mini-screw implants

### Introduction

The foundation 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.<sup>1-3</sup>

Mini-screw implants are a compliance-free alternative to more traditional forms of incisor intrusion. It has recently been developed. They are smaller than regular dental implants and have the advantages of reducing patient compliance, immediate loading, uncomplicated

placement, and minimal expense for patients. 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.<sup>4-6</sup>

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.<sup>4-6</sup>

Stability refers to the resistance to reactive forces, offered by teeth or other oral or extraoral structures that would lead to unwanted movements. In the case of mini-implants, two types of stability can be distinguished: primary and secondary. Primary stability is mechanical and is achieved by the mini-implant compressing the bone during insertion, while secondary, or biological stability, begins at the moment of placement and increases during the bone remodeling or healing process.<sup>7-9</sup> Hence; the present study was undertaken for assessing the clinical success of Miniscrew Implants for Orthodontic Treatment.

### Materials & Methods

The present study was undertaken for assessing the outcome of orthodontic Mini dental implants. A total of 30 patients were enrolled. Complete demographic details of all the patients were obtained. A Performa was made and thorough details of the clinical examination of all the patients were recorded. All the surgical procedures were carried out under adequate septic conditions. Exclusion criteria for the present study included:

- Patients with history of any other systemic illness,
- Smoking patients
- Patients with any known drug allergy
- Patients with history of any metabolic bone disorder

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 neighboring tooth injury occurred, were considered as failures. Before screw insertions, the correct location of the implants was determined by physical and radiological investigations. The data were entered over a spreadsheet, and statistical analysis was performed using SPSS software version 17 (IBM, Chicago, United States). Chi-square test was used for evaluation of level of significance.

### Result

The present study was undertaken for assessing the clinical success of Miniscrew Implants for Orthodontic Treatment. In the present study, a total of 30 patients were analysed. Mean age of the patients was 20.6 years. 16 (53.3%) patients were males while the remaining 14 (46.6%) patients were females. **(Table no. 1)** In 73.3 percent of the patients, screw was placed in maxilla whereas 26.6 percent of screw was placed in mandible. **(Table no. 2)** Success was observed in 86.6 percent of the cases. Failure was seen in 13 percent of the cases. Among the failure cases, inflammation was the cause in 10 percent of the cases while screw fracture was seen in 3.33 percent of the cases. **(Table no. 3)**

Gender	Number of subjects	Percentage
Male	16	53.3
Female	14	46.6

Screw location	Number of subjects	Percentage
Maxilla	22	73.3
Mandible	08	26.6

Outcome	Number of patients	Percentage	
Success	26	86.6	
Failure	Inflammation	3	10
	Screw fracture	1	3.33

**Discussion**

Mini-screw implants, often referred to as temporary anchorage devices (TADs), have become an accepted component of orthodontic treatment. In contemporary orthodontics utilization of miniscrews are becoming more common because of its capability to provide adequate anchorage and also it decreases the need of patient conformity during orthodontic procedure.<sup>10</sup> According to few studies, considerably high number of patients (86.7%) selected miniscrews over extraction even though only very few (12.7%) had the previous knowledge of miniscrews.<sup>11</sup> Hence, this proves that patients conformity is not necessary in placements of miniscrews and it promotes the successful orthodontic treatment with better results, without the need of extraction.

In the present study, a total of 30 patients were analysed. Mean age of the patients was 20.6 years. 16 patients were males while the remaining were females. In 73.3 percent of the patients, screw was placed in maxilla and 26.6 percent screw was placed in mandible. Success was observed in 86.6 percent of the cases. In the present study, failure was seen around 14 percent of the cases. Among

the failure cases, inflammation was the cause in 10 percent of the cases while screw fracture was seen in 3.33 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.

**Conclusion**

Miniscrew Implants for Orthodontic Treatment are accompanied by high success rate.

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