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Original Research

Assessment of factors related to outcome of orthodontic mini-implants

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ABSTRACT:
Background: Recently, there has been a surge in the clinical use of temporary anchoring devices (TADs), particularly orthodontic mini-implants. The purpose of this study was to evaluate clinical orthodontic mini implant application-related parameters. Materials & Methods: 106 patients of both genders who received micro implants were included in the current study. Recorded were patient-related factors such implant length, systemic illnesses, bone width, and malocclusion. Results: Forty females and sixty guys were present. 52 dental implants were placed in women and 80 in men. In patients with 42 systemic disorders, there were 22 small implants that failed. Type IV bone (12) had the highest implant failure rate, followed by type III (10), II (8), and I (12), as well as 10 in 68 patients with a height of more than 12 mm, 12 in 42 patients with a height of 10–12 mm, and 10 in 22 patients with a height of less than 10 mm. Conclusion: Authors found that factors such as bone height, width, malocclusion, systemic diseases and bone type determine the outcome of mini implants.
Key words: Anchorage, Malocclusion, Mini implants.

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INTRODUCTION

Recently, there has been a surge in the clinical use of temporary anchoring devices (TADs), particularly orthodontic mini-implants. There are two possible advantages to defining precise indications when orthodontic mini-implants can be used successfully.[1] Using mini-implants correctly will, first and foremost, improve treatment outcomes. Second, overtreatment is avoided by avoiding employing them when more satisfactory outcomes may be obtained with standard mechanics. Mini-implant augmented mechanics' adaptability, however, may allow for the quicker or more predictable resolution of certain circumstances that could take longer to resolve with standard mechanics. In these circumstances, mini-implant anchoring may be recommended if the advantages of the procedure outweigh the dangers and the patient's preferences may be more effectively met.2. Mini-implants have a high success rate and a very low failure rate of 13.5%. Most faults occur after orthodontic loading. Jaw failure rates vary, but not in a way that is clinically noteworthy. Using mini-implants correctly will, first and foremost, improve treatment outcomes. Second, overtreatment is avoided by avoiding employing them when more satisfactory outcomes may be obtained with standard mechanics. Mini-implant augmented mechanics' adaptability, however, may allow for the quicker or more predictable resolution of certain circumstances that could take longer to resolve with standard mechanics. In these circumstances, mini-implant anchoring may be recommended if the advantages of the procedure outweigh the dangers and the patient's preferences may be more effectively met.[2] While the failure rate for mini-implants is very low (13.5%),

the success rate is high. The majority of malfunctions follow orthodontic loading. Variations in jaw failure rates are not clinically significant. The use of these implants carries a risk of problems, such as implant fracture, anatomic structural trauma, inflammation, and implant loss from motion. The patient, the mini- implant and insertion site selection, the insertion process, and orthodontic loading all play a part in the successful application of mini-implants.[3] Mini-implants are most suited for healthy persons free of systemic disease, conditions, or medications that interfere with osseous healing. Although it has been questioned whether they should be used on very young patients, there is no upper age limit.[4]Since local inflammation was a relative risk factor for failure when movement was ruled out and was directly li nked to failure, dental hygiene improves prognosis.Success depends on preventing inflammation, while factors t hat contribute to inflammation like poor dental care and screw emergence at the oral mucosa are tangentially linked to failure.[5] The present study was conducted to assess factors related to the clinical application of orthodontic mini-implants.

MATERIALS & METHODS

The department of orthodontics Included 106 patients of both sexes who received micro implants.
They were made aware of the study, and their signed consent was acquired.
Prior to the study, the ethical committee granted its approval.
Information like name, age, gender, and so forth were noted.
Patients were called back on a regular basis to see how their treatment was going. Recorded werepatientrelated factors such implant length, systemic illnesses, bone width, and malocclusion. The resulting data were then statistically analyzed. A P value of less than 0.05 was deemed noteworthy.

RESULTS

Table I Distribution of patients

Total- 106		
Gender	Males	Females
Number	66	40
Implants	80	52

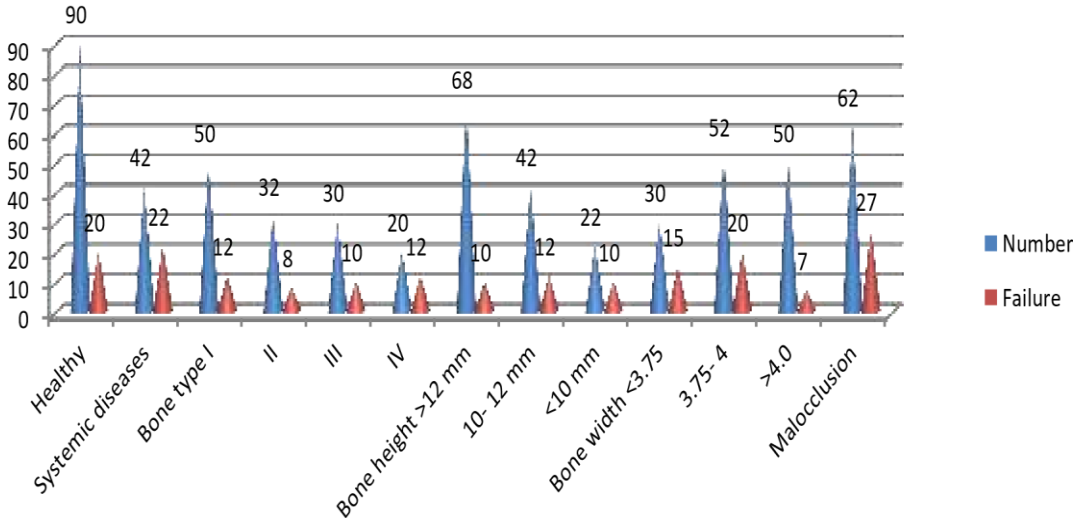
Table I shows that there were 66 males and 40 females. Males had 80 and females had 52 dental implants.

Table II Factors concerning the patients

Factors	Number	Failure	P value
Healthy	90	20	0.05
Systemic diseases	42	22	
Bone type I	50	12	0.04
II	32	8	
III	30	10	
IV	20	12	
Bone height >12 mm	68	10	0.03
10- 12 mm	42	12	
<10 mm	22	10	
Bone width <3.75	30	15	0.01
3.75- 4	52	20	
>4.0	50	7	
Malocclusion	62	27	

Table II, graph I shows that there was 22 mini implants failure in patients with 42 systemic diseases, maximum implant failure was seen in type IV bone (12) followed by type III (10), II (8) and I (12), 10 in 68 >12 mm height, 12 in 42 10-12 mm implant height and 10 in 22 <10 mm height. Implant failure was seen in 15 in bone width <3.75 mm, 20 in 3.75- 4 mm and 7 in >4 mm and 27 out of 62 patients with malocclusion.

Graph I Factors concerning the patients



DISCUSSION: The definition of orthodontic anchoring is the ability to withstand unwanted tooth movement. The ratio of incisor retraction to molar protraction is a classic way to define three anchorage scenarios in the anteroposterior dimension.[6] Maximum anchoring indicates that most of the space is closed by retraction of the incisors, lowest anchorage indicates that most of the space is closed by protraction of the buccal segments, and moderate anchorage implies reciprocal space closure.[7] Treatment duration may be prolonged if an implant fails. Certain technologies allow for the instant placement of much larger diameter mini-implants in the location of the failed implant. Taking great care is necessary to avoid damaging the nearby roots.[8] To allow the bone to fill in, a healing period of two to three months is required before putting a fresh implant in the same area with the same diameter. Using a longer bicortical screw in place of the original monocortical screw is an additional option.[9] More research is needed on the use of bicortical screws in cases where monocortical screws fail. If the implant comes loose from the appliance entirely, aspiration poses the biggest risk of mini-implant failure. However, the chance of aspirating foreign materials is minimal in a neurologically normal individual because this is an uncommon event in conscious patients.[10] The present study was conducted to assess factors related to the clinical application of orthodontic mini-implants.

In this study, there were 66 males and 40 females. Males had 80 and females had 52 dental implants. Motoyoshi *et al.*[11] discovered that the success rate was 91.9% in the adult group, 97.2% in the late-load group (adolescents with a 3-month latent period), and 63.8% in the early-load group (less than a 1-month latent period). Adolescents in the early-load group had a substantially lower success rate than the other groups ($P < 0.01$).Just in the maxillary arch of the early-load group, the 5–10 N cm group's placement torque success rate was much higher than that of the other groups in measurements conducted on adolescents. To increase the success rate of the mini implant, a latent period of three months prior to loading is advised, even if the ideal torque could not be determined. We discovered that patients with 42 systemic disorders had 22 micro implants fail. The type IV bone (12) had the highest implant failure rate, followed by type III (10), II (8), and I (12), and the following patient groups: 10 in 68 >12 mm height, 12 in 42 10-12 mm implant height, and 10 in 22 <10 mm height. In patients with malocclusion, implant failure was observed in 27 out of 62 cases, with 15 cases in bone width <3.75 mm, 20 cases in 3.75–4 mm, and 7 cases >4 mm.

High anchorage demanding cases involving distal movement of molars or extrusion and intrusion of teeth require careful planning and anchorage control. In both non-extraction and extraction scenarios, both intra-oral and extra-oral techniques are typically employed. Unfortunately, in order to prevent unintentional tooth movements and loss of space, the orthodontist frequently has to rely on patient compliance, such as the wearing of headgear. Mini-screws, micro-implants, skeletal anchorage devices, temporary anchorage devices, and orthodontic implants have all been used to refer to mini-implants in the literature. In orthodontics, mini-implants have lately been introduced for skeletal anchoring.[12]

CONCLUSION

Authors found that factors such as bone height, width, malocclusion, systemic diseases and bone type determine the outcome of mini implants.

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