MINI-IMPLANTS FOR "EN MASSE" MAXILLARY ANTERIOR TEETH RETRACTION: A CLINICAL STUDY

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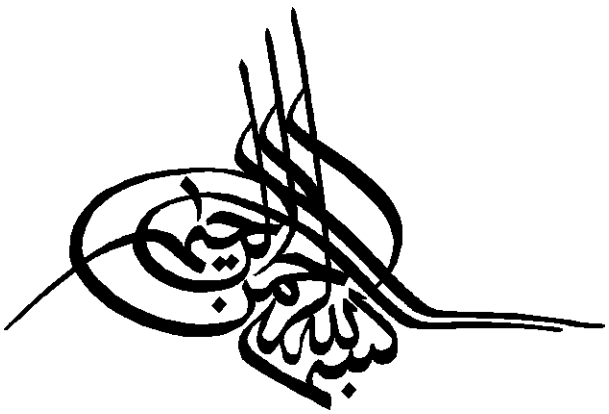

وَقُلِ اعْمَلُوا فَسَيَرَى اللهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ وَسَتُرَدونَ

إِلَى عَالِمِ الْغَيْبِ وَالشَهَادَةِ فَيُنَبِئُكُم بِمَا كُنْتُمْ تَعْمَلُونَ

"صدق الله العظيم"

"سورة التوبة"

آية(١٠٥)

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I dedicate this to:

My beloved Mother,

The soul of my father

&

All my wonderful family

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CONTENTS

List of Tables

List of Figures

Page

INTRODUCTION

Class II malocclusions cause esthetic and functional problems as well as psychological problems of varying intensity. They depend on the amount of anterior-posterior discrepancy and its interaction with the related soft tissue structures. Treatment for the Class II malocclusions in nongrowing patients usually involves selective removal of permanent teeth.

On retracting anterior teeth, anchorage control assumes profound importance because maintaining the posterior segment in place becomes very critical. A loss in molar anchorage cannot only compromise correction of the anterior-posterior discrepancy, but can also affect the overall vertical dimension of the face.

The en masse retraction of the upper anterior teeth has always been a popular option in the treatment of the maxillary protrusion cases, with the shortened treatment time being its main advantage. It allows the extraction space to be closed in a single step. However, the anchorage requirement for the en masse retraction is much greater than that for the two step retraction.

Throughout the literature, several methods have been described to accomplish distal movement of anterior teeth after premolar extraction without losing posterior anchorage. Molar buccal torque, multiple teeth at anchorage segment and application of light forces are commonly used. Many appliances including Nance holding arch, palatal bar and extraoral appliances have been designed for anchorage reinforcement. Although headgear has proved to be the best source of anchorage, still patient's

compliance, undesirable side effects on the maxillary complex and the risk of injuries have jeopardized its success.

Because any dental anchorage would to a certain degree result in unwanted movement of the anchor teeth, devices have been developed that do not use teeth as the anchorage unit. The growing demand for minimum compliance and maximum curative effects has made the temporary anchorage device (TAD) more promising as an excellent alternative to traditional orthodontic anchorage.

A temporary anchorage device is a device that is temporarily fixed to bone for the purpose of enhancing orthodontic anchorage either by supporting the teeth of the reactive unit or by obviating the need for the reactive unit altogether, and which is subsequently removed after use. They can be located transosteally, subperiosteally, or endosteally and they can be fixed to bone either mechanically (cortically stabilized) or biochemically (osseointegrated).

The incorporation of dental implants and TADs into orthodontic treatment raises the possibility for infinite anchorage, which has been defined in terms of implants as showing no movement (zero anchorage loss) as a consequence of reaction forces; this opens the gate for the present clinical research.

REVIEW OF LITERATURE

During orthodontic treatment, achieving maximum or absolute anchorage with traditional approaches can be a biomechanical challenge. Orthodontists are accustomed to using teeth and auxiliary appliances, both intraoral and extraoral, to control anchorage. However, these methods are limited because of its difficulty to achieve results commensurate with our idealistic goals without full patient compliance. The search for an ideal anchorage unit has resulted in bone-borne or skeletal anchorage devices that do not rely on patient cooperation, soft tissues or the dentition.

For the sake of clarity, the review of literature will be divided into:

I- Different methods applied for en masse maxillary anterior teeth retraction.

II- Mini-screw implants

A- Aiming devices.

B- Clinical applications of orthodontic mini-screw implants.

C- Success and failure rates.

I- Different methods applied for en masse maxillary anterior teeth retraction.

The one step retraction of the anterior segment, in the treatment of the first premolar extraction cases has been practiced in the Begg and Tip-edgewise techniques for many years [3]. In a modern edgewise technique, the en masse retraction is first presented by Andrews in 1976 [3], his retraction

method was developed by Bennett and Mclaughlin in 1991[6] and used routinely in their preadjusted appliance system.

Orton, Slattery and Orton (1992)[66], described a modified maxillary intrusion splint (M.I.S.) system which was applied as vertical pull headgear for management of severe 'gummy smile' class II division 1 malocclusion and designed to reduce the visibility and vulnerability of the maxillary incisors in this difficult clinical situation by achieving the intrusion of maxillary teeth, restraining maxillary growth and encouraging an element of subsequent forward mandibular rotation. The authors' initial experience using this system was presented in a retrospective cephalometric analysis of the lateral skull films of 26 treated patients contrasted with a similar number of comparable controls. Their results showed that the principal effects of the M.I.S. were on the maxillary teeth giving decisive overjet control and incisor retraction with actual maxillary incisor intrusion. There was a similar effect on the maxillary molar and the M.I.S. provided effective en masse vertical control of the maxillary dentition. There was some degree of maxillary restraint in the M.I.S. group, but no noticeable difference in the change of mandibular position between the groups at the end of treatment.

Bauer et al (1992)[5], applied their study on 11 patients for the isolated canine retraction, as well as for the en masse retraction, controlled types of movement for the active units and maximum anchorage situations for the passive units produced by the torquing force. Because of these good anchorage conditions space closure could be done without headgear. The level of the anchorage segments was negligibly influenced but in the