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DENTAL DISTRACTION – A CASE STUDY

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ABSTRACT:

Distraction osteogenesis [DO] is a process of inducing new bone by mechanical stretching of the pre existing bone tissue. This procedure is being followed in orthopedic surgeries and orthognathic surgeries since a long time. Now a days this procedure is being applied for the orthodontic tooth movement also. This article presents a case of canine retraction with Distraction osteogenesis

KEY WORDS: Distraction osteogenesis [DO], Retraction, Canine, Tooth Movement, Orthodontic

INTRODUCTION

Distraction osteogenesis [DO] is a process of growing new bone by mechanical stretching of the pre existing bone tissue¹. Distraction osteogenesis was used as early as 1905 by Codivilla and this technique was first described by Ilizarov^{2,3} in the early 1950's which basically consisted of performing corticotomy of the long bones with minimal disruption of the periosteal and endosteal tissues and slowly stretched by mechanical means.

External devices were initially used for distraction osteogenesis and then intraoral devices were introduced shortly. These intraoral devices can be tooth borne ^{4,5} bone borne or both land has gained popularity as they are much simpler and more patient acceptable.

Most of the orthodontic cases are done by extracting the first premolars. For anchorage preservation individual canine retraction are done. For rapid canine retraction, dental distraction can be done as described by Liou and Huang^{8]}in 1997, Kontham et al⁹ in 1999 and Eric Jein - Wein Liou et al in 2000^{10} .

This paper presents a clinical case of dental distraction.

Clinical Procedure

An adult patient who had a bidental protrusion was selected, who needs extraction of all first premolars (Fig.1). The teeth to be distracted were 13 and 23. The anchor unit was the first molar on respective side.

The canine distractor used in the study was a rigid, intraoral, tooth borne device (**Fig.2**). The bands were first fabricated for the canine and 1^{st} molar. Then impression was taken with alginate. The bands were transferred into

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the impression and models of die stone were made. The distractor with appropriate length was soldered to the bands directly.

Surgical Procedure

Patient was given local anaesthesia. A horizontal mucosal incision 2 to 2.5 cm long was made parallel to the gingival margin of the canine and bicuspid teeth well beyond the depth of the vestibule. Subperiosteal elevation was carried out to expose the canine root and first premolar region. A vertical osteotomy was made on the anterior aspect of the first premolar using multiple cortical holes with a round bur under copious irrigation. Fine osteotomies were then introduced and advanced in the coronal direction.(**Fig.3**)

The bone apical to the extraction socket and the possible bony interferences at the buccal aspect that may be encountered during the distraction process were eliminated and smoothened between the canine and the second premolar tooth with the preservation of the palatal cortex. The wound was irrigated with saline and closed in a single mucosal layer with 3-0 catgut suture.

The distraction device was fitted and cemented to the first molar and canine teeth at the end of the surgical procedure. (Fig.4)

The patient was prescribed an antibiotics and nonsteroidal anti-inflammatory drugs for 5 days. The distractor was fabricated in such a way that it provided a better access for placement and activation of the distractor. It also produced less discomfort to the patient and enabled patient's co-operation during each stage of treatment.



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Fig.7. Pre Treatment OPG



The distraction device was activated 0.8 mm per day in the morning till retraction was complete. The patient was seen once in three days and a pre weekly periapical radiograph was taken to monitor the progress.

Results

Pre treatment, during treatment (**Fig.5**) and post treatment photographs (**Fig.6**) and orthopantamogram (**Fig.7and Fig.8**) were taken to analyse the results. The distance between the contact points of the lateral incisor and canine was measured directly in the patient mouth and the pre treatment model. The distraction was completed totally in ten days time and 8mm was distracted. Amount of retraction was slow on first three days showing 1mm of retraction and at the end of six days 3.5 mm of retraction was completed. The retraction was almost same on both sides of the arch.

No mesial migration of first molar or extrusion of canine is seen. No pain was experienced by the patient except for mild discomfort for 20 minutes during the activation daily. No tipping of canine is seen clinically and radiographically. Bodily movement of canine was seen.

Pre and post treatment models were taken. Orthopantamogram and peri apical radiograph were also taken to assess the bone formation, root resorption and PDL changes. Widening of PDL was seen on the mesial side and compression on the distal side of canine.

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Discussion

Treatment duration has been a great concern in treating patient with severe protrusion. Maximum anchorage cases need careful manipulation of appliance especially in individual canine retraction. Distraction has been proved a useful adjunct provided the clinician capitulates the distraction procedure with utmost care, with least discomfort to the surrounding structures.

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