



En-Masse Retraction Revisited: Labial and Lingual Biocreative Therapy



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Abstract

For cases presented with dento-alveolar protrusion, protruded lips, and a convex profile, the treatment plan often calls for the extraction of first premolar teeth followed by retraction of the anterior segment to achieve the desired dental and soft tissue profile objectives. En-masse retraction of the anterior segment is a biomechanically demanding procedure. This article presents the Biocreative Therapy technique for en-masse anterior retraction and highlights the three main control mechanisms that should be implemented in the biomechanical system during anterior retraction.

Introduction

Dentoalveolar protrusion with resultant protrusive lips is commonly treated by premolar extraction followed by anterior retraction to obtain the desired dental and soft tissue profile changes. Correct positioning of the maxillary and mandibular incisors is essential for function, stability, and esthetics. Retraction of the anterior segment, therefore, represents a fundamental and often critical stage in orthodontic treatment. Three main control mechanisms should be implemented in the applied biomechanical system to achieve the desired tooth movement.

These are:

- i. Torque control; achieving the desired type of tooth movement whether by controlled tipping, translation, or root torque,
- ii. Vertical control; anteriorly to avoid bite deepening during anterior retraction, as well as posteriorly preventing molar extrusion and clockwise mandibular rotation which can worsen profile esthetics, and
- iii. Anchorage control, minimizing the unwanted protraction of posterior segments (anchorage loss) during space closure.

Retraction of the anterior teeth in extraction cases can be performed with sliding or loop mechanics. They can be retracted as one unit (en-masse) or in two steps (separate canine retraction followed by incisor retraction). Furthermore, either continuous or segmented mechanics can be used. For optimum control during en-

masse anterior retraction, Chung et al. introduced the Biocreative Therapy. The Biocreative therapy is a treatment philosophy that was developed to target the patient's chief complaint using a variety of temporary skeletal anchorage devices without unwanted side effects of conventional orthodontic biomechanics. The treatment protocol requires placement of fixed appliances only on the teeth to be moved. Labial Biocreative Therapy type I and type II were introduced as well as the Lingual Biocreative Technique for invisible orthodontics.

In Labial Biocreative Therapy type I and II, anterior vertical control is achieved through the use of gable bends and overlay intrusive arch wire, respectively. This can effectively control the commonly observed side effect of incisor extrusion and resultant bite deepening during retraction. If not properly controlled, this can hinder complete incisor retraction and detrimentally affect incisor display at rest and on smile. Anchorage control is of paramount importance in dentoalveolar protrusion cases in need for first premolar extraction and maximum anterior retraction. In Labial Biocreative therapy, anchorage control depends on the use of c-implants as a sole source of anchorage for anterior retraction. Posterior teeth are not bonded or banded, with minimal (if any) anchorage loss occurring during retraction.

As for torque control, this merits special attention as one is retracting the anterior teeth in a segment unattached to the posterior teeth. Location and management of the centre of resistance (CR) with respect to retraction force vectors is critical. In labial

Biocreative Therapy, the length of the power arm positioned onto the arch wire distal to the lateral incisor, as well as the application of anterior torqueing moment via gable bends (in type I) or overlay intrusive arch wire (in type II) could be varied to produce the desired type of tooth movement whether controlled lingual crown tipping, root tipping, or bodily movement of the anterior segment. The same three main control mechanisms are also implemented in the Lingual Biocreative technique, with an added advantage of being invisible and completely esthetic. This system comprises C-lingual retractor and C-palatal plate for en masse retraction of the maxillary anterior dentition. The C-lingual retractor with retraction hooks is bonded to the lingual surfaces of the upper six anterior teeth, providing excellent esthetics. The C-palatal plate is fixed near the median palatal suture with microscrews and removes the need for upper posterior orthodontic appliances as anchorage and provides optimum anchorage control. Torque and vertical control are achieved by varying the length of the retraction hooks as well as the line of action of retraction force relative to the centre of resistance of the anterior segment.

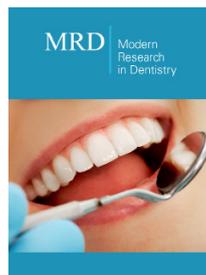
However, in some cases, anterior vertical elastics might be needed for better vertical control over the canine. Biocreative therapy can be used to provide patients with esthetic treatment, rapid and controlled retraction while simplifying conventional orthodontic biomechanics, to discourage unnecessary use of complex orthodontic devices, and to facilitate orthodontic tooth movement by using orthodontic force against skeletal anchorage. Posterior teeth are not disturbed by friction in the appliance and posterior occlusion is well maintained. Patients will have reasonable comfort with minimal required compliance. As the majority of research work related to Biocreative therapy technique was mainly case reports, three-dimensional finite element analyses, and retrospective studies using two-dimensional cephalometric data, and the fact that no studies; up to the time of this writing; compared the labial and lingual biocreative techniques, further research work is encouraged to clinically evaluate and compare the effects of labial and lingual biocreative therapy for en-masse retraction of the maxillary anterior teeth.



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