

Review Article

Reverse Bracket Placement & Torque Results in Dentofacial Orthopaedics- A Review

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ABSTRACT:

The torque is a shear-based moment, that is a force which has been obtained from a twisted spring wire in its effort to un-twist itself which causes the rotation. In dentistry, it prevails to the facio-lingual root movement and also control. Moreover, it also refers to the amount of twist which has been applied to an arch wire in the bracket engagement or for the activation. In spite of the advent of various treatment concepts, the appliance systems, torque prescriptions and the considerable research done in the past, torque is still a mystery. The main key is to understand is to learn how to manage the torque properly by focusing on the technical as well as the biomechanical purposes that led to the changes of the torque values over time. The present review focuses on the importance of torque in orthodontics and how bracket positioning modifies the nature of the torque applied.

Keywords: Preadjusted Brackets, Reverse bracket, Torque, Torque expression.

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INTRODUCTION:

For everyone, the lower third of the face and especially the anterior teeth are essential for social concern. The orthodontic treatment modality aims to position the teeth in such a way that they achieve an optimum aesthetics as well as the function.¹ In order to obtain a functional occlusion, one of the criteria is to have an ideal axial inclination of all the teeth at the end of the active treatment. The torque is the force that permits the orthodontist to control the axial inclinations of teeth in order to place them in a balanced position. Torque is one of the most fundamental and forbidding forces in orthodontics.

Clinically, the torque is the third key of the occlusion, and the torque is said to be positive when the root is linguallly positioned and negative when the root is facially positioned as compared to the crown.² However, biomechanically it is the torsion of a rectangular arch-wire in the bracket slot. According to Rauch, torque has been defined as the force that provides the control to operator over the movements of roots of teeth.² The aim of the present article is to review the importance of torque on various aspects in orthodontics and also to provide a brief description about the variation in the expression of torque in modified bracket position.

Effect of torque:

- **On apical bases:** One of the major objectives of the orthodontic treatment is to reorient the apical base relationship by maintaining a good labial axial inclination of the upper incisors. The torque assists the orthodontist in bringing about a desirable change of points A and B and thereby the desirable facial changes.³

- **On teeth: It is of prime importance to have a** proper bucco-lingual inclination of both posterior and anterior teeth in order to have an optimal stability and also for a proper occlusal relationship in the orthodontic treatment.

- **On smile esthetics:** The fullness of smile should be sought through the adjustment of clinical crown torque of the maxillary canines and the premolars in order to have their most esthetic appearance in different face types.⁴

- **On root resorption:** As per the first comprehensive study on the root resorption by Ketcham, most of the investigations have confirmed that the root resorption is common after the orthodontic treatment. Moreover, in mature young teeth, adult patients and periodontally compromised cases, a thin edgewise arch wire is preferred. To apply a light torquing force that acts interruptedly is the best technical solution in order to avoid the root resorption in light-wire technique.

VARIATIONS IN THE TORQUE EXPRESSION:

In spite of the abundant empirical as well as the research data on the necessity of adequate torque, there is still a striking variability among the various prescriptions with respect to the anterior dentition torque values. Thereby, the maxillary central incisor torque in the pre-adjusted appliances ranges from 12° in the Roth prescription to 22° in the Bioprogressive prescription, a variation which is reaching almost 100% of the suggested value. The torque variation generally occurs because of the following sources; i.e., the material properties, the manufacturing processes and the biologic variables. According to a study by Morina in which it was observed that the conventional brackets with the self-ligating brackets for their capability to generate the moment angle able to produce the torque. The maintenance of the torque was found to be best for the ceramic brackets which is followed by conventional metal brackets, the self-ligating active brackets and also self-ligating passive brackets.^{5,6}

Bracket Positioning:

The force which determines torque is correctly expressed when the force is applied in the center of the clinical crown: a different positioning, as demonstrated by Meyer and Miethke, could determine a variation of the torsion angle by 10° to 15°. The positioning of brackets could also be

affected by the morphology of the dentition, i.e., if there is a divergency between the longitudinal axis of crown and of the root, then it could change the effect of the same bracket.⁶ One aspect of the orthodontists is to correct the position of the bracket by correctly debonding and rebonding the bracket, while the other aspect is the debonding procedures which also present their unfavourable effects, i.e., if the verticality is properly controlled then the change of the bracket position on vertical aspect, could be a good clinical option in order to reduce/add torque.

The modification of bracket position:

Inversion like modifications to the bracket position can also help in achieving the movements of individual tooth. The planning of bracket position must be considered at the outset of the treatment modality in order to achieve the maximum benefit. Various such clinical scenarios include: A Class II division 1 malocclusion with lateral incisors palatally displaced, and another case with absent lateral incisors for space closure.⁷ Moreover, Class III malocclusions with consideration given to: canine angulation; a palatally displaced canine requiring labial movement; absent upper central incisors (space closure), and finally, a Class III case where incisor inclination requires consideration

Reverse bracket when indicated:

When the lateral incisor is palatally placed, the brackets have to be reversed [9], in order to change the torque values from positive to negative for achieving the desired root movements. This helps in saving the valuable treatment time at the end for torquing. In case of palatally displaced lateral incisor, the normal brackets are placed, but it is rotated 180 degrees, which changes the torque + 10 degree to -10 degree. This assists in the labial root torque at the rectangular wire stage.⁸

CONCLUSION:

The torque can influence the outcome and thereby the stability of orthodontic treatment in many more ways. While treating any case, a great care is needed with respect to the control with any treatment philosophies and the appliance systems that are currently available. The torque control should be maintained from initial stages of the treatment in order to move the teeth to their finished positions which begins soon after the placement of brackets and the first arch-wires. With the help of torque, a gradual flow towards the finishing stage is achieved with lesser work required towards the end. However, future research and the development of product should be directed towards the improvement of current knowledge and also the armamentarium for this purpose so that the goals of orthodontic treatment namely obtaining the functional occlusion, esthetics, and the stability are attained at their very best.

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