

Editorial

OCCLUSION REVISITED

The evaluation of occlusion is of utmost importance, when planning for dental and orthodontic treatment. The occlusal characteristics of normal occlusion change according to the dentoalveolar maturation stages. In primary dentition, flush terminal plane relationship of the second primary molars is desired for a normal molar relationship. In the early mixed dentition stage, cusp to cusp molar relationship is the normal occlusal feature, when posterior primary teeth are in place and leeway space is preserved.

In modern orthodontics, the concept of normal occlusion was first postulated by Edward H Angle who stated that upper first molar teeth were the key of occlusion. According to this concept, if correct molar relationship exists, that is upper first molar's mesiobuccal cusp occludes into the buccal groove of the lower first molar and the teeth are arranged on a smoothly curving line of occlusion, then normal occlusion would result. Angle's line of occlusion refers to the line that passes through the central fossae of upper posterior and cingulum of anterior teeth when in contact with the buccal cusps of mandibular posterior teeth and incisal edges of anterior teeth respectively. Angle described three classes of malocclusion in 1890s, based on the occlusal relationships of the first molars as class I, class II and class III. This classification is still used today, as it is a simple and practical way of defining occlusion.

In 1970, Andrews studied the dental models of 120 subjects with normal occlusions and put forward the six keys of normal occlusion. Andrews' six keys of occlusion are molar interarch relationship, mesiodistal crown angulation, labiolingual crown inclination, absence of rotation, tight contacts and curve of spee. Andrews stated that these six keys are essential for a complete and proper occlusion. The first key, molar interarch relationship, is not very different from Angle's definition except that Andrews emphasized the distal marginal ridge of the upper first molar must be occluded with mesial marginal ridge of lower second molar. The second key defines the angulation of teeth by using the facial axis of the clinical crown, when occlusal area of the teeth is mesial than their gingival part, it is known as positive crown angulation. According to the third key, distal or mesial view determines the crown inclination. Positive crown inclination occurs when the gingival area of crown is lingually placed than the occlusal part. In fourth key, absence of rotation characterizes normal occlusion. Fifth key states that there should be tight contact between adjacent teeth. And lastly, normal occlusal plane must have a flat or a slight curve of spee.

It is known that occlusion has also dynamic components and associated with the temporomandibular joints and elevator muscles. Okeson defined the optimum functional occlusion criteria and can be summarized as optimal orthopedically stable joint position, all tooth contacts providing axial loading of occlusal forces, when the mandible moves into laterotrusive positions canine guidance is desired, when the mandible moves into a protrusive position anterior tooth guidance should be present and when the patient is in upright position posterior tooth contacts are heavier than anterior tooth contacts. These criteria, as a clinical guide during clinical procedures, are essential for dental health of the patient.

On the other hand, long-term stability of treatment results needs knowledge of normal dentoalveolar development. As Thilander stated normal arrangement of teeth and their supporting tissues are subject to continuous changes of the dental arches that occur from the primary until the adult period with individual variations. These changes are primarily the biological migration of the dentition and continuous eruption of the teeth due to vertical alveolar development. These factors may affect the treatment plan and stability of orthodontic treatment as well as the success of the implant treatment in the long-term.

REFERENCES

1. Proffit WR, Fields HW. Contemporary Orthodontics. Mosby 2000.
2. Graber TM, Vanarsdall RL. Orthodontics Current Principles and Techniques. Mosby, St Louis, Missouri 2000.
3. Andrews LF. The concept and the appliance. San Diego: LA Wells Co 1989.
4. Okeson JP. Management of temporomandibular disorders and occlusion. Mosby, St Louis 2003.
5. Thilander B. Dentoalveolar development in subjects with normal occlusion. A longitudinal study between the ages of 5 and 31 years. Eur J Orthod 2009; 31:109-120.

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