

The Use of Bite Force in Malocclusions Interception

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<p>Received 12-03-2022</p>	<p>Abstract: The aim of this paper is to highlight the use of children masticatory muscles in the interception of involving malocclusions. The vertical force produced by these muscles is known as bite force and it can be used for diagnosis and treatment at the same time.</p>	<p>Keywords: Teeth, Bite, Malocclusions.</p>
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INTRODUCTION

Malocclusions are defined as developmental conditions where there is a deflection from the normal relation or alignment of the teeth to other teeth in the same arch and/or to the teeth in the opposing arch (1). A large-scale survey in the United States found that approximately 15% of subjects had severe malocclusion that could affect social acceptability or function (2). This rate can be higher in some countries depending on genetic and/or environmental factors. As an example, in a report of Algerian public health institute, the estimated prevalence of dento-facial abnormalities is 65% in 12 years-old children (3). The old orthodontic care that usually treats children after 12 years old with fixed appliances can't take in charge anymore all these health care demanders. This issue is becoming a highly challenging situation for care systems especially speaking in low income countries. So, new thoughts must be undertaken in order to find solutions for the high orthodontic care demand. The aim of this paper is to highlight the use of children masticatory muscles in the interception of involving malocclusions. The vertical force produced by these muscles is known as bite force and it can be used for diagnosis and treatment at the same time.

BITE FORCE AND MALOCCLUSIONS

From infancy, through childhood and adolescence and old age, considerable changes take place in the quality and quantity of skeletal muscles (4). The muscles as masseters, medial pterygoids and anterior temporalis are known to be strong jaw elevators and they assume the same changes of skeletal muscles. These muscles generate a highly strong force called "bite force" (Fig 1).

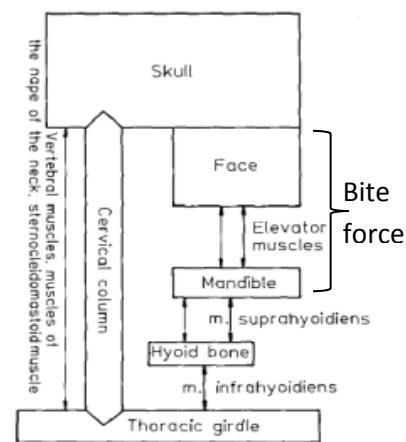


Figure 1 : The place of bite force in the head and neck forces system

Braun et al. stated that the bite force has a potential influence on the development of the masticatory complex (5). It has been positively correlated with facial transverse dimensions in growing children (6). In some malocclusions, the bite force was about the half of the normal subjects (7). At the same time, old reports found the bite force can be improved by chewing exercises (8). Recently Shirai et al. reported that a gum chewing exercise could be effective in improving masticatory muscle performance in young adults (9). But few studies investigated the long term effect of chewing exercise and bite force improvement on malocclusions interception.

In my clinical practice, the improvement of bite force by masticatory muscles squeeze exercises on a soft occlusal plane is found to be effective in growing number of cases. The use of this approach is more effective in during bicuspid eruption process from 9 to 11 years-old. Even if it needs the compliance of parents and children for the squeeze exercises, the impact of bite force

improvement on malocclusions is spectacular (Fig 2).



Figure 2: Clinical case treated by bite force exercises

In this context of diagnosis and treatment, the evaluation of bite force is key information (Fig 3). The first response for the squeeze exercises on soft occlusal plane is the improvement of bite force which must be evaluated before and after exercises. The second response to exercises will take more time to be noticed and evaluated (clinically and cephalometrically). This response is represented by malocclusion improvement.



Figure 3: Bite force measurement usually practiced in my office

DISCUSSION

A recent study confirmed the impact of bite force on the vertical and transversal dimensions of 8 to 12 years old children in Algeria (10). In this study, higher dimensions have been found correlated to higher bite forces. But the use of bite force in malocclusions management needs high quality studies about the long term effect of bite force improvement on malocclusion interception in the evidence based medicine era. These studies must deal mainly with two issues. First of all, the factors influencing bite force value must be made clear such as ethnicity, gender, age, physical characteristics, tooth decay and periodontal diseases in order to assess and to treat the eligible patients. The second issue is to use reliable methods to check bite force improvement during exercises before the clinical improvement of malocclusions. Several methods have been used

to evaluate bite force and masticatory muscles status such as gnathodynamometers (11). The use of these devices is advantageous because it can be easily made in any dental office and depending on the brands, all the records can be stored in digital formats.

In addition to bite force produced by elevator muscles, the soft occlusal plane is important to prevent temporomandibular joint (TMJ) damages during exercises. In the practice, silicone-made planes are very effective for exercises and TMJ protection.

Finally, I find it important to notice that the improvement of bite force during growth allows functional occlusal contacts to be developed which is a key factor to avoid relapse. In the other hand, this kind of treatment is really cost effective and can be used in a large scale.

CONCLUSION

This review aims essentially to report early findings on bite force and the possibility of its improvement through muscles plasticity. Authors reported also, impact of this force on jaws and malocclusions. Thus, the clinical findings confirm the link between the improvement of bite force and malocclusions signs. Large scale studies are needed to confirm this impact on malocclusions and this will be a real breakthrough in orthodontics.

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