

# Is there a Relation between Crossbite and/or an Open bite, Static Postural Behaviour, and the incidence of Non-Traumatic Injuries in young athletes?

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## BACKGROUND

Many studies suggest there is a close relationship between stomatognathic system and posture, and that crossbites (CB) and open bites (OB) are malocclusions which may influence other human body structures capable of changing the athlete's static posture and balance capacity. This condition can promote the occurrence of Non-traumatic sports injuries (those which occur without the intervention of any external factors).



Unilateral Posterior Crossbite



Anterior Open Bite

## OBJECTIVE

- ✓ Firstly, this work aims to study if the presence of CB and/or OB change the static postural behaviour when compared to individuals without the presence of these malocclusions;
- ✓ the second goal of this study relies on analyzing if a change of an athlete's static posture is related to a higher incidence of Non-traumatic Injuries (assuming that the presence of CB and/or OB affects the posture/balance);

## METHODS

With the purpose of observing the presence of CB and/or OB an intra-oral evaluation was preceded in young athletes, of football and basketball, between the ages of 11-19 years old. After we measured the static postural behaviour with a posturographic platform – *RsScan footscan*. The posturographic variables analyzed were Area (mm<sup>2</sup>) of Centre of Pressure (CP), CP's total Distance (mm) and the distribution of anterior-posterior and medial-lateral plantar pressure, for a period of 20 sec. It was also applied a questionnaire to assess the occurrence of Non-traumatic Injuries for each athlete.



Posturographic platform – *RsScan footscan*

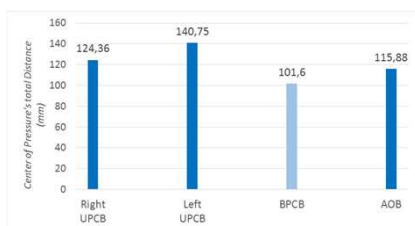
## RESULTS

This study's sample involved 166 athletes (124 males), of which 29 (17,5%) presented CB and/or OB (11 Right Unilateral Posterior CB (Right UPCB); 4 Left UPCB; 5 Bilateral Posterior CB (BPCB); 1 Anterior CB (ACB); 8 Anterior OB (AOB)).

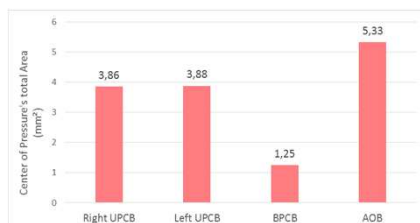
We observed that all participants with BPCB reported having experienced at least one Non-traumatic Injury and that CP's total Distance of BPCB's athletes was significantly lower than athletes with Right ( $p=0,043$ ) and Left ( $p=0,007$ ) UPCB (graphic 1). The CP's Area of athletes with BPCB it was also lower than all other CB/OB groups (graphic 2). These findings can be justified because since the presence of an UPCB promotes a unilateral chewing to the side of CB, this can cause an asymmetric activation of the masticatory muscles that causes an imbalance in growth and an uneven skeletal development between the left and right sides of the jaw. This can lead to postural changes through the muscle chains that may cause asymmetry in the whole body.

We didn't find any association between the presence of CB and/or OB and the analyzed posturographic variables when compared with individuals without CB and/or OB. This can be justified because postural control behaviour is also dependent on visual and vestibular systems, which can compensate for balance problems related to somatosensorial system, even more in individuals that practice regular physical activity.

Regarding the incidence of Non-traumatic Injuries, in this sample, we didn't identify any significant difference amongst these two groups but we observed that BPCB appears to influence a greater predisposition for this events, because all this athletes referred at list one non traumatic lesion and his group had a lower CP's Area and Distance – lower oscillation can be associated to a higher rigidity that can lead to a higher risk of injuries.



Graphic 1. Relationship between the mean value of Center of Pressure's total Distance and Crossbites/Open bites.



Graphic 2. Relationship between the mean values of Center of Pressure's total Area and Crossbites/Open bites.

## CONCLUSION

The CP's Total Distance was significantly inferior in athletes with BPCB than with Right and Left UPCB. It was observed BPCB appears to influence a greater predisposition for the incidence of Non-traumatic Injuries, even though these data should be confirmed in future studies.

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