

Influence of intensive training on salivary flow, on salivary pH and on salivary lactate concentration: consequences for oral health

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Introduction: During physical activity lactate concentration increases in blood and it is excreted into the saliva ^[1]. Moreover, if there is not a fluid reestablishment, a dehydration status may be achieved and in combination with oral breathing it can reduce saliva's volume ^[2]. In addition, during exercise there is a stimulation of sympathetic nervous system, which induces changes on saliva's composition and volume ^[3]. Altogether, these factors decrease saliva's functions and increase the risk of dental erosion and caries. The association of physical exercise with the consumption of a diet rich in carbohydrates and acidic substances, which also lead to decrease of saliva's pH, further increases the dental erosion and caries risk ^[4]. The objective of this work was to determine whether intensive physical exercise influences variables related to saliva (flow, pH and lactate concentration) and if there is a relationship between body water and salivary variables and prevalence of dental erosion and caries; In addition, we want to determine how athletes perceive the relationship between physical activity and oral health.

Methodology: This observational study comprised a convenience sample of 30 athletes, 18 male and 12 female, aged 18 – 40 years, selected from 3 sports clubs. The athletes were observed before and immediately after a session of intensive training. A questionnaire about oral health, nutrition and physical exercise, an intraoral clinical examination, an anthropometrical evaluation to characterize body composition and a collection of not stimulated and stimulated saliva samples were undertaken. SPSS software was used for statistic analyse, included t-student test, wilcoxon test and non-parametric correlations.

Results and Discussion: We observed for just a few athletes a decrease in not-stimulated salivary flow justified because of the possible combination among stimulation of sympathetic nervous system, dehydration status and oral breathing ^[2, 3]. On the contrary, a small increment in not-stimulated saliva's pH was monitored in some athletes. The increase of saliva's pH may be a consequence of the decrease in salivary flow ^[4]. However, the changes observed were not higher than 0,5 and, in any case, decrease to 5.5, the critical pH for dental demineralization ^[5]. These data is in agreement with the relationship found between saliva's pH (both not-stimulated and stimulated) and low incidence of dental caries among these athletes. Dental caries is a multifactorial disease so not depending only on saliva's pH and flow ^[5]. A similar relationship was found with lactate concentration probably because the in these athletes is associated with neutral salivary pH and constant salivary flow which neutralize the acid effect ^[5]. There wasn't a relationship between the total body water percentage before and after training and the salivary flow.

The athletes don't have a real perception concerning their own oral health, however they recognized its importance and the influence on sports performance.

Conclusion: Although it is known that intensive training may affect some salivary variables (flow and pH), we found a higher variability among athletes after training. More studies are needed to better characterize this relationship.

References:

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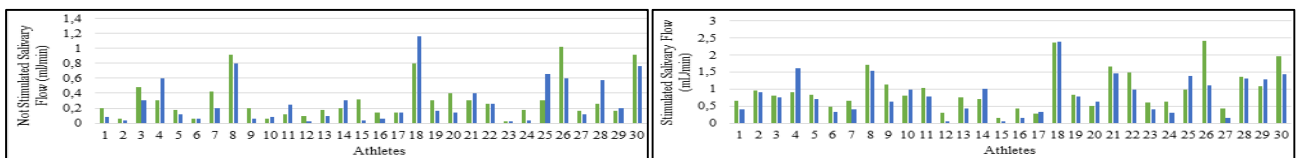


Figure 1 and 2. Comparison between Not Stimulated Salivary Flow (Figure 1) and Stimulated Salivary Flow (Figure 2) before training (Green) and after training (Blue)

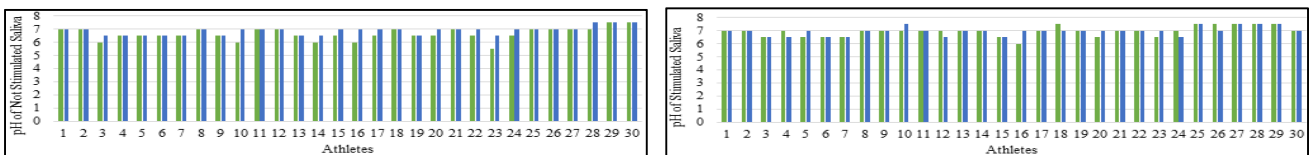


Figure 3 and 4. Comparison between pH of Not Stimulated Saliva (Figure 3) and pH of Stimulated Saliva (Figure 4) before training (Green) and after training (Blue)

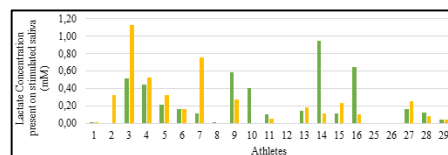


Figure 5. Comparison between lactate concentrations present on stimulated saliva before training (Green) and after training (Yellow)