



# THE EFFECT OF THE SYMPATHETIC NERVOUS SYSTEM AND DEHYDRATION ON SALIVARY LACTATE CONCENTRATION

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## INTRODUCTION

Measuring of salivary lactate (SL) level is a possible new method to determine training efficiency. The aim of this study was to investigate the correlation between salivary and blood lactate (BL) concentration in athletes (SG) and non-athletes (NG) after maximal exercise, and to determine the possible differences in RR-variability and total body water on SL.

## RESULTS

In SG we registered two SL peaks at different time points (SG: 1 min and 8 min, NG: 4 min and 12 min) in NG group we found high individual differences among subjects. Pearson correlation analyses between BL and SL concentration showed significant correlation in both groups. We noted relationships between several measured parameters (SL - TBW, SL - RR-variability, maximal SL - maximal heart rate during exercise).

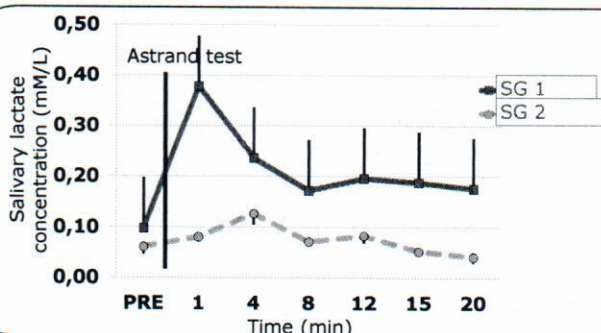


Figure 2: Salivary lactate concentration in SG

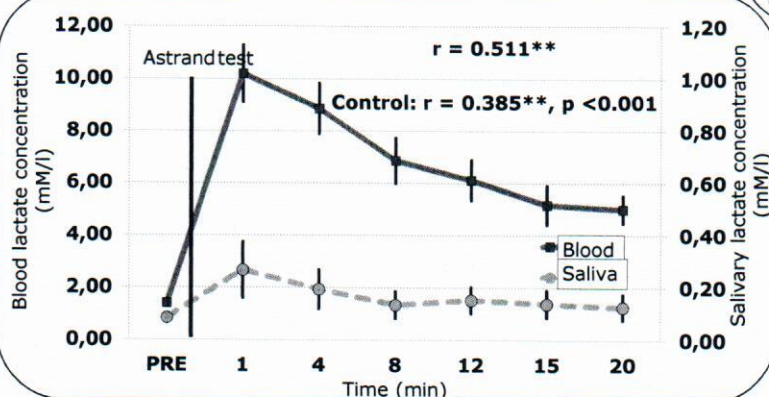


Figure 3: Salivary and blood lactate concentration is significantly correlated in athletes

## DISCUSSION

According to our results hydration status and the function of autonomic nervous system affect post-exercise salivary secretion.

## MATERIALS AND METHODS

Sixteen volunteers (22.80±3.18yrs) performed a maximal Astrand treadmill test. Before and after the exercise saliva and blood samples were collected and SL content was assessed with spectrophotometric analyses. BL concentration was measured from fingertips with a portable lactimeter. Anthropometric characteristics, body composition (total body water -TBW-, body fat percent) and physiological parameters (RR-variability, HR) were assessed before the test.

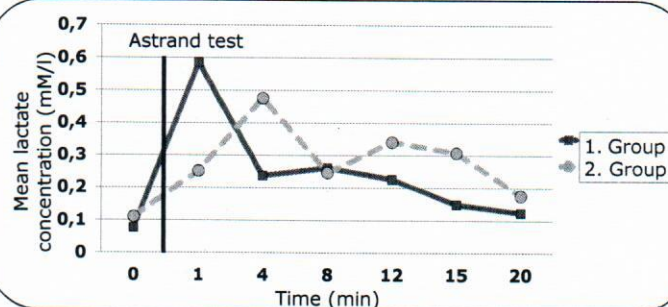


Figure 1: Pilot study: Salivary lactate concentration in athletes (two type of lactate curve)

|        | Athletes     |               | Control      |               |
|--------|--------------|---------------|--------------|---------------|
|        | BLOOD (mM/L) | SALIVA (mM/L) | BLOOD (mM/L) | SALIVA (mM/L) |
| PRE    | 1.41±0.08    | 0.09±0.01     | 1.34±0.13    | 0.11±0.02     |
| 1.min  | 10.20±1.08   | 0.27±0.11     | 11.20±0.63   | 0.34±0.08     |
| 4.min  | 8.86±0.96    | 0.19±0.07     | 10.81±0.53   | 0.33±0.04     |
| 8.min  | 6.86±0.86    | 0.13±0.05     | 10.03±0.75   | 0.29±0.06     |
| 12.min | 6.11±0.77    | 0.15±0.05     | 9.31±0.92    | 0.32±0.07     |
| 15.min | 5.16±0.74    | 0.14±0.05     | 7.98±0.84    | 0.27±0.06     |
| 20.min | 5.00±0.52    | 0.13±0.05     | 7.30±0.95    | 0.26±0.06     |

Table 1: Blood and salivary lactate level pre- and post-exercise

| Variables                  | Athletes         | Control         |
|----------------------------|------------------|-----------------|
| Training volume (h/week)   | 15.9±2.78**      | 1.69±0.87**     |
| Test time (min)            | 19.14±1.31**     | 9.21±1.44**     |
| Body fat (%)               | 9.36±1.93*       | 19.31±3.99*     |
| Fat mass (kg)              | 5.58±1.01*       | 13.53±3.22*     |
| Total body water (%)       | 64.75±1.56*      | 56.63±2.62*     |
| VLF (ms2)                  | 3342.61±1152.26* | 124.42±31.78*   |
| LF (ms2)                   | 1393.72±316.25*  | 35.73±10.16*    |
| HF (ms2)                   | 575.31±240.90*   | 4.72±2.05*      |
| LF/HF ratio                | 334.15±45.53**   | 951.09±120.48** |
| Number of heart beats      | 913.50±86.97**   | 447.75±12.97**  |
| Mean RR (ms)               | 347.00±29.09**   | 673.88±18.88**  |
| HRmin (during test, bpm)   | 67.63±4.88*      | 89.88±6.93*     |
| HR (1 min after test, bpm) | 132.13±4.14*     | 146.00±5.11*    |

Table 2: Differences between the two group