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**Impaired autonomic nervous system innervation has an impact on the mucosal immune response to exercise in wheelchair athletes**

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**Introduction:** It is well known that saliva composition and secretion of sIgA can be modified by both parasympathetic and sympathetic nerve stimulation. As persons with tetraplegia represent a model with no centrally mediated sympathetic nervous control, it was of particular interest to examine the effects of level of spinal cord injury. Therefore, the purpose of this study was to examine salivary secretory immunoglobulin A (sIgA) responses and α-amylase activity following constant load and intermittent exercise in elite wheelchair athletes with varying levels of disability.
Methods: Twenty-three wheelchair athletes divided into three groups (8 tetraplegic (TETRA), 7 paraplegic (PARA) and 8 non-spinally injured (NON-SCI) performed two randomised and counterbalanced 60-min bouts of exercise on a treadmill. These consisted of a constant load (60% peak oxygen uptake ( $\dot{V}O_{2peak}$ )) and an intermittent (80% and 40% $\dot{V}O_{2peak}$ ) exercise bout. Timed, unstimulated saliva samples were obtained pre, mid, post, and 30 min post exercise and analysed for sIgA and α-amylase. Furthermore, oxygen uptake, blood lactate concentration and rating of perceived exertion (RPE) were measured during both sessions.
**Results:** SIgA secretion rate and α-amylase activity were increased during exercise in all groups ($p<0.05$). However, the increase of sIgA secretion rate during exercise was greater in TETRA individuals (post exercise average data for both trials in comparison to pre: TETRA +60±31%, PARA +30±35%, NON-SCI +11±25%, $p<0.05$). Yet, groups were comparable with respect to the α-amylase response, blood lactate concentration and RPE for both conditions.
**Discussion:** The disruption of autonomic salivary gland innervation in TETRA athletes seems to result in an altered sIgA response. However, their ability to increase sIgA secretion rate is comparable with wheelchair athletes with intact autonomic salivary gland innervation. This may stem from sympathetic reflex activity during exercise and/or a predominant contribution of parasympathetic activity to increase sIgA, as these are still intact systems in the TETRA population. The similar α-amylase responses between groups indicate that α-amylase may not be suitable to be used as a biomarker for sympathetic central drive. Finally, these results support the positive role of acute exercise on oral immune function in wheelchair athletes independent of disability type.