Changes on Human Urinary Glycosaminoglycans Pattern in High Performance Athletes


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During cartilage turnover many partially degraded matrix metabolites, like glycosaminoglycans (GAGs) are released on synovial fluid, where they may be recycled or excreted on urine. Sports that subject joints repeatedly to high levels of impact and torsional loading increase the risk of injury. The aim of the present study was analyze volleyball athletes’ urinary glycosaminoglycans comparing to a control group. GAGs were extracted and purified by ion exchange chromatography from urine samples in athletes (n=23) for five months, twice a week, and a single sample of control group (n=43), and analyzed by agarose gel electrophoresis on PDA buffer. Training loads were measured every day according to Foster’s scale. The athletes were between 17 and 29 years old (22.08±3.49), 67.5 and 101.3 kg (85.69±11.56) and 1.70 and 2.12 m (1.90±0.09) with mean body mass index (BMI) 23.70 kg/m². Chondroitin sulfate (CS), dermatan sulfate and heparan sulfate were found in urines. Athletes presented lower CS/creatinine excretion than control group both before (p<0.001) and after (p<0.001) the volleyball season and if considering the same age range. There was major changes on excretion according to different training loads during the experiment but after the complete season the urinary CS/creatinine returned to the initial pattern (p=0.999). Age and BMI did not changed cartilage effects of training during the experiment. These observations support the idea of an adaptation of athletes group to their life style, even after a long period of sport practicing.

Keywords: Extracellular matrix, Glycosaminoglycans, Exercise.