

FIGUEIREDO, Flavia Albuquerque. *Serum leptin levels and their relation to body composition in physically active and non-active spinal cord injured individuals* 2011. 60 p. Dissertation (Master Degree in Food, Nutrition, and Health) – Nutrition Institute, State University of Rio de Janeiro, Rio de Janeiro, Brazil 2011. *Advisors:* Josely Correa Koury e Magna Maria Cottini da Fonseca Passos.

Abstract

The life expectancy of individuals with spinal cord injury (SCI) has increased in the past decades, even though changes in their metabolism, hormones, and body composition favor an increased risk of developing cardiovascular disease (CVD), obesity, and type 2 diabetes mellitus. Individuals with SCI have reduced activity of the sympathetic nervous system and reduced concentrations of catecholamines, which inhibit lipolysis and favor increased fat mass. The accumulation of fat, especially abdominal fat, leads to increased serum levels of leptin and C-reactive protein (CRP), and it may also alter the concentrations of thyroid hormones and TSH. Furthermore, urinary tract infections and infected pressure ulcers may also contribute to increased concentrations of CRP in spinal cord injured individuals. Increased serum levels of CRP and leptin are independent predictors for CVD. Physical activity (PhA) has beneficial effects on motor and muscle functions, and on the lipid profile in chronic post-injury, besides playing an important role in reducing body fat and the risk of chronic diseases and of systemic inflammation. Studies relating this topic to spinal cord injured individuals are still rare. The objectives of this study were to compare serum levels of leptin in physically active (PA) and non-active (NA) spinal cord injured individuals, and assess their relationship with body composition and concentrations of TSH, T3, T4 and CRP, since these factors are considered to directly affect the serum levels of leptin. The study included 22 individuals with cervical SCI (C5-C7) divided into PA (n = 13) individuals who had started PhA 3 months before that, .3 times a week, totaling 150 minutes / week, and NA (n = 9). Body composition was determined by Dual-emission X-ray absorptiometry. Blood samples were collected after 12-hour fast to determine serum leptin, TSH, T3, T4 and CRP. PA individuals had lower total body mass (p = 0.02), fat mass (in kg, p.0.001 and in percentage, p.0.001) and BMI (p = 0.004). A positive relationship between serum levels of leptin and fat mass (kg) was noted most significantly only when the entire group was taken into account (n = 22, r = 0.78; p.0.001).

When NA individuals were highlighted, the power of association reduced ($r = 0.67$, $p = 0.05$), and when PA individuals were isolated, the relationship was lost ($r = 0.36$, $p = 0.22$). Serum levels of TSH and thyroid hormones were similar, but the levels of leptin ($p.0.001$), as well as CRP levels ($p < 0.04$), were lower for the PA group. Our results suggest that regular PhA provides better body composition with reduced fat mass, total body mass, and BMI, and reduced serum levels of CRP and leptin, possibly contributing to reduce chronic disease risk, especially CVD, which are the major cause of mortality among these individuals. Leptin was positively correlated with fat mass, when the entire group was tested, and only NA individuals, suggesting that there is an unexplained mechanism on which active spinal cord injured individuals maintain the same behavior as uninjured individuals, with regard to disruption of leptin and fat mass relationship.