GH responsiveness before and after a 3-week multidisciplinary body weight reduction program associated with an incremental respiratory muscle endurance training in obese adolescents.

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Several studies have demonstrated that the obesity-related hyposomatropism is usually reversible after a consistent weight loss induced by diet and/or bariatric surgery. Recently, a single bout of respiratory muscle endurance training (RMET) by means of a specific commercially available device (Spiro Tiger®) has been reported to induce a marked GH response in obese adults, its GH-releasing effect being significantly lower in obese adolescents. The GH response disappeared in both obese adults and adolescents when RMET was repeated at 2-h intervals inbetween. The aim of the present study was to evaluate GH responses to repeated bouts of RMET administered before and after a 3-week in-hospital multidisciplinary body weight reduction program (entailing energy-restricted diet, 90 min/daily aerobic physical activity, psychological counseling, and nutritional education) combined with a progressively increasing RMET (15 daily sessions, 5 sessions per week) in 7 obese male adolescents [age: 12-17 years; body mass index (BMI): 38.5±3.1 kg/m^2; percent fat mass (FM): 37.0±2.0 %]. Blood samplings for GH determinations were collected during the 1st and 15th sessions, which were composed of 2 consecutive bouts of RMET (of identical intensity and duration) at 2-h interval in-between. At the beginning of the study, baseline GH levels significantly increased after the first bout of RMET in all subjects ($p < 0.05$). The administration of the second bout of RMET resulted in a significantly lower ($p < 0.05$) GH increase in comparison with the first one. Three weeks of the integrated intervention significantly reduced both body weight (from 115.3±9.2 kg to 111.5±8.7 kg, $p < 0.05$) and FM (from 43.1±5.7 kg to 41.9±5.3 kg, $p < 0.05$), these combined effects being, however, not sufficient to influence GH responsiveness to the 2 repeated bouts of RMET (GH peaks to the first bout: 4.8±1.6 ng/ml vs. 4.8±1.6 ng/ml; GH peaks to the second bout: 0.9±0.2 ng/ml vs. 1.1±0.1 ng/ml, before and after 3 weeks of the treatment, respectively, p = NS). In conclusion, a 3-week incremental RMET combined with a body weight reduction intervention does not seem useful to positively influence the reduced GH responsiveness to 2 repeated RMET bouts in obese adolescents. More intensive and/or long-term RMET protocols, associated with energy-restricted diets, determining more consistent changes in body composition, are likely needed to restore the impaired GH-IGF-1 function of obese adolescents.