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Impact of resistance and endurance training on ghrelin and plasma leptin levels in overweight and obese subjects

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ADMINISTRATIVE INFORMATION

Support - NA.

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INTRODUCTION

Review question / Objective How does resistance and endurance training influence ghrelin and leptin plasmatic levels in overweight and obese subjects?

Rationale There is a need for updated practice recommendations on exercise in managing overweight and obesity in adults. The body seeks to achieve homeostasis through the process of energy balance. Without giving daily thought to their calorie intake and output, most people live most of their lives within the same weight range. Energy output (non-exercise thermogenesis + exercise) vs energy intake (eating and drinking) is the two-part equation for maintaining weight. According to many international associations, such as the American Academy of Clinical Endocrinologists and the National Academy of Nutrition and Dietetics, exercise is crucial to any weight loss program. Exercise and physical activity are frequently used synonymously. But when adequately defined, exercise is organized, structured physical activity, whereas physical activity is any movement that results in energy expenditure. Exercise is linked to better cardiovascular fitness, insulin sensitivity, type 2 diabetes glycemic management, blood pressure, and depression scores, according to research. However, does exercise itself aid in attempts to lose and maintain weight?

Condition being studied Obesity is a medical condition with increased incidence in the general population and linked to many other pathologies. Understanding the effects of resisting training exercise programs on fasting/postprandial levels of appetite hormones and subjective appetite sensations in overweight and obese individuals

can help us understand the mechanisms of loosening weight and also understand why, in the case of some categories, the exercise does, not determine a loose weight. Also, it is important to find arguments for motivating people and discovering new therapies that have to go together. In this respect, epidemiology, clinical practice, and fundamental sciences have a common goal.

METHODS

Search strategy The research was conducted across several significant databases, using the operators "AND," "OR," and "ghrelin" OR “leptin” OR "appetite-related peptides" OR "gastrointestinal peptides" OR "gastrointestinal hormones," the following essential phrases were added and combined: ("exercise" OR "acute exercise" OR "chronic exercise" OR "training" OR "physical activity" OR “endurance training” OR “resistance training”). A relevant study was also found in the full-text publications' reference lists and by searching related articles and citations in the PubMed database.

Participant or population Overweight or obese subjects who followed a specific type of physical activity.

Intervention The reviewed studies measured ghrelin and leptin response to acute or chronic physical exercise with variables regarding the kind, frequency, intensity, and length of exercise/ training. Multiple exercise types, intensities, or durations were used in the trials: aerobic, resistance, intermittent or combination.

Comparator The control groups did not follow a specific physical activity.

Study designs to be included Full-text papers were evaluated where abstracts suggested they should be included. Relevant data, such as sample size, participant characteristics (e.g., sex, age class, body mass phenotype, level of fitness/ training, health condition), exercise modality (e.g., acute, chronic), type (e.g., aerobic, resistance, intermittent, combined), intensity (e.g., moderate, intense), duration, and analytical characteristics (e.g., ghrelin form detected, method of analysis, precision) were extracted for each eligible study.

Eligibility criteria Studies were considered included if they met the following requirements: (1)had been written in English, in a peer-reviewed journal; (2) included individuals of any gender, age, overweight or obese, level of physical fitness, and health; (3) used physical exercise as a stand-alone intervention or in conjunction with other interventions; (4) applied resistance or endurance training using exercises of varying kinds, intensities, and duration; and (5) included a minimum of two measurements (pre- and post-exercise/training) of ghrelin, regardless of the form found.
The following criteria were used to rule out studies: (1) they were not reviews, case reports, comments, opinions, or editorials; (2) they applied an intervention without any physical exercise; (3) they did not provide information about the type, intensity, frequency, or duration of the exercise or training; (4) they used exogenous ghrelin administration; or (5) they involved animals.

Information sources The research was conducted across several significant databases, including PubMed, Scopus, EBSCO Host, Google Scholar, Academic Search Premier, ScienceDirect, and Springer-Link. In addition, a relevant study was found in the full-text publications' reference lists and by searching related articles and citations in the PubMed database.

Main outcome(s) Numerous studies have demonstrated a close and primary association between ghrelin and leptin as hormones that regulate appetite, and exercise, particularly long-term or high-intensity exercise.

Additional outcome(s) Until now, there is no firm evidence to use ghrelin and leptin as a pharmacologic therapy in obesity.

Data management The literature search found 327 records. After screening complete texts, abstracts, and titles, 54 pertinent papers were found and added to the final analysis.

Quality assessment / Risk of bias analysis Two writers independently assessed the titles from the above-described literature search. Any differences in opinion between the two writers about the choice of studies or the data extraction process were settled by discussion and agreement between all the authors.

Strategy of data synthesis A systematic review was conducted because of the significant heterogeneity of the included studies concerning the type of ghrelin found, participant characteristics, and activity. 54 studies emerged after applying the inclusion and exclusion criteria. Each study was analyzed regarding participants, type of exercise, ghrelin or leptin measured, results.

Subgroup analysis Subgroup analysis regarding age, gender, comorbidities was performed.

Sensitivity analysis The type of sensitivity analysis used was as-treated analysis in which participants were analyzed according to the protocol they actually followed.

Language restriction The requirement for inclusion was that the studies had to be written in English.

Country(ies) involved Romania.

Keywords ghrelin; leptin; appetite-related peptides; exercise; training; physical activity; overweight; obesity.

Contributions of each author

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