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Physical Activity Its Effects on Health

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Editorial

Physical activity has important effects on the health of people, it should be understood that the lack of this is negatively associated with health effects, increasing morbidity and producing an increased risk of premature death. It has been observed that the lack of regular physical activity is associated with:

1. An increase in the prevalence of non-communicable chronic diseases
2. Increased risk of premature death
3. Decrease in the size of the skeletal muscle
4. Reduced muscle capacity to oxidize carbohydrates and fats
5. An increase in insulin resistance
6. Lower vasodilation capacity of the coronary arteries
7. Lower maximum cardiac output
8. Sarcopenia.

Physical activity has important physiological effects that affect all the cells and tissues of the body in different ways depending on the intensity and type of activity, varying in people by their genetic, epigenetic, sex, age, environment, nutrition and condition physical.

Recent publications show the following biochemical and physiological responses of the exercise [1] at the systemic level that help to prevent the disease and promote the health of people who practice regular physical activity and can be seen in the following (Table 1) [2].

There is an enormous amount of benefit that impacts on better health and recovery of physical and mental pathologies in people who perform some type of physical activity without side effects.

Physical activity as analgesic treatment

Physical activity also plays an important role in the treatment of pain, although it has always benefited the pharmacological treatments, I personally believe by its ease of use, because the treatments based on the activity require an adaptation exercise, a routine of activity based in the intensity and continuity of physical activity that patients must pass. At this point we will comment on the effects of physical activity on pain, and the characteristics that this physical activity must have in order to be an effective treatment for chronic pain.

Studies in this regard show that; hypoalgesia is greater during the execution of the exercise by isometric contraction than after. [3]; also other studies have found that there is a decrease in acute pain after inducing ischemic pain for 30 min. After performing high intensity aerobic exercise [4]. In addition, some more recent investigations have shown that the same thing happens with other stimuli, for example 30 minutes of exercise as a race to 75% of the maximum oxygen volume (VO2 max) there is a decrease in pain before stimuli to painful pressure but not to thermals [5].

Respect to the differences of the effects according to the experimental pain, the authors concluded that; the same type of exercise may vary its results depending on the type of experimental pain used and this variability may be due to the fact that exercise produces a systemic increase in temperature [6].

In general terms, exercise produces a hypoalgesic systemic response that is not localized exclusively in the area that is exercised locally [7-9] although the greater hypoalgesia is localized. In the limb used during exercise, when compared with the contralateral and with the distal muscles at rest.

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Table 1: Practice regular physical activity and can be seen in the following table.

Physiological Response	Action
Genetic changes skeletal muscles	Activation AMPK (Protein kinase activated by AMP) to change fibers in skeletal muscle
Changes in oxidative muscular, cerebral, renal and adipose tissue	Mitochondrial biogenesis
Muscle hypertrophy	Active mitochondrial biogenesis, kinases and phostases are also activated to mediate exercise response
Regulation cellular functions	Relationship ATP-ADP
Activates endothelial, neuronal and cardiac progenitor cells	
Muscular angiogenesis	Release of reactive oxygen species
Antioxidant	Activates antioxidant enzymes
Repair myocardial damage	Mediated by circulating angiogenic cells
Myogenesis and muscle remodeling	Through growth factors, cytosines and metallopeptatases
Muscle adaptations of glycogen content	Increases the activity of key enzymes in β-oxidation
Increase anti-inflammatory cytokines	
Anti-obesogenic effect	Mediated IL-15
Repair and maintenance of motor neurons	Mediated by the neurotrophic factor derived from the brain (BDNF)
Prevents colon cancer	Mediated by secreted acid protein and rich in cysteine
Decreased depression and psychological stress	Mediated by the expression in the musculoskeletal kynurenina aminotranferase that accelerates the consumption of kynurenine in kynurenico acid

In conclusion, it can be inferred that moderate aerobic exercise (70% of maximum oxygen consumption) performed regularly for at least 30 minutes per day reverses hypersensitivity due to an increase in endogenous opioids [10,11], suppresses the excess of substance P and cytokines in the dorsal root ganglion [12], activating pain inhibitory pathways at the central level and managing to modulate the perception of pain. This is how people who perform physical activity consistently have increased threshold and tolerance to pain [13].

Although exercise induces endogenous analgesia, some patients with D, especially patients with fibromyalgia, have a dysfunction in the stress response system due to an alteration of the hypothalamic-pituitary-adrenal axis [11], which is why Exercise can increase pain on some occasions.

In relation to the application of physical activity as an analgesic treatment in some pathology, the effect of isometric contractions was shown in subgroups of women with fibromyalgia [14]. And in other clinical pictures that present with chronic pain such as osteoarthritis, a review has concluded that there is sufficient evidence to say that it does not cause or accelerate this pathology, on the contrary, it is clearly effective in the management and treatment of pain and loss of functional capacity associated with osteoarthritis [15].

What characteristic should physical activity have to generate greater analgesia?

To generate analgesia in conditions such as osteoarthritis, muscles strengthening exercises with variable resistance and aerobic exercises have been shown to increase muscle function, reduce pain and improve the functional capacity of patients [16]. At least 3-4 times a week and lasting 35 min to 45 mins with a moderate to high intensity (40% to 75% of the maximum heart rate) so that the symptoms of osteoarthritis are not exacerbated [15,17].

In lumbago, studies support the use of exercise as part of the treatment of pain and show relief, but do not see some type of exercise that is better than another [13,18-19].

In relation to the degrees of analgesia independent of the pathology presented, it is seen that at high intensity of exercise between 60% to 5% maximum volume of oxygen [20]. Studies in animals have shown that higher intensities and duration have a higher pain threshold than those that do less activity [21]. In relation to strengthening exercises, there are fewer studies on this, but there are no differences in intensity to generate analgesia [22].

In relation to the isometric work [22], they saw that the magnitude of the hypoalgesia is dependent on the intensity and duration of the isometric contraction.

In general terms these are some of the general characteristics for a good exercise program for analgesia purposes, but gender differences should be considered, since women may experience greater hypoalgesia than men independent of the type of exercises for example in 10 minute runs with 85% heart rate found a decrease in pain only in women [23].

Physical activity should be considered as a medication that with a good dosage can be fantastic treatment with few side effects to treat chronic pain in various pathological conditions in both women and men with the corresponding considerations.

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