

**119 - A PHYSICAL ACTIVITY AND STRENGTHENING THE IMMUNE SYSTEM**

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Currently healthcare organizations confirm the relationship between the disease, the style and quality of life. The greatest ally essential to achieve good health, among the most recommended habits to have a healthy life in contemporary societies is the practice of physical activity. The World Health Organization (WHO) defines sedentary as an expense of calories below 2,200 points per week is associated with various health problems.

Given the importance of physical activity as a healthy habit, WHO has expressed incisively on the subject, noting that physical inactivity is a growing threat to global health, both in developed countries and in developing, particularly among the poor who live in major cities aiming physical inactivity as the fourth largest risk factor for mortality in the world.

In Brazil the data is very different, possibly because of the methodologies used to collect them, but current research indicate the strong presence of inactivity.

It is known that physical activity is not limited to sports activities, either sedentary his absence. To take advantage of these actions, it is important to increase the degree of integration in daily life.

Physical activity performed permanently and without exaggeration, improves posture, makes them more efficient muscles, helps reduce excess weight and fat accumulation, increases productivity at work, it helps to reduce stress and increase the willingness to everyday tasks, improves the immune system and helps reduce the effects of various diseases such as heart disease, obesity, hypertension, osteoporosis, impaired respiratory function and changes in cholesterol levels.

In addition to these aspects should be considered that discussions on physical activity are closely linked to the meaning of the body in the world today. So this crucial issue for the health and quality of life should not be seen or mechanically isolated from the contemporary context in which it appears, because the biological body is also saturated symbolic meaning construction.

The human body to stop agents and foreign molecules, to combat invading microorganisms, remove dead cells and cell debris, establish immunologic memory and maintain homeostasis of the body, has its immune system is composed of cells, tissues, organs, and molecules existing in the body. Such a system is composed of leukocytes, macrophages, neutrophils, eosinophils, basophils, mast cells, B and T lymphocytes, and natural killer cell immunoglobulin (TEVA; Fernandes and Silva, 2009; LEANDRO et al 2007).

There are two types of immunity, innate and acquired. The intrinsic (natural), considered a low-art system for acting against most infectious agents. Macrophages, neutrophils, epithelia, and others participate in this process. Since the specific or acquired immunity is a specialized reaction acting differently for each type of antigen. Due to its memory, this process makes have more powerful answers to the same agents and is very efficient. For activation of this defense process act lymphocytes and the antibodies they produce (PRESTES, 2006). As the body's response to exercise can- have increased the stress level because it provides changes between imunoneuroendocrino shaft with a variation in the levels of metabolic substrates, which modify functions related to immunity, resulting in changes in the homeostatic system.

Many studies show that immunity can be imunomodulada by physical exercise (Krinski et al., 2008). Despite being classified as stressful stimulus, fits more split the response to exercise in two components: that would be the transient reaction to stress; and chronic adaptation which causes the body tolerates more adequately stress (PINK AND VAISBERG, 2002).

The mechanisms suitable physical exercises immune response can be divided into three groups: hormones, metabolic and mechanical. The catelocaminas (epinephrine), cortical, growth hormone (GH) and opióides peptides (endorphins) are hormones that act on the immune system during exercise.

The amino acids are part of the fundamental metabolic and mechanical factors on the metabolism of muscle cells and immune system cells, factors such as hypoxia, hyperthermia and muscle injury can cause an inflammatory process (PINK E Vaisberg, 2002).

In some cases due to physical exercise can occur the increased susceptibility of the organism to infections, especially in the upper airways (UAI), as in other cases acts in reducing the risk of infections because the immune system changes will occur according to the intensity, duration and type of exercise (LEANDRO et al., 2007, MARTÍNEZ ALVAREZ-MON, 1999).

For Prestes (2006) understand that the practice of weighted physical activity will result in the protection of individuals against infection. On the other hand, the practice of intense exercise will result in increasing the number of these infectious episodes.

On the data presented this study aims to understand what are the main benefits that physical activity practice brings to the proper functioning of the immune system as an ally to health. This study consists of a literature integrative review in order to understand and identify the main benefits of physical activity as strengthening tool of the immune system, from literature on the topic.

The development of this integrative review started from the following question: What are the benefits that physical activity provides the immune system as allied health? This method of study aims to gather and synthesize results of research on a limited topic or issue in a systematic and orderly manner, contributing to the deepening of knowledge of the subject investigated (SOUZA, 2010).

Given the above, based on the theme: The main benefits of physical activity as a strengthening tool of the immune system. We seek to highlight what each article brings similar and divergent for a better determination of the facts. Within this review include discussions on hypotheses and possible suggestions, based on the findings, to improve the process.

The search of the studies took place in May 2016 and respected some of inclusion and exclusion criteria. As database was used the following sources: Virtual Health Library (VHL), database Latin American and Caribbean Health Sciences (LILACS), and the Scientific Electronic Library Online (SciELO). these sources were chosen due to its credibility and quality found jobs. The selected descriptors for the search were: immunity and exercise.

From reading the abstracts were considered the following inclusion criteria: approved work and / or published from

2002 and related to the topic, and these publications in Brazil and available in Portuguese, Spanish and English and studies available in full text. The exclusion criteria were discarded repeated articles, book chapters, dissertations, theses, reports, news, editorials, articles that did not correspond to the desired time period and that did not address the specific issue.

Through the analysis of the selected articles were found five articles that answered the inclusion criteria, all available in Portuguese. As regards the year of publication, an article was published in 2002, two in 2007, and in 2008 in 2011. Through these data it can be seen that there was a large-scale difference between the years of studies, as well as low in publishing this issue.

This indicates a lack in demand for particular topic. Regarding the type of study, four were literature review (LEANDRO (2007) ROSE (2002); EARTH (2012), a bibliographical study (Krinski (2008), and an experimental study (BRUNELLI (2011) According to the survey data, we found that the studies address of the benefits that physical exercise brings to the immune system.

It is known that the practice of moderate physical activity causes a chance of an individual contracting some type of bacterial or viral pathology, as well as the same practice, more intense and prolonged way can just cause the opposite, while the first embodiment improves quality of the immune response, the second may ultimately cause an immunosuppression framework of this system, is what shows us some studies (BRUNELLI (2011); Krinski (2008); LEANDRO (2007) ROSE (2002), TERRA (2012).

To validate such information some studies present theories that explain that there is the existence of a period of immunosuppression after high-intensity exercise training, as follows: Curve theory "J" Niemann and Canarella, the theory of open window Pedersen and Ullum and neuroendocrine model of Smith and Wiedeman (BRUNELLI (2011); Krinski (2008); EARTH (2012) According Brunelli (2011), many cells are altered by the practice of some physical activity, leukocytes, e.g. responsible for protecting the body and antibody production, because it is very sensitive cells can be modified in the increase or functionality depending on the seasonality or the stressor agents which will be submitted, for example, exercise. In competing to macrophages, these act as phagocytic cells processing and presenting antigens.

It may be noted that the practice of physical exercises vigorously, that is for a long time, is presented as a factor that converges in a decrease in the number of macrophages that are destined to a region that presents inflammation installed. The above shortage is due to increased plasma contractions substances called catetocolaminas as well as inhibiting main complex action histocompatibility (MHC) belonging to class II, which is a key device of the immune system as engaged in antigen presentation, thus it is results in a significant decrease in antiviral function of macrophages (BRUNELLI (2011); Krinski (2008); LEANDRO (2007).

It is noteworthy that the practice of high-intensity physical activity helps to reduce the number of neutrophils. Already in relation to functional capacity, it is observed disagreement in the literature. Some studies indicate reduction of reactive oxygen intermediates and fall microbicide capacity, while others indicate greater chemotactic and phagocytosis capacity. It is noteworthy that although there are contradictions between the discussions of these data, they are not configured as mutually exclusive, a possible justification for such an occurrence would be possible methodological differences (LEANDRO (2007) ROSE (2002), TERRA (2012).

Regarding the natural killer (NK) cells, it is known that these show greater changes across the year. It points to evidence indicating a higher rate of NK cell activity in athletes under resting conditions, when compared to non-athletes, which in turn reaffirms the importance of regular physical exercise in order to strengthen the immune system, there is seen that these cells play a significant role in the first line of defense against viruses and chronic infections, as well as work in recognizing and combating of tumor cells in the body (BRUNELLI (2011); Krinski (2008); LEANDRO (2007); ROSA (2002), TERRA (2012).

It points out that the exercise denotes direct influence on the response of cytokines, which are protein molecules and low molecular weight. It is known that the aforementioned molecules act as regulatory devices and flags, which in turn facilitate the lymphocyte response, neutrophils, manócitós and other cells that fight the antigens, and act in the healing of damaged tissues. It is worth noting that small disruptions in miofibrilas, which in turn are related to muscle contraction, are directly related to the responses of cytokines during physical exercise (Krinski (2008); LEANDRO (2007) ROSE (2002).

Immunoglobulins, known as antibodies, are the basis of humoral immunity and are divided into five classes: A (IgA), D (IgD), E (IgE), G (IgG) and M (IgM) (Krinski (2008); EARTH (2012) regarding the immunoglobulins related to physical activity, it should be to look again at the a (IgA), which is seen as the first barrier against pathogenic microorganisms, since this antibody class has predominance in mucosal secretions from the upper respiratory tract (Krinski (2008); TERRA (2012).

In all studies it is emphasized that the action of intense physical exercise impairs the functioning of the cells that make up the immune system and can be harmful to health. On the other hand these same studies show that physical activity regulated and associated with other factors such as good nutrition is beneficial to the immune system of individuals, in particular the prevention and combating of IVAS.

#### CONCLUSION

It is evident that the practice of moderate physical exercise is associated with improvement in neutrophil functions, macrophages and NK cells, which can cause in turn decline of infections and cancers. However, the exercise, when practiced intensely, is associated with increased occurrence of infectious diseases, especially of the upper airways (UAI). It follows therefore that when the exercise practiced within physiological limits, brings benefits to the body, including here the immune system.

As the number of the topic related publications is very scarce not get an accurate view of all the benefits that physical activity practice brings to the immune system, but from this we can identify the beneficial to have a higher prevalence. Therefore research related to this issue should be addressed more frequently.

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#### ABSTRACT

Although already known the importance of exercise for improving health, treatment of diseases and disorders, its relation to strengthening the immune system apparently begins in the era epidemiological chronic degenerative diseases. On the data presented this study aims to understand what are the main benefits that physical activity practice brings to the proper functioning of the immune system as an ally to health. This study consists of a literature integrative review in order to understand and identify the main benefits of physical activity as strengthening tool of the immune system, from literature on the topic. The development of this integrative review started from the following question: What are the benefits that physical activity provides the immune system as allied health? This method of study aims to gather and synthesize results of research on a limited topic or issue in a systematic and orderly manner, contributing to the deepening of knowledge of the subject investigated (SOUZA, 2010). Given the above, based on the theme: The main benefits of physical activity as a strengthening tool of the immune system. We seek to highlight what each article brings similar and divergent for a better determination of the facts. Within this review include discussions on hypotheses and possible suggestions, based on the findings, to improve the process. The search of the studies took place in May 2016 and respected some of inclusion and exclusion criteria. As database was used the following sources: Virtual Health Library (VHL), database Latin American and Caribbean Health Sciences (LILACS), and the Scientific Electronic Library Online (SciELO). these sources were chosen due to its credibility and quality found jobs. The selected descriptors for the search were: exercise, strengthening and immune system. We suggest conducting research with better control parameters in Brazil, which allow performing data intersections in subsequent ecological studies. Regarding the studies on adhesion, the main approach is to identify the determinants for adoption and maintenance in physical exercise, and to examine the prevalence of physical inactivity in the most remote regions of Brazil, confirming the known classical applications of epidemiology in the study of diseases in Cheers.

KEYWORDS: Physical Exercise. Fortification. Immune system ACTIVITÉ PHYSIQUE ET RENFORCEMENT DU SYSTEME IMMUNITAIRE

#### RÉSUMÉ

Bien que déjà connu l'importance de l'exercice pour améliorer la santé, le traitement des maladies et des troubles, sa relation avec le renforcement du système immunitaire apparemment commence à l'ère des maladies dégénératives chroniques épidémiologiques. Sur les données présentées cette étude vise à comprendre quels sont les principaux avantages que la pratique de l'activité physique apporte au bon fonctionnement du système immunitaire comme un allié pour la santé. Cette étude consiste en une revue de la littérature d'intégration afin de comprendre et d'identifier les principaux avantages de l'activité physique comme outil du système immunitaire renforcement, de la littérature sur le sujet. Le développement de cet examen d'intégration a commencé à partir de la question suivante: Quels sont les avantages que l'activité physique fournit le système immunitaire comme la santé alliée? Cette méthode d'étude vise à recueillir et synthétiser les résultats de la recherche sur un sujet ou d'une question limitée d'une manière systématique et ordonnée, ce qui contribue à l'approfondissement de la connaissance du sujet étudié (SOUZA, 2010). Compte tenu de ce qui précède, sur le thème: Les principaux avantages de l'activité physique comme un outil de renforcement du système immunitaire. Nous cherchons à mettre en évidence ce que chaque article apporte similaires et divergentes pour une meilleure détermination des faits. Dans cette revue, des discussions sur des hypothèses et des suggestions, basées sur les résultats, afin d'améliorer le processus. La recherche des études a eu lieu en mai 2016 et respecté certains critères inclusion et d'exclusion. Comme base de données a été utilisé les sources suivantes: Bibliothèque virtuelle de la santé (VHL), base de données Health Sciences des Caraïbes (LILACS) d'Amérique latine et, et le scientifique Electronic Library Online (SciELO). ces sources ont été choisis en raison de sa crédibilité et des emplois de qualité trouvé. Les descripteurs sélectionnés pour la recherche étaient: l'exercice, le renforcement et le système immunitaire. Nous vous proposons de mener des recherches avec de meilleurs paramètres de contrôle au Brésil, qui permettent d'effectuer des intersections de données dans les études écologiques ultérieures. En ce qui concerne les études sur l'adhérence, l'approche principale est d'identifier les déterminants de l'adoption et le maintien dans l'exercice physique, et d'examiner la prévalence de l'inactivité physique dans les régions les plus reculées du Brésil, ce qui confirme les applications classiques connues de l'épidémiologie dans l'étude des maladies santé.

MOTS-CLES: Exercice physique. Renforcement. Systeme immunitaire

#### ALAACTIVIDAD FÍSICA Y FORTALECIMIENTO DEL SISTEMA INMUNOLÓGICO RESUMEN

Aunque ya se conoce la importancia del ejercicio para mejorar la salud, el tratamiento de enfermedades y trastornos, su relación con el fortalecimiento del sistema inmunológico, aparentemente comienza en la era de las enfermedades degenerativas crónicas epidemiológicos. En los datos presentados este estudio tiene como objetivo comprender cuáles son los principales beneficios que aporta la práctica de la actividad física para el buen funcionamiento del sistema inmunológico como un aliado para la salud. Este estudio consiste en una revisión integradora de la literatura con el fin de comprender e identificar los

principales beneficios de la actividad física como herramienta de fortalecimiento del sistema inmunológico, de la literatura sobre el tema. El desarrollo de esta revisión integradora comenzó a partir de la siguiente pregunta: ¿Cuáles son los beneficios que la actividad física proporciona al sistema inmune como aliado de la salud? Este método de trabajo tiene como objetivo reunir y sintetizar los resultados de la investigación sobre un tema o asunto limitada de una manera sistemática y ordenada, lo que contribuye a la profundización del conocimiento del tema investigado (SOUZA, 2010). Teniendo en cuenta lo anterior, basado en el tema: Los principales beneficios de la actividad física como herramienta de fortalecimiento del sistema inmunológico. Buscamos resaltar lo que trae similar y divergente para una mejor determinación de los hechos de cada artículo. Dentro de esta revisión incluirá discusiones sobre hipótesis y posibles sugerencias, basadas en los resultados, para mejorar el proceso. La búsqueda de los estudios se realizó en mayo de 2016 y respetado algunos de los criterios de inclusión y exclusión. Como se utilizó la base de datos de las siguientes fuentes: Biblioteca Virtual en Salud (BVS), base de datos de Ciencias de la Salud del Caribe (LILACS) de América Latina y, y la Scientific Electronic Library Online (SciELO). estas fuentes fueron escogidos debido a su credibilidad y empleos de calidad encontrado. Los descriptores seleccionados para la búsqueda fueron: el ejercicio, el fortalecimiento y el sistema inmunológico. Se aconseja la realización de investigaciones con mejores parámetros de control en Brasil, que permiten la realización de las intersecciones de datos en los estudios ecológicos posteriores. En cuanto a los estudios sobre la adherencia, el enfoque principal es identificar los factores determinantes para la adopción y el mantenimiento en el ejercicio físico, y para examinar la prevalencia de inactividad física en las regiones más remotas de Brasil, lo que confirma las conocidas aplicaciones clásicas de la epidemiología en el estudio de enfermedades en la salud.

PALABRAS CLAVE: Ejercicio Físico. El fortalecimiento. Sistema inmunológico

#### A ATIVIDADE FÍSICA E O FORTALECIMENTO DO SISTEMA IMUNOLÓGICO RESUMO

Embora já conhecida a importância do exercício físico para melhoria da saúde, tratamento de doenças e agravos, sua relação com o fortalecimento do sistema imunológico aparentemente tem início na era epidemiológica das doenças crônicas degenerativas. Diante dos dados apresentados este estudo tem como objetivo compreender quais os principais benefícios que a prática de atividade física traz para o bom funcionamento do sistema imunológico como aliado à saúde. O presente estudo consiste em uma revisão integrativa de literatura com o objetivo de compreender e identificar os principais benefícios da atividade física como ferramenta de fortalecimento do sistema imunológico, a partir de literaturas referentes ao tema. A elaboração desta revisão integrativa partiu da seguinte questão norteadora: Quais os benefícios que a prática de atividade física proporciona ao sistema imunológico como aliado a saúde? Esse método de estudo tem a finalidade de reunir e sintetizar resultados de pesquisas sobre um delimitado tema ou questão, de maneira sistemática e ordenada, contribuindo para o aprofundamento do conhecimento do tema investigado (SOUZA, 2010). Diante do exposto, com base no tema: Os principais benefícios da atividade física como ferramenta de fortalecimento do sistema imunológico. Buscamos evidenciar aquilo que cada artigo traz de semelhante e de divergente para uma melhor apuração dos fatos. Dentro dessa revisão incluem discussões sobre as hipóteses levantadas e possíveis sugestões, com base nas conclusões, para melhoria do processo. A busca dos estudos ocorreu em maio de 2016 e respeitou alguns critérios de inclusão e exclusão. Como base de dados foi utilizada as seguintes fontes: Biblioteca Virtual em Saúde (BVS), base de dados Literatura Latino-Americana e de Caribe em Ciências da Saúde (LILACS), e a Scientific Electronic Library OnLine (SCIELO). Foram escolhidas essas fontes devido a sua credibilidade e qualidade de trabalhos encontrados. Os descritores selecionados para a busca foram: exercício físico, fortalecimento e sistema imunológico. Sugerimos realização de pesquisas com melhores parâmetros de controle no Brasil, que possibilitem realizar cruzamentos de dados em estudos ecológicos posteriores. Com relação aos estudos sobre aderência, a perspectiva principal seria identificar os determinantes para adoção e manutenção no exercício físico, bem como a análise a prevalência do sedentarismo nas regiões mais remotas do Brasil, corroborando com as conhecidas aplicações clássicas da epidemiologia no estudo dos agravos em saúde.

Palavras-chave: Exercício Físico. Fortalecimento. Sistema Imunológico.