

# *Introduction*

<https://doi.org/10.21830/9789585380240.00>

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One of the most important challenges for science is to adequately convey the knowledge arising from research or generated by the interaction of individuals with their environment. The communication and development of knowledge prevents the academic community from falling into repetitive and systematic errors, which cause any type of project to fail. If scientific advances are not communicated, knowledge gaps will persist and, in some cases, will even be perpetuated. Hence, the importance of communicating scientific production, which is the main objective of this work.

One of the limitations in applying research involving the military population is that data are taken from other studies that do not reflect the specific characteristics or conditions of Colombian soldiers. Regardless, they are applied and appropriated as if they were the same sample of study. Therefore, this work presents the results of research involving the physical performance of Colombian military personnel to provide the academic community with descriptions of the variables that make up this population's physical fitness. This is a first attempt to characterize their physical, physiological, and biomechanical capabilities using the best available evidence and state-of-the-art technology.

It should be mentioned that military personnel must endure demanding physical activities during tactical and physical training, in military garrisons, or operations in different areas of Colombia. These activities go from hauling heavy field equipment (including personal items, food, ammunition, and weapons) over long distances in difficult terrains to carrying out common military physical training, including jogging, sprinting, digging, and dodging obstacles. The soldiers' speed and skill in these activities can impact their effectiveness in combat and, certainly, their survival. Therefore, describing, evaluating, and updating the best training programs for military personnel during their active service in the Army are important research objectives to enable the institution to prepare them effectively through activities that resemble military actions in interval, means, and location.

Service personnel must perform specific tasks in military operations in environments where they are exposed to stressors, such as caloric deficit, sleep deprivation, mood disturbances, and continuous physical activity, which can lead to fatigue. Likewise, military operations require the soldier to have high levels of aerobic capacity and muscle strength, making optimal physical conditioning through constant and suitable physical conditioning an important factor in operational performance and the prevention of different musculoskeletal injuries. Therefore, Characterizing the fitness of Colombian military personnel addresses different research results in its eight chapters that contribute, from science, to the evaluation of the physical conditioning of the Colombian military serviceperson. The order of presentation and the topics studied are presented below.

The *first chapter* evaluates the use of the Body Mass Index (BMI) as a mechanism for cleavage and diagnosis of overweight and obesity in military personnel. The objective of the researchers is to correlate the BMI as a diagnostic test with different tools, such as the determination of body composition by bioimpedance. In the *second chapter*, the author determines the changes in the body composition of the students participating in the Advanced Combat Course (ACC) and proposes some inferences about how they happen, since they can affect the physical performance of soldiers. In

the *third chapter*, a comparative study is made between the body composition of the students of the three training schools of the National Army (Esmic, Emsub, Espro) and the results are correlated with the intensity and frequency of the training times. In the *fourth chapter*, the correlations between two of the most important variables (see index) are established to determine oxygen consumption through ergo spirometry tests in a population of athletes of Esmic (Escuela Militar de Cadetes General José María Córdova), who in addition to their inherent preparation for military activity are athletes trained for the Inter-school Games of the institutions of the Colombian Military Forces. Likewise, the authors of *chapter five* describe the ventilatory patterns of a group of trained military personnel from the Urban Counter-Terrorism Special Forces Grouping, for which they studied for two consecutive years the oxygen consumption of members of this elite unit of the National Army. Subsequently, the *sixth chapter* characterizes one of the most forgotten, but no less important, components of the military's physical training: flexibility. The researchers conducted a correlational study between three different tests to evaluate flexibility in the pentathletes of the military pentathlon league of the Colombian Military Sports Federation (Fecodemil). Specifically, their findings are based on the «Sit and Reach» test, the Schober test and the passive straight leg lift test. The penultimate parameter in the evaluation of military fitness is addressed in the *seventh chapter*: the power and explosive strength of the lower limbs. The researchers applied the «Squat Jump» test to characterize these aspects in a population of cadets of the Military School and determine important variables involved in the development of injuries in lower limbs, as with asymmetries in the phases of the jump. Finally, *chapter eight* analyzes the medial tibial stress syndrome also known as shin splints, one of the clinical conditions that most afflict the military in formation, in relation to the asymmetries in the gesture of the jump, considered as a risk factor.

These eight chapters present original works that not only describe and characterize each of the components of fitness in different groups of military population, but also provide a scientific basis for the variables associated

with military physical performance. However, it is important to note that in order to better determine the variables of physical activity it is necessary in the long term to continue and expand the research of this work, in such a way that the majority of the military population is characterized in all ranks and years of service. In this way, this book reflects the efforts of the Army's training schools to maintain and improve the physical and psychological condition of Colombian military personnel.