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SPECIFIC PHYSICAL TRAINING OF FUTURE OFFICERS FOR ACTIONS IN MOUNTAIN ENVIRONMENTS

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Abstract: *The mountain environment implies a certain degree of difficulty even in peacetime, in civilian sector activities, even more so from a military point of view, especially in conducting operations in this environment. The varied terrain, sudden weather changes, oxygen depletion with increasing altitude and the lack of suitable travel lanes are just some of the challenges that future officer mountain hunters have to face and overcome. Preparation for this stage must start early with an emphasis on physical and mental endurance, the latter being a basic pillar for any military person, but even more so for a mountain hunter. Sustained physical effort in difficult terrain and exposure to bad weather combined with strong winds requires a trained psyche, ready to carry on even when the physique might give way. Endurance training also plays an important role and contributes to the ability of mountain hunters to traverse large areas of terrain in a relatively short time using weapon-specific methods and techniques. Being a mountain hunter puts a strain on your body and mind. One thing we can improve as mountain hunters is certainly the level of physical training specific to this weapon. Given the specificity of mountain hunter actions in terms of both ski and alpine training, training with a focus on the lower body is a starting point in the physical preparation needed to carry out actions in the mountain environment.*

Keywords: mountain hunters, physical preparation, aerobic training

1. Introduction

It is well known that to acquire the necessary skills of a mountain hunter requires an adequate physical condition maintained at optimal parameters at all times. In other words, the combat capacity of mountain hunters increases in proportion to the quality and intensity of the physical training prior to specific activities. Given the important role of this weapon, specific physical training is extremely important in order to be able to carry out defensive actions in a harsh, rigid environment requiring physical strength and character. Mountain troops were used mainly in mountainous areas. But they have often been successful in other terrain. "Movement in mountainous terrain under military conditions are even more demanding and therefore more dangerous for military personnel" [1].

2. Particular Features of the "Mountain Hunter" Weapon

The mountain fighter troops specialise in defensive as well as offensive combat actions. They can operate both in collaboration with other troops and also independently in a variety of terrain [2]. The combat devices must be judiciously

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grouped on the directions and in the districts that are advantageous to the actions, will be more staggered in depth and strongly protected on the flanks and in the rear [3]. The level of independence of combat actions is enhanced by the large intervals between units and sub-units as well as the possibility of training in spatial isolation and over a long period of time. The defence is organised, in all situations and at all levels, in a circular way, in order to close off the directions leading to key points, objectives and areas, to the flanks and rear of the combat devices, or to the areas where the logistic formations are deployed [4].

The high degree of coverage of the mountainous area and the steep terrain, in addition to the difficulties they pose for the troops on the offensive, also offer multiple possibilities for the concealed formation of units and sub-units, favouring infiltration into the opponent's device, manoeuvres to strike his flanks and rear, the movement of reserves, the protection of forces against search and hits executed by the enemy [5].

In defence, mountain hunter structures can act for:

- the defence of a mountain village or group of huts;
- the defence of forced crossing points, passes or intra-mountain depressions;
- the defence of engineering works (hydro technical dams, viaducts, tunnels, etc.).

In offensive combat, mountain troops by independent action or in cooperation with other troops can:

- liberate localities and groups of huts;
- open main passes;
- conquer orographic nodes and works of art;
- carry out harassment of the enemy in order to break up his dispositions and lower morale [6].

3. Physical Training of Mountain Hunters

With the notable exception of certain obvious factors (clothing and equipment), physical and mental training and preparation should be priorities for conducting military operations in mountain environments [7].

Exercise capacity is not a single entity, but is composed of several components, each representing a separate source or pathway of energy for muscular activity.

Although all the energy for muscle contraction is initially derived from muscle, the size of the energy systems or fitness components are not equally influenced by the size of the muscle mass or fat-free component. Therefore, body composition in terms of physical performance must differentiate between these components of fitness.

Leaders and their staff need to be aware of and consider the challenges of operating in mountain environments when developing their plans.

Climbing and traversing mountain ranges is one of the most daring tests of the mountain hunter's combat skills. They consist of a fierce battle that mountain hunters wage with the vertical of the cliffs, over dizzying chasms, high up on Alpine ridges, to conquer and hold a point, a mountain space, on which the combat success of sub-units and units depends. In mountaineering, during climbs and traverses, no two moves are alike. “Each rocky passage climbed calls for a different technical procedure, a completely different movement, in very short segments of time the conditions of the route can change and create a multitude of complex and critical situations” [8].

“Properly executed free climbing requires calmness, skill, establishing in advance the holds for support, executing each step with thoughtfulness and foresight, and maintaining necessary reserves of strength at critical moments” [9]. An important role in the specialist instruction of mountain hunters is the training of skiing skills. This has always been a central concern in their combat training.

4. Recommended Types of Training for Mountain Hunters

Aerobic exercise capacity is the maximum amount of oxygen a person can use in a given amount of time with very intense physical exertion.

"Aerobic efforts use energy obtained through metabolic pathways that require the presence of oxygen (aerobic = in the presence of oxygen), processes that can run for long periods of time, but can only maintain submaximal (medium and low) intensity effort" [10].

Aerobic capacity is the ability of large groups of skeletal muscles to adapt to mechanical work and exertion, using the energy obtained as a result of aerobic metabolism. VO2max is a good indicator of aerobic capacity and is considered to be an indicator of the physiological integration of pulmonary, cardiovascular and neuromuscular functions. Aerobic exercise is an extremely important conditioning component in a variety of branches of sport and in the development of individual fitness.

Thanks to these qualities of aerobic exercise, individuals who practice endurance sports gain a higher level of endurance, helping in the evolution of exercise capacity.

Aerobic training has several positive effects:

- "increases the efficiency of the breathing process and the endurance of the muscles involved in breathing;
- increases blood volume, distribution and transport to the muscles;
- increases cardiovascular efficiency (increases stroke volume and cardiac output simultaneously, reducing resting and exercise heart rate). The heart becomes more efficient by pumping more blood with each beat;
- regulates certain nervous and hormonal mechanisms" [11].

Increasing aerobic capacity can help improve the flow of oxygenated blood to muscle tissue.

The main categories into which all types of training fall are metabolic, hypertrophic and neurological. Each of them are based on a number of characteristics, but it is important to note that they can overlap. Each of these types of training relies on the application of certain stimuli, and each stimulus will (if the training plan and diet are designed correctly) lead to certain adaptations at the biochemical, cellular and anatomical levels.

In metabolic training individuals can train at a high intensity while supporting muscle growth and calorie burning. It combines high-intensity interval training (or HIIT) with resistance training [12].

High-intensity interval training (HIIT) is not only effective for burning calories, but can also help improve aerobic capacity.

"Although there is no universal definition, HIIT generally refers to repeated short to long bouts of high-intensity exercise - performed at close to 100% maximal oxygen uptake (V_ O2max) - interspersed with recovery periods. *(PDF)* A HIIT-based running plan improves athletic performance by improving muscle power" [13].

According to some studies [14, 15] studies have shown that different types of HIIT programs improve endurance performance in athletes. "HIIT shows superiority over conventional training methods in improving VO2max, promoting aerobic capacity, in elite athletes" [16].

At higher intensities, the body will use ATP from anaerobic sources, but will rely on aerobic metabolism during lower intensity recovery intervals to help replace energy expended during periods of high intensity work.

Cross training, popularised in the late 1980s, it has been used for years, but it is relatively new as a training concept [17].

"CrossFit is a form of high-intensity interval training and comparable to other high-intensity exercises. CrossFit exercises increase VO_{2max}, strength, endurance, and improves the body composition" [18].

Doing a long run on one day, followed by a HIIT bike ride, followed by circuit training

on the third day, is a great example of how to periodize a workout to improve overall aerobic capacity.

Another approach is to cross-train in the same training session. Dividing a workout into short periods of exercise on different equipment can help to challenge different muscle groups within the same workout session.

This, in turn, can help improve aerobic fitness while reducing the risk of injury. Cross training appears to be a good and safe workout [19] by performing several types of exercises that help improve motor capacity. Low Intensity Interval Training (LIIT) also known as long distance training is the ability to maintain constant mechanical work over an extended period of time.

"LIIT is a type of physical activity that involves alternating periods of low-intensity exercise with periods of restore active recovery. LIIT workouts usually involve exercises such as walking or light jogging, and can also include movements such as bodyweight squats or lunges" [20].

LIIT relies on aerobic energy pathways for energy and can provide fueling muscle activity for prolonged durations such as endurance races. Compared to HIIT, LIIT is a lower-stress way to improve aerobic capacity, but is not as effective for burning calories. LIIT represents the minimum exercise intensity threshold for developing aerobic capacity, typically at 40–45% of the maximum oxygen uptake (VO2max) [21].

LIIT unlike HIIT (High-Intensity Interval Training), which pushes the body to its maximum capacity, generally maintains a lower intensity during exercise, making it more accessible to people of varying fitness levels and physical conditions [22].

Various exercises that can be used by mountain hunters can have the following characteristics:

Swimming training to develop upper body strength and maintain cardiovascular endurance.

- Cross-country skiing, which they also use on certain missions to maintain leg strength and endurance when snow and ice are specifically in conflict zones;
- free weight training to maintain and develop strength levels at the same time;
- climbing to maintain upper body strength and endurance, skill and balance.
- Mountain biking to use lower body muscles from different angles;
- deep water running to lessen the impact on ligaments while maintaining an intense physical program;
- weightlifting exercises to develop overall explosiveness, here the focus is on plyometrics.

5. Conclusion

The present dynamism in the field of military physical training acts as a formative, developing role within the structures, given the many changes and attempts at highly innovative programs brought to military physical education classes.

For Mountain Hunters, physical exertion capacity can be improved over time, but the duration is different from one body to another. Without ignoring or minimizing the importance and contribution of strength exercises in the physical training of the military, it can be said that a programme consisting of cardio-type exercises responds much better to the realities faced both in training and on mission by military personnel, i.e. mountain hunters.

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