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Combating the fixed postures effects at military personnel – a remedy suggestion

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Abstract. *Aim.* In this article, we tried to lead a way to revitalise the body after long hours of working (especially in fixed kept postures), to increase its resistance for sustained effort and defence against illness, as is the case of the personnel from military vessels. As they can be often far from shore, developing missions, it is important for them to learn to confront and manage by themselves the various physical symptoms, in order to implement the control of their own state of health.

As a paradox or an exception, military personnel can develop both physical maximum intensity activity and be sedentary in 24 hours and that is at least said. If the situation and/or the orders request, 24 hours could multiply as long as is necessary for their duty to be done.

This presentation contains a set of stretching exercises that can be effective in combating the fixed long hours maintained postures symptoms, especially articular pain and stiffness, and in increasing muscle endurance and strength.

Conclusions. The proposed physical exercises eliminates the muscular and articular functional blockage and decreases/prevents the evolution of the inflammation-pain-disfunction pathological chain.

Keywords: posture, military personnel, physical exercise, state of health control.

1. Introduction

Some healthy principles, a bit of awareness and some common sense can ameliorate one's general state, resolve medical problems and stop the chronic diseases consequences.

In this presentation, we tried to lead a way to revitalise the body during and after long hours of working (especially in fixed kept postures), to increase the organism resistance for sustained effort and defence against illness, as is the case of the personnel from military vessels. As they can be often far from shore, developing missions, it is important for them to learn to confront and manage by themselves the various physical symptoms, in order to implement *the control of their own state of health*.

Pheasant identified two types of persons in danger of a lumbar disk hernia diagnosis (given example because is one of the most incidental diseases upon population of all ages): those having a physical soliciting profession and those having a sedentary one. Individuals having a profession which permits an often change of position and with a moderate physical effort, so having a permanent active musculature, are taken a very low risk of low back pain, only of 2% [1].

As a paradox or an exception, in 24 hours, military personnel can develop both types of activity described above and that is at least said. If the situation and/or the orders request, 24 hours could multiply as long as is it necessary for their duty to be done.

As a definition, the posture is a function of the human body based on the synergy and coordinated action of the locomotor apparatus elements and the central and peripheral nervous system, in order to maintain stability, equilibrium and constant reports among the body segments and between the body and certain elements of the external environment. Muscular imbalances can be responsible of the osteo-articular pain in various areas (neck, back, hip, knee etc.) and of the lost postural harmony [2]. As causes of this phenomenon occurrence, the muscular blockage, the structures inflammation and microruptures due to *in excess forces distribution* (as in the case of maintaining the same posture many hours) are ones of the main.

The effect of the loads upon body structures during maintaining fixed postures

The daily positions, movements and activities affect the body structures. The habitual repetitive postures solicitate the vertebral column mainly to flexion and extension. The sustained loading in flexion could lead at *deformation, compression and distortion* in various areas [3] and thus it represents one of the main etiology of the structural deteriorations.

The physiology of this process is sequentially described and explained by McKenzie: if a constant force is applied on a collagenous structure for a long period of time, a very slow, discrete, imperceptible *movement appears*, as a consequence. This phenomenon is the result of the collagen fibres redistribution and water absorption from the tissue. Short periods of biomechanical stress are not enough for this type of process to occur, in comparison with the case when the forces are long time sustained (weeks, months, years), causing the *structures elongation* [4].

After this elongation appearance, the tissues are able to come back at normal state, if the force is removed, does not action in excess and a long enough period of time is given for the complete rehabilitation to be installed. Though, after this phenomenon occurrence, the structures will have a *reduced elongation capacity* than the initial one (possibility of deformation); they could also *remain slightly elongated*, with a difference between the initial and the actual length, depends on the tissue and the force type (compression or strain).

However, in most of the cases, the collagenous structures are not given sufficient time to recover and come back to their initial form, before a new load to be applied on them. If the force determined the apparition of some disfunctional connections between the collagen fibres (superposition, entanglement), the difference between the initial and the actual length can persist indefinitely and that is the reason why the repetitive forces extended time applied *could alter the mechanical properties of the collagenous tissues*, thus they become vulnerable at deterioration and susceptible to cease at fatigue (as in the fixed prolonged maintained postures situation).

After repetitive/sustained stress (*cumulative stress*), the body structures could cede at loads more smaller than those that can cause damage by an unique application, an insidious pain installing, rather than a brutal sudden one. In other words, while a load does not have any deteriorating effect upon tissues, same load, applied repetitive or for a long period of time, can determine the tissues breakage, without major or obvious traumas in antecedents [5].

An obvious explanation for this body reaction is that, due to fatigue, after a period of time the muscular activity is reduced during these sustained postures, so the force (mechanical stress) bombards the non-contractile structures and peri-articular areas, such as ligaments, tendons, articular capsule. If this "attack" will repeat over and over, the result will be musculoskeletal damage with its symptoms: pain, inflammation, stiffness, reduced range of motion.

The efficiency of movement as a pathological rhythm breaker

The human body is projected to be active, thus the range of motion or movement limitation it only conduct to discomfort or pain. The simple change of one's position can act holistic, improving the organism general well being.

A study made on patients diagnosed with lumbar disk hernia determined that even when the pathological process has been installed, *physical exercise* (aka movement) conducted by the specialist *is able to ameliorate or abolish the symptoms*, like pain, probably due to muscular flexibility and neural mobility improvement [6].

Performed progressively, gradually, systematically, the active movements have the role to distribute oxygen and nutrients at the neuro-muscular structures level and the tissues that surround it. Repeated with consistency, physical exercises help in prevention of the articular stiffness and the muscular weakness, thus contributing in acute pain episodes reduction or/and in diminishing their duration and severity.

Both in the case of a patient with an active pathology installed and the healthy long hours working individual, the effects of physical exercises could be summarized briefly as follows:

- preserve and/or correct the body posture;
- maintain and increase muscle endurance and strength;
- develop and maintain normal motor functions and recover the disturbed ones;
- prevent osteoporosis inactivity;
- increase capsule and ligament strength and elasticity;
- improve muscle properties: trophicity, elasticity, excitability and contractility by synchronizing the motor units;
- help the patient to regain confidence in his/her own possibilities for recovery, causing his/her active participation in the execution of the physical therapy program [7];
- contribute to a general well being state of mind, by realising endorphines;
- influence cognitive performance by a superior blood oxygenation;
- increase coordination and energetic efficiency in performing activities of daily living and professional ones;
- optimize the enhancement of the muscular force due to the proprioceptors stimulation [8].

A stretching exercises program proposal to combat musculo-articular pain, stiffness, inflammation

Considering the lack of time, space and energy, not many physical exercises could be done by the personnel on a military vessel. This is the reason why we recommend the next short program of stretching (positions and movements), for the main body parts involved in their working postures, that can be performed even during the duty time:

- Sitting on a chair, feet apart on the floor, lean back, raise both arms with elbows straight and go with it slowly maximum behind; head and neck follow the arms and go in extension;
- Same position, hands put together behind the chair backrest, pull the shoulders maximum behind and maintain it so, then look slowly and maximum over the right shoulder, then over the left one;
- Sitting on a chair, feet apart on the floor and in front of the chair, not under it, bend over and put both palms on the floor then start walking with it forward, as far as you can; maintain the chin up;
- Put your body in squat position if your knees allow it and maintain it for a couple of minutes; head up, palms on the knees;
- Before sleep or right after it, stay in all four position and slowly move your bottom until it reaches the heels; repeat few times, until your low back is relaxed;
- Laying with face up, bend your knees, then cross your legs, then pull to your chest both knees put in this position, maintain the pulling few seconds; do the same for the other side (reverse the legs crossing).

These few exercises are only an example of many human body movement possibilities and with repetitions, in time, it will prove their efficiency, acting as an *articular and muscular daily hygiene*, preventing and/or abolish intense pain.

2. Conclusions

Maintaining fixed postures for long periods of time could determine any form of mechanical stress placed upon the body. That prevents it from functioning to the full, usually affects the musculoskeletal system (muscles, tendons, ligaments, bones, cartilage) and often results in pain, swelling, stiffness, tenderness and the inability to properly use the affected area.

Not allowing the structures to move or change position could lead to chronic or "overuse", injuries which result from wear and tear on the body and occur over extended period of time [9].

The daily execution of few stretching exercises represents a proper form of musculoskeletal hygiene, preventing the acute episodes occurrence and conducting to a decreased pain intensity, the person being able to manage the symptoms more efficiently when it appear, due to an optimum mechanosensitivity of the neural structures that the movement offers.

In a study on children and adolescents with idiopathic scoliosis, a group of specialists concluded that the administration of melatonin, calcium and vitamin D positively affected the illness progression quantified by the spine curvature [10]. Supplements as Magnesium, Potassium, Zinc, Boron, Silicium, Iodine can also be taken by the military personnel, as a way of improving and maintaining physical - mental resistance and vitality through an increased nutrition at the celular level.

Synthesizing all that was presented so far, we remind that the function modification obligatory attracts the modification of form and internal-external organisation [11], or, in other words, the way we use ourselves and our bodies influences the way we function as a whole.

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