

## HYDRO-ACOUSTIC WAVES IN REHABILITATION OF LIMB FROSTBITING

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The deep development of Arctic Regions, where air temperatures reach 30–50° C below zero in winter time, increases the risk of *cold trauma* (CT) — total hypothermia of the entire body and frostbite of limbs in the personnel of exploration companies (geologists, geophysicists) and employees of industrial or oil and gas extracting enterprises. Non-native population, civil and military seamen, border guards, working on a rotational basis or residing permanently in cities beyond the Arctic Circle, are also in a great danger.

Currently, there are no adequate methods of CT treatment. Conservative and surgical treatment and physical methods (low frequency, ultrasound, hyper-frequency radiation treatment) give a high percentage of disability. [1, 2, 3].

We proposed a new method of CT treatment and rehabilitation. It is a method of low-frequency hydro-acoustic impact on human limbs, based on a unique sound wave generator. [4, 5].

Hydroacoustic (HA) waves are generated in the audio range from 50 to 700 Hz and pass through the entire volume of patient's limbs with negligible reflection, causing micro vibrations at molecular level and initiating the variable HA overpressure from 500 to 10000 Pa on the skin, subcutaneous fatty tissue, tendons, muscles, periosteum, capillaries, lymphatic vessels and nerve endings.

The use of this method in the first day of CT, improves microcirculation, restores hemorrheological processes, reduces blood viscosity and the possibility of hypercoagulable syndrome, preventing thrombosis, stimulates tissue and vascular regeneration processes, improves lymph flow, metabolism and gas exchange of tissues.

Previously, the method was tested for athletes' and dancers' muscle overstrain [6].

The given method has autonomy, requires minimal additional equipment and supply, it can be used in any conditions or in the companies in the Arctic Regions.

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