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## INNOVATIVE METHODS OF THERAPEUTIC USE OF COLD AND HOT

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The present paper discusses innovative and conventional methods of therapeutic use of heat and cold, based on patent databases and a literature study. Various treatments of afflicted tissue by means of heat withdrawal or heat provision are presented. Potential indications and contraindications to such therapy are listed. A number of innovative methods is shown and their effect on the human tissue is described, as well as examples of heat and cold therapy applications

The aim of the study was to provide a review of the current state of knowledge regarding the therapeutic use of heat and cold. The conducted research was based on a literature review, as well as a survey of patent applications. In the Google Patents database, there were 3692 records related to thermotherapy. Within the last three years 346 new records of this sort have appeared, which is evidence that the field is still making progress.

Heat therapy employs both local and systemic forms of treatment, either providing the body with heat or inducing heat directly in the tissues. Methods relying on the provision of heat include hydrotherapy, balneotherapy, as well as paraffin treatment. Cryotherapy is a form of cold treatment which utilizes liquid nitrogen, carbon dioxide, (rarely) cold air or chemical substances as a means of lowering the temperature of target tissues in the human body. The thermopercussion therapy involves simultaneous application of heat and rhythmic mechanical percussion vibrations to the affected area or region of the body. This sort of treatment is recommended to people whose cells are incapable of regenerating naturally. The intensity and frequency of the applied rhythm is adjusted to the age and type of tissue involved in order to stimulate the body, while the applied heat causes vasodilation that accelerates the process of regeneration.

Method for enhancing thermal treatment of cancer and intelligent material medicine. This method involves instantly raising the temperature of the cancer cells to 42.5°C or above, which occurs as a result of a high-frequency electromagnetic field by means of microwave heating. As a result, cancer cells are subject to apoptosis.

Heat and cold therapy is mainly used in treatment of the locomotor system diseases, as well as the easing of pain and reduction of edema. Heat and cold treatments are a prevalent and continuously improved form of physiotherapy. They are used in treatment of many diseases, mainly those of the locomotor system, as well as in easing muscle aches. Some of the discussed methods are new and constantly improved, such as e.g. cryotherapy.

Worthy of notice are the developments made in hyperthermia therapy, which utilizes microwaves, radio waves or infrared lamps as a means of raising the temperature of the organism or some select parts of it. In recent years, this method has made great progress, especially in treatment of cancer. The researchers have found out that cancer cells – due to their primitive blood supply – do not dissipate heat energy nearly as well as normal cells. When subject to high temperature during the treatment, they undergo apoptosis, whereas healthy cells tend to maintain a normal temperature.

The above review of the literature and patents indicates that the field of heat and cold treatment is continuously developing and that new applications are being sought. New devices to be used in physiotherapy and cosmetology enter the market almost every year.