

Cryo-modelling

Clinical study

Introduction

Homeostasis – homeo thermy

The concept of homeostasis was introduced in biology by Claude Bernard (1929) to indicate the constancy of the physiological characteristics of an organism. This state of stability is ensured at various levels whose principal ones are:

1. Extracellular liquids (interstitial compartment, blood, lymph...).
2. Ionic concentrations of salts (sodium, potassium, calcium...).
3. The internal body temperature.

It requires the intervention of regulation systems, which allow to preserve constant physical, chemical and biological parameters in spite of the ceaseless variations of the environment. In other words, our intrinsic system of control allows maintaining constant our environment intern in spite of the external changes that we undergo. Among the various regulation systems of the homeostasis, one of the most important carries a very suggestive name:

Homeothermy:

The concept of homéothermie implies to define a "normal" temperature of the human body, even if it is appreciably different according to the concerned zones. We so end in the notion of " thermal balance " which results from a balance between the heat losses (thermolysis) and the heat production (thermogenesis). Finally, it is necessary to note that the regulation of the homeothermy, and thus the thermal balance, is centralized at the level of the hypothalamus from the information passed on by of numerous thermo receptors so cutaneous as visceral.

Thermal balance

Each knows that the "normal" temperature of the human body is 37 ° Celsius. However, this symbolic value, not to say mythical, of 37 ° deserves to be clarified, put in perspective even. It concerns, in fact, only the "central" temperature of the human body, which corresponds to the "nucleus" including the thorax with the cardiopulmonary organ, the belly with the whole visceral complex as well as the central nervous system. Other structures, which notably consist of mild parts, muscles and skin, are accepting different thermal values. For example the skin temperature is between 30° & 33°.

But in every case, about the nucleus or the peripheral structures, the regulation of the temperature takes place inevitably by exchanges of heat between the body and the environment, and mutually. So, there are four types of exchanges for the " thermal balance " of the human body: the radiation, the evaporation, the conduction and the convection.

Cryo therapy

Definition

Using cold as a therapeutic agent. It can be produced physically, chemically or by using gazes. The cryo therapy was described by Hippocrates (460–377 before Christ). It stayed quite confidential, as producing cold was problematic.

The effectiveness of cryo therapy is directly linked to a specific condition: The temperature break down must be quick. We are using an electronic cooling system which presents the best advantages as it's produced by electricity and because we can adjust very precisely the temperature. This technique to produce cold is called "Peltier".

Physiologic effects

The therapeutic cryo therapy defines itself as a controlled hypothermia aiming to reduce the temperature on a precise area. Obtained by conduction and by convection, it engenders various physiological effects.

● At the level of tissues

We observe a mechanism of conduction, which propagates the cold of the cryogenic source towards the depth. Step by step the reduction in the temperature interests the skin then the muscular levels etc. The obtained result is double:

- Reduction of the cellular activity
- Reduction of the oxygen consumption

● At the vascular level

• At first, the local cryogenic application quickly provokes a superficial vasoconstriction which limits the arterial and venous exchanges: it is the thermoregulation. Then, by a mechanism of convection, the blood streams of the various arterio-venous networks pass cold to the deeper levels and the nearby cutaneous areas.

• Secondly, we attend a paradoxical vasodilatation which succeeds the initial vasoconstriction. This phenomenon of escape named " hunting response " is bounded to the liberation of biochemical substances. It's due, in fact, to an hyperaemia of protection which represents a real mechanism of defence.

• In the third time, we observe a repetitive alternation of these phenomenon with vasoconstrictions and successive vasodilatations, what maintains the cutaneous tissular protection.

• Finally, it is necessary to notice that the speed of the cooling is important because we know that a very fast drop of temperature facilitates the vasodilatation.

- **At the neurological level**

The cutaneous analgesia which we observe during the cryogenic application is linked to the synergy of several phenomenon obtained by conduction:

- Involvement of the Gate Control System by stimulation of the fast nervous fibres of big calibre (A α and A β), what blocks the nociceptive impulse at the level of the posterior horn of the spine.
- Decrease of the speed of conduction of the slow fibres C and A which pass on the nociceptives information.
- Neutralization of thermo receptors and cutaneous nociceptors which excitability is strongly reduced.

Skin refrigeration

The cryo-modelling respond at a precise temperature level: between +5° and -15°C. So it's important to dispose of a precise material like the Oxynergy Paris cryo-modelling device.

- Over +5°C, the cooling effect is not producing the desired effect.
- Below -15°C, the cooling effect is too strong and can produce skin damages.

Keep in mind that the cryo modeling is a stimulation technique.



Aim of cryo modelling

Controlled analgesia

The temperature shock produces a quick inhibition of the nervous conduction. It's an interesting aspect to produce local anaesthesia to practise certain treatments like, dermabrasion injections etc.

Vasomotricity

Always very helpful in all beauty treatment, the vasomotricity stimulates the microcirculation and improves the blood flow to the skin. The cells are receiving more oxygen and are reactivated.

Cryodermophoresis

The vasomotricity has also as consequence to increase the penetration of the active ingredients, which makes the cryo modelling a transdermal delivery technique like iontophoresis or ultrasounds.

Treatment protocol:

