

## Raynaud's phenomenon: poor adaptation to the cold

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*Raynaud's phenomenon is caused by excessive constriction of arteries in the extremities (fingers, feet, ears) in response to cold, which blocks the circulation of blood. A defect in metabolic adaptation which is very painful, but without real danger!*

When exposed to **cold conditions**, the body attempts to reduce heat loss by constricting the small arteries located just below the skin. This process, called vasoconstriction, ensures that the blood is less exposed to the cold of the external environment and thus allows minimizing the loss of heat. The skin becomes pale and cold, which can be unpleasant, but it is most important that the central body temperature remains constant and permits the internal organs to function normally.

This constriction of cutaneous blood vessels is produced in an autonomous fashion: when a variation in temperature is detected, the brain triggers the production of adrenaline which binds to certain receptors located at the muscles which encircle the blood vessels. The subsequent contraction of the muscles then causes a constriction of the blood vessel and a reduction in blood flow.

This role of adrenaline also explains why strong emotions or extreme nervousness can also cause the extremities to become colder than normal: the surplus adrenaline produced in these situations activates the constriction of the muscles surrounding the blood vessels, somewhat mimicking the effect of cold conditions.

### EXCESSIVE RESPONSE

In some people, the constriction of vessels in response to cold or to strong emotions becomes so strong that the blood circulation is practically stopped. This phenomenon, named Raynaud's phenomenon in honour of its discoverer, Maurice Raynaud, affects 3 to 5% of the population (principally women) and generally occurs in three stages: first, excessive constriction stops the flow of blood to the extremities which become white (pallor), followed by these regions turning blue due to the ensuing lack of oxygen (cyanosis) and finally turning red with the reestablishment of circulation (rubor).

These transformations are associated with extremely disagreeable sensations (numbness, tingling) and often with a very intense pain<sup>1</sup>.

The very large majority of cases of Raynaud's phenomenon are called "primary" because they have no known cause and they appear relatively early in life, between ages 15 and 30. Although



disagreeable, these cases of Raynaud's phenomenon do not present any danger. There are, however, "secondary" Raynaud's phenomena which originate either from certain pathological conditions (scleroderma, lupus, Sjögren's syndrome, arthritis, atherosclerosis) or are linked to certain professions.

In the latter cases, it has been well-documented that repetitive use of vibrating tools (such as a jack-hammer) is associated with secondary Raynaud's phenomenon. It is thus particularly important to pay attention to the appearance of this problem, since modification of work procedures could prevent this phenomenon from worsening and leading to a permanent deterioration of the circulation in the extremities it has affected.

### FLUID CIRCULATION

Although there is no remedy for Raynaud's phenomenon, there are several concrete measures which can minimize its effects. The most important, evidently, is to remain warm: get used to "layering" different forms of clothing, particularly when covering the arms and legs, so that the heat generated can be transmitted to the fingers and to the feet. Remaining physically active when going outside is also important: not only is exercise indispensable to good health, but all activity which accelerates the heart rate also stimulates the blood circulation and aids, at the same time, in heating the extremities.

Some substances are known to promote Raynaud's phenomenon and their elimination could also help in diminishing its effects. If you smoke, this is another good reason to stop: the nicotine in tobacco stimulates the constriction of the small peripheral arteries and cause a decrease in skin temperature, which can aggravate the problem. The same is true for certain medications which stimulate the constriction of blood vessels, including cold medications such as pseudoephedrine.

<sup>(1)</sup> Wigley FM and Flavahan NA. Raynaud's Phenomenon. N. Engl. J. Med. 2016;375:556-565.