Magnetic Field Therapy in Patients with Severe Hemophilia – Motion Analysis and Quality Control

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Material and Methods

Ten subjects with severe hemophilia and severe hemarthropathy of both knee joints were treated for three months with a magnetic field applicator (manufacturer: Schober). The patients performed no other physiotherapy during this period. Their prior pain management regimen and factor VIII supply were continued unchanged. Motion analysis on a treadmill and during knee bends was performed for both knees before and after starting magnetic field therapy.

Patients were provided with the Schober Medicare GmbH Enzymed 5004 magnetic field system consisting of a controlling device, plug and an applicator worn as a cuff on the extremities. The system produces a pulsating magnetic field, primarily in an oscillation range of 2 to 22 Hz. The impulse is a 5-fold sawtooth ramp signal. The treatment period per application is 20 minutes. The device is programmed to automatically produce a gradually beginning and gradually ceasing magnetic field effect at a range of 40 to 90 microtesla. Volunteers use the system 1-2 times daily on the affected knee joints for a period of three months.

How the Magnetic Field Works

1. In the vicinity of a magnetic field, more oxygen is delivered from the blood to the surrounding tissue. The increased oxygen supply widens the circulatory capillaries, resulting in better perfusion and hence a better supply of nutrients and hormones. This is a particular advantage in inflamed tissue.
2. Deflection of positive and negative ions in the magnetic field in proportion to the magnetic flow density and size of charge shifts the charge environment on cell membranes with a positive impact on intracellular metabolic processes.
3. Every organism has electrical conductivity. A magnetic field that changes over time creates a voltage in a conductor. The size of the voltage depends not on the magnetic flow density but on how it changes as a function of time. Rectangular and sawtooth impulses are therefore used to influence the tissue. The sawtooth impulses are more powerful.
4. Hydrogen ions are moved the most in the displacement current of the charge bearers in the magnetic field. This results in a pH shift with release of calcium ions and activation of NO synthesis. This in turn dilates the veins and activates macrophages. Regeneration processes are significantly speeded up.

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