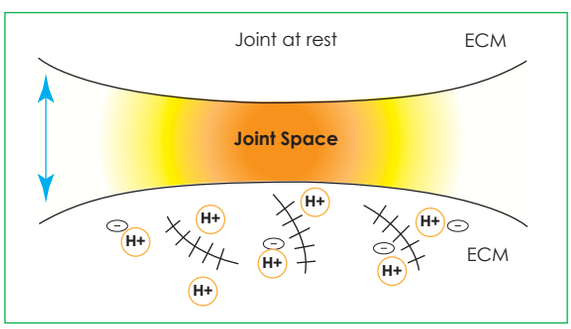
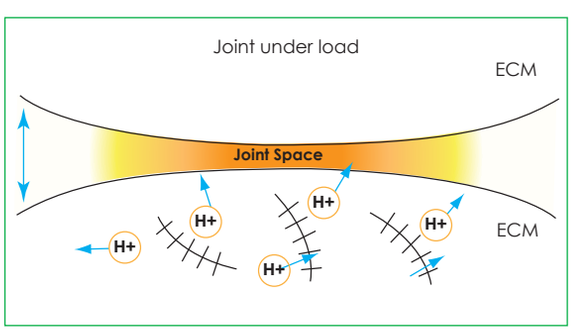
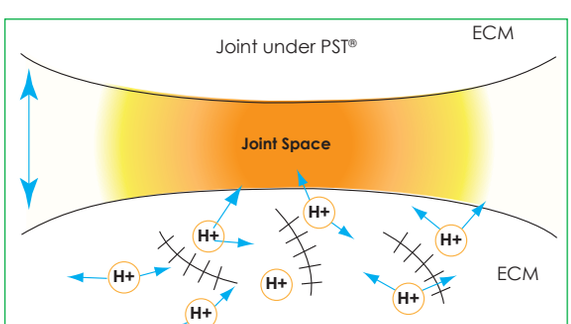
The working principle of the patented PST® technology is scientifically founded



Charge equilibrium between hydrogen protons and negative charge carriers of the extracellular cartilage matrix (ECM) - no streaming voltage potential.



Generation of a streaming voltage potential in the joint under load by the « compression » of fluid forced out of cartilage tissue with forced movement displacement of the hydrogen protons (joint flexion).



Generation of streaming potential flow in the joint caused by forced movement of hydrogen protons in the extracellular cartilage matrix through alternating rectangular impulses as stimuli for the cells in the connective tissue, primarily chondrocytes.

The tissues of the human musculoskeletal system are stressed by continuous support of the body weight and muscle and tendon strength. The cartilage tissue reacts with a functional adaptation. It has been demonstrated that the cartilage layer of the joints under higher load will become thicker and enable a more even distribution of the load. Electrical currents are responsible for the function of the cartilage cells and the regeneration of the bone tissue. However, in unhealthy cartilage tissue a normal flow of streaming potentials is severely affected.

The patented Original PST® technology intervenes here in the treatment of the affected joint cartilage. The unhealthy tissue is treated with impulses that constantly change in intensity and duration. Another effect of the pulsed electromagnetic fields method is that PST® stimulates the natural regeneration of the cartilage cells and the bone tissue with changing rectangular impulses.

The PST® therapy concept supports natural processes and can be applied as a pain free, non-invasive method without known side effects.

How does PST® work? (extract)

Various studies indicate that the capacity of the cartilaginous tissue to withstand compressive stresses is linked to the level of proteoglycans in the intercellular substance; the sulphated glycosaminoglycan chains have an increased concentration of negative electrical charges which give considerable rigidity to the system by their reciprocal repulsion and hold bound a large part of the cartilaginous water in states of rest. Once the destructive process has begun, similarly to the operation of factors which stimulate the chondrocytes to produce harmful substance in pathological quantities, the same cells initiate an attempt at regeneration of the cartilage by increasing the synthesis of glycosaminoglycans. However, they are not capable of supporting such hyperactivity for long so the glycosaminoglycan content is reduced with a more marked reduction in the chondroitin sulphates and an increase in the keratan sulphate/chondroitin sulphate ratio.

The reduction in the proteoglycans, the breaking up of the proteoglycan aggregates, their increased extractibility and the change in tissue hydration cause a reduction of the resistance of the amorphous substance and the collagen fibrils are subjected to intolerable mechanical pressure. There have been numerous studies showing that the process is reversible initially; if maintenance of an adequate concentration of GAG is successful, the cartilage damage can be hindered or slowed and use of chondroprotective drugs and also of PST® is based on this assumption.

Pulsed Signal Therapy (PST®) is based on a patent developed by the American doctor and biophysicist of German origin, Richard Markoll. This is a therapeutic method which differs from the so-called magnetic field therapy used for many years for slowly consolidating fractures. PST®, while it can be used in bone tissue also, finds its main indication in the treatment of cartilage and of soft and connective tissues. To understand the effect of PST®, it must be remembered that when a joint is subjected to compressive stress, there is a displacement of the water present in the matrix accompanied by sodium ions, leaving the negative charges of the proteoglycan molecules unneutralised. By a mechanism of mechanical-electrical transduction, the mechanical stimulus is transformed into a weak electric current (potential streaming) which is thought to represent the main signal for the cartilage cells to increase the synthesis of proteoglycans and collagen.

If the potential streaming is the signal for chondrocytes to produce new matrix, the same effect can be obtained by exposing the joint to an electromagnetic field, producing currents which simulate those of the organism. Administration in this way of low strength pulsed signals at a frequency similar to the biological one is capable of creating an electrical field in the joint, promoting the regeneration of the cartilaginous tissue, and thus conferring physical chondroprotection.

M. Cossu, N. Portale - Niguarda Hospital, Milan (1998)

- Early improvement of the joint function (mobility and flexibility) by the removal of muscular tension, with normalized joint kinematics and reduced pain
- Acceleration of the healing process in injuries to joint-related structures
- Stimulation of the chondrocyte activity on streaming potentials with regeneration of the cartilage tissue
- Stimulation of the osteoblast activity through piezoelectric potentials with stabilisation of the bone thickness

Supported by clinical studies and laboratory research