

A Neural Model for Chronic Pain and Pain Relief by Extracorporeal Shock Wave Treatment

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Device and producing company:

Shock wave devices in general e.g. DUOLITH SD1, Storz Medical

Introduction:

Shock waves are used for urinary stone treatment and for several chronic pain diseases. The etiology of those diseases is mostly unknown but hypothesized to be based on neurobiology. There are numerous chronic pain syndromes in orthopaedics/rheumatology or cardiology, successfully treated by extracorporeal shock wave treatment (ESWT). The working mechanism of ESWT is not completely known.

Methods:

Chronic pain without underlying anatomical disorder is looked at as a pathological control function of memory or "pathological conditioned reflex". Reflexes are considered engraved memory traces linking sensory input with motor response. This feature can be described by associative memory functions of the nervous system. Some conditioned reflexes may cause inappropriate or "pathological reactions". Consequently, a circulus vitiosus of pain sensation and muscle and/or vessel contraction is generated when pain becomes chronic (pain spiral).

Results:

A neural theory of chronic pain is developed on the basis of a neuro-holographic brain model. It explains how ESWT may delete pathologic memory traces by mechanosensory- transduction and hyperstimulation, resulting in permanent pain relief.

Discussion:

The neuro-holographic brain model may be one among others to shine a light on the neural mechanism of chronic pain and, simultaneously, may lead the way to developing appropriate therapies.

Conclusion:

In a generalized manner, the concept of associative memory functions may help to understand conditioning as a learning process and explain ESWT as an efficient method for treatment of chronic pain. This concept may open the door for new treatment approaches to chronic pain and other disorders of the nervous system.