

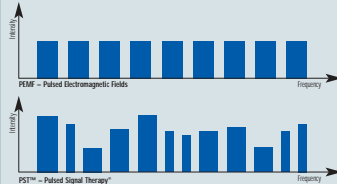
# Pulsed Signal Therapy® (PST™)

A Non-Invasive Treatment for Osteoarthritis and other Musculoskeletal Disorders  
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## Introduction

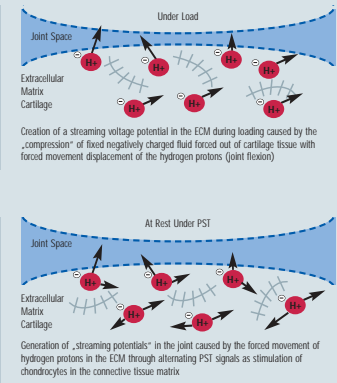
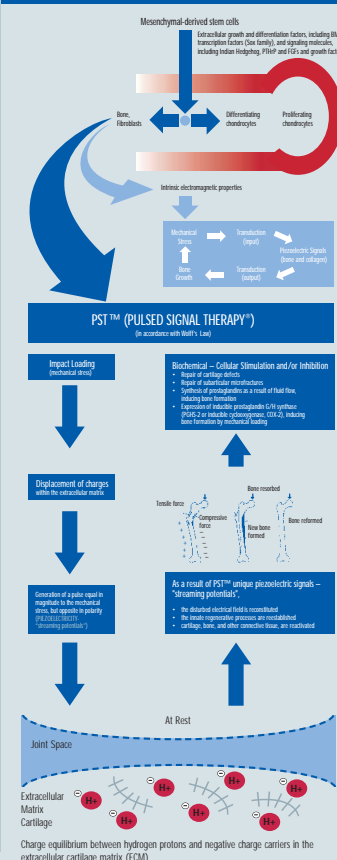
**Pulsed Signal Therapy® (PST®)** is a unique, patented, form of therapy, for the treatment of diverse musculoskeletal disorders, most notably osteoarthritis. PST® was initiated more than three decades ago following clinical evidence that pulsed electromagnetic fields (PEMF) could promote the healing of bone fractures (Bassett *et al*). Since then PST® has undergone rigorous clinical trials over, 15 years, consistently demonstrating both long-term pain relief in osteoarthritis and traumatic joint injury, as well as a return to functionality.

Unlike conventional therapeutic devices, which deliver alternating current, or at times, direct current at a specific intensity and constant frequency, PST<sup>®</sup> delivers changing pulsed electromagnetic signals in an alternating fashion that mimic signals generated in the body. In so doing, cartilage cell (chondrocyte) activity is stimulated in the affected area. **These findings have been patented and can be viewed in our Scientific Information CD (available upon request).**

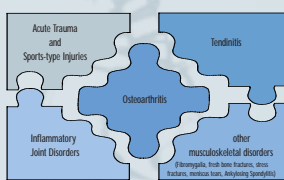


Device Parameter	Magnetic Field Therapy	PSM™
Electromagnetic properties	Passive	Biological signal
Energy form	Alternating current	Direct current
Frequency	44.77Hz	7.30Hz
Waveform	Sinusoidal	Quasi-rectangular
Field Strength	2G	12.5G
Energy drive	Voltage control	Pulsed DC
Duty cycle	<50%	<50%
Pulse frequency	Continuous	Pulse modulated
Frequency source	Fixed frequency source	6 frequency sources
Implementation	Diode (bipolar)	Free-wheeling diode

### Mechanism of Action



## General Medical Applications



### Clinical & *in vitro* studies

Double-blind clinical trials and other open label prospective studies have been conducted and published over a fifteen year period in the USA, Canada, France, Italy, Germany, and Asia, to verify the effectiveness of PST<sup>®</sup> proprietary pulsed electromagnetic induction therapy, for the treatment of osteoarthritis and other musculoskeletal disorders of the knee, hip, lower back and cervical spine.

### Completed Clinical Studies

[illegible]

Completed *in vitro* studies

[illegible]

### Current Clinical Studies

Name of Study	Institution conducting the study	Year started	Year completed	Comments
Chronic Itchiness	Medical Practice	1997	2001	Study in progress. As of 22 August 2003, 193 patients have been completed, in an currently ongoing treatment.
Study on the Efficacy of the Placebo effect of the PCP <sup>1</sup> for patients with chronic itchiness (Validation study of the effect of PCP <sup>1</sup> on patients with sustained itchiness)	Inferomed - Institut für innovative Medizin München, Germany	2002	Approx. 20%	Pending final report – expected this fall.
Definitive Venous Ulcer Clinical Trial	Inferomed, University of Colorado	2003	2004	June 2003: In a written memo, Prof. Dr. G. H. Weiss reported to participate the study, in Portland Hospital. August 2003: Preparation of documents for the Ethics Committee. September 2003: Trial start planned by Prof. Weiss et al.

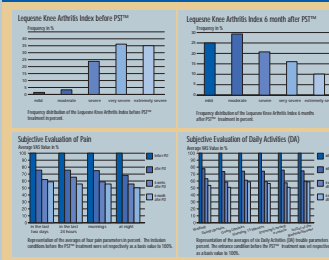
**Results:** Prospective Multicenter Study (pooled data)

Controlled Double-Blind and Prospective Open Label Studies undertaken in the USA, Germany, and Italy, on 35 000 patients.

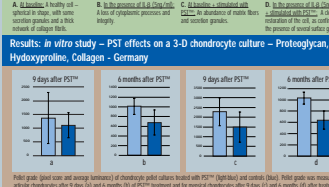
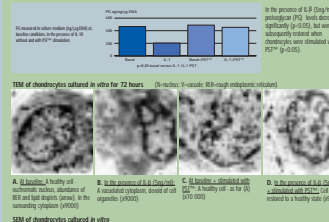


In all investigated groups the improvement in pain (intensity, frequency, in motion) is significant to the baseline with  $p < 0.0001$  and leads to a pain index between 4 and 50% after 1 year follow-up. **Discussion:** In previous studies it has been shown that the changes in the placebo patients had less significance the end of treatment, and had less significance for most variables at the one month follow up. The open label analysis and these data were consistent with double-blind results. **Conclusion:** These studies provide continuing evidence for the use of PST in obtaining improved functionality along with effective and safe from chronic pain associated with Osteoarthritis.

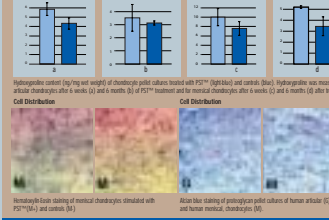
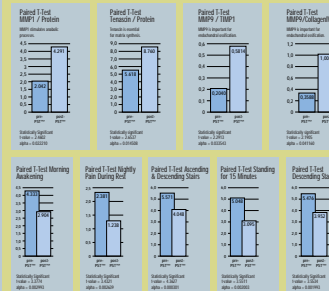
## Results: Multicenter Clinical Study – Gonarthrosis - Germ.



**Results: *in vitro* study – Proteoglycan Synthesis - Italy**



6 weeks after PST™	6 months after PST™	6 weeks after PST™	6 months after PST™
1	2	3	4

Results: *in vitro* study – Matrix Metalloproteinases in Synovial Fluid – Germany

## Discussion

Including clinical trials in diverse parts of the globe, has been certified and accepted, and is currently available in over 600 PST clinics worldwide. More than 200 000 patients worldwide have been treated – many for whom conventional therapies have failed. PST is non-invasive, painless, and, to date, no known adverse effects have been reported. Therefore, and other PST<sup>®</sup> therapeutic benefits, have been published globally in numerous scientific and medical journals – an **integrative CD is available upon request**.

Continued extensive *in vitro* and *in vivo* studies, supported by scientific clinical and research data, seek to unravel its various therapeutic potentials in several diverse disorders, for which there are no currently available treatments, or for which conventional treatments are met with rather harsh adverse side effects. In addition, studies to unravel its mechanism of action at the biomolecular level, will enable its multifaceted, therapeutic potential in the treatment of diverse musculoskeletal disorders, to be elucidated.

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