



8th International Congress on Shock Wave Therapy in Vienna – Remarkable Results in Wound Healing and Curing Myocardial Diseases

Effective, non-invasive (“unbloody”) and with a low risk of side effects –extracorporeal shock wave therapy has demonstrated speedy and promising developments in orthopedics and traumatology worldwide during recent years.

At the 8th International Congress on Shock Wave Therapy in Vienna, 85 studies on extracorporeal shock wave therapy will be presented by physicians from 20 countries in North and South America, Europe, Asia, and Africa. These studies will demonstrate that shock wave treatment is not only successfully employed in pain therapy and bone healing, but also produces impressive results treating fresh and chronic wounds as well as circulatory disorders of the myocardial muscle.

Relief for Bedsores, Chronic Ulcers and Skin Traumas

Common skin ailments like chronic ulcers, bedsores and poorly healing and infected wounds or burns often lead to long-term suffering and a considerable decrease in quality of life.

The effectiveness of shock wave treatment for treating skin diseases was established through circulation of skin flaps and standardized burn-tests on rats which were conducted at the Universitätsklinik für Plastische und Wiederherstellungschirurgie (University for Plastic and Reconstructive Surgery) in Innsbruck, Austria, under the direction of Univ. Prof. Hildegunde Piza. Animal experiments have shown that shock wave therapy outclasses all previously applied treatments. Until now the application of expensive synthetic growth factors was the most effective way to speed up wound healing however, studies show shock wave therapy to be significantly more effective.

A pilot project¹ conducted in Vienna and Berlin from September 2004 to January 2005 involving more than 100 patients with skin diseases produced promising results. More than 80 percent of the skin lesions were brought to a complete healing through the use of shock wave therapy. An additional 11 percent of the patients showed greater than 50 percent

¹ Encouraged by the observation that shock wave treatment of pseudarthrosis caused not only bony consolidation but in many cases also a faster healing of skin lesions (fistulas and other defects), pilot studies on the treatment of skin lesions were established at the Unfallkrankenhaus Meidling (Trauma Clinic Meidling) of the AUVA, Vienna, and at the Center of Extracorporeal Shock Wave Therapy, Berlin, between September 2004 and January 2005.

healing of the trauma surface. Neither objective nor subjective side effects were reported and no patients experienced any painful irritation. Even in cases of chronic trauma of the lower leg (chronic ulcers), which are extremely persistent and difficult to treat, definite improvements were observed – within 4 to 8 weeks 53% of the patients were fully healed and an additional 28% showed improvement of at least 50 percent.

After observing these results, research was expanded to an international level. Currently shock wave treatment studies are being conducted at the Unfallkrankenhaus Meidling in Vienna, Austria, at the Universitätsklinik für Plastische und Wiederherstellungschirurgie in Innsbruck, Austria and at the Center for Extracorporeal Shock Wave Therapy in Berlin, Germany. An additional study will commence in autumn 2005 at the Wilhelminenspital in Vienna, Austria.

Shock Waves Improve Blood Circulation of the Myocardial Muscle with a Preexisting Condition

Once all conservative and operative therapies (bypasses) have been tried, prognoses for myocardial muscles with an impaired blood circulation are bleak – the impaired circulation leads to an aggravation of the cardiac output, resulting in dyspnea, a reduction of blood flow and heart attacks with agonal syndromes (angina pectoris).

By applying shock waves in animal experiments using pigs, Japanese researchers achieved surprising results – a neoplasm of blood vessels in the heart was observed and a marked improvement of the cardiac output was achieved.

The first clinical applications on humans in Germany and Switzerland (Inselspital, Bern) have confirmed these results. After shock wave treatment, marked improvement of the blood circulation with a significant bettering of the patient's general condition as well as a reduction in the number of heart attacks were observed. The circulation improved substantially in both restful condition and under stress. Currently shock wave treatment studies are being conducted at the Inselspital Bern (Switzerland), at the Universitätsklinikum Essen, at the Segeberger Kliniken (Germany) as well as in the Kyushu University Graduate School of Medical Sciences (Japan).

Based on previous results, experts are confident that successful treatment of heart diseases will be confirmed and that further applications will be found in the near future. The biochemical effect of shock waves not only produces an improved circulation, but also initiates a healing process in the chronically aggrieved tissues by releasing growth factors. In addition, an antibacterial effect was established in laboratory conditions.

Shock Wave Treatment in Cases of Pseudoarthrosis – State-of-the-Art in Austria

The 8th International Shock Wave Congress will focus in depth on the now “classical” fields of application of shock waves in treating non- or delayed healing fractures and painful

pathologies like tendinosis calcarea of the shoulder, epicondylitis of the elbow (tennis elbow) and plantar fasciitis (heel spurs). Since shock wave treatment was first applied systematically in cases of delayed fracture healing and non-unions at the Unfallkrankenhaus Meidling under the patronage of AUVA just 10 years ago, it has become internationally accepted and is now the “treatment of first choice” in Austria.

Development of Shock Wave Treatment

The promising developments in the newest fields of application, such as skin and heart treatment, are based on long experience with shock waves – effective and minimal risk of side effects. For 30 years, extracorporeal shock wave treatment has been applied successfully for disintegrating urinary tract concrements, whereby primarily the mechanical energy of the shock wave is used. Shock waves pass through soft tissue without damaging it. At the kidney stone energies are set free which cause it to disintegrate. The remnant is secreted via the urinary tract.

From Kidney Stone Disintegration to Bone Treatment

The concept of treating bone and tendon pathologies arose from observations of shock wave treatments of deeper positioned stones in the ureter and bladder. In order to disintegrate these concrements, shock waves must pass through the ala of the ilium (pelvic bone). Monitoring radiography showed that a thickening of the treated patients’ pelvic bone occurred, and this definitive growth-enhancing effect of shock waves on bony tissue soon attracted the attention of orthopedic and trauma surgeons.

After appropriate clinical studies and animal experiments, use of shock wave therapy increased worldwide in cases of delayed fracture healing and non-unions as well as tendon pathologies (tennis elbow, heel spurs). All observations indicated that shock waves not only enhanced the growth in bony tissue, but also in other tissues (skin, blood vessels).

Mechanisms of Shock Waves

Originally, a “mechanistic” model of the shock wave was adopted whereby shock waves, having passed through the soft tissue without damaging it, cause micro-lesions in the target area thereby triggering the healing impulse in the bone. But recent findings in basic research prove the assumption of a mechanical effect to be mistaken.

From the Mechanistic Model to the “Body’s Innate Bioengineering”

Prof. Dr. Ching-Jen Wang (Kaoshiung, Taiwan) lead the basic research in shock wave therapy demonstrating that shock waves trigger a “biological response” in treated tissue. Under the influence of shock waves, various proteins responsible for healing processes (so called “growth factors”) are created. These cause an increased integration of newly formed blood vessels as well as new growth of tissue, thereby triggering the healing process – better

circulation of the myocardial muscle, new bone formation or the formation of new skin on lesions.

Thus, it was demonstrated that under the influence of shock waves a “body’s innate bioengineering” and the process of self-healing are initiated.

Effective Initiation of Self-Healing – Relevant in Many Medical Fields

For physicians, this active principle provides scores of new possibilities. Instead of applying biologically active substances, which are produced in laboratories at high cost and with high risks, shock waves can be applied to activate the body’s innate system to create these substances naturally. This new hypothesis of the micro-biological mechanism of shock waves has been confirmed in various animal experiments and has attracted the interest of other medical fields. It has also been corroborated by the first successful clinical applications of shock wave treatment in cases of circulation problems of the myocardial muscle as well of chronic and acute skin lesions.

These findings pave the way for shock wave therapy to be utilized in other medical disciplines.

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