

Translation

EXTRA CORPOREAL SHOCKWAVE THERAPY IN 2008

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In recent years, shockwave therapy has experienced a significant development; its fields of application have widened beyond urology and rheumatoid arthritis to such an extent that we changed the name of our association: the International Society of Muscular-Skeletal Shockwave Therapy has become the International Society of Medical Shockwave Treatment. There is now more profound knowledge of the ways in which shockwaves work. In France, however, rheumatologists do not appear to have recognised the opportunities offered by this form of treatment and manufacturers have turned away from the French market. The hope is that the 11th Congress of the ISMST in Juan-Les-Pins will again serve as a catalyst.

FOCUSED SHOCKWAVES AND RADIAL SHOCKWAVES: WHAT ARE THE DIFFERENCES?

The confusion between focused (acoustic) shockwaves and radial (mechanical) shockwaves has had a detrimental effect in France, not only on focussed shockwaves but also on others. We do not classify strontium ranelate as a biphosphonate under the pretext that it also treats osteoporosis in the same way as methotrexate like a biotherapy. To do so would have grave consequences as the manner of action, the secondary effects and monitoring are different. To say that radial shockwaves are not shockwaves does not imply that these waves are without therapeutic effects. The term shockwaves should no longer be used for the latter, especially since, for new dermatological applications, the acoustic shockwave devices have non-focussed heads, the appropriate term is **pressure waves**.

Acoustic and cavitation fields of three shock wave therapy devices (Robin Cleveland, Parag Chitnis, Scott Mc Clure) (10th ISMST CONGRESS 2007 TORONTO)

This study, carried out in the aerospace research department of the University of Boston, involved measuring shockwaves produced by three devices, Evotron and Ossatron (acoustic) and Dolorcast (mechanical). The authors did not detect shockwaves produced by the Dolorcast, not even with the new focussed head of this brand. The authors came to the conclusion that the therapeutic effects observed with the Dolorcast must come from mechanisms other than the shockwaves.

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Shock and pressure Waves - magic tools in medicine (O. Wess) (9th ISMST CONGRESS 2006 RIO)

As stated by O. Wess, an electric bulb and a laser produce light, this does not mean that a bulb is a laser, shockwaves and pressure waves have common indications, in particular in tendonitis and the treatment of pain, however they have differing qualities and manners of action. **Certain shockwave applications must by no means be carried out with pressure waves** (pseudo arthritis, osteonecrosis of the femoral head, osteochondritis, Osgood Schlatter, ulcers).

The various illustrations below explain the difference between shockwaves and pressure waves and the different shockwave devices.

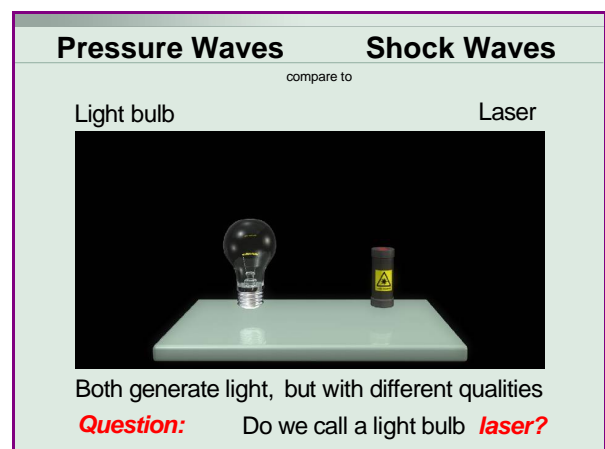


Figure 1



Figure 2: pressure waves

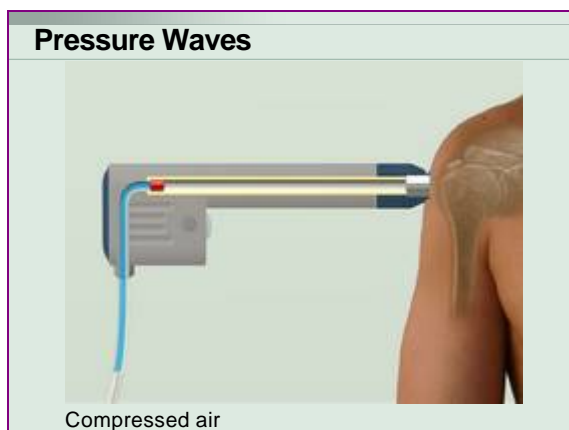


Figure 3: pressure waves

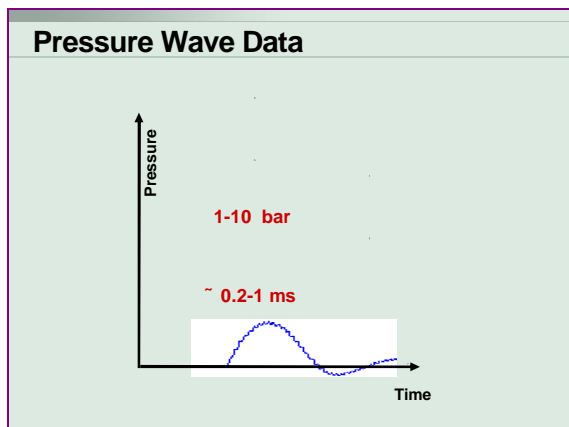


Figure 4: pressure waves

ACTION MECHANISMS OF SHOCKWAVES

NO and shockwaves (Murad Ferid Nobel Prize for Medicine 1998) (10th ISMST CONGRESS 2007 TORONTO)

Extracorporeal shockwaves manifest themselves as biological mechanical transduction (HG Neuland, H.J Duchstein) (9th ISMST CONGRESS 2006 RIO) and (10th ISMST CONGRESS 2007 TORONTO)

Nitric oxide and shockwaves: another brick in the wall (E. Amelio) (9th ISMST CONGRESS 2006 RIO)

All studies are directed not only towards a mechanical action but also towards a biological mechanical transduction whose principal pivotal point is the induction of the production of NO (nitric oxide or nitrogen monoxide (*fig. 9*), NO is a chemical compound formed by an atom of oxygen and an atom of nitrogen. It is a gas under normal pressure and temperature conditions. It is an important neurotransmitter in men, one of the rare gaseous neurotransmitters known. It plays an essential role in numerous physiological functions.

In the vascular system it maintains the vasodilator tone necessary for regulation of the blood circulation and control of arterial pressure. It acts as a neurotransmitter in the central nervous system, participating in the acquisition of the memory, coordinating numerous neuronal activities, regulating the flow of blood, modulating pain.

In the peripheral nervous system NO is freed by nitroergic endings which control the neurogenic vasodilatation and which regulate certain functions of the gastro-intestinal, respiratory and urogenital systems. In addition, large quantities of NO are released during certain immunological or defensive reactions against micro organisms and NO is implicated in septic shock and inflammation physiotherapy.

The Nobel Medicine and Physiology Prize 21 was awarded to Ferid Murad, Furchgott, and Louis J. Ignarro in 1998 for their work on the neurotransmission functions of NO. On the occasion of the 10th Congress of the ISMST, Ferid Murad honoured us with a presentation showing the link between NO and shockwaves.



Figure 5: shockwaves

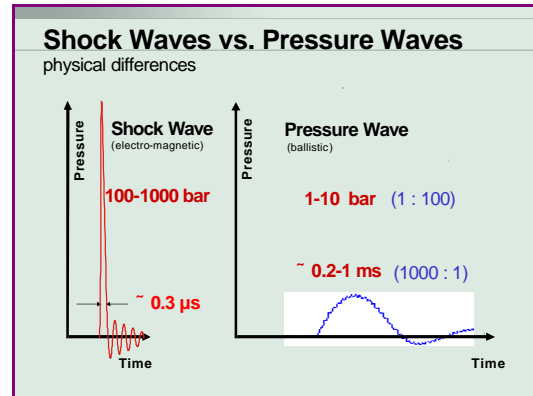


Figure 8: differences between pressure waves and shockwaves

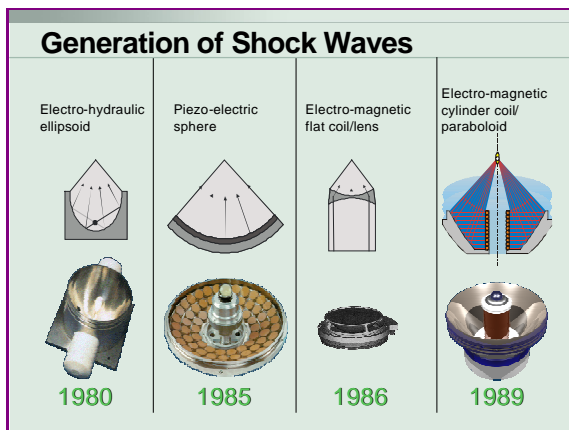


Figure 6: shockwaves

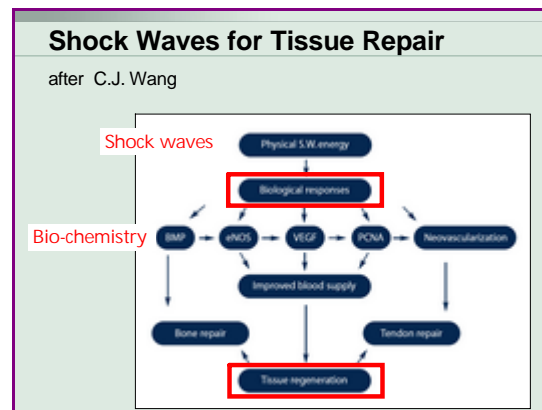


Figure 9: shockwaves

NEW AREAS OF APPLICATION FOR SHOCKWAVES:

RHEUMATOLOGY

Numerous studies presented back up the effectiveness of shockwaves with classical indications (see the consensus recommendations stated below) as well as the good results of pressure waves on tendonitis. We should note the application of shockwaves and above all pressure waves on the trigger points (myofascial syndrome, cervical and lumbar pains) which has been the subject of a workshop and a presentation by Markus Gleitz (Luxembourg) [Results of the combined treatment with radial and focussed shockwaves in patients with chronic cervical pain (Markus Gleitz) (10th ISMST CONGRESS 2007 TORONTO).

Treatment of chronic lumbar pain with radial shock waves (P. Kertzman, J.E. Fugukawa) (9th ISMST CONGRESS 2006 RIO).

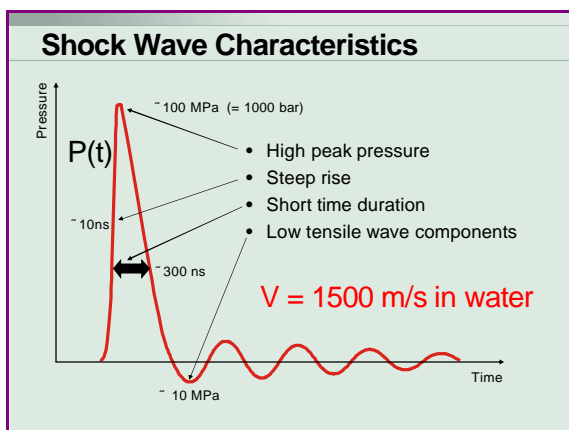


Figure 7: shockwaves

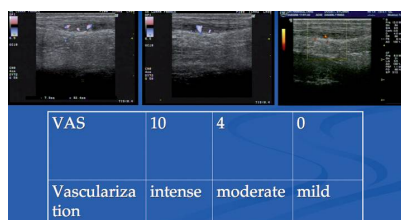


Figure 10

Studies have been presented on Morton's neuroma, sesamoiditis, scleroderma calcifications, Kienbock disease, dermatomyositis (adjuvant).

To follow are studies on the effectiveness of shockwaves on osteochondral lesions and on gonarthrosis by MRI and arthroscopy presented by teams from Germany.

Osteochondral lesions as an indication for ESWT (R. Thiele, S. Marx) (9th ISMST CONGRESS 2006 RIO). Two Years results of patients with gonarthrosis treated with intermittent extracorporeal shockwaves and intra-articular application of hyaluronic acid (A. Lang, H. Neuland) (9th ISMST CONGRESS 2006 RIO).

A study on the action of shockwaves on neo-vessels in chronic tendonitis of the Achilles tendon under ultrasonic control via power Doppler showing a diminution or disappearance of the neo-vessels correlated to the diminution or disappearance of the pain (fig. 10).

Evaluation with ultrasound and colour doppler of a results of ESWT for the control of hyper vascular areas in tendinosis (R. Hamisultane) (9th ISMST CONGRESS 2006 RIO)

DERMATOLOGY:

Numerous studies have indicated the effectiveness of shockwaves on cutaneous ulcers, burns and healing. These perspectives are the origin of an industrial expansion of shockwaves and the development of non-focussed or flat heads (figs. 11 and 12).

ESWT for chronic skins lesions (W.Schaden et. al.) (9th ISMST CONGRESS 2006 RIO).

Non-focused ESWT & skin ulceration in complex neurological disabilities (K. Andrews, A. Larking) (10th ISMST CONGRESS 2007 TORONTO).

Accelerated wound recovery in treatment of burning using ESWT (R.Thiele et. al.) (10th ISMST CONGRESS 2007 TORONTO).

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Figure 11



Figure 12

NEUROLOGY:

Studies on animals have opened up promising perspectives for the **repair of spinal lesions and peripheral nerves, even for treatment of periodontopathy.**

ESWT in peripheral nerve repair (W. Schaden et. al.) (10th ISMST CONGRESS 2007 TORONTO).

Application of ESWT to enhance spinal fusion: a rabbit experiment (T. Lee, C. Wang) (10th ISMST CONGRESS 2007 TORONTO).

ESWT induces alveolar bone regeneration in experimental periodontitis (S. Sathishkumar et. al.) (10th ISMST CONGRESS 2007 TORONTO).

WHO CAN PRACTICE SHOCKWAVES?

Markus GLEITZ (Luxembourg) has raised the problem of the use of shockwaves by non-doctors; according to European directives (http://ec.europa.eu/enterprise/medical_devices/legislation_en.htm) shockwaves (including pressure waves) are **class 2b**, due to the potentially dangerous energy, "hazardous energy".

On the other hand, physiotherapy devices (electrotherapy, ultrasound) are class 2a because they do not emit hazardous energy.

In Italy, the law permits use of shockwaves (and pressure waves) exclusively by doctors (Effectiveness of Radial Shockwave Therapy for Calcific Tendonitis of the Shoulder: Single-Blind, Randomised Clinical Study, A. Cacchio, Physical Therapy. Volume 86. Number 5. May 2006).

RECOMMENDATIONS AND CONSENSUS OF THE ISMST

On the initiative of the German society for shockwaves (DIGEST) and of Pr Rompe, the ISMST has issued consensus recommendations which will be ratified at the 11th congress in Juan-Les-Pins:

The 11th Congress of the ISMST will be held on 5 June 2008 in Juan-Les-Pins under the patronage of the FFR. It is an opportunity for all practitioners interested in shockwaves.

Registration via the website ISMST.COM and <http://web.mac.com/ondesdechoc.france>

**11th International Congress
of the
International Society for
Medical Shockwave Treatment**

June 5th – 7th, 2008







Le Meridien Garden Beach Hotel - Antibes – Juan les Pins, France