

# PhysioNews

Shock Wave Technology for People

The STORZ MEDICAL Information Journal on Shock Wave Therapy

»Keep on running!«

■ **Shock wave therapy**

A successful treatment concept

■ **Seminars**

Training and reference centres for radial ESWT

■ **Large choice**

Overview of STORZ MEDICAL shock wave systems

■ **Innovation**

Shock waves and ultrasound in one system

# Extracorporeal shock wave therapy: A successful treatment concept for physiotherapy



Radial treatment of epicondylitis

Originally used for the fragmentation of kidney stones, shock waves are now applied in physiotherapy and rehabilitation medicine for indications such as pseudarthrosis, epicondylitis, calcific tendinitis of the shoulder, heel spur and myofascial pain syndromes.

## Evolution

Extracorporeal shock wave therapy (ESWT) was first used in pain therapy in the mid-1990s. For this purpose, modified urological lithotripters were employed, which, however, did not become established in medical practice because of their shape and size and high investment cost. 1999 marked the beginning of the successful »career« of radial shock waves in pain therapy. Compact and conveniently priced shock wave systems became available for physiotherapy centres for the first time.

## System technology

Shock wave treatment has become a standard procedure in pain therapy today. Radial



MASTERPULS® MP100  
»elite edition«  
in transport bag

systems are used in physiotherapy centres and rehabilitation medicine. Pressure waves – also referred to as radial shock waves – are generated pneumatically and are suited for

treating all types of enthesiopathies, trigger points and myofascial pain. Thanks to the on-board compressor, the shock wave systems can be transported easily and without any effort and put into operation within less than two minutes.

Today, pain therapy uses primarily radial shock wave systems because of their ease of use, absence of side effects and continuous technological improvements. Research and development have produced better materials for the different shock transmitters. As a result the range of applications has been greatly extended over time and the treatment has become much more comfortable for patients. Depending on the shock transmitter employed, radial shock waves may reach a depth of up to 6 cm (see page 6).



Propagation of radial wave

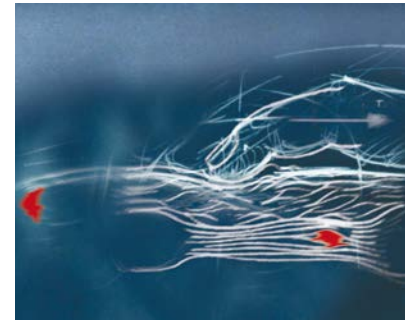
## Guidelines and indications

### Studies

The evolution of shock wave therapy has been strongly influenced by user experience and its consistent translation into technological solutions. Over the years, scientific studies have confirmed previous field reports. In the 1980s there were five publications, followed by 80 publications in the 1990s and more than 450 publications on shock waves between 2001 and 2011.

### Indications

- Calcific tendinitis (shoulder tendinitis)
- Lateral and radial epicondylitis
- Heel spur
- Achillodynia
- Tibial stress syndrome
- Patellar tendinitis
- Myofascial pain syndrome
- Tendinopathies



Palpation of trigger points

## Course of treatment

### Two-step procedure

Shock wave treatment comprises two steps. The first step consists in the local treatment of muscles during which shock waves are applied to active trigger points or painful muscle spots. In the second step, large-area muscle treatment takes place. With this so-called muscle smoothing technique, shock waves are applied in the direction of the muscle fibres, treating not only the painful muscle, but, if necessary, also its antagonist.

### Application

Treatment success is dependent on the application pressure applied (at least 2 – 4 bar), on the shock transmitter type used (depending on the indication) and the number of treatments. In general, patients undergo a total of three to five therapy sessions, receiving no more than two sessions a week.

### Effect

Shock wave therapy triggers different mechanisms of action in the body. It is assumed that the body reacts directly with a reduction of pain by releasing »substance P« and increasing metabolic activity.

Shock waves have demonstrated to produce antibacterial and anti-inflammatory effects. Also, growth factors have been found in vessels, bones and connective tissue. Besides analgesic effects observed immediately during the therapy, shock waves primarily produce long-term results. Generally speaking, it can be said that the biological effects induced by shock waves produce a time-shifted and sustained response inside the body.





Smoothing of painful muscle

### Diagnosis and ultrasound

Accurate diagnostic examination and differential diagnosis certainly are fundamental pillars of successful treatment. For this reason, diagnostic ultrasound is gaining in importance also for physiotherapy not only to improve the ESWT treatment but also to make the result visible and verifiable. The implementation of power Doppler sonogra-

phy also allows the representation of chronic inflammations in the soft parts showing neovascularization.

### Cost effectiveness

A shock wave system requires a somewhat higher initial investment than other common medical devices used in physiotherapy. Depending on the type of system employed and on its accessories (e.g. with on-board ultrasound diagnostics unit) and performance parameters, the purchase price is between 7,000 and 20,000 Euros. But what we should bear in mind is that a shock wave system is a capital good that helps to generate higher turnover.

Corry Ullrich, Physiotherapist

## Recommended literature

The books in the series on »Shock Wave Therapy in Practice« explain the physical principles of shock waves and also describe pathophysiology as well as causes of muscular pain. They illustrate the diagnostic and therapeutic possibilities of radial and focused shock waves in a comprehensive and close to practice manner.

### Ulrich Dreisilker

Shock Wave Therapy in Practice: Enthesiopathies, October 2010

### Markus Gleitz

Shock Wave Therapy in Practice: Myofascial Syndromes & Trigger Points September 2011

### Matthias Beck

Shock Wave Therapy in Practice: Sonography and ESWT, May 2013



# STORZ MEDICAL Shock waves – successful in sports medicine

## Bobsleigh World Championship 2013 St. Moritz, Switzerland



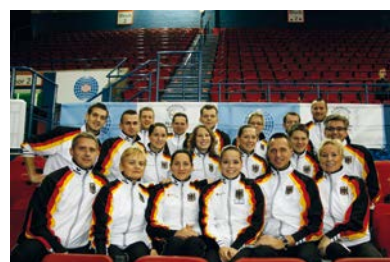
German team with Kevin Kuske

## Olympic Summer Games 2012 London, United Kingdom



Bronze medal for the soccer team from South Korea

## Trampoline World Championship 2011 Birmingham, United Kingdom

German team with gold medallists  
Anna Dogonadze and Jessica Simon

## »Zurich open« 2011 Zurich, Switzerland



Thomas Muster is treated by Dr Kerstin Warnke.

## BVB – Borussia Dortmund German Soccer Champion 2012



Antonio da Silva during trigger treatment

## Olympic Winter Games 2010 Vancouver, Canada



Gold medallist Kim Yu-na, South Korea

# STORZ MEDICAL – Overview of shock wave systems for use in physiotherapy and rehabilitation medicine

## DUOLITH® SD1 »ultra«



### Innovation and technology combined in one system

With the modular design of the DUOLITH® SD1 »ultra« both new and experienced users will be able to utilize the different functions of the system in their daily practice according to their needs. The focused shock wave system can be upgraded any time.

- Radial shock wave therapy:  
Pressure: 1.0 – 5.0 bar;  
frequency: 1 – 21 Hz
- Vibration therapy V-ACTOR®: 1 – 35 Hz
- STORZ MEDICAL »Top View« display delivering all relevant information via touch screen
- Radial shock wave with innovative handpiece display with pressure and frequency selection
- On-board ultrasound imaging, S/W or colour Doppler
- Modular version »Tower«

## MASTERPULS® MP100 »elite edition+«



### Classic shock wave therapy for efficient use

- Pressure: 1.0–5.0 bar; frequency: 1–21 Hz
- Vibration therapy V-ACTOR®: 1–31 Hz
- On-board high-performance »Silent« compressor with self-regulating air moisture separation
- Transport bag or case

## MASTERPULS® MP50 »elite edition+«



### Compact shock wave therapy for beginners

- Pressure: 1.0–4.0 bar; frequency: 1–15 Hz
- Vibration therapy V-ACTOR®: 1–21 Hz
- On-board compressor »Silent« with self-regulating air moisture separation
- Transport bag or case

# Radial ESWT reference and training centres worldwide

## Belgium

- Jean Dehon, Anderlecht
- Myriam Smette, Liège

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- Tamer Yildiz, Etterbeck (Brussels)
- Damien Clotuche, Cortil-Noirmont

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## Denmark

- Them Klinik for Fysioterapi, Them  
www.themfys.dk
- Fysio + Plus, Sønderborg  
www.fysioplus.dk

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- Allerød Fysioterapi & Træning, Allerød  
www.cure4you.dk
- Arkadens Fysioterapi, Aalborg  
www.arkadensfysioterapi.dk

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## France

- Jacques Nicolle, La Rochette
- Claude Le Meur, Montigny le Bretonneux
- Alexandre Jette, Equihen-Plage

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## Germany

- Ralf Pfeiffer, Cologne  
Praxis für Physiotherapie  
www.physiotherapie-koeln.de
- Boris Wittmann, Kempten  
Sportheilpraxis  
www.sportheilpraxis-wittmann.de
- Dr. Tanja Nauck, Frankfurt  
Sportmedizinisches Institut Frankfurt am  
Main e. V., www.smi-frankfurt.de

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## Norway

- Løp og Idrettsklinikken, Asker  
www.loep-og-idrettsklinikken.no
- Follo Kiropraktorsenter, Ski and Kolbotn  
www.follokiropraktor.no
- Naprapatklinikken, Lillehammer  
www.naprapatklinikken.no

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## Switzerland

- Markus Graf, Wetzikon  
Physio-Center  
www.physio-center.ch
- Sven Witjes, Bern  
Physiotherapie Effingerstrasse  
www.pte-bern.ch
- Sandro Haller, Reinach  
Physiotherapie Reinach  
www.physios.ch

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## Canada

- Elsie Culham, PhD, Kingston, Ontario  
School of Rehabilitation Therapy  
Queen's University  
www.rehab.queensu.ca

## Netherlands

- Bert Evers, Zwolle  
Fysiostad Shockwave Center  
www.fysiostad.com



Practice-oriented training

Training schedule upon request!

# Radial shock wave transmitters: Successful treatment in different fields of application



Handpiece with R15 transmitter

Thanks to the diversity of materials, shapes and types, the transmitters do not only reach structures at a depth of up to 6 cm but are also suited for the treatment of painful and sensitive areas.

## Shock wave acupuncture

### A6



- Ø 6 mm, AkuSt transmitter
- Penetration depth: 0 – 40 mm

## Treatment of any type of enthesiopathy

### R15



- Ø 15 mm, ESWT transmitter
- Penetration depth: 0 – 40 mm

### C15



- Ø 15 mm, CERAmA-x®, ESWT transmitter
- Gel-free shock wave application
- Penetration depth: 0 – 40 mm

## Myofascial trigger point therapy

### F15 Muscles of mastication (trigger), cervical spine



- Ø 15 mm, »Focus Lens« transmitter, energy »Point Focus«
- Superficial pain regions
- Penetration depth: 0 – 20 mm

### DI15 Deep target areas



- Ø 15 mm, Deep Impact® transmitter, »Energy beam«
- Chronic disorders, high-energy applications
- Penetration depth: 0 – 60 mm

### D20-S



- Ø 20 mm, D-ACTOR® transmitter
- Muscle and connective tissue
- Penetration depth: 0 – 50 mm



## Example of treatment: Achillodynia as one of the most frequent sporting injuries

The term Achillodynia either refers to a paratendinitis or an enthesitis at the heel bone.

### Symptoms

- Pain caused by pressure or stress
- Swelling, reddening, hypothermia
- Limited mobility or morning stiffness
- Formation of palpable knots due to scar tissue

### Diagnostics: Ultrasound examination

In addition to the thickening of the Achilles tendon (thicker than 5 mm), degenerative changes when comparing both sides, as well as the existence of sprouting blood vessels (neovascularization) can be shown.

### Anatomy

The Achilles tendon is the extension of the M. triceps surae and is one of the strongest

tendons of the body. Very large forces are transmitted especially during jumps and landings.

### Radial shock wave therapy

#### Treatment parameters

##### Step 1:

**Pressure:** 2.0 – 3.0 bar depending on the patient's pain threshold

**Frequency:** 12 Hz

**Pulses:** 1000 pulses on the painful points

**Transmitters:** R15 or DI15

##### Step 2:

**Pressure:** 1.8 – 2.6 bar depending on the patient's pain threshold

**Frequency:** 15 Hz

**Pulses:** 2000 pulses along the Achilles tendon and the M. triceps surae

**Transmitter:** D20-S



Radial treatment

## The ideal complement to shock wave therapy: Biomechanical stimulation with the V-ACTOR® handpiece

The V-ACTOR® handpiece is the ideal complement to modern shock wave therapy. The development of this add-on tool was based on new knowledge about the vital function of the extracellular matrix (ECM) and the physiological vibrations of human tissue.

Researchers such as Professor Nazarov found out that these so-called microvibrations play a crucial role in the physiological processes that take place within the organism. Microvibrations are produced by skeletal muscles and transmitted to the surrounding tissue. In addition to stabilizing the body temperature, physiological vibrations are of decisive

importance in metabolic activity and cell renewal. Owing to their pumping effect, microvibrations support the circulation of nutrients, oxygen and blood cells and enhance the removal of metabolic waste products and toxins in capillaries and in the interstitial space. This means that muscles and the microvibrations they produce are the timer of microcirculation.

The V-ACTOR® induces targeted local vibration pulses in the affected muscles. For this purpose, the muscle to be treated is slightly stretched to produce preliminary tension. The V-ACTOR® is then moved slowly to and fro along the muscle fibres. Depending on the frequency setting, this action normalizes or stimulates physiological muscle vibrations. The frequency should be selected according to the specific indication and should be between 17 and 35 Hz.

The energy level at which the V-ACTOR® is operated depends on the patient's pain thresh-



Mode of operation of the V-ACTOR® handpiece

old. It is generally between 2 and 3 bar. The treatment takes 3 to 10 minutes and varies according to body region and indication. In the daily medical practice, the V-ACTOR® has also made its way into a second field of application. In fact, it is frequently used before and after shock wave treatment. The V-ACTOR® is an ideal tool to prepare highly sensitive or new patients for shock wave therapy and acustom them to the shock waves.



Application with the V-ACTOR® handpiece

# DUOLITH® SD1 »ultra« – Innovation: Shock wave therapy and ultrasound diagnosis merged into a single system

For physiotherapists ultrasound diagnosis is also becoming increasingly important



DUOLITH® SD1 »ultra«

## \* Advantages of ultrasound diagnosis

- Differential diagnosis
- Improvement of results thanks to accurate diagnosing
- Determination of precise treatment depth
- Better control thanks to images before and after treatment
- Treatment becomes more transparent and reliable

Physiotherapists and rehabilitation centres can now benefit from a unique medical innovation: Shock wave therapy and ultrasound diagnosis combined in one system.

At last, diagnosis and treatment have merged into a single shock wave therapy unit. With the DUOLITH® SD1 »ultra«, therapists can now perform diagnostic ultrasound imaging and the corresponding patient-specific radial shock wave treatment with one single control unit.

»The fact that we can provide a clear picture of the available treatment options and that, in most cases, successful therapy results are achieved instantly after the treatment are important aspects for our patients«, explain Dr Carlo Di Maio and Dr Stephan Swart from Neukirchen-Vluyn, who were given the opportunity to install and use the system at their practice before market launch. »The system is well equipped for this kind of patient communication. Our patients are very pleased with the treatment. The on-board ultrasound is in daily use and facilitates im-

mediate diagnosing considerably in the majority of cases.«

Dr Tanja Nauck and Prof Dr Heinz Lohrer of the Frankfurt Centre of Sports Medicine (Sportmedizinisches Institut Frankfurt am Main e.V. SMI) point out, »The new DUOLITH® SD1 »ultra« is in a class of its own! Its highlights are low-noise operation, intuitive control, handpiece display and adjustable radial parameters as well as ultrasound diagnosing. The perfect solution!«



Ultrasound localization for identifying the treatment area



Heel spur treatment with the innovative radial handpiece



Physiotherapist Bert Evers works with the DUOLITH® SD1 »ultra« in Zwolle, Netherlands.