SWISS

DOLOR CLAST®

METHOD

TECHNOLOGY I CLINICAL PROOF I EDUCATION

*ESWT: EXTRACORPOREAL SHOCK WAVE THERAPY

EMS

EMS

E.M.S. ELECTRO MEDICAL SYSTEMS SA

EMS is a Swiss Medical company which, in 1997, patented a ballistic technology that generates shock waves.

By purposing Radial and Focused Shock Wave technology, EMS invented a solution for patients suffering from musculoskeletal and dermatological pathologies.

And so, in 1999, The Swiss DolorClast® Method was born. Today, more than 10,000 units are in use worldwide and more than 2.5 million treatment sessions healing 500,000 happy patients a year are performed.

The high value of our solutions makes us a partner of choice in ESWT.

“I FEEL GOOD”

THE SWISS DOLORCLAST® METHOD →

SAFELY AND EFFICIENTLY TREAT MUSCULOSKELETAL AND DERMATOLOGICAL INDICATIONS WITH SHOCK WAVE THERAPY

MUSCULOSKELETAL INDICATIONS →

TENDINOPATHIES
> Plantar fasciopathies, Achilles tendinopathies, rotator cuff tendinopathies, tennis elbow, etc.

MUSCLE ACHES AND PAINS
> Trigger points, myofascial pain syndrome, etc.

OSTEOARTHRITIS

DELAYED UNIONS AND NONUNION FRACTURES

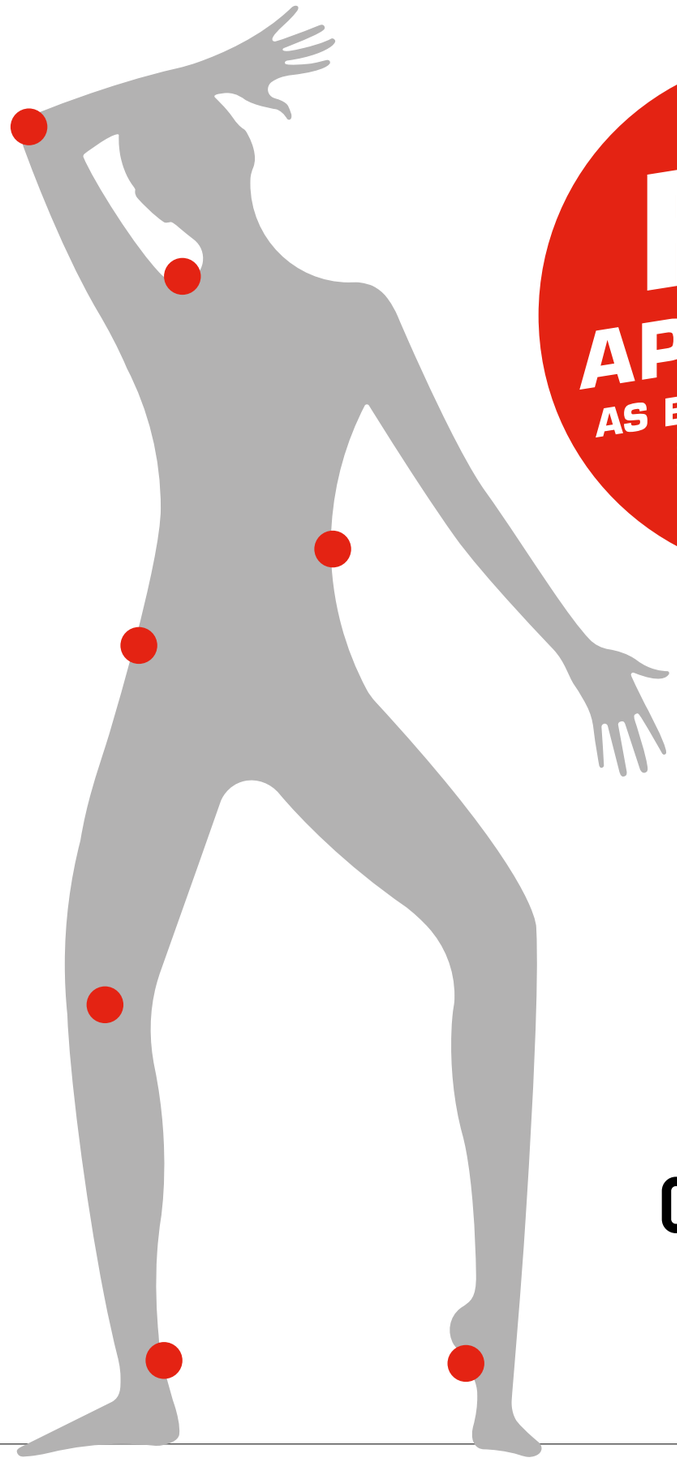
SPASTICITY

DERMATOLOGICAL INDICATIONS →

CELLULITE

SOFT-TISSUE WOUNDS

LYMPHEDEMA



FDA APPROVED AS EXTRACORPOREAL SHOCK WAVE DEVICES

TECHNOLOGY
Innovative and reliable solutions

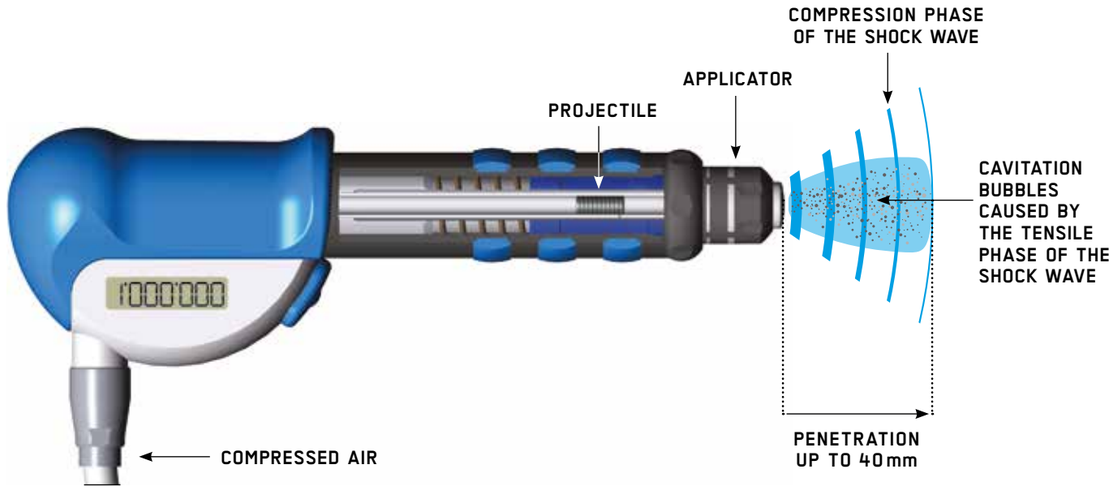
CLINICAL PROOF
Positive clinical outcomes: safe and effective

EDUCATION
Practitioner training and shared knowledge

RADIAL ESWT →

BALLISTIC GENERATION →

> Compressed air accelerates a projectile, which strikes a fixed applicator at high speed (up to 90 km/h) – the kinetic energy is converted into a shock wave delivered to the target tissue through the skin.

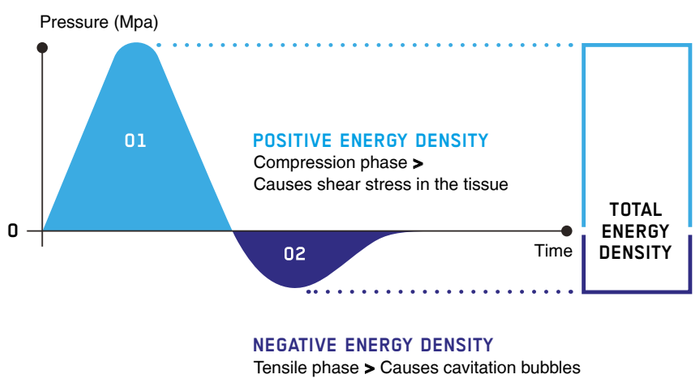


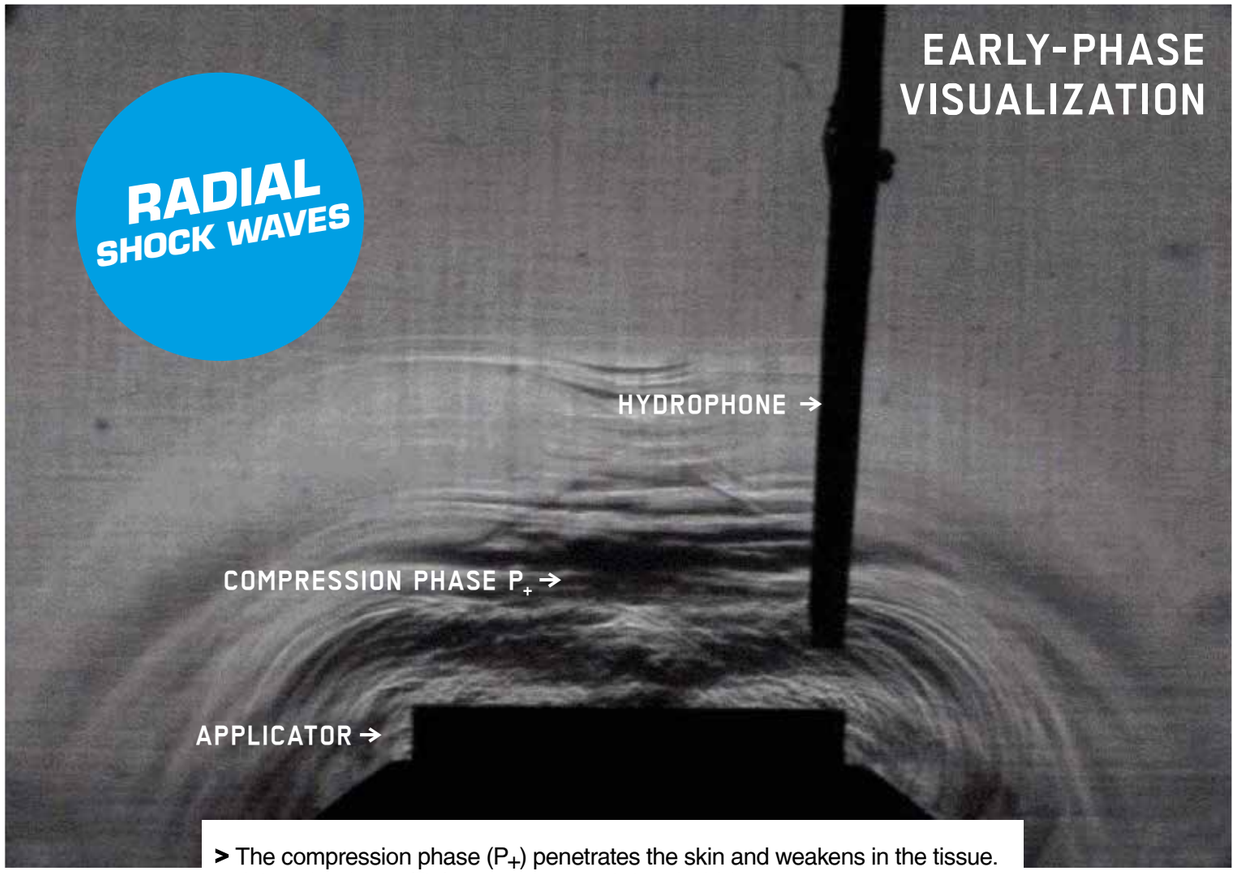
RADIAL SHOCK WAVE PRESSURE CHARACTERISTICS →

01 > The shock wave begins by a compression phase, creating shear stress in the tissue.

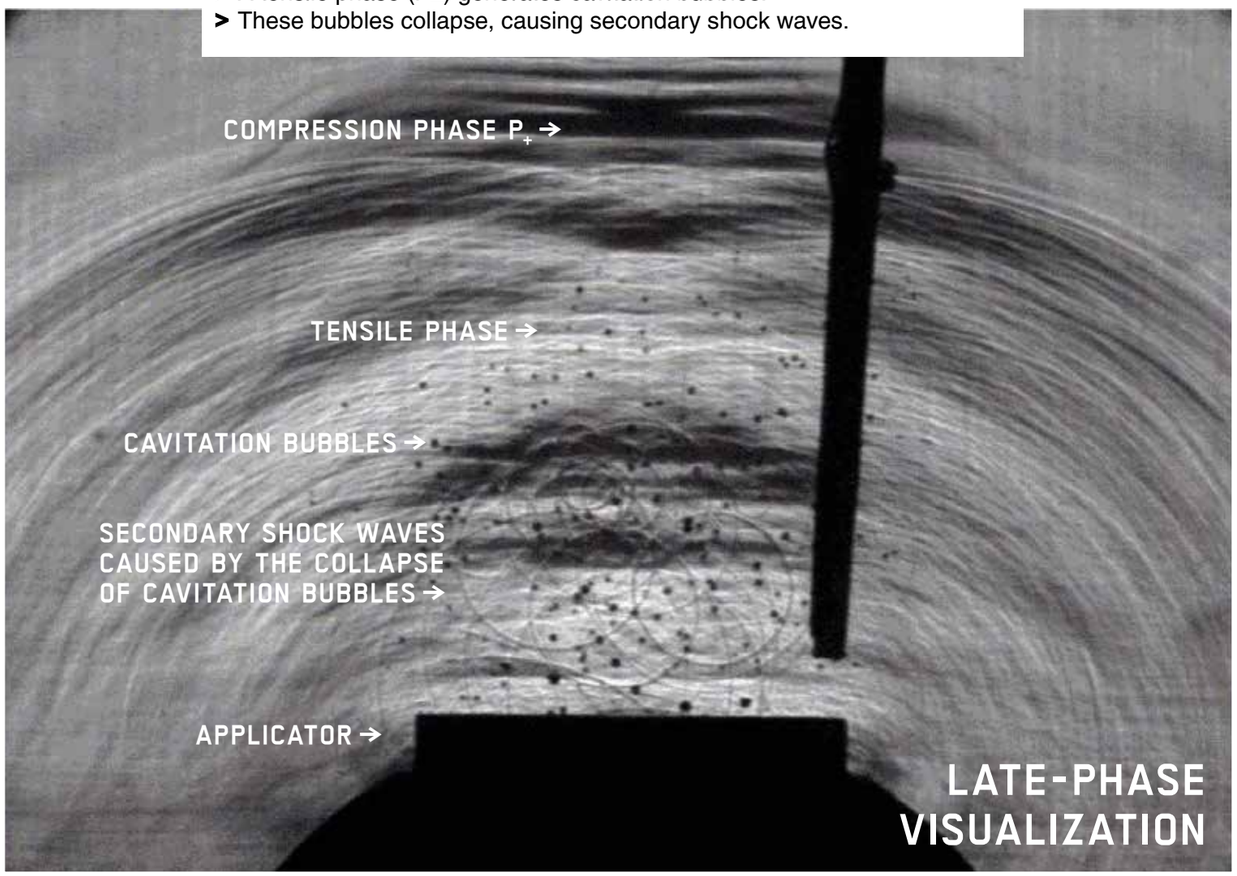
02 > Is followed by a depression phase or tensile phase, generating cavitation bubbles.

→ The energy flux density (ED or EFD) is the squared area below the pressure curve.





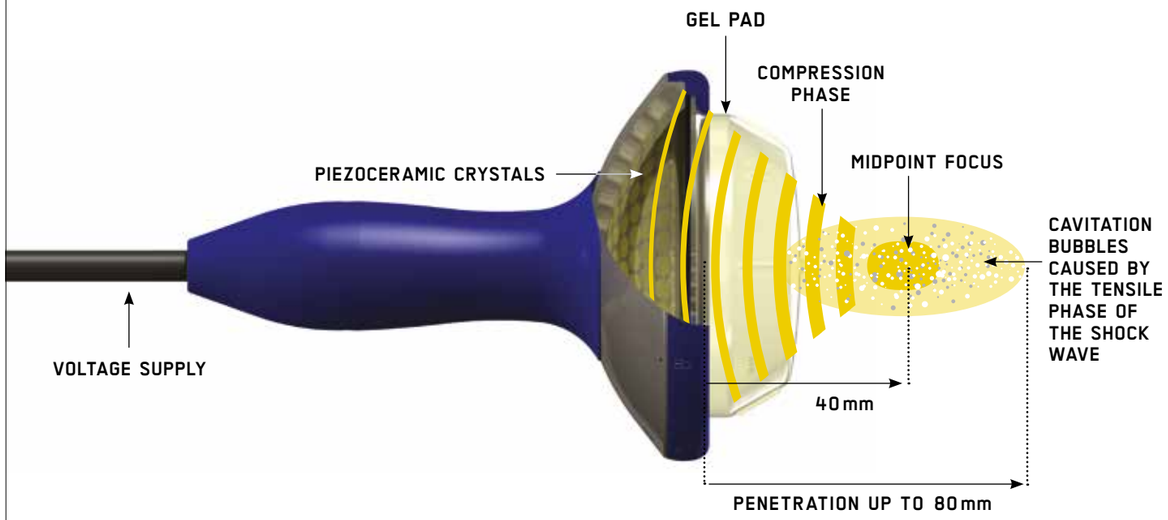
> The compression phase (P_+) penetrates the skin and weakens in the tissue.
> A tensile phase (P_-) generates cavitation bubbles.
> These bubbles collapse, causing secondary shock waves.



FOCUSED ESWT →

PIEZOCERAMIC GENERATION →

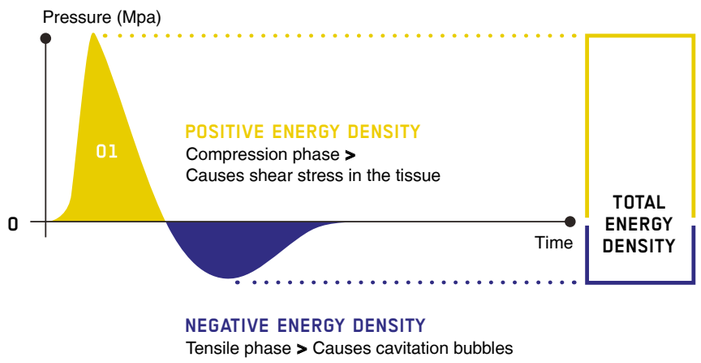
> High voltage is applied to 1,000 piezoceramic crystals generating 1,000 pressure waves.
These 1,000 waves converge into a shock wave at the midpoint focus due to the crystal's ellipsoid alignment.

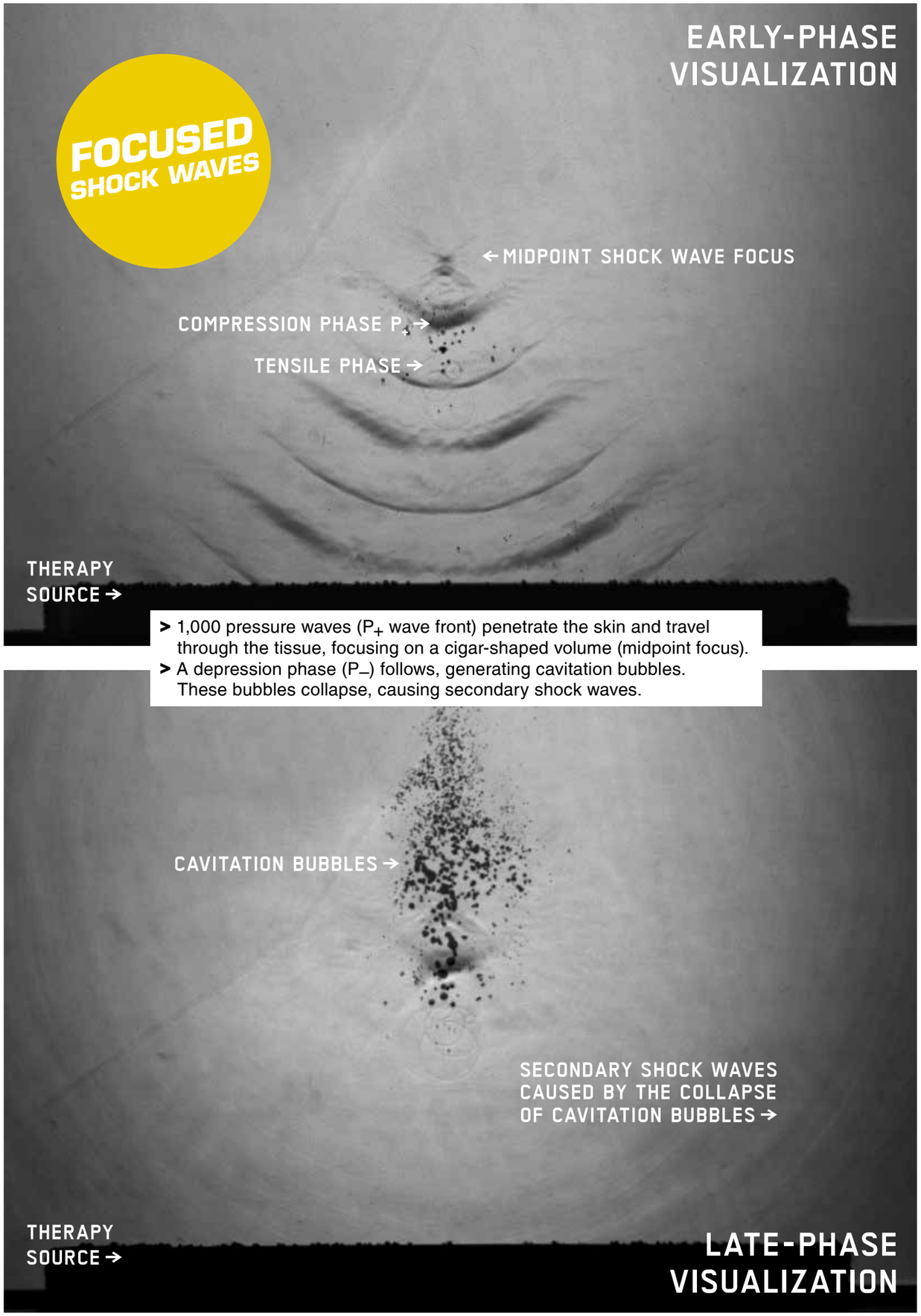


FOCUSED SHOCK WAVE PRESSURE CHARACTERISTICS →

01 > The compression phase in focused ESWT is usually shorter than in radial ESWT and maximum pressure P_+ is usually higher.

→ Both focused and radial ESWT can reach an ED_+ of 0.4 mJ/mm², which has been clinically proven to be sufficient for almost all ESWT indications on the musculoskeletal system and the skin.





SWISS DOLORCLAST® METHOD = BEST TREATMENT OUTCOME →

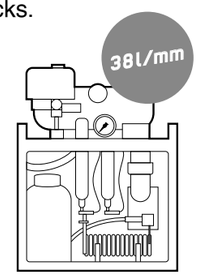
HIGH AIRFLOW

The external compressor of the Swiss DolorClast® delivers 3.8 times more airflow at maximum pressure than the internal pump used by competitors.

High airflow is important to generate energetic shocks.

EXTERNAL COMPRESSOR →

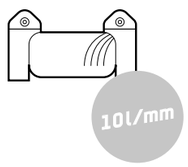
Werther AA100 Air tank
38l/min at 4 bar

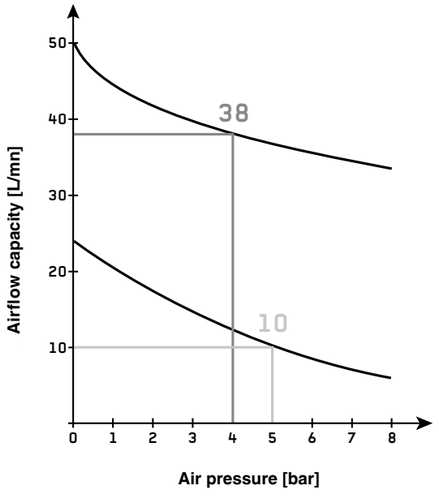


VS

INTERNAL PUMP →

KNF NPK09, two heads
10l/min at 5 bar





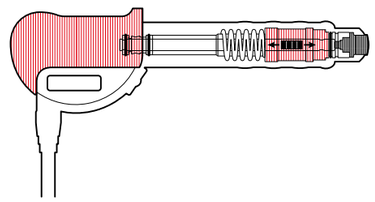
EFFICIENT ENERGY CONVERSION

The Power+ handpiece delivers the highest energy density of all radial ESWT handpieces while the EVO BLUE® handpiece keeps the energy density constant at all frequencies.

Mastering energy conversion is key to maximize energy density and cavitation levels.

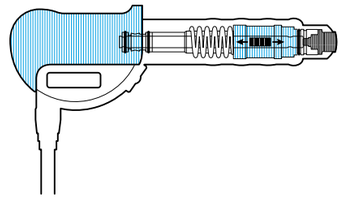
SWISS DOLORCLAST® POWER+ →

FR-140B
converts 4 bar into 0.40 mJ/mm²



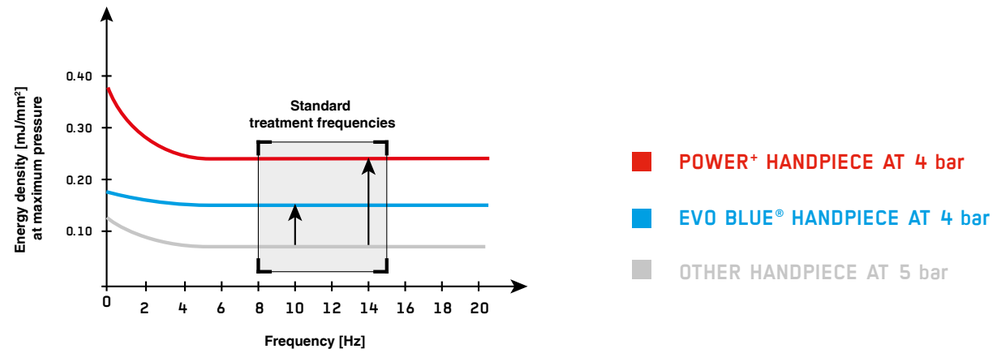
SWISS DOLORCLAST® EVO BLUE →

FR-119A
converts 4 bar into 0.18 mJ/mm²



MAXIMUM ENERGY OUTPUT

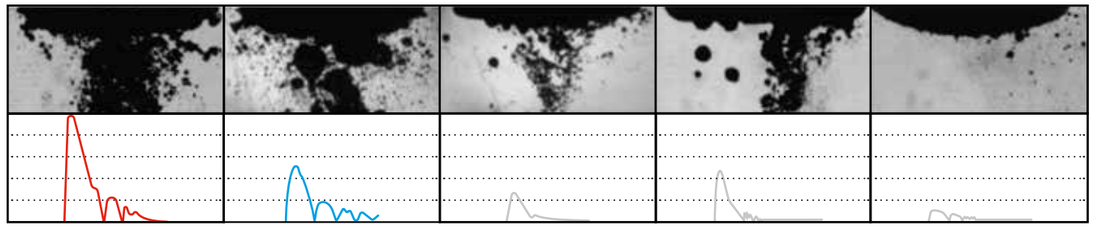
At maximum pressure and between 8 to 15Hz, the Power+ handpiece delivers three times and the EVO BLUE® handpiece two times more positive energy density than a competitor.



Positive energy density was measured for a single shot with a laser hydrophone FOPH 2000 and the measure in frequency was done with an accelerometer omega DPX-101-5K at an EMS laboratory. All measurements were performed at maximum pressure settings of the devices.

HIGH CAVITATION LEVEL

These pictures show the cavitation level of RSWT® handpieces at maximum pressure/energy settings at 15Hz.



The pictures represent the maximum level of cavitation (black dots) for different handpieces at maximum pressure.
The graphs above are the number of pixels caused by cavitation as a function time.

COMPETITOR 1 (Storz Medical D-Actor 200 with external compressor) | COMPETITOR 2 (BTL 5000SWT with external compressor)
COMPETITOR 3 (Zimmer en Puls V. 2.0)

"High-speed imaging of cavitation bubbles generated with radial extracorporeal shock wave devices" by Nikolaus B. M. Császár et al., "Radial Shock Wave Devices Generate Cavitation", 2015. (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0140541#sec020), used under CC-BY-4.0 (https://creativecommons.org/licenses/by/4.0/legalcode)

CLINICALLY PROVEN RESULTS → THE PEDro[1]

30/45 OF THE RCTS[2] ON R-ESWT LISTED IN THE PEDro DATABASE[3] WERE PERFORMED WITH THE SWISS DOLORCLAST®.
IN 80% OF THE STUDIES, THE SWISS DOLORCLAST® RESULTED IN BETTER CLINICAL OUTCOME THAN THE CONTROL GROUP.

ALL STUDIES HAVE BEEN PERFORMED WITH EXTERNAL COMPRESSORS

INDICATION	STUDY	PEDro SCORE	OUTCOME	DEVICE	ENERGY DENSITY	SESSIONS	INTERVAL	IMPULSES	COMMENTS
Calcifying tendonitis of the shoulder	Kvalvaag et al. (2017) 37	9	+[4]	**Swiss DolorClast® (EMS)**	Up to 0.24 (ED_+)[5]	4	7	2,000	The study by Kvalvaag et al. (2017) was performed with the Power+ handpiece, and the study by Kolk et al. (2013) with the Swiss DolorClast® Radial handpiece. The much higher energy applied by Kvalvaag et al. (2017) compared to Kolk et al. (2013) may explain the different outcomes of these studies.
	Cacchio et al. (2006) 06	9	+	Physio SW Therapy (Pagani)	0.10 (ED_+)	4	7	2,500	
	Kolk et al. (2013) 34	7	-	**Swiss DolorClast® (EMS)**	0.11 (ED_+)	3	12	2,000	
Subacromial pain	Engebretsen et al. (2009) 15	8	-	**Swiss DolorClast® (EMS)**	0.1 – 0.16 (ED_+)	4-6	7	2,000	In these studies, patients with rotator cuff rupture were also included. However, the latter is not an indication for the Swiss DolorClast®.
	Engebretsen et al. (2011) 14	7	-	**Swiss DolorClast® (EMS)**	0.1 – 0.16 (ED_+)	3	5	2,000	
Adhesive capsulitis of the shoulder	Hussein & Donatelli (2016) 27	9	+	**Swiss DolorClast® (EMS)**	0.16 (ED_+)	4	7	2,000	
Primary long bicipital tenosynovitis	Liu et al. (2012) 43	5	+	**Swiss DolorClast® (EMS)**	0.12 (ED_+)	4	7	1,500	
Lateral epicondylitis	Spacca et al. (2005) 47	8	+	Physio SW Therapy (Pagani)	"1.2 bar" and "1.0 bar"	4	7	2,000	
	Gündüz et al. (2012) 22	7	+	Not specified	"1.4 bar"	10	1	500	
	Yang et al. (2017) 82	7	+	**Swiss DolorClast® (EMS)**	"2 – 3.5 bar"	3	1	2,000	
	Capan et al. (2016) 07	6	-	ShockMaster 500 (Gymna)	"1.8 bar"	3	7	2,000	
	Sarkar et al. (2013) 61	5	+	Masterpuls MP 100 (Storz)	0.06 (?)	3	7	2,000	
	Lee et al. (2012) 38	5	+	**Swiss DolorClast® (EMS)**	0.06 – 0.12 (ED_+)	3	7	2,000	
	Mehra et al. (2003) 48	4	+	**Swiss DolorClast® (EMS)**	0.10 (ED_+)	3	14	2,000	
Carpal tunnel syndrome	Wu et al. (2016) 81	7	+	Physio SW Therapy (Pagani)	"4 bar"	3	7	2,000	A similar RCT with the Swiss DolorClast® is currently ongoing.
Coccydynia	Lin et al. (2016) 42	6	+	BTL-5000 (BTL)	"3 to 4 bar"	4	7	2,000	
Proximal hamstring tendinopathy	Cacchio et al. (2011) 06	8	+	**Swiss DolorClast® (EMS)**	0.18 (ED_+)	4	7	2,500	
Greater trochanteric pain syndrome	Weckström et al. (2016) 80	6	(+)	Masterpuls MP 100 (Storz)	0.1 – 0.4 (ED_{total}) (2-4 bar)	3	7	3,200	
	Rompe et al. (2009b) 58	5	+	**Swiss DolorClast® (EMS)**	0.12 (ED_+)	3	7	2,000	
Knee osteoarthritis	Imamura et al. (2017) 29	9	-	**Swiss DolorClast® (EMS)**	Up to 0.16 (ED_+)[5]	3	7	2,000	Another RCT performed with the Swiss DolorClast® and the Power+ handpiece (not yet listed in the PEDro database) showed positive outcome when treating knee osteoarthritis (Zhao et al., 2013).
	Li et al. (2015) 41	4	+	**Swiss DolorClast® (EMS)**	0.04 – 0.16 (ED_+)	7	?	600[6]	
Achilles tendinopathy	Rompe et al. (2007) 55	8	+	**Swiss DolorClast® (EMS)**	0.10 (ED_+)	3	7	2,000	
	Rompe et al. (2008) 56	8	+	**Swiss DolorClast® (EMS)**	0.12 (ED_+)	3	7	2,000	
	Rompe et al. (2009a) 57	8	+	**Swiss DolorClast® (EMS)**	0.10 (ED_+)	3	7	2,000	
Plantar fasciopathy	Gerdesmeyer et al. (2008) 18	9	+	**Swiss DolorClast® (EMS)**	0.16 (ED_+)	3	14	2,000	
	Ibrahim et al. (2010) 28	9	+	**Swiss DolorClast® (EMS)**	0.16 (ED_+)	2	7	2,000	
	Rompe et al. (2010) 59	8	-	**Swiss DolorClast® (EMS)**	0.16 (ED_+)	3	7	2,000	In this study by Rompe et al. (2010a) on newly diagnosed plantar fasciopathy, a certain plantar fascia-specific stretching program resulted in better clinical outcome than rESWT using the Swiss DolorClast®.
	Lohrer et al. (2010) 44	8	+	Duolith SD 1 radial part (Storz)	0.17 (ED_{total})	3	7	2,000	
	Chow & Cheing (2007) 09	7	+	**Swiss DolorClast® (EMS)**	0.05 – max. tolerable ED_+	3	7	1,000	
	Rompe et al. (2015) 60	7	+	**Swiss DolorClast® (EMS)**	0.16 (ED_+)	3	7	2,000	
	Eslamian et al. (2016) 17	7	+	**Swiss DolorClast® (EMS)**	0.2 (?) (ED_+)	5	3	2,000	
	Shaheen (2010) 46	6	+	**Swiss DolorClast® (EMS)**	0.06 – 0.14 (ED_+)	3	7	2,000	
	Konjen et al. (2015) 35	6	+	**Swiss DolorClast® (EMS)**	0.08 (ED_+)	6	7	2,000	
	Ulusoy et al. (2017) 71	6	(+)	BTL-5000 (BTL)	"2.5 bar"	3	7	2,000	
	Grecco et al. (2013) 20	5	+	**Swiss DolorClast® (EMS)**	0.12 (ED_+)	3	7	2,000	
	Greve et al. (2009) 21	5	+	**Swiss DolorClast® (EMS)**	0.12 (ED_+)	3	7	2,000	
	Marks et al. (2008) 47	5	-	**Swiss DolorClast® (EMS)**	0.16 (ED_+)	3	3	2,000	Potential reasons for the negative outcome of the study by Marks et al. (2008) were discussed in Schmitz et al. (2013).
	Akinoglu et al. (2017) 02	5	+	**Swiss DolorClast® (EMS)**	"0.2 and 0.3 mJ/mm²"[7]	3	7	2,000	
	Mehra et al. (2003) 48	4	+	**Swiss DolorClast® (EMS)**	0.10 (ED+)	3	14	2,000	
	Krukowska et al. (2016) 36	4	+	BTL-5000 (BTL)	"2.5 bar"	4	3.5	2,000	
Trigger points / myofascial pain syndrome	Cho et al. (2012) 08	5	+	JEST-2000 (Joeunmedical)	0.12 (?)	1		1,000	RCTs on trigger points / myofascial pain syndrome using the Swiss DolorClast® are currently ongoing.
	Damian & Zalpour (2011) 12	4	+	Masterpuls MP 200 (Storz)	Not specified	5.5	7	?	
	Lee & Han (2013) 39	4	-	JEST-2000 (Joeunmedical)	Not specified	1	-	1,000	
Spasticity	Dymarek et al. (2016) 14	6	+	BTL-5000 (BTL)	0.030 (?)	1	-	1,500	
	Vidal et al. (2011) 73	4	+	**Swiss DolorClast® (EMS)**	0.10 (ED_+)	3	7	2,000	

[1] The PEDro database (www.pedro.org.au) is a freely available database of over 37,000 randomized controlled trials (RCTs), [2] Evidence-Based Medicine Level 1. [3] As of September 09, 2017, systematic reviews and clinical practice guidelines in physical and rehabilitation medicine. For each RCT, review or guideline, the PEDro database provides the citation details, the abstract, and a link to the full text, where possible. All RCTs listed in the PEDro database are independently assessed for quality (the assessment criteria are summarized in Schmitz et al., 2015). All but two of the PEDro scale items are based on the Delphi list (Verhagen et al., 1998). PEDro is currently the largest independent database on topics related to physical and rehabilitation medicine. It was developed by The George Institute for Global Health affiliated with the University of Sydney, Australia. [4] Positive outcome in a subgroup of n=46 patients with calcifying tendonitis of the shoulder. [5] Depending on what the patient tolerated. [6] 600 impulses per acupuncture point. [7] 500 impulses at "0.2 mJ/mm²" followed by 1,500 impulses at "0.3 mJ/mm²" (most probably ED^{total} provided in this study).

MECHANISMS OF ACTION →

SWISS DOLORCLAST® METHOD ACTS ON THE MUSCULOSKELETAL SYSTEM VIA A MULTITUDE OF MOLECULAR AND CELLULAR MECHANISMS

NERVES

01 > Hyperstimulation of nerves, activating the gate control mechanism [60-46]

01 > Removal of substance P from C-fibers [23-24]

02 > Blockade of neurogenic inflammation [46]

TENDONS

01 > Improved movement of tendon gliding thanks to Lubricin [85]

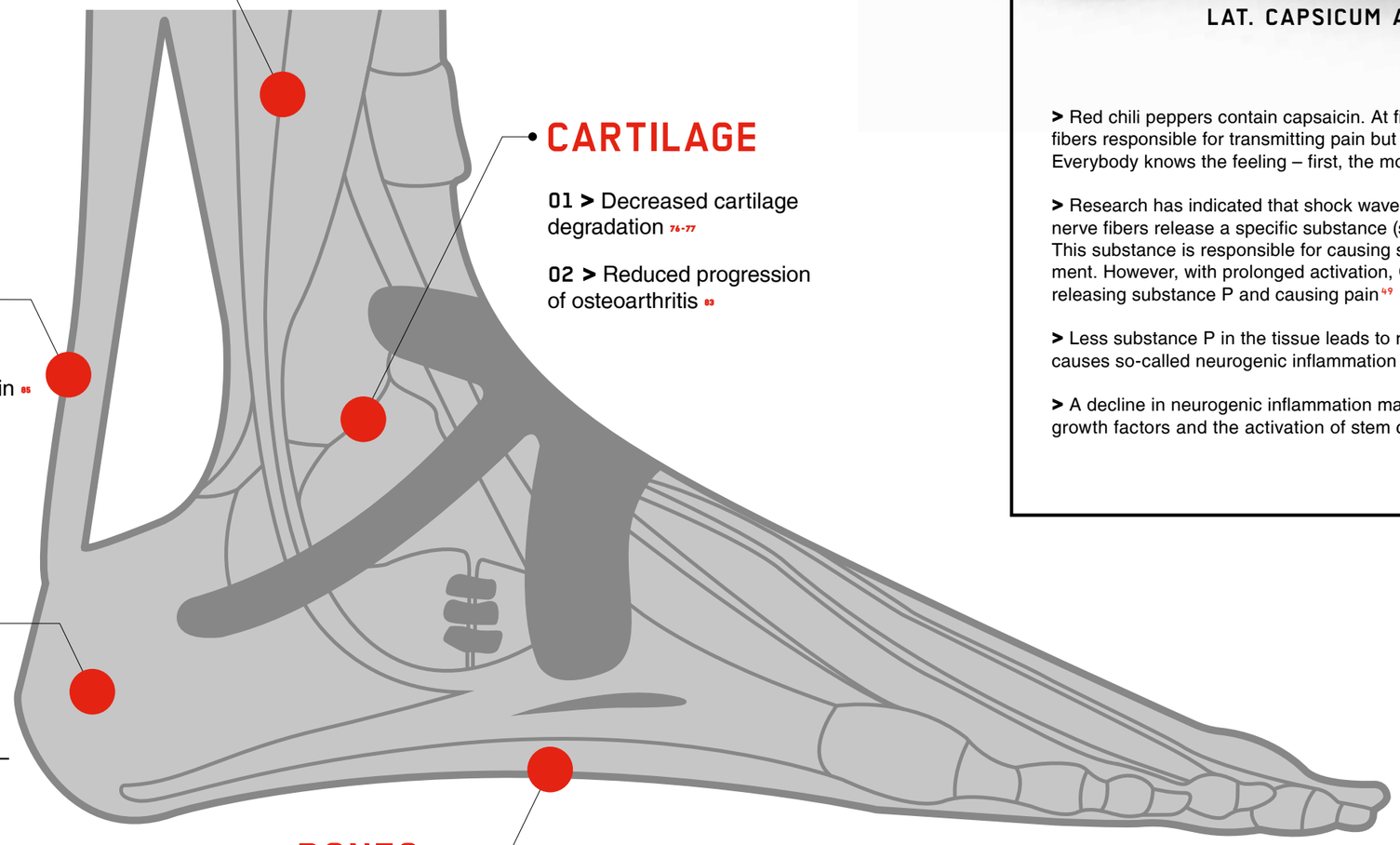
02 > Stimulation of tendon remodeling [79]

MUSCLES

01 > Removal of substance P from trigger points [HYPOTHESIZED FROM 65]

02 > Functional angiogenesis – improved blood circulation [10-33]

02 > Mechanical muscle relaxation [78]



CARTILAGE

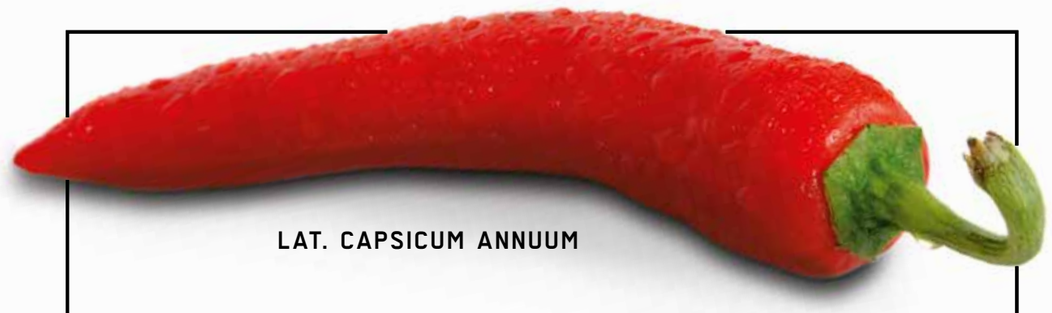
01 > Decreased cartilage degradation [76-77]

02 > Reduced progression of osteoarthritis [83]

BONES

01 > Stimulation of proliferation and differentiation of osteoblasts [70-26-19]

02 > New bone remodeling thanks to increased microcracks / new bone formation [11-30-75]



LAT. CAPSICUM ANNUUM

> Red chili peppers contain capsaicin. At first this substance overwhelms the so-called C nerve fibers responsible for transmitting pain but then disables them for an extended period of time. Everybody knows the feeling – first, the mouth is on fire, then it feels completely numb

> Research has indicated that shock wave therapy works the same way.[46] When activated, the C nerve fibers release a specific substance (substance P) in the tissue as well as in the spinal cord. This substance is responsible for causing slight discomfort during and after shock wave treatment. However, with prolonged activation, C nerve fibers become incapable for some time of releasing substance P and causing pain[49]

> Less substance P in the tissue leads to reduced pain, but there is more: Less substance P also causes so-called neurogenic inflammation to decline[52-53-40-46-69]

> A decline in neurogenic inflammation may in turn foster healing – together with the release of growth factors and the activation of stem cells in the treated tissue[74-26]

Refer to the Literature on page 22 to learn more on the clinical studies

01 > IMMEDIATE AND LASTING PAIN RELIEF

02 > HEALING AND IMPROVED FUNCTION

4 STEPS FOR SUCCESS →

AFTER A PROPER DIAGNOSIS IS PERFORMED AND THE CONTRAINDICATIONS ARE EXCLUDED, POSITION YOUR PATIENT ON THE TREATMENT BENCH

RADIAL ESWT

OR

FOCUSED ESWT

01 PALPATE AND MARK

Locate the area of pain through palpation and biofeedback and mark the area of pain

02 APPLY THE GEL

Apply coupling gel to transmit shock waves to the tissue

03 TREAT WITH SHOCK WAVES

Deliver shock waves to the area of pain while keeping the applicator firmly in place on the skin

04 RELAX MUSCLES

If tense, relax surrounding muscles by applying radial shock waves with the 36 mm applicator

FC LIVERPOOL PLAYERS

FROM LEFT TO RIGHT

Sadio Mané (19)
Jordan Henderson (14)
Alex Oxlade-Chamberlain (21)
Joe Gomez (12)
Mohamed Salah (11)

SWISS DOLORCLAST® ACADEMY →

SHOCK WAVE EDUCATION MAKES YOUR PRACTICE SUCCESSFUL

MAKE YOUR PRACTICE VISIBLE

EDUCATING TOMORROW'S EXPERTS IN ESWT →

> The Swiss DolorClast® Academy – SDCA – offers flexible shock wave training programs globally to spread knowledge about the Swiss DolorClast® Method with a view to improving patient care. Wherever you are, working from a remote location, in a small town or a big city, you can access our high-quality tailored courses in your area and in your language.

> The SDCA has a large network of shock wave experts encouraging users and future trainers to popularize the Swiss DolorClast® Method worldwide.

INCREASING YOUR EXPOSURE →

> The SDCA helps you increase your exposure and drive business for your practice by adding you to the online directory of certified shock wave centers.

> The SDCA is the perfect organization to keep you up to date on the latest clinical advances.

SDC-ACADEMY.COM

Q&A

CAN I TREAT ACUTE PATHOLOGIES WITH ESWT?

> In general this is possible. With regard to tendon pathology it is critical to note that there are no acute tendinopathies, only newly diagnosed ones. Safety and efficacy of radial ESWT for newly diagnosed tendinopathies have already been demonstrated in the international peer-review literature for plantar fasciopathy[59], primary long bicipital tenosynovitis[43] and lateral or medial epicondylitis[38].

CAN I COMBINE ESWT WITH OTHER TREATMENTS?

> Yes, you can. In case of chronic midportion Achilles tendinopathy it has been shown that the combination of radial ESWT and eccentric loading resulted in statistically significantly better clinical outcome than eccentric loading alone[57], with radial ESWT being as effective as eccentric loading for this indication[55].

WHAT ARE THE CONTRAINDICATIONS OF THE SWISS DOLORCLAST® METHOD?

> Treatment over air-filled tissue (lung, gut) | Treatment of preruptured tendons | Treatment of pregnant women | Treatment of patients under the age of 18 (except for the treatment of Osgood-Schlatter disease) | Treatment of patients with blood-clotting disorders (including local thrombosis) | Treatment of patients treated with oral anticoagulants | Treatment of tissue with local tumors or local bacterial and/or viral infections | Treatment of patients treated with local cortisone injections (within the six-week period following the last local cortisone injection).

More Q&A at www.sdc-academy.com

Refer to the Literature on page 22 to learn more on the clinical studies

LITERATURE →

01 **ANGSTMAN ET AL.,** Front Behav Neurosci 2015; 9:12.
02 **AKINOGLU ET AL.,** Pain Med 2017: Epub ahead of print on May 29 (doi: 10.1093/pm/pnx113).
03 **BHOGAL ET AL.,** J Clin Epidemiol 2005; 58:668-73.
04 **BURR,** Bone 2002; 30:2-4.
05 **CACCHIO ET AL.,** Physical Therap 2006; 86:672-682.
06 **CACCHIO ET AL.,** Am J Sports Med 2011; 39:146-153.
07 **CAPAN ET AL.,** Am J Phys Med Rehabil 2016; 95:495-506.
08 **CHO ET AL.,** J Phys Ther Sci 2012; 24:1319-1323.
09 **CHOW & CHEING,** Clin Rehabil 2007; 21:131-141.
10 **CONTALDO ET AL.,** Microvasc Res 2012; 84:24-33.
11 **DA COSTA GÓMEZ ET AL.,** Vet Surg 2004; 33:49-55.
12 **DAMIAN & ZALPOUR,** Med Probl Perform Art 2011; 26:211-217.
13 **DE MORTON,** Aust J Physiother 2009; 55:129-133.
14 **DYMAREK ET AL.,** Ultrasound Med Biol 2016; 42:1862-1875.
15 **ENGEBRETSEN ET AL.,** Brit Med J 2009; 339:b3360.
16 **ENGEBRETSEN ET AL.,** Phys Ther 2011; 91:37-47.
17 **ESLAMIAN ET AL.,** Pain Med 2016; 17:1722-1731.
18 **GERDESMEYER ET AL.,** Am J Sports Med 2008; 36:2100-2109.
19 **GOLLWITZER ET AL.,** Ultrasound Med Biol 2013; 39:126-133.
20 **GRECCO ET AL.,** Clinics 2013; 68:1089-1095.
21 **GREVE ET AL.,** Clinics 2009; 64:97-103.
22 **GÜNDÜZ ET AL.,** Clin Rheumatol 2012; 31:807-812.
23 **HAUSDORF ET AL.,** Brain Res 2008a; 1207:96-101.
24 **HAUSDORF ET AL.,** Neuroscience 2008b; 155:138-144.
25 **HOCHSTRASSER ET AL.,** Sci Rep 2016; 6:30637.
26 **HOFMANN ET AL.,** J Trauma 2008; 65:1402-1410.
27 **HUSSEIN & DONATELLI,** Eur J Physiother 2016; 18:63-76.
28 **IBRAHIM ET AL.,** Foot Ankle Int 2010; 31:391-397.
29 **IMAMURA ET AL.,** J Rehabil Med 2017; 49:54-62.
30 **KEARNEY ET AL.,** J Orthop Res 2011; 29:1536-1543.
31 **KENMOKU ET AL.,** J Orthop Res 2012; 30:1660-1665.
32 **KENMOKU ET AL.,** Muscle Nerve 2017: Epub ahead of print on July 31 (doi: 10.1002/mus.25754).
33 **KISCH ET AL.,** J Surg Res 2016; 201:440-445.
34 **KOLK ET AL.,** Bone Joint J 2013; 95–B:1521-1526.
35 **KONJEN ET AL.,** J Med Assoc Thai 2015; 98:S49-S56.
36 **KRUKOWSKA ET AL.,** Arch Orthop Trauma Surg 2016; 136:1289-1296.
37 **KVALVAAG ET AL.,** Am J Sports Med 2017; 45:2547-2554.
38 **LEE ET AL.,** Ann Rehabil Med 2012; 36:681-687.
39 **LEE & HAN,** J Phys Ther Sci 2013; 25:341-344.
40 **LEMELLE ET AL.,** Clin Podiatr Med Surg 1990; 7:385-389.
41 **LI ET AL.,** Acupunct Res 2015; 40:300-303.
42 **LIN ET AL.,** Plos One 2016; 10: e0142475.
43 **LIU ET AL.,** Ultrasound Med Biol 2012; 38:727-735.
44 **LOHRER ET AL.,** Foot Ankle Int 2010; 31:1-9.
45 **MAHER ET AL.,** Phys Ther 2003; 83:713-721.
46 **MAIER ET AL.,** Clin Orthop Relat Res 2003; (406):237-245.
47 **MARKS ET AL.,** Acta Orthop Belg 2008; 74:98-101.
48 **MEHRA ET AL.,** Surgeon 2003; 1:290-292.
49 **MELZACK AND WALL,** Science 1965; 150:971-979
50 **OGDEN ET AL.,** Clin Orthop Relat Res 2001; (387):8-17.
51 **PEREZ ET AL.,** J Acoust Soc Am 2013; 134:1663-1674.
52 **RICHARDSON & VASKO,** J Pharmacol Exp Ther 2002; 302:839-845.
53 **ROETERT ET AL.,** Clin Sports Med 1995; 14:47-57.
54 **ROMPE ET AL.,** J Orthop Res 2005; 23:931-941.
55 **ROMPE ET AL.,** Am J Sports Med 2007; 35:374-383.
56 **ROMPE ET AL.,** J Bone Joint Surg Am 2008; 90:52-61.
57 **ROMPE ET AL.,** Am J Sports Med 2009a; 37:463-470.
58 **ROMPE ET AL.,** Am J Sports Med 2009b; 37:1981-1990.
59 **ROMPE ET AL.,** J Bone Joint Surg Am 2010; 92:2514-2522.
60 **ROMPE ET AL.,** Int J Surg 2015; 24:135-142.
61 **SARKAR ET AL.,** Hong Kong Physiother J 2013; 31: 19-24.
62 **SCHELLING ET AL.,** Biophys J 1994; 66:133-140.
63 **SCHMITZ ET AL.,** J Orthop Surg Res 2013; 8:31.
64 **SCHMITZ ET AL.,** Brit Med J 2015; 116:115-138.
65 **SHAH ET AL.,** Arch Phys Med Rehabil 2008; 89:16-23.
66 **SHAHEEN,** Indian J Physiother Occupat Therap 2010; 4:8-12.
67 **SPACCA ET AL.,** Eur Med Phys 2005; 41:17-25.
68 **SPEED,** J Bone Joint Surg Br 2004;86:165-171.
69 **TAKAHASHI ET AL.,** Auton Neurosci 2003; 107:81-84
70 **TISCHER ET AL.,** Eur Surg Res 2008; 41:44-53.
71 **ULUSOY ET AL.,** J Foot Ankle Surg 2017; 56:762-767.
72 **VERHAGEN ET AL.,** J Clin Epidemiol 1998; 51:1235-1241.
73 **VIDAL ET AL.,** NeuroRehabilitation 2011; 29:413-419.
74 **WANG,** ISMST Newsletter 2006, Vol.1, Issue 1.
75 **WANG ET AL.,** Bone 2003; 32:387-396.
76 **WANG ET AL.,** Arch Orthop Trauma Surg 2011; 131:1153-1158.
77 **WANG ET AL.,** J Surg Res 2012; 178:196-205.
78 **WANG ET AL.,** Medicine 2016; 95:e3649.
79 **WAUGH ET AL.,** Eur Cell Mater 2015; 29:268-280.
80 **WECKSTRÖM & SÖDERSTRÖM,** J Back Musculoskelet Rehab 2016; 29:161-170.
81 **WU ET AL.,** J Orthop Res 2016; 34:977-984.
82 **YANG ET AL.,** Am J Phys Med Rehabil 2017; 96:93-100.
83 **ZHAO ET AL.,** Arch Orthop Trauma Surg 2012; 132:1547-1553.
84 **ZHAO ET AL.,** J Surg Res 2013; 185:661-666.
85 **ZHANG ET AL.,** Cell Tissue Res 2011; 346:255-262.
86 **ZISSLER ET AL.,** Am J Sports Med 2017; 45:676-684.

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