

S. Tveten



Extracorporeal Shockwave therapy in aesthetic medicine

Aesthetic treatment with radial shockwaves transmits intense mechanical shockwaves into the tissue. The new shockwave system *ZWave^{Pro}* from Zimmer MedizinSysteme GmbH, Neu-Ulm, Germany, makes it possible to provide effective treatments for weak connective tissue, to tighten skin, to treat cellulite, and several other application. Several studies have shown that the treatment improves blood circulation through the tissue, makes the epidermis firmer and significantly stimulates the formation of new collagen



Fig 1: *ZWave^{Pro}*.

How it works

The stimulating effect of low-energy, defocused extracorporeal shock waves on the biological processes within the tissues they penetrate has been the focus of much research in recent years. The biological effect of being penetrated by a shock wave is becoming better understood. There are reports of biological responses that lead to the release of various substances (measured immunohistochemically), such as VEGF (vascular endothelial growth factor), eNOS (endothelial nitric oxide synthase) and PCNA (proliferating cell nuclear antigen) (Siems et al. 2005; Wang et al. 2006); also lesions of the cytoskeleton (Moosavi-Nejad 2006), changes in the mitochondria, endoplasmic reticulum and the nuclear membrane. Shock waves also stimulate blood circulation in the area of application and the patient's metabolism; they also have an enormous antibacterial effect.

Scientific studies have shown that unfocused low-energy shock waves have a positive influence on the collagen structure of the skin and the body's connective tissues. They improve blood circulation and metabolism of the body's fat cells. The intense mechanical massage effect leads to a reduction of oedemas (not for use in fresh, highly inflammatory conditions), and to an improved elimination of toxins. It also stimulates the formation of collagen fibres. The skin becomes more elastic and, after just a few sessions, its firmness is not only noticeable but also visible.

Indications and contraindications

Cellulite (stages I-III), general skin tightening and increasing the skin's elasticity, as well as for the following indications:

- ▶ weakness of the muscles and connective tissue
- ▶ stretch marks (striae)

- ▶ follow-up treatment for Cryolipolyse™ for skin tightening and/or to reduce fat cells
- ▶ in combination with radio frequency for skin tightening
- ▶ skin tightening following injection lipolysis
- ▶ follow-up treatment after injection lipolysis to reduce fat cells
- ▶ in combination with ultrasound for skin tightening and/or to reduce fat cells
- ▶ in combination with non-invasive laser treatment to reduce fat tissue
- ▶ functional scar treatment
- ▶ supporting lymphatic drainage with special programs
- ▶ lipoedema
- ▶ follow-up to liposuction for skin tightening and/or to reduce fat cells

In the following cases, treatment with shock waves is not recommended: vascular disorders in or in the vicinity of the treatment area; local infections in the treatment area; application to areas with malignant or benign tumours; direct application to cartilage surfaces or the small facet joints of the spine; direct application over implanted electronic devices, such as pacemakers, patient-controlled analgesia, etc.; application in areas where mechanical energy in the form of vibrations might lead to tissue damage, such as metal plates used to repair broken bones. Generally, treatments are not recommended for bleeding disorders or for therapies that result in a change in blood coagulation; in pregnancy; neurological diseases with vasomotion disorders in the treatment area; over body cavities filled with air, such as the chest; in children, especially in area of the epiphyseal joints. Caution is recommended in patients with sensory disturbances, with strong autonomic system disorders, or in patients under the influence of drugs and/or alcohol, as high circulatory stresses and inadequate treatment responses cannot be excluded. Persons receiving treatments that might



Fig. 2a-b: Appearance before (left) and after (right) Combination therapy with injection lipolysis and Z Wave^{Pro}.

decrease and/or alter blood coagulation, or cause extended coagulation time (such as with aspirin), should consult their therapist regarding a possible suspension of this treatment, since the application of radial shock waves in these patients can increase the incidence of, or possibility of, haemorrhages and haematomas.

Course of treatment

The scope and course of the treatment is discussed with the patient. The patient is in a recumbent position and a gel or oil is applied to the treatment zone in order to introduce the acoustic sound waves into the body without energy loss. Open the lymphatic system, for example on the thigh, by first stimulating the lymph nodes in the groin with a low HZ and shock rate, then start the actual . Z Wave^{Pro} treatment for 2-3 minutes, always working towards the lymph nodes. Apply cellulite reduction following treatment.

A cellulite session lasts about 30 minutes on average and is usually painless. Depending on the degree of cellulite, 6-10 sessions with a week between sessions may be required. In conjunction with acoustic wave therapy, 30 minutes per day of active exercise, a low fat diet, and

diet, and 2-3 litres of liquids daily are recommended for faster elimination of the toxins that have been released.

Shockwave therapy with the Z Wave^{Pro} -System can be delegated to trained assistants. Thanks to innovative, time-optimized treatment methods, the required time is approximately 30 minutes per session. A special room for this therapy is not absolutely necessary, since the compact system is portable. The device allows individual treatment programmes to be set for each patient. The innovative technology allows a compact design with no need for a compressor. The clear and modern colour display showing all parameters relevant for treatment and the modern touch operation are highly intuitive. Various, adjustable frequencies allow applications customized to the current condition of the person to be treated.



Fig. 3a-b: Appearance before (left) and after (right) Combination therapy with liposuction and *ZWave Pro*.

Treatment results

Excellent and reliable therapeutic results can be achieved for all the above-mentioned indications. Here are just a few examples:

Follow-up to Cryolipolysis™

For this indication, the fat reduction doubles in the first 4 weeks. The excess skin resulting from fat reduction or weight loss can be tightened using *ZWave Pro*. With this method of *ZWave Body Contouring*, the treatment zone becomes softer in the transitional areas and a better outcome for the patient can be achieved at an earlier point. The treatment success is visible and tangible for the patient and can be achieved much faster than without the *ZWave Pro* application.

Follow-up to injection lipolysis

Here, the combined method has a clear advantage over the method without *ZWave Pro*. The sound waves help to distribute the injection agent evenly across the tissue; additionally, the shock-wave therapy accelerates fat loss. Using *Body Contouring*, the *ZWave* therapy provides smooth transitions in the treated areas; the resulting excess

skin is very well tightened. The treatment success is achieved faster.

Cellulite

Good and reproducible therapeutic results can also be achieved when treating cellulite. The surface structure is improved significantly, the skin is tightened and the extent of cellulite is reduced. Analysis of dietary habits and physical activity is also important in the cellulite treatment. Prior to starting therapy, the patient expectations should be discussed in detail. The treatment success is greatly increased by patient's cooperation (diet, exercise).

Conclusions for clinical practice

The *ZWave Pro* system is suitable for many indications and can be used with patients of any age. The skin regains its natural elasticity and tonicity. The therapy has a positive effect on the body shape and reduces the scope of the treated area.

Compared to other devices, the ZWave system is used exclusively in medical or therapeutic facilities. A one-time initial training of the user is usually sufficient. The device is very easy and comfortable to use, the method is easy to learn and can be easily carried out by skilled assistants. The manufacturer (Zimmer MedizinSysteme GmbH, Neu-Ulm) provides corresponding training and instruction on-site in the respective doctor's clinic.

Patient satisfaction is generally high. However, a medical briefing, addressing patient expectations is also important, as with all aesthetic and cosmetic treatments. For specific indications, as for a cellulite treatment, the active cooperation of the patient is essential. A particularly high level of patient satisfaction can be seen in the case of combined treatments, such as liposuction, injection lipolysis, Cryolipolyse™ etc. The long-term outcome depends on the weight, connective tissue, etc. of the individual patient. For some indications, the treatment results remain permanently visible, for others the patient may need a treatment package with 4-6 post-treatments per year. To achieve excellent treatment results, follow-up treatment is generally recommended. ■

CONTACT

Dr. Dr. Stein Tveten

aesthetic clinic
Bahnhofstraße 42
87435 Kempten
kempten@aesthetic-info.com

aesthetic clinic Bad Honnef

Steinsbüscherhof 2
53604 Bad Honnef
badhonnef@aesthetic-info.com

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