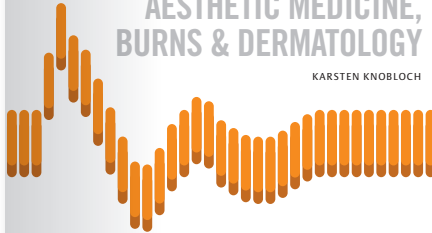



**SHOCK WAVE
THERAPY
IN PRACTICE**

**ESWT IN
AESTHETIC MEDICINE,
BURNS & DERMATOLOGY**

KARSTEN KNOBLOCH



level10 

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ESWT FOR SKIN REJUVENATION IN THE FACE

/ Prof. Dr. Karsten Knobloch, FACS

ESWT for skin rejuvenation in the face

According to American Society of Plastic Surgeons (ASPS) statistics there were 17.1 million surgical and minimally-invasive cosmetic procedures performed in the United States in 2016. As one trend evident, fat transfer procedures are more frequently used:

- | minimally-invasive cosmetic fat injections increased 13% on 2016
- | buttock augmentation using fat grafting increased 26%
- | breast augmentation using fat grafting increased 72%.

On the other hand, non-invasive fat reduction and skin tightening procedures increased by 10%. While body procedures are still popular, three of the five top cosmetic surgical procedures focused on the face.

Of the nearly 1.8 million cosmetic surgical procedures performed in 2016 in the United States, the top 5 were:

1. breast augmentation (290,467 procedures, up 4 percent from 2015)
2. liposuction (235,237 procedures, up 6 percent from 2015)
3. nose reshaping (223,018 procedures, up 2 percent from 2015)
4. eyelid surgery (209,020 procedures, up 2 percent from 2015)
5. facelifts (131,106 procedures, up 4 percent from 2015)

Top 5 surgical cosmetic procedures.

Among the 15.5 million cosmetic minimally-invasive procedures performed in 2016, the top 5 were:

1. Botulinum toxin type A (7 million procedures, up 4 percent from 2015)
2. soft tissue fillers (2.6 million procedures, up 2 percent from 2015)
3. chemical peel (1.36 million procedures, up 4 percent since 2015)
4. laser hair removal (1.1 million procedures, down 1 percent from 2015)
5. microdermabrasion (775,000 procedures, down 3 percent from 2015)

Top 5 minimally-invasive procedures.

Facial rejuvenation seeks to restore a youthful appearance. As such, both non-surgical as well as surgical options for distinct facial rejuvenation entities are on the market. As far as botulinum toxin type A injections are concerned, more than 7 million procedures were done in 2016 in the United States with an increase of 797% since 2000. In line, soft tissue filler injections with more than 2.6 million in 2016 increased by 298% since 2000.

Figure 4 CONSORT flowchart of intervention group and control group in CelluShock Study.

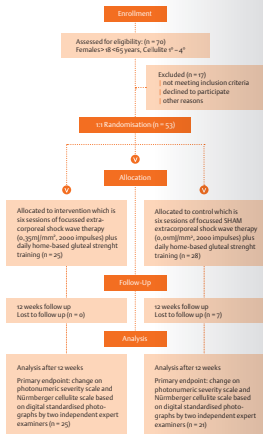


Figure 5 Focused shock wave therapy for cellulite (CelluShock Study Prof. Knobloch, Hannover).

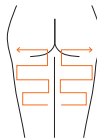
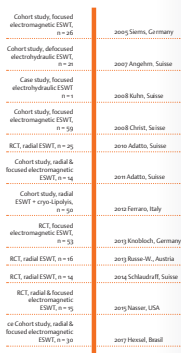


Figure 6 Scheme of focussed shock wave therapy monitoring from digital to processed in the CelluShock Study by Prof. Knobloch, Hannover.

The primary endpoint was defined as the scores on the CelluShock Severity Scale (CSS) before vs. 3 months after the six shock wave therapy sessions as determined by digital photography. This CelluShock Severity Scale (CSS) is comprised of five dimensions, which as assessed by trained observers based on digital photographs:

The findings of the five randomized trials are highlighted in a historical order in the following (Fig. 2):

TIMELINE OF ESWT IN CELLULITE FROM 2005 | Figure 2



1. RANDOMIZED-CONTROLLED TRIALS (LEVEL 1B EVIDENCE)

A. ADATTO ET AL., 2010¹

Adatto and coworkers performed a randomized trial with 1:1 allocation and an intra-individual control with 25 females. Six radial ESWT sessions were performed with a Storz D-ACTOR® 200 with 2.6–3.6 bar at 15 Hz and 3,000 impulses on a 10x15 cm rectangle on a single leg six times twice a week. Follow-up was at 12 weeks. Changes in the skin structure were evaluated using the DermaTOP System (Eotech, Paris, France). Skin elasticity measurements were performed using the Dermalab Device (Cortex Technology, Hadsund, Denmark). The difference between treated and untreated legs was statistically significant with regard to depressions, elevations, roughness and elasticity after the first follow-up visit.

Radial ESWT improved cellulite.

B. KNOBLOCH K ET AL., 2013⁹

Knobloch and coworkers performed a single-center, double-blinded, randomized-controlled trial with a 1:1 allocation. The primary outcome parameter was the photo-numeric Cellulite Severity Scale (CSS) proposed by Doris Hessel determined by two blinded, independent assessors based on standardized photographs. The intervention group received six sessions of focused ESWT (Storz DUOLITH®, 2,000 impulses, 0.35 mJ/mm², every week) at both gluteal and thigh regions plus specific gluteal strength exercise training with 3x15 repetitions per day. The control group (group B) received six sessions of SHAM-ESWT (0.01 mJ/mm², 2,000 impulses) plus specific gluteal strength exercise training. Knobloch found the cellulite severity scale CSS in the intervention group was 10.9 ± 3.8 before focused ESWT and 8.3 ± 4.1 after 12 weeks (P = 0.001, 2.53 improvement, 95% confidence interval (CI) 1.43–3.62). The CSS in the placebo group was 10.0 ± 3.8 before intervention and 10.1 ± 3.8 after 12 weeks (P = 0.876, 95% CI 1.1–0.97). The change of the CSS in group A versus group B was significantly different (P = 0.001, -2.3 effect size, 95% CI -3.6 to -1.2).

Focused ESWT improved cellulite.

C. RUSSE-WILFINGSEDER ET AL., 2013¹¹

Russe-Willingseder and coworkers performed a placebo controlled double-blinded, prospectively randomized clinical trial with 17 patients with a 2:1

Radial ESWT improved cellulite.