

# Extracorporeal Shock Wave Therapy (ESWT) in Skin Lesions



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(2 patients were treated in 2 areas). Mean patient age was 61 years. The patient group was made up of 37 women and 44 men. At the same time, 21 patients (13 women and 8 men) were treated at Berlin's Center for Extracorporeal Shock Wave Therapy. The mean age was slightly younger (54 y), The skin pathologies are listed in **Table 1**.

| Causes of skin lesions         | Number |
|--------------------------------|--------|
| Posttrauma lesions             | 44     |
| Postsurgical healing disorders | 10     |
| Venous ulcer                   | 25     |
| Arterial ulcer                 | 15     |
| Decubital ulcer                | 5      |
| Burns                          | 5      |
| Total                          | 104    |

## Introduction

Since 1981 extracorporeal shock waves have been used very successfully for the disintegration of calcified deposits in urology as well as in orthopedics. Due to high efficacy and few side effects, this therapy soon becomes very popular around the world. Since 1990 (1) shock waves have also been used for a variety of orthopedic indications. The therapy proved effective for tendon insertion conditions such as fasciitis plantaris (heel spur) and calcific tendinitis of the shoulder. Shock wave therapy is also widely used for lateral epicondylitis (tennis elbow) as described within previous chapters. Due to the few side effects shock waves also gain ground for the treatment of pseudoarthrosis (non union) and delayed union. Non-invasive and without clinical significant side effects, ESWT has also been used successfully in pilot studies for the treatment of osteochondritis dissecans (OCD) (2) as well as aseptic bone necrosis (AVN) (3, 4, 12). In Japan, shock waves were used successfully in animal experiments for the treatment of ischemia-induced myocardial dysfunction (5). Even skin flap survival in rats improved as a result of shock wave treatment (6).

When treating septic pseudoarthrosis (osteomyelitis), often linked to skin lesions (fistula formation, skin defects, Ö), bone tissue would consolidate and skin defects would heal particularly fast in many cases. In addition, Gerdesmeyer (7) found in vitro bactericidal effect of shock wave therapy. Encouraged by such findings, a pilot study on the treatment of skin lesions with ESWT was conducted.

## Material and Methods

To conduct the study an OrthoWave 180c from MTS was used. Since most often surface defects are involved, the shock wave head was modified in that the shock wave would no longer be focussed but be roughly plane to the treatment area. Low energy flow densities were used to treat the skin lesions. Depending on the size of the defect, the number of impulses varied from a few 100 to several 1,000. No anesthesia was necessary due to the defocussing and low energy of the shock waves. In principle, the treatment was performed as an outpatient except for those patients already

Since no empiric data were available, treatments were carried out in weekly intervals, in part in biweekly intervals. After the first treatment, the same wound dressing was used in principle as before the shock wave therapy. Only after the second or third treatment when wound conditions had improved, adequate options were indicated.

## Results

**Table 2** lists the results by lesion cause:

| Causes of skin lesions          | Number     | Healed    | >50%     | <50%    | Dropout |
|---------------------------------|------------|-----------|----------|---------|---------|
| Posttrauma lesions              | 44 (42%)   | 39 (89%)  | 1 ( 2%)  |         | 4 (9%)  |
| Postoperative healing disorders | 10 (10%)   | 10 (100%) |          |         |         |
| Venous ulcer                    | 25 (24%)   | 9 (36%)   | 8 (32%)  | 6 (24%) | 2 ( 8%) |
| Arterial ulcer                  | 15 (14%)   | 10 (67%)  | 2 (13%)  | 1 (7%)  | 2 (13%) |
| Decubital ulcer                 | 5 (5%)     | 4 (80%)   |          |         | 1 (20%) |
| Burns                           | 5 (5%)     | 5 (100%)  |          |         |         |
| Total                           | 104 (100%) | 77 (74%)  | 11 (10%) | 7 (7%)  | 9 (9%)  |

In the beginning of the treatment, all of the treated skin lesions were to be considered as infected. Particularly striking was a lessening of the infection after the first treatment because of the shock wave related bactericidal effect. None of the patients received any antibiotics. None of the patients experienced any worsening of the wound conditions. Only one (female) patient dropped out after the first therapy because she expected herself to fail. Dropouts involved for the most part very old, in part



## Discussion

Based on the initial encouraging results of our pilot study, a completely new potential of shock wave therapy appears to emerge. The patients enrolled in our pilot study are reported as a negative selected patient group because all cases refused to get any surgical intervention. Patients willing to get surgery were referred to and shock wave therapy was not offered. The promising outcome after this non-invasive treatment option in chronic wound care justifies to indicate shock wave in those soft tissue conditions as described above. For sure further studies have to be performed to determine optimum treatment parameters. Finally subsequent prospective, randomized controlled double-blind studies may demonstrate the efficacy and safety of ESWT in treating skin lesions.

## Literature

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Figure 1 shows the forearm of a 94 year old female patient after a paravenous infusion and two septic revisions. An abating infection with penicillin-resistant staphylococcus aureus was diagnosed (positive smear test). Because of a chronic COPD the patient is being treated with cortisone. The patient also suffers from chronic lymphatic leukemia. The first shock wave treatment was applied on 10/13/2004 as an outpatient procedure without anesthetics.



Figure 2 shows the same patient 2 weeks after the first shock wave treatment. A pre-existing therapy with antibiotics was discontinued and the second shock wave treatment (again without anesthetics) was applied.



## Figures

Figure 3 shows the lesion of the same patient after the third shock wave treatment on 11/10/2004.



Figure 4 shows the healing status 6 weeks after starting the therapy with altogether 4 shock wave treatments. In total, the 4 treatments lasted just about 12 minutes.

