

## Diabetic gangrene of the great toe

# Complete healing with ESWT



**Fig. 1:** Diabetic gangrene of the great toe, 20.4.2007  
**Fig. 2:** Follow-up examination on 11.3.2008, increasing healing is visible  
**Fig. 3:** Follow-up examination on 23.10.2009, the gangrene is completely healed

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### Medical history

Bilateral amputation of the great toes was planned in a 75-year-old patient with diabetic gangrene of the great toe (type II diabetes mellitus, fig. 1), an absolute cardiac arrhythmia, cardiac insufficiency due to coronary sclerosis and arterial hypertension. During a pain therapy consultation (pain intensity 7-9 VAS), however, the patient requested an alternative treatment.

### Therapy

Treatment commenced in April 2007 with two applications (interval of one week) of combined focused/radial shock waves (DUOLITH SD1, STORZ MEDICAL AG).

The shock transmitter was applied to the ball of the foot in the vicinity of the necrosis without directly contacting the diseased tissue. The treatment was interrupted after two sessions due to inflammatory swelling proximal to the necrosis. Short-term prophylactic antibiotic treatment. The pain started to ease approximately three weeks after the final treatment. ESWT was recommenced in August 2007.

Application of focused shock waves only (energy flux density 0.10 mJ/mm<sup>2</sup>, frequency 4 Hz, 1500 impulses per foot, at intervals of two weeks).

Increasing healing (Fig. 2) and reduction in pain medication (VAS pain intensity 2). The final ESWT was carried out in July 2008, the final follow-up examination in October 2009 (Fig. 3).

### Summary

The astounding healing of this patient's severe diabetic gangrene of the great toes will lead to further discussion. Previously described cases of healing of diabetic ulceration are confirmed by this severe case. The micro-angiologic pathohistology clearly requires clarification. What state must the vascular walls be in to allow the nutritive situation to be improved by means of shock wave-triggered messenger molecules in general and specifically the efferent nerve branches? The decrease in pain in this case may be due to angiogenesis and improved perfusion of the nerve branches. Indirect treatment of the healthy balls of the feet may indicate that healing occurs as a result of

adequate local concentrations of endothelial nitric oxide and vascular endothelial growth factor (VEGF).

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