

# How cavitation evolves during ESWT treatment

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**Device and producing company:**

Dornier Epos Ultra

**Introduction:**

Cavitation may be important in ESWT treatment. However, the extent to which cavitation actually occurs in-vivo is unknown. The object of this study was to image and quantify cavitation during treatment.

**Methods:**

A Dornier Epos Ultra with ultrasound guidance was used to treat patients for plantar fasciitis in a lateral-to-medial direction. Treatment was performed by the attending physician using their own protocol. The ultrasound images were recorded onto a laptop computer for post processing. Cavitation, when it occurs, manifests as a hyperechoic region.

These regions were measured by quantifying the intensity and area of the hyperechoic regions.

**Results:**

The results of this feasibility study suggest that cavitation can and does occur under some conditions. Cavitation activity can build over treatment time. After treatment, cavitation bubbles dissolve. The location of cavitation is not necessarily at the focus of the device.

**Discussion:**

When cavitation occurs, the bubbles may not have enough time to dissolve before the next shock wave arrives. This leads to a growth in cavitation activity with each subsequent shock wave. Blood pooling due to damaged blood vessels may also contribute to increased cavitation activity. The location of cavitation 'hot-spots' depend on the presence of nearby bones, and possibly on vessel damage location. During treatment, it is possible that the cavitation field becomes too large, preventing the acoustic wave from passing through, reducing therapeutic benefit.

**Conclusion:**

Cavitation was measured and quantified from ultrasound imaging. Optimal treatment protocols should take into account the possibility that cavitation will influence subsequent shock waves. (Acknowledgments: AKSM, APL, NIH #RO1AR053652).