

What is the size of the treatment points made with TOOsonix devices?

The size of a treatment point is first and foremost dependent on the wavelength of the ultrasound signal.

The wavelength of ultrasound varies inversely with frequency, i.e. the higher the frequency, the shorter the wavelength. A short wavelength will in turn enable a smaller focal zone, defined by the zone in which the pressure is within 6 dB from the maximum pressure in the focal point (see separate FAQ on the theoretical calculation of the size and shape of the focal zone). An example of thermal points created by HIFU operating at different frequencies relative to typical features in the human skin is shown in Fig. 1.

The intensity of the emitted ultrasound signal also plays a significant role for both the size and shape of a treatment point. At high power levels the intensity of the ultrasound can be enough to initiate cavitation inside the focal zone. In this case, thermal points tend to be spherical, but with signs of very severe physical and thermal reactions, for example complete destruction and disintegration of tissue. At lower power levels, the treatment point formation is purely thermal, where tissue is coagulated through more gentle thermal heating.

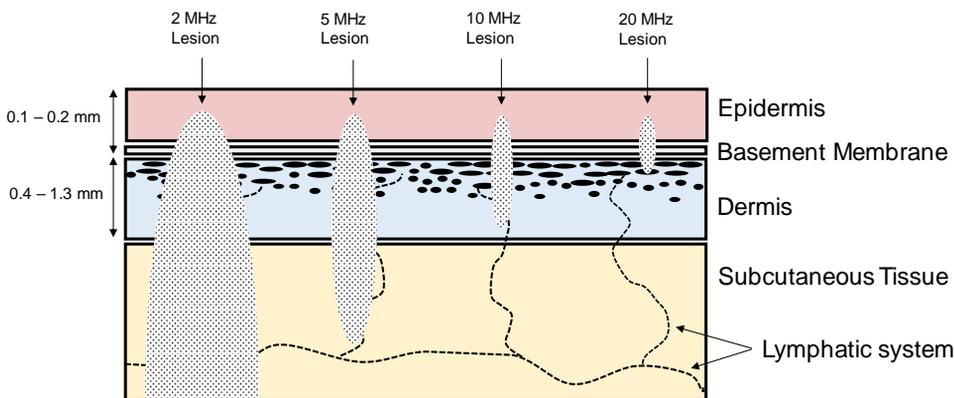


Fig. 1. Schematic representation of the size of treatment points as a function of frequency in the transducer.

Contact

TOOsonix A/S
Agern Allé 1
DK-2970 Horsholm
Denmark

info@toosonix.com
www.toosonix.com

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Frequently Asked Questions

The shape and size of the treatment points are also very time-dependent. The various mechanical and thermal effects increase the volume of the thermal point over time. Simple heat conduction will for example conduct heat to adjacent volumes, and thereby gradually increase the size of the treatment point.

Coagulated tissue will furthermore both have different acoustic and thermal properties than the original tissue. In practice, lesions therefore mostly expand and grow from its originally depth towards the source of the ultrasound as illustrated in Fig. 2.

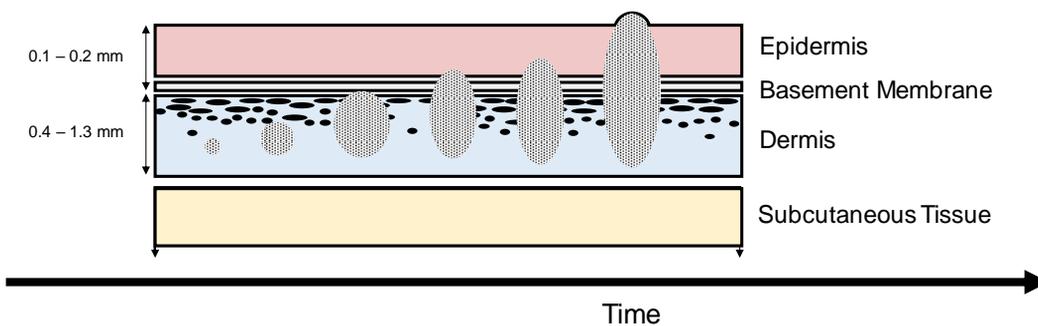


Fig. 2. Schematic representation of the development and growth of a HIFU lesion as a function of shot duration. .