What is the difference between normal HIFU and TOOsonix' high frequency HIFU?

Different modes of HIFU treatment can be performed depending on the energy and power settings, ranging from direct ablation and necrosis of cells in the focal zone due to local thermal heating, to modifications in pharmaceutical transport and uptake due to mild local hyperthermia.

The HIFU method is known and commercially available for research, cosmetology and medical indications from a number of suppliers world-wide. The available devices however typically operates at relatively low frequencies, and therefore produce focal zones with dimensions in the mid-millimeter to low centimeter range.

This is obviously not optimal in cases where the clinician want to target very small features and/or treat with very high precision due to sensitive tissue in close proximity to the focal zone.

To overcome these problems, TOOsonix has developed a high-frequency HIFU technology operating at significantly higher frequencies than the approximately 0.5 to 10 MHz available from existing suppliers in the market.

The wavelength of ultrasound varies inversely with frequency (Fig 1), i.e. the high frequency from the TOOsonix devices produces a very short wavelength.

A short wavelength will in turn enable a smaller focal zone. The higher frequency offered by the TOOsonix systems (typically 20 MHz) thereby allows for the ultrasound to be focused into much smaller focal zones within a target than ever before.

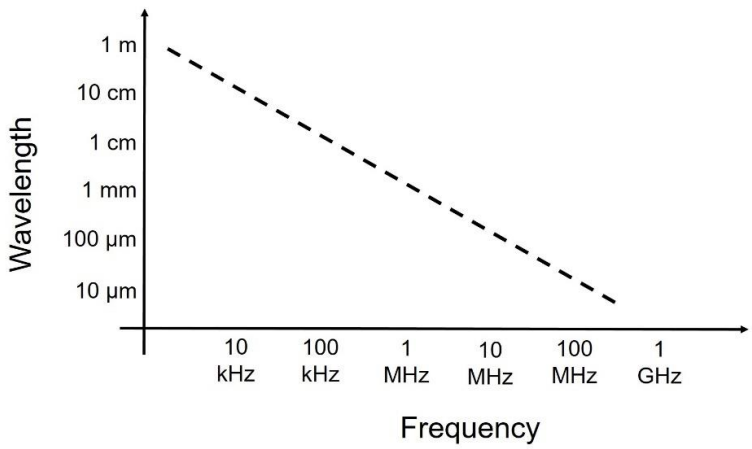

Fig. 1. Relation between ultrasound frequency and wavelength in water.

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This inverse relation between frequency and size of the focal zone can for example be illustrated by a schematic HIFU treatment in the human skin. Fig 2 illustrates the approximate relative size of lesions made with HIFU devices operating at different frequencies (and therefore different wavelengths).

It can clearly be seen that low-frequency HIFU devices creates very large lesions, which in turn are not nearly accurate enough to target small features, for example in the human skin or small animal models.

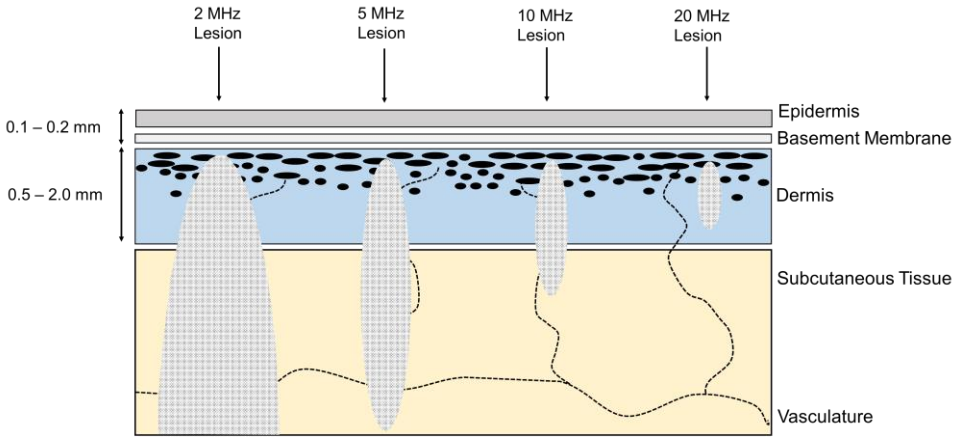

Fig. 2. Schematic representation of HIFU lesion sizes at different frequencies in relation to the normal size of the human skin.