

What is claimed is:

1. An treatment system for creating multiple focal points simultaneously at different depths with an ultrasound transducer, the system comprising:

an ultrasonic probe comprising:

a first switch operably controlling an ultrasonic imaging function for providing an ultrasonic imaging;

a second switch operably controlling an ultrasonic treatment function for providing an ultrasonic treatment; and

a movement mechanism configured to direct ultrasonic treatment in at least one sequence of individual thermal cosmetic treatment zones; and

a transducer module configured to apply ultrasonic therapy with at least one of the group consisting of amplitude modulation poling and phase shifting,

wherein the transducer module is configured for both ultrasonic imaging and ultrasonic treatment,

wherein the transducer module is configured for coupling to the ultrasonic probe,

wherein the transducer module comprises an ultrasound transducer configured to apply ultrasonic therapy to tissue at a plurality of locations with at least two focal depths,

wherein the transducer module is configured to be operably coupled to at least one of the first switch, the second switch and the movement mechanism; and

a control module,

wherein the control module comprises a processor and a display for controlling the transducer module.

2. The treatment system of Claim 1, wherein the ultrasonic treatment is a cosmetic treatment, wherein the plurality of locations are positioned in a substantially linear sequence within a cosmetic treatment zone.

3. The treatment system of Claim 1, wherein the ultrasonic treatment is an aesthetic treatment, wherein a first set of locations is positioned within a first treatment zone and a second set of locations is positioned within a second treatment zone, the first zone being different from the second zone.

4. The treatment system of Claim 3, wherein the first treatment zone comprises a substantially linear sequence of the first set of locations and the second treatment zone comprises a substantially linear sequence of the second set of locations.

5. The treatment system of any one of Claims 1-4, wherein the transducer module is configured to apply ultrasonic therapy using amplitude modulation whereby a plurality of portions of the transducer module are configured to emit ultrasonic therapy at a plurality of amplitudes of acoustic intensity, wherein a first amplitude is different than a second amplitude.

6. The treatment system of any one of Claims 1-4, wherein the transducer module is configured to apply ultrasonic therapy phase shifting whereby a plurality of portions of the transducer module are configured to emit ultrasonic therapy at a plurality of phases of acoustic intensity, wherein a first phase is different than a second phase.

7. The treatment system of any one of Claims 1-4, wherein the transducer module is configured to:

apply ultrasonic therapy using amplitude modulation whereby a plurality of portions of the transducer module are configured to emit ultrasonic therapy at a plurality of amplitudes of acoustic intensity, wherein a first amplitude is different than a second amplitude; and

apply ultrasonic therapy phase shifting whereby a plurality of portions of the transducer module are configured to emit ultrasonic therapy at a plurality of phases of acoustic intensity, wherein a first phase is different than a second phase.

8. The treatment system of any one of Claims 1-4, wherein the plurality of phases comprises discrete phase values.

9. The treatment system of any one of Claims 1-4, wherein the transducer module comprises piezoelectric material and the plurality of portions of the transducer module are

configured to create a plurality of corresponding piezoelectric material variations in response to an electric field applied to the transducer module.

10. The treatment system of Claim 9, wherein the plurality of piezoelectric material variations comprise at least one of expansion of the material and contraction of the material.

11. The treatment system of any one of Claims 1-4, wherein at least one portion of the transducer module is configured to emit ultrasonic therapy at two or more amplitudes of acoustic intensity, and wherein the amplitude of ultrasonic therapy emitted by the at least one portion of the transducer module varies over time.

12. The treatment system of any one of Claims 1-4, wherein the movement mechanism is configured to be programmed to provide variable spacing between a plurality of individual thermal cosmetic treatment zones.

13. The treatment system according to any one of Claims 1-4, wherein a sequence of individual thermal cosmetic treatment zones has a treatment spacing in a range from 1 mm to 25 mm.

14. The treatment system according to any one of Claims 1-4, wherein the first and second switches comprises user operated buttons or keys.

15. The treatment system according to any one of Claims 1-4, wherein at least one of the first switch and the second switch is activated by the control module.

16. The treatment system according to any one of Claims 1-4, wherein the treatment function is at least one of a face lift, a brow lift, a chin lift, an eye treatment, a wrinkle reduction, a scar reduction, a burn treatment, a tattoo removal, a skin tightening, a vein removal, a vein reduction, a treatment on a sweat gland, a treatment of hyperhidrosis, a sun spot removal, a fat treatment, a cellulite treatment, a décolletage treatment, a vaginal rejuvenation, and an acne treatment.

17. The treatment system of any one of Claims 1-4, wherein the transducer module is configured to provide an acoustic power of the ultrasonic therapy in a range of between 10 W to 1000W and a frequency of 1 MHz to 20 MHz to thermally heat the tissue to cause coagulation.

18. An ultrasound treatment system for dithering multiple simultaneous focus points from an ultrasound transducer at multiple depths, comprising:

an ultrasonic probe comprising an ultrasound transducer with a single transduction element adapted to simultaneously apply ultrasonic therapy to tissue at a plurality of spaced focal depths,

wherein the ultrasound transducer is poled with at least a first poling configuration and a second poling configuration,

a control module coupled to the ultrasonic probe for controlling the ultrasound transducer,

wherein the control module modifies the spacing between the spaced locations via dithering of a first focal zone and a second focal zone, such that dithering via modulation of a frequency precisely moves a position of a beam focus point at the spaced locations.

19. The treatment system of Claim 18, wherein the plurality of locations are positioned in a linear sequence within a cosmetic treatment zone, wherein the spaced locations are separated with a spacing dithered via a frequency swing.

20. The treatment system of Claim 18, wherein a first set of locations is positioned within a first cosmetic treatment zone and a second set of locations is positioned within a second cosmetic treatment zone, the first zone being different from the second zone.

21. The treatment system of Claim 18, wherein the ultrasound transducer is adapted to apply ultrasonic therapy using amplitude modulation whereby a plurality of portions of the ultrasound transducer are adapted to emit ultrasonic therapy at a plurality of amplitudes of acoustic intensity, wherein a first amplitude is different than a second amplitude.

22. The treatment system of Claim 21, wherein at least one portion of the ultrasonic transducer is adapted to emit ultrasonic therapy at two or more amplitudes of acoustic intensity, and wherein the amplitude of ultrasonic therapy emitted by the at least one portion of the piezoelectric varies over time.

23. The treatment system of Claim 21, wherein the ultrasound transducer comprises piezoelectric material and the plurality of portions of the ultrasound transducer are adapted to create a plurality of corresponding piezoelectric material variations in response to an electric field applied to the ultrasound transducer.

24. The treatment system of Claim 23, wherein the plurality of piezoelectric material variations comprise at least one of expansion of the piezoelectric material and contraction of the piezoelectric material.

25. The treatment system of any one of Claims 18 - 21, wherein the ultrasound transducer is adapted to apply ultrasonic therapy via phase shifting whereby a plurality of portions of the ultrasound transducer are adapted to emit ultrasonic therapy at a plurality of phases of acoustic intensity, wherein a first phase is different than a second phase.

26. The treatment system of Claim 25, wherein the plurality of phases comprises discrete phase values.

27. The treatment system of any one of Claims 18 - 21, wherein the ultrasound transducer is adapted to:

apply ultrasonic therapy using amplitude modulation whereby a plurality of portions of the ultrasound transducer are adapted to emit ultrasonic therapy at a plurality of amplitudes of acoustic intensity, wherein a first amplitude is different than a second amplitude; and

apply ultrasonic therapy whereby a plurality of portions of the ultrasound transducer are adapted to emit ultrasonic therapy at a plurality of phases of acoustic intensity, wherein a first phase is different than a second phase.

28. The treatment system of any one of Claims 18 - 21, wherein the ultrasonic treatment is at least one of: a face lift, a brow lift, a chin lift, an eye treatment, a wrinkle reduction, a décolletage improvement, a buttock lift, a scar reduction, a burn treatment, a skin tightening, a blood vessel reduction, a treatment of a sweat gland, a sun spot removal, a fat treatment, an abdominal laxity treatment, and a cellulite treatment.

29. The treatment system of any one of Claims 18 - 21, wherein the ultrasonic probe comprises a movement mechanism adapted to direct ultrasonic treatment in at least one pair of simultaneous sequences of individual thermal cosmetic treatment zones.

30. The treatment system of any one of Claims 18 - 21, wherein the ultrasonic probe is configured for both ultrasonic imaging and ultrasonic treatment.

31. The treatment system of any one of Claims 18 - 21, wherein the ultrasonic probe comprises a transducer module adapted to apply ultrasonic therapy.

32. A method of simultaneously dithering a focused ultrasound beam at multiple depths, comprising:

providing an ultrasonic probe comprising a single transduction element and a control module,

wherein the single transduction element is adapted to apply ultrasonic therapy to tissue at a focal zone at a focal depth,

wherein the control module is coupled to the ultrasonic probe for controlling the single transduction element, and

dithering the focal zone via modulation of a frequency to alter a size of the focal zone at the tissue.

33. The method of Claim 32, wherein the relative position of the focal zone is dithered in a range of between 1 – 50%.

34. The method of Claim 32, wherein a second focal zone is emitted simultaneously from the single transduction element.

35. The method of Claim 32, further comprising imaging the focal zone with an ultrasound imaging element.

36. The method of Claim 32, wherein the modulation of the frequency is in a range of between 1 – 50%.

37. The treatment system of Claim 32, wherein the system is designed to work non-invasively to treat tissue.

38. The method of any one of Claims 32 - 36, wherein the method functions in a non-invasive manner to treat tissue.

39. An ultrasound treatment system for delivering simultaneous multi-focus treatment at a plurality of depths with an electrostrictor, comprising:

a module comprising an ultrasound transducer,

wherein the ultrasound transducer is adapted to simultaneously apply ultrasonic therapy to tissue at a plurality of spaced depths in tissue with the application of an electrostrictor,

wherein the module modifies a spacing between the plurality of spaced depths via dithering of a first focal zone and a second focal zone, such that dithering via

modulation of a frequency precisely moves a position of a beam focus point at the plurality of spaced depths,

wherein the module further comprises an interface guide designed to for removable coupling to a hand wand to provide electronic communication and power between the module and the hand wand.

40. The treatment system of Claim 39, wherein the ultrasound transducer is adapted to apply ultrasonic therapy using amplitude modulation whereby a plurality of portions of the ultrasound transducer are adapted to emit ultrasonic therapy at a plurality of amplitudes of acoustic intensity, wherein a first amplitude is different than a second amplitude.

41. The treatment system of Claim 39, wherein the ultrasound transducer is adapted to apply ultrasonic therapy whereby a plurality of portions of the ultrasound transducer are adapted to emit ultrasonic therapy at a plurality of phases of acoustic intensity, wherein a first phase is different than a second phase.

42. The treatment system of Claim 39, wherein the ultrasound transducer comprises piezoelectric material and the plurality of portions of the ultrasound transducer are adapted to create a plurality of corresponding piezoelectric material variations in response to an electric field applied to the ultrasound transducer.

43. The treatment system of Claim 39, wherein at least one portion of the ultrasonic transducer is adapted to emit ultrasonic therapy at two or more amplitudes of acoustic intensity, and wherein the amplitude of ultrasonic therapy emitted by the at least one portion of the ultrasonic transducer remains constant over time.

44. The treatment system of any one of Claims 39- 43, wherein the ultrasonic treatment is at least one of a face lift, a brow lift, a chin lift, an eye treatment, a wrinkle reduction, a décolletage improvement, a buttock lift, a scar reduction, a burn treatment, a tattoo removal, a skin tightening, a vein removal, a vein reduction, a treatment on a sweat gland, a treatment of hyperhidrosis, a sun spot removal, a fat treatment, a cellulite treatment, an abdominal laxity treatment, a vaginal rejuvenation, and an acne treatment.

45. An ultrasound treatment system having one or more of the features described in the foregoing description.

46. A method of reducing imaging misalignment in a moving ultrasound transducer having one or more of the features described in the foregoing description.

47. An ultrasound treatment system for producing multiple simultaneous focus points from an ultrasound transducer having one or more of the features described in the foregoing description.

48. An ultrasound treatment system for delivering multi-focus treatment having one or more of the features described in the foregoing description.

49. An ultrasound treatment module for use in cosmetic treatment for forming multiple simultaneous focal zones from an ultrasound transducer having one or more of the features described in the foregoing description.

50. A method of generating simultaneous focused ultrasound treatment beams using multi-channel signal mixing having one or more of the features described in the foregoing description.