

CLAIMS

What is claimed is:

1. A low cost minimally invasive apparatus for tightening a target tissue by linear tensing and stimulation of collagen production and to deliver an agent to the target issue, the agent selected from anesthetics and optionally other treatment fluids through the same apparatus, wherein the apparatus comprises:
 - an insertable energy transfer device having an elongated shape, wherein the device has a hollow body, a tip, and a base and includes:
 - at least one orifice located in the body or tip of the energy transfer device, through which an effective amount of an anesthetic and optionally other treatment fluids can be delivered to a target issue; and
 - a temperature sensor located in the energy transfer device that measures the temperature of the target tissue in immediate contact with the energy transfer device; and
 - an external generation device configured to generate energy that is transferred to the energy transfer device
2. The apparatus according to Claim 1, wherein the body of the energy transfer device is at least 1 cm long.
3. The apparatus according to Claim 1, wherein the body of the energy transfer device is a hollow cannula.
4. The apparatus according to Claim 1, wherein the body of the energy transfer device is a needle or syringe.
5. The apparatus according to Claim 1, wherein the body of the energy transfer device has a double wall configuration.
6. The apparatus according to Claim 1, wherein the body of the energy transfer device comprises a textured surface to achieve focalized energy transfer into the target tissue.

7. The apparatus according to Claim 1, wherein the body of the energy transfer device comprises spiral or helicoidally configured protrusions that generate a spring-like effect on the target tissue when such spirals transfer energy into the dermis layer of the target tissue.
8. The apparatus according to Claim 1, wherein the body of the energy transfer device comprises elements or materials located in the inside or embedded into the energy transfer device, and that have a helicoidally configured pattern that cause heating through such elements or materials and therefore generates a spring-like effect on the target tissue when such materials or elements transfer energy into the target tissue.
9. The apparatus according to Claim 1, wherein the body or tip of the energy transfer device comprises a plurality of orifices to deliver an agent to the target tissue.
10. The apparatus according to Claim 1, wherein the agent is selected from treatment fluids comprising anesthetics, anti-inflammatory, anti-bruising, and/or collagen induction substances.
11. The apparatus according to Claim 1, wherein the energy transfer device comprises a heating element covering at least one portion of the body and/or tip of the energy transfer device, so that such material is able to increase its temperature in a controlled manner.
12. The apparatus according to Claim 11, wherein the portion of the body not covered with the heating element, is covered with a non-heating element that does not increase its temperature substantially to protect the insertion point of the target tissue.
13. The apparatus according to Claim 11, wherein the heating element is constructed so that it increases its temperature in response to an electrical current passing through a resistance that is generated by the external generation device.

14. The apparatus according to Claim 11, wherein the heating element is constructed so that it increases its temperature driven by electricity generated by the external generation device.
15. The apparatus according to Claim 11, wherein the heating element is constructed so that it increases its temperature in response to an electromagnetic field generated by the external generation device.
16. The apparatus according to Claim 1, wherein the energy transfer device comprises lasers, radiofrequency irradiation, or ultrasound applicators in order to heat the target tissue.
17. The apparatus according to Claim 1, wherein the energy transfer device is configured so that a portion of it acts as a thermal insulator in order to avoid the heat to be transmitted and conducted to other portions of the target tissue.
18. The apparatus according to Claim 11, wherein the heating element covers the majority of the body of the device except for the base, which is made of a non-heating element that does not increase its temperature substantially.
19. The apparatus according to Claim 1, wherein the energy transfer device is located in a handheld device that is used in a specific treatment zone within the target tissue once at a time and allows performing shorter heat application periods at relatively higher temperatures.
20. The apparatus according to Claim 1, wherein the apparatus is designed and configured to allow the simultaneous operation of at least two energy transfer devices that are inserted into the target tissue.
21. The apparatus according to Claim 1, wherein an external temperature control device is provided, such that the external temperature control device is configured to measure the temperature reached in the zone of the target tissue where the device is inserted.
22. The apparatus according to Claim 1, wherein cooling means are provided in order to lower the temperature of the target tissue.

23. The apparatus according to Claim 1, wherein the cooling means is selected from the group comprising cold air, ice, or cold compresses.
24. The apparatus according to Claim 1, wherein the cooling means is a cooling fluid delivered through the device or put in direct contact with the target tissue while inserted in the target tissue, to achieve localized cooling of such treatment area.
25. The apparatus according to Claim 1, wherein the external generation device allows to generate energy that is transferred to the energy transfer device, selected from the list comprising an electromagnetic field generator, an electric current generator, a radiofrequency generator, a laser generator, or an ultrasound generator.
26. The apparatus according to Claim 1, wherein the external generation device transfers the energy to the energy transfer device either by a physical connection, such as cables or similar means, or through induction.
27. The apparatus according to Claim 1, wherein target tissue is the dermis layer of the skin.
28. The apparatus according to Claim 1, wherein target tissue is the epidermis layer of the skin.
29. A low cost minimally invasive apparatus for tightening a target tissue by linear tensing and stimulation of collagen production, and to deliver an agent to the target tissue, the agent selected from anesthetics and optionally other treatment fluids through the same apparatus, comprising:
 - an insertable energy transfer device having an elongated shape, wherein the device has a hollow body, a tip, and a base and includes:
 - a heating element covering at least one portion of the body and/or tip of the energy transfer device, so that such material is able to increase its temperature in a controlled manner;
 - at least one orifice located in the body or tip of the energy transfer device, through which an effective amount of an anesthetic and

optionally other treatment fluids can be delivered into a target tissue;
and

- a temperature sensor located in the energy transfer device that measures the temperature of the target tissue in immediate contact with the energy transfer device; and
 - an external generation device configured to generate energy that is transferred to the energy transfer device in order to increase the temperature of the heating element.
- 30.** The apparatus according to Claim 29, wherein the body of the energy transfer device is at least 1 cm long.
- 31.** The apparatus according to Claim 29, wherein the body of the energy transfer device is a hollow cannula.
- 32.** The apparatus according to Claim 29, wherein the body of the energy transfer device is a needle or syringe.
- 33.** The apparatus according to Claim 29, wherein the body of the energy transfer device has a double wall configuration.
- 34.** The apparatus according to Claim 29, wherein the body of the energy transfer device comprises a textured surface to achieve focalized energy transfer into the target tissue.
- 35.** The apparatus according to Claim 29, wherein the body of the energy transfer device comprises spiral or helicoidally configured protrusions that generate a spring-like effect on the target tissue when such spirals transfer energy into the dermis layer of the target tissue.
- 36.** The apparatus according to Claim 29, wherein the body of the energy transfer device comprises elements or materials located in the inside or embedded into the energy transfer device, and that have an helicoidally configured pattern that cause heating through such elements or materials and therefore generates a spring-like effect on the target tissue when such materials or elements transfer energy into the dermis layer of the target tissue.

37. The apparatus according to Claim 29, wherein the body or tip of the energy transfer device comprises a plurality of orifices to administer a treatment fluid to the target tissue.
38. The apparatus according to Claim 29, wherein the treatment fluids comprise anesthetics, anti-inflammatory, anti-bruising, and/or collagen induction substances.
39. The apparatus according to Claim 29, wherein the portion of the body not covered with the heating element, is covered with a non-heating element that does not increase its temperature substantially to protect the insertion point of the target tissue.
40. The apparatus according to Claim 29, wherein the heating element is constructed so that it increases its temperature in response to an electrical current passing through a resistance that is generated by the external generation device.
41. The apparatus according to Claim 29, wherein the heating element is constructed so that it increases its temperature driven by electricity generated by the external generation device.
42. The apparatus according to Claim 29, wherein the heating element is constructed so that it increases its temperature in response to an electromagnetic field generated by the external generation device.
43. The apparatus according to Claim 29, wherein the energy transfer device is configured so that a portion of it acts as a thermal insulator in order to avoid the heat to be transmitted and conducted to other portions of the target tissue.
44. The apparatus according to Claim 29, wherein the heating element covers the majority of the body of the device except for the base, which is made of a non-heating element that does not increase its temperature substantially.
45. The apparatus according to Claim 29, wherein the energy transfer device is located in a handheld device that is used in a specific treatment zone within the target tissue once at a time and allows performing shorter heat application periods at relatively higher temperatures.

46. The apparatus according to Claim 29, wherein the apparatus is designed and configured to allow the simultaneous operation of at least two energy transfer devices that are inserted into the target tissue.
47. The apparatus according to Claim 29, wherein an external temperature control device is provided, such that the external temperature control device is configured to measure the temperature reached in the zone of the target tissue area where the device is inserted.
48. The apparatus according to Claim 29, wherein cooling means are provided in order to lower the temperature of the target tissue.
49. The apparatus according to Claim 48, wherein the cooling means is selected from the group comprising cold air, ice, or cold compresses.
50. The apparatus according to Claim 48, wherein the cooling means is a cooling fluid administered through the device or put in direct contact with the target tissue, to achieve localized cooling of such treatment area.
51. The apparatus according to Claim 29, wherein the external generation device allows to generate energy that is transferred to the energy transfer device, selected from the list comprising an electromagnetic field generator, an electric current generator, a radiofrequency generator, a laser generator, or an ultrasound generator.
52. The apparatus according to Claim 29, wherein the external generation device transfers the energy to the energy transfer device either by a physical connection, such as cables or similar means, or through induction.
53. The apparatus according to Claim 29, wherein target tissue is the dermis layer of the skin.
54. The apparatus according to Claim 29, wherein target tissue is the epidermis layer of the skin.
55. Use of the low cost minimally invasive apparatus according to any claims 1 to 54, wherein the apparatus is useful for tightening a target tissue.

56. A low cost minimally invasive linear tensing cosmetic method for tightening a target tissue by linear tensing and stimulation of collagen production by applying heat to a target tissue, which comprises the next steps:

- a) providing an energy transfer device with an elongated shape and a hollow body, comprising at least one orifice located within the body or tip of the energy transfer device;
- b) inserting the energy transfer device into the target tissue;
- c) delivering an effective amount of an anesthetic into the target tissue through the at least one orifice located in the body or tip of the energy transfer device;
- d) generating energy through an external generation device, wherein such energy is transferred into the energy transfer device in order to apply heat to target tissue;
- e) measuring the temperature of the target tissue that is in immediate contact with the energy transfer device through a temperature sensor located within the energy transfer device;
- f) controlling the external generation device so that the energy transfer device allows to heat the target tissue up to a temperature of between 45° to 75°C;
- g) maintaining the minimum temperature generated in the target tissue in immediate contact with the energy transfer device for a time of up to 10 minutes;
- h) cooling the tissue in the vicinity of the treatment area;
- i) repeating steps c. through h. as necessary, taking advantage of the already introduced energy transfer device in contact with the target tissue; and
- j) removing the energy transfer device from the target tissue.

57. The minimally invasive cosmetic method from Claim 56, wherein at least a portion of the energy transfer device comprises a heating element that increases its temperature in a controlled manner.
58. The minimally invasive cosmetic method from Claim 57, wherein the heating element of the energy transfer device is constructed so that it increases its temperature in response to energy generated by the external generation device.
59. The minimally invasive cosmetic method from Claim 58, wherein the external generation device allows to generate energy that is transferred to the energy transfer device, selected from the list comprising an electromagnetic field generator, an electric current generator, a radiofrequency generator, a laser generator, or an ultrasound generator.
60. The minimally invasive cosmetic method from Claim 56, wherein by controlling the temperature and time of the heat application from the energy transfer device, the target tissue layer that is in direct contact with the energy transfer device achieves a shrinkage rate of between 5-35%.
61. The minimally invasive cosmetic method from Claim 60, wherein the shrinkage rate can be achieved in one or multiple applications.
62. The minimally invasive cosmetic method from Claim 56, wherein a technician is able to visualize and evaluate the lineal shrinkage of the target tissue in real time in order to determine next steps of the method.
63. The minimally invasive cosmetic method from Claim 56, wherein two or more energy transfer devices are inserted into the target tissue, and afterwards the heating and/or fluid administration processes can be performed simultaneously on at least two of the inserted energy transfer devices.
64. The minimally invasive cosmetic method from Claim 56, wherein the anesthetic comprises a solution having a lidocaine concentration between 0.1% to 2%.
65. The minimally invasive cosmetic method from Claim 56, wherein the anesthetic comprises a solution having a lidocaine concentration between 0.1% to 2% that is mixed with epinephrine diluted to 1:100,000 to 1:500,000.

66. The minimally invasive cosmetic method from Claim 56, wherein the method comprises delivering additional treatment substances through the at least one orifice in the energy transfer device.
67. The minimally invasive cosmetic method from Claim 66, wherein the treatment substances comprise collagen and/or collagen inductors including but not limited to calcium hydroxyapatite, poly-L-lactic acid, and hyaluronic acid, an anti-inflammatory, an anti-bruising substance, and other type of substances that can help in the treatment and/or recovery of the treated zone.
68. The minimally invasive cosmetic method from Claim 56, wherein the anesthetic is mixed with the treatment fluids and delivered simultaneously through the energy transfer device.
69. The minimally invasive cosmetic method from Claim 56, wherein the cooling of the target tissue is performed with cooling means that comprise cold air, ice, or cold compresses.
70. The minimally invasive cosmetic method from Claim 56, wherein the cooling of the target tissue does not require external cooling means but is done naturally.
71. The minimally invasive cosmetic method from Claim 56, wherein the cooling means is a cooling fluid administered through the device or put in direct contact with the target tissue while inserted in the target tissue, to achieve localized cooling of such treatment area.
72. The minimally invasive cosmetic method from Claim 56, wherein the method can be applied to the face and neck, as well as to other body parts.
73. The minimally invasive cosmetic method from Claim 56, wherein target tissue is the dermis layer of the skin.
74. The minimally invasive cosmetic method from Claim 56, wherein target tissue is the epidermis layer of the skin.
75. The minimally invasive cosmetic method from Claim 56, wherein the method is a non-therapeutic method.

76. A low cost minimally invasive linear tensing cosmetic method for tightening a target tissue by linear tensing and stimulation of collagen production by applying heat to the dermis layer of the target tissue directly, which comprises the next steps:
- a) providing an energy transfer device with an elongated shape and a hollow body, comprising at least one orifice located within the body or tip of the energy transfer device, wherein at least a portion of the energy transfer device comprises a heating element that increases its temperature in a controlled manner;
 - b) inserting the energy transfer device into a target tissue;
 - c) delivering an effective amount of anesthetic into the target tissue through the at least one orifice located in the body or tip of the energy transfer device;
 - d) generating energy through an external generation device, wherein such energy is transferred into the energy transfer device in order to apply heat to the target tissue by increasing the temperature of the heating element;
 - e) measuring the temperature of the target tissue that is in immediate contact with the energy transfer device through a temperature sensor located within the energy transfer device;
 - f) controlling the external generation device so that the energy transfer device allows to heat the target tissue up to a temperature of between 45° to 75°C;
 - g) maintaining the minimum temperature generated in the target tissue in immediate contact with the energy transfer device for a time of up to 10 minutes;
 - h) cooling the target tissue in the vicinity of the treatment area;
 - i) repeating steps c. through h. as necessary, taking advantage of the already introduced energy transfer device in contact with the target tissue; and

j) removing the energy transfer device from the target tissue.

77. The minimally invasive cosmetic method from Claim 76, wherein the heating element of the energy transfer device is constructed so that it increases its temperature in response to energy generated by the external generation device.
78. The minimally invasive cosmetic method from Claim 76, wherein the external generation device allows to generate energy that is transferred to the energy transfer device, selected from the list comprising an electromagnetic field generator and an electric current generator.
79. The minimally invasive cosmetic method from Claim 76, wherein by controlling the temperature and time of the heat application from the energy transfer device, the target tissue that is in direct contact with the energy transfer device achieves a shrinkage rate of between 5-35%.
80. The minimally invasive cosmetic method from Claim 76, wherein the shrinkage rate can be achieved in one or multiple applications.
81. The minimally invasive cosmetic method from Claim 76, wherein a technician is able to visualize and evaluate the lineal shrinkage of the target tissue in real time in order to determine next steps of the method.
82. The minimally invasive cosmetic method from Claim 76, wherein two or more energy transfer devices are inserted into the target tissue, and afterwards the heating and/or fluid administration processes can be performed simultaneously on at least two of the inserted energy transfer devices.
83. The minimally invasive cosmetic method from Claim 76, wherein the anesthetic comprises a solution having a lidocaine concentration between 0.1% to 2%.
84. The minimally invasive cosmetic method from Claim 76, wherein the anesthetic comprises a solution having a lidocaine concentration between 0.1% to 2% that is mixed with epinephrine diluted to 1:100,000 to 1:500,000.
85. The minimally invasive cosmetic method from Claim 76, wherein the method comprises delivering additional treatment substances through the at least one orifice in the energy transfer device.

86. The minimally invasive cosmetic method from Claim 85, wherein the treatment substances comprise collagen and/or collagen inductors including but not limited to calcium hydroxyapatite, poly-L-lactic acid, and hyaluronic acid, an anti-inflammatory, an anti-bruising substance, and other type of substances that can help in the treatment and/or recovery of the treated zone.
87. The minimally invasive cosmetic method from Claim 76, wherein the anesthetic is mixed with the treatment fluids and delivered simultaneously through the energy transfer device.
88. The minimally invasive cosmetic method from Claim 76, wherein the cooling of the target tissue is performed with cooling means that comprise cold air, ice, or cold compresses.
89. The minimally invasive cosmetic method from Claim 76, wherein the cooling of the target tissue does not require external cooling means but is done naturally.
90. The minimally invasive cosmetic method from Claim 76, wherein the cooling means is a cooling fluid administered through the device or put in direct contact with the target tissue while inserted in the target tissue, to achieve localized cooling of such treatment area.
91. The minimally invasive cosmetic method from Claim 76, wherein the method can be applied to the face and neck, as well as to other body parts.
92. The minimally invasive cosmetic method from Claim 76, wherein target tissue is the dermis layer of the skin.
93. The minimally invasive cosmetic method from Claim 76, wherein target tissue is the epidermis layer of the skin.
94. The minimally invasive cosmetic method from Claim 76, wherein the method is a non-therapeutic method.