CLAIMS

1. A device for treating a patient's nasal airway, the apparatus comprising:

an elongate shaft having a proximal end and a distal end, defining a longitudinal axis; a handle at the proximal end of the elongate shaft; and

a fixed-size elongate treatment element, having a larger diameter than the elongate shaft, extending from the distal end of the elongate shaft, having an elongate front tissue-contact surface and a back surface along a length of the treatment element,

wherein the elongate front tissue-contact surface comprises a shallow convex shape having a curve configured to mechanically press laterally against a nasal tissue to be treated to reshape a region of the nose to a new conformation, and

wherein the length of the treatment element is parallel to the longitudinal axis of the shaft, and wherein the curve of the convex shape of the treatment element is perpendicular to the longitudinal axis of the shaft; and

at least one electrode disposed on the elongate front tissue-contact surface of the elongate treatment element configured to deliver radiofrequency (RF) energy to the nasal tissue to be treated.

2. The device of claim 1, wherein the back surface narrows distally along the length of the treatment element from approximately the distal end of the at least one electrode to the distal tip of the treatment element.

3. The device of claim 5, wherein the multiple electrodes are arranged both vertically and horizontally within the electrode array.

4. The device of claim 1, wherein one of the at least one electrode is a monopolar needle.

5. The device of claim 1, wherein the at least one electrode comprises an electrode array comprising multiple electrodes.

6. The device of claim 5, wherein energy may be selectively delivered between a certain set of electrodes of the electrode array.

7. The device of claim 5, wherein the electrode array comprises one or more bipolar electrode pairs.

8. The device of claim 1, further comprising an external re-shaping element extending from the handle, wherein the treatment element is positionable internal to the nose and the external re-shaping element is positionable external to the nose, so that the external re-shaping element and the treatment element are positionable on opposite sides of the nasal tissue.

9. The device of claim 8, wherein the at least one electrode comprises one or more needles or a plate and the external re-shaping element further comprises one or more electrode needles or an electrode plate.

10. The device of claim 1, further comprising an adaptor coupled with the handle and configured to be connected to an energy source.

11. The device of claim 1, further comprising a control system coupled with the handle and configured to control the characteristics of energy applied to tissue.

12. The device of claim 1, further comprising a thermocouple coupled with the shaft or the energy delivery element and configured to measure a temperature near tissue to be treated.

13. The device of claim 1, wherein the energy delivery element comprises a re-shaping element having a shape configured to alter a conformation of a region of the nose to a new conformation.

14. The device of claim 1, further comprising a re-shaping element having a shape configured to alter a conformation of a region of the nose to a new conformation.

15. The device of claim 14, wherein the treatment element and the reshaping element are configured to be positioned on opposite sides of nasal tissue.

16. The device of claim 14, wherein the treatment element and the re-shaping element are both configured to be positioned within a single nostril of the nose.

17. A system for treating a patient's nasal airway, the system comprising:

a nasal airway treatment device, comprising:

an elongate shaft having a proximal end and a distal end, defining a longitudinal axis;

a handle at the proximal end of the elongate shaft; and

an elongate, fixed-size treatment element having a larger diameter than the elongate shaft extending vertically from the distal end of the elongate shaft in a direction along a longitudinal axis of the shaft and handle, wherein the treatment element is sized to be inserted into a nasal airway or to be delivered external to a nose and configured to reshape a region of the nose to a new conformation, the treatment element comprising an at least one electrode configured to deliver energy to the nasal tissue disposed on an elongate front tissue-contact surface of the treatment element configured to mechanically press laterally against a nasal tissue to be treated; and

an energy source couplable with the handle for providing energy to the at least one electrode,

wherein the elongate front tissue-contact surface comprises a shallow convex shape having a curve, and

wherein the length of the treatment element is parallel to the longitudinal axis of the shaft, and wherein the curve of the convex shape of the treatment element is perpendicular to the longitudinal axis of the shaft.

18. The system of claim 17, further comprising a cooling mechanism coupled with the energy delivery element or the shaft for cooling the nasal tissue or nearby nasal tissue.

CLAIMS

1. A device for treating a patient's nasal airway, the device comprising:

an elongate shaft having a first width, a proximal end and a distal end, and defining a longitudinal axis;

a handle at the proximal end of the elongate shaft;

a fixed-size elongate treatment element, extending from the distal end of the elongate shaft, the treatment element having a second width larger than the first width, an elongate front tissue-contact surface, and a back surface along a length of the treatment element; and

two rows of non-penetrating, radiofrequency electrodes protruding laterally from the elongate front tissue-contact surface of the elongate treatment element, wherein the electrodes comprise multiple bipolar electrode pairs configured to deliver radiofrequency energy to a nasal tissue to be treated,

wherein the elongate front tissue-contact surface comprises a shallow convex shape having a curve configured to mechanically press laterally against the nasal tissue to be treated to reshape a region of the patient's nasal airway to a new conformation, and

wherein the length of the treatment element is parallel to the longitudinal axis of the shaft, and wherein the curve of the convex shape of the treatment element is perpendicular to the longitudinal axis of the shaft.

2. The device of claim 1, wherein the back surface narrows distally along the length of the treatment element from approximately the distal end of the two rows of electrodes to the distal tip of the treatment element.

3. The device of claim 1, wherein each of the multiple bipolar electrode pairs has a separate, controlled electrical channel, configured to allow different regions of the treatment element to be activated separately to allow for accurate temperature control and precise targeting of tissue.

4. The device of claim 1, wherein the device is configured to select one or more of the bipolar electrode pairs and separately deliver the radiofrequency energy between the one or more selected electrode pairs.

5. The device of claim 1, further comprising an insulating material interposed between the two rows of electrodes.

6. The device of claim 1, further comprising an external re-shaping element extending from the handle, wherein the treatment element is positionable internal to the nose and the external re-shaping element is positionable external to the nose, so that the external re-shaping element and the treatment element are positionable on opposite sides of the nasal tissue.

7. The device of claim 6, wherein the external re-shaping element further comprises one or more electrode needles or an electrode plate.

8. The device of claim 1, further comprising an adaptor coupled with the handle and configured to be connected to an energy source.

9. The device of claim 1, further comprising a control system coupled with the handle and configured to control the characteristics of energy applied to tissue.

10. The device of claim 1, further comprising a thermocouple coupled with the shaft or the energy delivery element and configured to measure a temperature near tissue to be treated.

11. The device of claim 1, wherein the energy delivery element comprises a re-shaping element having a shape configured to alter a conformation of a region of the nose to a new conformation.

12. The device of claim 1, further comprising a re-shaping element having a shape configured to alter a conformation of a region of the patient's nasal airway to a new conformation.

13. The device of claim 12, wherein the treatment element and the reshaping element are configured to be positioned on opposite sides of nasal tissue.

14. The device of claim 12, wherein the treatment element and the re-shaping element are both configured to be positioned within a single nostril of the nose.

15. A system for treating a patient's nasal airway by reshaping the nasal airway, the system comprising:

a nasal airway treatment device, comprising:

an elongate shaft having a first width, a proximal end and a distal end, and defining a longitudinal axis;

a handle at the proximal end of the elongate shaft;

an elongate, fixed-size treatment element having a second width larger than the first width, the treatment element extending vertically from the distal end of the elongate shaft in a direction along the longitudinal axis of the shaft and handle, wherein the treatment element is sized to be inserted into a nasal airway or to be delivered external to a nose and configured to reshape a region of the nose to a new conformation by mechanically pressing laterally against a nasal tissue to be treated; and

two rows of non-penetrating, radiofrequency electrodes protruding laterally from the elongate front tissue-contact surface of the elongate treatment element, wherein the electrodes comprise multiple bipolar electrode pairs configured to deliver radiofrequency energy to the nasal tissue to be treated; and

a radiofrequency energy source couplable with the handle for providing energy to the two rows of electrodes,

wherein the elongate front tissue-contact surface comprises a shallow convex shape having a curve, and

wherein the length of the treatment element is parallel to the longitudinal axis of the shaft, and wherein the curve of the convex shape of the treatment element is perpendicular to the longitudinal axis of the shaft.

16. The system of claim 15, further comprising a cooling mechanism coupled with the energy delivery element or the shaft for cooling the nasal tissue or nearby nasal tissue.