

[00017] In another embodiment, a method for preparing a contoured biological tissue is provided. The method comprises compressing a layer of biological tissue to reduce a thickness of at least a portion of the tissue and delivering energy from an energy source to one or both of the first and second plates during the compressing. The tissue following the compressing has at least two areas of different thicknesses and a continuous transition within the defined shape.

[00018] The method can further comprise treating the tissue with a first fixative to at least partially fix the tissue before, during and/or after the compressing. The first fixative can be glutaraldehyde.

[00019] The method can also include treating the tissue with a second fixative, the second fixative being one or a combination selected from the group consisting of: polyvinyl alcohols, polyetheramines, polyethyleneimine, di- or poly-amines, polyurethanes, polyepoxies, polysiloxanes, polyacrylates, polyesters, poly block isobutylene-co-maleic acid, collagen, elastin, fibrin, hyaluronic acid, dextrin, genapin, di- or poly-alkynes, di- or poly-azides, and tannins. The fixative is a 0.1% polyetheramine solution having an average molecular weight of about 600 and a pH of about 6 to 9.

[00019a] In another embodiment, an assembly for providing a contoured biological tissue, the assembly comprising:

a first plate configured to receive a biological tissue;

a second plate having a surface and being configured to apply a compressive force on the biological tissue disposed on the first plate;

wherein one or both of the first and second plates comprise a defined shape and a contoured area within the defined shape, the contoured area comprising at least first and second elevations and a continuous transition between the first and second elevations; and

one or more energy sources associated with one or both of the first and second plates, the one or more energy sources delivering energy to the biological tissue while the second plate applies the compressive force on the biological tissue is provided.

[00019b] In another embodiment, a method for preparing a contoured biological tissue comprising:

compressing a layer of biological tissue to reduce a thickness of at least a portion of the tissue; and

delivering energy from an energy source to the biological tissue through one or both of a first and second plates during the compressing;

wherein the tissue following the compressing has at least two areas of different thicknesses and a continuous transition within a defined shape is provided.

[00020] Other objects, features and advantages of the described preferred embodiments will become apparent to those skilled in the art from the following detailed description. It is to be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the present disclosure, are given by way of illustration and not limitation. Many changes and modifications within the scope of the present disclosure may be made without departing from the spirit thereof, and the disclosure includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[00021] Illustrative embodiments of the present disclosure are described herein with reference to the accompanying drawings, in which:

[00022] **FIG. 1A** is an exploded perspective view of an embodiment of an energized tissue compression assembly;

[00023] **FIG. 1B** is a perspective view of the bottom surface of the top compression plate of **FIG. 1A**;

WHAT IS CLAIMED IS:

1. An assembly for providing a contoured biological tissue, the assembly comprising:

a first plate configured to receive a biological tissue;

a second plate having a surface and being configured to apply a compressive force on the biological tissue disposed on the first plate;

wherein one or both of the first and second plates comprise a defined shape and a contoured area within the defined shape, the contoured area comprising at least first and second elevations and a continuous transition between the first and second elevations; and

one or more energy sources associated with one or both of the first and second plates, the one or more energy sources delivering energy to the biological tissue while the second plate applies the compressive force on the biological tissue.

2. The assembly of claim 1, wherein the one or both of the first and second plates are porous.

3. The assembly of claim 1, wherein the defined shape is one or a plurality of heart valve leaflets and wherein the heart valve leaflets each have a substantially straight free edge and an arcuate cusp edge.

4. The assembly of claim 3, wherein the first elevation is defined along the arcuate cusp edge and the second elevation is located between the arcuate cusp edge.

5. The assembly of claim 4, wherein the first elevation is higher relative to the second elevation.

6. The assembly of claim 4, wherein the second elevation is higher relative to the first elevation.

15. The assembly of claim 1, wherein the first and second plates each comprise the defined shape and the contoured area within the defined shape.

16. A method for preparing a contoured biological tissue comprising:
compressing a layer of biological tissue to reduce a thickness of at least a portion of the tissue; and
delivering energy from an energy source to the biological tissue through one or both of a first and second plates during the compressing;
wherein the tissue following the compressing has at least two areas of different thicknesses and a continuous transition within a defined shape.

17. The method of claim 16, further comprising treating the tissue with a first fixative to at least partially fix the tissue before, during and/or after the compressing.

18. The method of claim 17, further comprising treating the tissue with a second fixative before, during or before and during the compressing.

19. The method of claim 18, wherein the second fixative is one or a combination selected from the group consisting of: polyvinyl alcohols, polyetheramines, polyethyleneimine, di- or poly-amines, polyurethanes, polyepoxies, polysiloxanes, polyacrylates, polyesters, poly block isobutylene-co-maleic acid, collagen, elastin, fibrin, hyaluronic acid, dextrin, genapin, di- or poly-alkynes, di- or poly-azides, and tannins.

20. The method of claim 16, further comprising soaking the tissue with a fixative, wherein the fixative is a 0.1% polyetheramine solution having an average molecular weight of about 600 and a pH of about 6 to 9.