SUMMARY OF INVENTION

There is disclosed a method comprising:

positioning a guide plate at a donor site;

aligning a scalpet array of a device with the guide plate at the donor site, wherein the scalpet array comprises at least one scalpet;

incising skin pixels at the donor site with the scalpet array;

preparing a recipient site by positioning the guide plate at the recipient site, and generating with the scalpet array skin defects; and

applying the incised skin pixels at the recipient site.

There is disclosed a method comprising:

positioning a harvest pattern at a donor site;

aligning a scalpet array of a device with the harvest pattern at the donor site, wherein the scalpet array comprises at least one scalpet;

incising skin pixels at the donor site with the scalpet array;

preparing a recipient site by positioning the harvest pattern at the recipient site, and generating with the scalpet array skin defects; and

applying the incised skin pixels at the recipient site.

There is disclosed a method comprising:

positioning a guide plate at a donor site, wherein the guide plate comprises perforations arranged in a configuration;

aligning a scalpet array of a device with the guide plate at the donor site, wherein the scalpet array comprises a plurality of scalpets arranged in the configuration, and the aligning comprises aligning the scalpet array with at least one set of the perforations;

incising skin pixels at the donor site with the scalpet array;

preparing a recipient site by positioning the guide plate at the recipient site, aligning the scalpet array with the guide plate, and generating with the scalpet array skin defects having a same geometry as the incised skin pixels; and

applying the incised skin pixels at the recipient site.

There is disclosed a method comprising:

positioning a guide plate at a donor site, wherein the guide plate comprises perforations arranged in a configuration;

aligning a scalpet array of a device with the guide plate at the donor site, wherein the scalpet array comprises a plurality of scalpets arranged in the configuration, and the aligning comprises aligning the scalpet array with at least one set of the perforations;

incising skin pixels at the donor site with the scalpet array;

preparing a recipient site by generating with the scalpet array skin defects in the configuration; and

applying the incised skin pixels at the recipient site.

There is disclosed a method comprising:

positioning a guide plate at a donor site, wherein the guide plate comprises perforations arranged in a configuration;

aligning a scalpet array of a device with the guide plate at the donor site, wherein the scalpet array comprises a plurality of scalpets arranged in the configuration, and the aligning comprises aligning the scalpet array with at least one set of the perforations;

incising skin pixels at the donor site with the scalpet array; and

capturing the incised skin pixels and maintaining the captured incised pixels in the configuration.

There is disclosed a method comprising:

aligning a scalpet array of a device at a donor site, wherein the scalpet array comprises a plurality of scalpets arranged in a configuration;

incising skin pixels at the donor site with the scalpet array;

capturing the incised skin pixels and removing the incised skin pixels from the donor site; and

transferring the captured incised pixels away from the donor site while maintaining the captured incised pixels in the configuration.

There is disclosed a method comprising:

aligning a scalpet array of a device at a donor site, wherein the scalpet array comprises at least one scalpet arranged in a configuration;

incising skin pixels at the donor site with the scalpet array;

capturing the incised skin pixels and transferring them to a recipient site while maintaining the configuration;

generating skin defects at the recipient site with the scalpet array; and

applying the incised skin pixels at the recipient site.

A first aspect of the present invention provides a system comprising:

a harvest pattern positioned at a donor site and a recipient site;

a device comprising a scalpet array that includes at least one scalpet, wherein the at least one scalpet is configured to align with the harvest pattern, wherein the at least one scalpet is configured to incise skin pixels at the donor site and generate skin defects at the recipient site; and

an adherent substrate configured to capture the incised skin pixels at the donor site and maintain relative positioning of the incised skin pixels during transfer to the recipient site and application of the incised skin pixels at the recipient site.

A second aspect of the present invention provides a system comprising:

a harvest pattern including indicators arranged in a configuration, wherein the harvest pattern is configured to be positioned at a target site and a recipient site;

a device comprising a scalpet array that includes a plurality of scalpets arranged in the configuration, wherein the plurality of scalpets is configured to align with at least one set of the indicators, wherein the plurality of scalpets is configured to incise skin pixels at the target site and generate skin defects at the recipient site; and

an adherent substrate configured to capture the incised skin pixels at the target site and maintain the configuration during application of the incised skin pixels at the recipient site.

A third aspect of the present invention provides a system comprising:

a harvest pattern including indicators arranged in a configuration, wherein the harvest pattern is configured to be positioned at a target site and a recipient site; and

a device comprising a scalpet array that includes a plurality of scalpets arranged in the configuration, wherein the plurality of scalpets is configured to align with at least one set of the indicators, wherein the plurality of scalpets is configured to incise skin pixels at the target site and generate skin defects at the recipient site.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows the PAD Kit placed at a target site, under an embodiment.

Figure 2 is a cross-section of a scalpet punch or device including a scalpet array, under an embodiment.

Figure 3 is a partial cross-section of a scalpet punch or device including a scalpet array, under an embodiment.

Figure 4 shows the adhesive membrane with backing (adherent substrate) included in a PAD Kit, under an embodiment.

Figure 5 shows the adhesive membrane (adherent substrate) when used with the PAD Kit frame and blade assembly, under an embodiment.

Figure 6 shows the removal of skin pixels, under an embodiment.

Figure 7 is a side view of blade transection and removal of incised skin pixels with the PAD Kit, under an embodiment.

Figure 8 is an isometric view of blade/pixel interaction during a procedure using the PAD Kit, under an embodiment.

Figure 9 is another view during a procedure using the PAD Kit (blade removed for clarity) showing both harvested skin pixels or plugs transected and captured and non-transected skin pixels or plugs prior to transection, under an embodiment.

Figure 10A is a side view of a portion of the pixel array showing scalpets secured onto an investing plate, under an embodiment.

Figure 10B is a side view of a portion of the pixel array showing scalpets secured onto an investing plate, under an alternative embodiment.

Figure 10C is a top view of the scalpet plate, under an embodiment.

Figure 10D is a close view of a portion of the scalpet plate, under an embodiment.

CLAIMS

What is claimed is:

1. A system comprising:

a harvest pattern positioned at a donor site and a recipient site;

a device comprising a scalpet array that includes at least one scalpet, wherein the at least one scalpet is configured to align with the harvest pattern, wherein the at least one scalpet is configured to incise skin pixels at the donor site and generate skin defects at the recipient site; and

an adherent substrate configured to capture the incised skin pixels at the donor site and maintain relative positioning of the incised skin pixels during transfer to the recipient site and application of the incised skin pixels at the recipient site.

2. The system of claim 1, wherein the harvest pattern is on a skin surface on at least one of the donor site and the recipient site.

3. The system of claim 2, wherein the harvest pattern comprises an indicator on a skin surface on at least one of the donor site and the recipient site.

4. The system of claim 1, wherein the scalpet array is removeably coupled to the device.

5. The system of claim 1, wherein the scalpet array is disposable.

6. The system of claim 1, wherein a shape of each scalpet of the scalpet array is elliptical.

7. The system of claim 1, wherein a shape of each scalpet of the scalpet array is circular.

8. The system of claim 1, wherein a shape of each scalpet of the scalpet array is semicircular.

9. The system of claim 1, wherein a shape of each scalpet of the scalpet array is one of square, rectangular, and flat.

10. The system of claim 1, wherein each scalpet of the at least one scalpet includes a beveled surface.

11. The system of claim 1, wherein each scalpet of the plurality of scalpets includes at least one pointed surface.

12. The system of claim 1, wherein each scalpet of the plurality of scalpets includes at least one needle.

13. The system of claim 12, wherein the at least one needle comprises at least one needle including multiple points.

14. The system of claim 1, wherein the scalpet array generates the incised skin pixels using at least one of piercing force, impact force, rotational force, and vibration.

15. The system of claim 1, wherein at least one scalpet of the scalpet array comprises a through orifice.

16. The system of claim 1, wherein at least one diametric dimension of each scalpet of the scalpet array is approximately in a range 0.5 millimeters to 4.0 millimeters.

17. The system of claim 1, wherein the adherent substrate comprises a flexible substrate.

18. The system of claim 1, wherein the adherent substrate comprises a semi-porous membrane.

19. The system of claim 1, wherein the at least one scalpet on the device is arranged corresponding to the harvest pattern.

20. The system of claim 19, wherein the at least one scalpet on the device is configured to align with the harvest pattern.

21. The system of claim 20, wherein the scalpet array is applied to the donor site directly in accordance with the harvest pattern and the skin pixels are incised.

22. The system of claim 21, wherein the adherent substrate is configured to maintain the incised skin pixels in accordance with the harvest pattern during the transfer and the application of the incised skin pixels at the recipient site.

23. The system of claim 20, wherein the scalpet array is applied to the recipient site directly in accordance with the harvest pattern and the skin defects are generated.

24. The system of claim 23, wherein the skin defects are generated according to the harvest pattern.

25. The system of claim 19, comprising a guide plate that comprises perforations arranged in a configuration corresponding to the harvest pattern.

26. The system of claim 25, wherein the guide plate is positioned directly on a skin surface at one of the donor site and the recipient site.

27. The system of claim 25, wherein the guide plate is configured to extrude the incised skin pixels.

28. The system of claim 27, wherein the skin pixels are extruded through the perforations in response to an applied load.

29. The system of claim 27, wherein the skin pixels are extruded through the incised skin surface in response to an applied load.

30. The system of claim 25, wherein the incised skin pixels of the donor site and the skin defects of the recipient site are arranged in the configuration.

31. The system of claim 25, wherein the incised skin pixels of the donor site comprise a first configuration and the skin defects of the recipient site comprise a second configuration, wherein the first configuration and the second configuration are different.

32. The system of claim 25, wherein the at least one scalpet on the device is configured to align with at least one set of the perforations of the guide plate.

33. The system of claim 20, wherein the scalpet array is applied to the donor site directly through the at least one set of the perforations and the skin pixels are incised.

34. The system of claim 33, wherein the adherent substrate is configured to maintain the incised skin pixels in the configuration during the transfer and the application of the incised skin pixels at the recipient site.

35. The system of claim 25, wherein the scalpet array is applied to the recipient site directly through the at least one set of the perforations and the skin defects are generated.

36. The system of claim 35, wherein the skin defects are generated in according to the configuration.

37. The system of claim 25, wherein the guide plate is at least one of adherent, rigid, semi-rigid, conformable, non-conformable, and non-deformable.

38. The system of claim 25, wherein the guide plate includes at least one of metal, plastic, polymer, and membranous material.

39. The system of claim 25, wherein the guide plate is configured to transmit a load to a skin surface of at least one of the donor site and the recipient site.

40. The system of claim 1, wherein the scalpet array is configured to transfer a load to subjacent skin surface that includes the donor site, wherein the skin pixels are circumferentially incised by application of the load.

41. The system of claim 1, comprising a cutting member.

42. The system of claim 41, wherein the incised skin pixels are extruded, wherein the extruded skin pixels are transected by the cutting member.

43. The system of claim 42, wherein the adherent substrate is pulled away from the donor site, and bases of the incised skin pixels are transected by the cutting member.

44. The system of claim 41, wherein the cutting member is coupled to a plate frame.

45. The system of claim 44, wherein the plate frame is coupled to a guide plate.

46. The system of claim 44, wherein the adherent substrate is coupled to at least one of the guide plate and the plate frame.

47. The system of claim 1, wherein the incised skin pixels are applied directly from the adherent substrate to the skin defects at the recipient site.

48. The system of claim 47, wherein the incised skin pixels are aligned with the skin defects at the recipient site.

49. The system of claim 48, wherein each incised skin pixel is inserted into a corresponding skin defect at the recipient site.

50. The system of claim 1, comprising applying a first bandage to the donor site following the incising of the skin pixels, wherein the first bandage closes the donor site and controls a direction that the skin defects of the donor site are closed.

51. The system of claim 1, comprising applying a second bandage to the recipient site following the applying of the incised skin pixels at the recipient site, wherein the second bandage generates a force at the recipient site.

52. The system of claim 1, wherein the incised skin pixels include hair follicles.

53. The system of claim 1, wherein the skin defects are configured to evoke neovascularization in the incised skin pixels inserted at the recipient site.

54. The system of claim 1, wherein the skin defects are configured to evoke a wound healing response in the incised skin pixels inserted at the recipient site.

55. A system comprising:

a harvest pattern including indicators arranged in a configuration, wherein the harvest pattern is configured to be positioned at a target site and a recipient site;

a device comprising a scalpet array that includes a plurality of scalpets arranged in the configuration, wherein the plurality of scalpets is configured to align with at least one set of the indicators, wherein the plurality of scalpets is configured to incise skin pixels at the target site and generate skin defects at the recipient site; and

an adherent substrate configured to capture the incised skin pixels at the target site and maintain the configuration during application of the incised skin pixels at the recipient site.

56. A system comprising:

a harvest pattern including indicators arranged in a configuration, wherein the harvest pattern is configured to be positioned at a target site and a recipient site; and

a device comprising a scalpet array that includes a plurality of scalpets arranged in the configuration, wherein the plurality of scalpets is configured to align with at least one set of the indicators, wherein the plurality of scalpets is configured to incise skin pixels at the target site and generate skin defects at the recipient site.