grafting currently requires the harvesting of autologous skin grafts from the same burn patient. Typically, the donor site on the burn patient is chosen in a non-burned area and a partial thickness sheet of skin is harvested from that area. Incumbent upon this procedure is the creation of a partial thickness skin defect at the donor site. Healing by re-epithelialization of the donor site is often painful and may be prolonged for several days. In addition, a visible donor site deformity is created that is permanently thinner and more de-pigmented than the surrounding skin. For patients who have burns over a significant surface area, the extensive harvesting of skin grafts from non-burned areas may also be limited. Thus, there is a need for instruments and procedures that eliminate this donor site deformity and provide the means to repeatedly harvest skin grafts from the same donor site.

INCORPORATION BY REFERENCE

Each patent, patent application, and/or publication mentioned in this specification is herein incorporated by reference in its entirety to the same extent as if each individual patent, patent application, and/or publication was specifically and individually indicated to be incorporated by reference.

SUMMARY OF INVENTION

A first aspect of the present invention provides a method comprising, applying a scalpet array to a target skin site, wherein the scalpet array comprises a plurality of scalpets configured to be positioned on and applied through an investing plate, wherein the investing plate is a perforated plate. The method comprises circumferentially incising skin pixels at the target skin site by applying a load via the scalpet array onto subjacent skin surface that includes the target skin site, capturing a plurality of incised skin pixels on an adherent substrate, wherein the incised skin pixels are extruded through the ~~scalpet array~~investing plate, and transecting bases of incised skin pixels extruded through the scalpet array.

A second aspect of the present invention provides a system comprising, a scalpet array comprising a plurality of scalpets ~~secured~~ configured to be positioned on an investing plate, wherein the ~~scalpet~~

~~array~~ plurality of scalpets is configured for application through the investing plate to a skin surface, a loading member, wherein the loading member is configured to apply via the scalpet array a load onto the skin surface subjacent the scalpet array, an adherent substrate configured to capture incised skin plugs extruded through the ~~scalpet array~~ investing plate as a result of application of the load, and a cutting member, wherein the cutting member transects bases of the incised skin plugs extruded through the ~~scalpet array~~investing plate.

~~A third aspect of the present invention provides~~There is also disclosed a system comprising, a scalpet array comprising a plurality of scalpets secured on an investing plate, wherein the scalpet array is configured for application to a skin surface, and an adherent substrate configured to capture incised skin pixels extruded through the scalpet array as a result of application of a load onto the skin surface subjacent the scalpet array, wherein the scalpet array is independent of the adherent substrate.

~~A fourth aspect of the present invention provides~~ There is also disclosed a system comprising, a scalpet array comprising a plurality of scalpets fixed on a sleeve, wherein the sleeve is configured to be removeably coupled to and carried on a component of a dermatome, and an adherent substrate configured to be positioned on the component adjacent the sleeve, wherein the adherent substrate is configured to capture incised skin pixels extruded through the scalpet array as a result of application of a load to the scalpet array.

~~A fifth aspect of the present invention provides~~ There is also disclosed a system comprising, a scalpet array comprising a plurality of scalpets fixed on a sleeve, wherein the sleeve is configured to be removeably coupled to and carried on a component of a dermatome, and an adherent substrate, wherein the adherent substrate is configured to be removeably coupled to and carried on the component, wherein the adherent substrate is configured to capture skin pixels generated by application of the scalpet array to a skin surface.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a Pixel Array Dermatome (PAD) Kit placed at a target skin site, under an embodiment.

Figure 2 is a cross-section of a PAD Kit scalpet, under an embodiment.

Figure 3 is a partial cross-section of a PAD Kit scalpet, under an embodiment.

Figure 4 shows the adhesive membrane with backing of a PAD Kit, under an embodiment.

Figure 5 shows the adhesive membrane with the PAD Kit frame and blade assembly, under an embodiment.

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

CLAIMS

What is claimed is:

1. A method comprising:

applying a scalpet array to a target skin site, wherein the scalpet array comprises a plurality of scalpets configured to be positioned on and applied through an investing plate, wherein the investing plate is a perforated plate;

circumferentially incising skin pixels at the target skin site by applying a load via the scalpet array onto subjacent skin surface that includes the target skin site;

capturing a plurality of incised skin pixels on an adherent substrate, wherein the incised skin pixels are extruded through the ~~scalpet array~~investing plate; and

transecting bases of incised skin pixels extruded through the scalpet array.

2. The method of claim 1, wherein the applying the load comprises applying the load with a dermatome.

3. The method of claim 2, comprising configuring at least one dimension of the scalpet array to be consistent with at least one dimension of the dermatome.

4. The method of claim 3, comprising providing the scalpet array as a separate component from the dermatome.

5. The method of claim 4, comprising applying the scalpet array directly to the target skin site.

6. The method of claim 4, comprising removeably coupling the scalpet array to the dermatome.

16. The method of claim 14, comprising coupling the adherent substrate to the drum following the applying of the load.

17. The method of claim 14, comprising providing the scalpet array as a separate component from the drum dermatome.

18. The method of claim 17, comprising placing the scalpet array directly on the target skin site prior to the applying of the load.

19. The method of claim 18, comprising coupling the adherent substrate to the drum prior to the applying of the load.

20. The method of claim 14, comprising removeably coupling the scalpet array to the drum dermatome prior to the applying of the load, and applying the drum dermatome with the scalpet array to the target skin site.

21. The method of claim 20, comprising replacing the scalpet array with the adherent substrate following the applying of the load.

22. The method of claim 20, comprising applying ~~a template~~ the investing plate directly to a skin surface.

23. The method of claim 22, wherein the ~~template~~ investing plate is a perforated plate comprising a first pattern of perforations.

24. The method of claim 23, wherein the plurality of scalpets comprise a second pattern.

25. The method of claim 24, wherein the second pattern matches the first pattern.

26. The method of claim 25, wherein the scalpet array is configured to be applied over the ~~template~~ investing plate in a manner resulting in mating of the plurality of scalpets with perforations in the ~~template~~ investing plate.

27. The method of claim 14, comprising forming the scalpet array as an integral component of the drum dermatome.

28. The method of claim 14, wherein the transecting comprises transecting with a cutting member.

29. The method of claim 28, comprising coupling the cutting member to the drum dermatome.

30. A system comprising:

a scalpet array comprising a plurality of scalpets ~~secured~~ configured to be positioned on an investing plate, wherein the ~~scalpet array~~ plurality of scalpets is configured for application through the investing plate to a skin surface;

a loading member, wherein the loading member is configured to apply via the scalpet array a load onto the skin surface subjacent the scalpet array;

an adherent substrate configured to capture incised skin plugs extruded through the ~~scalpet array~~ investing plate as a result of application of the load; and

a cutting member, wherein the cutting member transects bases of the incised skin plugs extruded through the ~~scalpet array~~investing plate.

31. The system of claim 30, wherein the loading member comprises a dermatome.

32. The system of claim 31, wherein at least one dimension of the scalpet array fits at least one dimension of the dermatome.

43. The system of claim 41, wherein the cutting member is external to the drum.

44. The system of claim 41, wherein the adherent substrate is coupled to the drum.

45. The system of claim 39, wherein the drum is an array drum comprising the scalpet array.

46. The system of claim 45, wherein the array drum is detachable.

47. The system of claim 45, wherein the array drum is disposable.

48. The system of claim 45, wherein the adherent substrate is coupled to an interior of the array drum.

~~49. A system comprising:~~

~~a scalpet array comprising a plurality of scalpets secured on an investing plate, wherein the scalpet array is configured for application to a skin surface; and~~

~~an adherent substrate configured to capture incised skin pixels extruded through the scalpet array as a result of application of a load onto the skin surface subjacent the scalpet array, wherein the scalpet array is independent of the adherent substrate.~~

~~50. The system of claim 49, wherein the adherent substrate is coupled to a dermatome, wherein the dermatome is configured to apply the load via the scalpet array.~~

~~51. The system of claim 50, wherein the dermatome includes a cutting member, wherein the cutting member transects bases of the incised skin plugs extruded through the scalpet array.~~

~~52. The system of claim 51, wherein the dermatome is a drum dermatome comprising a drum.~~

~~53. The system of claim 52, wherein the adherent substrate is carried on the drum.~~

~~54. The system of claim 52, wherein at least one dimension of the scalpet array is in proportion with at least one dimension of the drum.~~

~~55. The system of claim 48, wherein the drum is an array drum comprising the scalpet array.~~

~~56. The system of claim 55, wherein the array drum is detachable.~~

~~57. The system of claim 55, wherein the array drum is disposable.~~

~~58. The system of claim 55, wherein the adherent substrate is coupled to an interior of the array drum.~~

~~59. A system comprising:~~

~~a scalpet array comprising a plurality of scalpets fixed on a sleeve, wherein the sleeve is configured to be removeably coupled to and carried on a component of a dermatome; and~~

~~an adherent substrate configured to be positioned on the component adjacent the sleeve, wherein the adherent substrate is configured to capture incised skin pixels extruded through the scalpet array as a result of application of a load to the scalpet array.~~

~~60. The system of claim 59, wherein the adherent substrate is configured to be positioned on the component between the sleeve and the component.~~

~~61. The system of claim 60, wherein the dermatome is a drum dermatome, and the component is a drum.~~

~~62. The system of claim 61, wherein the adherent substrate is positioned between an outer surface of the drum and the sleeve, wherein the drum dermatome is configured to apply the load via the scalpet array.~~

~~63. The system of claim 62, wherein the dermatome includes a cutting member, wherein the cutting member transects the incised skin plugs extruded through the scalpet array.~~

~~64. The system of claim 63, wherein the cutting member is internal to the drum.~~

~~65. The system of claim 63, wherein the cutting member is external to the drum.~~

~~66. The system of claim 61, wherein the drum dermatome is a Padgett dermatome.~~

~~67. The system of claim 61, wherein the drum is an array drum comprising the scalpet array.~~

~~68. The system of claim 67, wherein the array drum is detachable.~~

~~69. The system of claim 67, wherein the array drum is disposable.~~

~~70. The system of claim 67, wherein the adherent substrate is coupled to an interior of the array drum.~~

~~71. The system of claim 59, wherein the sleeve is disposable.~~

~~72. A system comprising:~~

~~a scalpet array comprising a plurality of scalpets fixed on a sleeve, wherein the sleeve is configured to be removeably coupled to and carried on a component of a dermatome; and~~

~~an adherent substrate, wherein the adherent substrate is configured to be removeably coupled to and carried on the component, wherein the adherent substrate is configured to capture skin pixels generated by application of the scalpet array to a skin surface.~~

~~73. The system of claim 72, wherein the dermatome is a drum dermatome, and the component is a drum.~~

~~74. The system of claim 73, wherein the drum dermatome is configured to apply via the scalpet array a load onto the skin surface subjacent the scalpet array.~~

~~75. The system of claim 74, wherein the adherent substrate is used in lieu of the scalpet array and is configured to capture incised skin plugs resulting from application of the load.~~

~~76. The system of claim 75, wherein the adherent substrate is positioned on an outer surface of the drum.~~

~~77. The system of claim 75, wherein the drum dermatome includes a cutting member, wherein the cutting member transects the incised skin plugs.~~

~~78. The system of claim 77, wherein the cutting member is internal to the drum.~~

~~79. The system of claim 77, wherein the cutting member is external to the drum.~~

~~80. The system of claim 73, wherein the drum dermatome is a Padgett dermatome.~~

~~81. The system of claim 73, wherein the drum is an array drum comprising the scalpet array.~~

~~82. The system of claim 81, wherein the array drum is detachable.~~

~~83. The system of claim 81, wherein the array drum is disposable.~~

~~84. The system of claim 81, wherein the adherent substrate is coupled to an interior of the array drum.~~

~~85. The system of claim 72, comprising a template plate configured for application to a skin surface.~~

~~86. The system of claim 85, wherein the template plate is a perforated plate comprising a first pattern of perforations.~~

~~87. The system of claim 86, wherein the plurality of scalpets comprise a second pattern on the sleeve.~~

~~88. The system of claim 87, wherein the second pattern matches the first pattern.~~

~~89. The system of claim 88, wherein the sleeve is configured to be applied over the template plate in a manner resulting in mating of the plurality of scalpets with perforations in the template plate.~~

~~90. The system of claim 72, wherein the sleeve is disposable.~~