INTRAOSSEOUS-NEEDLE STABILIZER AND METHODS

Stabilizers for intraosseous devices, such as, for example, stabilizers that may be coupled to an intraosseous device (e.g., a device including an intraosseous needle) while a portion of the device extends into a patient's bone and/or while the device is coupled to a fluid source (e.g., IV bag, syringe, etc.).
DESCRIPTION

INTRAOSSEOUS-NEEDLE STABILIZER AND METHODS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims benefit to U.S. Provisional Patent Application No. 61/184,035, filed February 2, 2010, which is incorporated here in its entirety.

BACKGROUND

1. Field of the Invention

[0002] The present invention relates generally to accessing intraosseous blood vessels and, more particularly, but not by way of limitation, to stabilizers for intraosseous devices.

2. Description of Related Art


SUMMARY

[0004] Some embodiments of the present apparatuses comprise: two members configured to be coupled together such that the members cooperate to encircle an intraosseous device to resist movement of the intraosseous device relative to the members; and one or more flexible tabs each coupled to at least one of the members and comprising an adhesive layer configured to be coupled to skin of a patient. In some embodiments, the apparatus is non-sterile. In some embodiments, the two members are substantially identical.

[0005] In some embodiments, the two members each comprise two connection portions. In some embodiments, the two connection portions comprise a male connection portion and a female connection portion. In some embodiments, the male connection portion comprises a resilient barb, and the female connection portion comprises a ledge configured such that if the members are coupled together, the resilient barb of each member contacts the ledge of the other member to resist separation of the members.
In some embodiments, the two members each comprise a coupling surface between the two connection portions, the coupling surface configured such that if the two members are coupled together, the coupling surfaces cooperate to define a device opening in which a portion of an intraosseous device can be positioned. In some embodiments, the members each have a proximal surface configured to face the patient’s skin, and if the members are coupled together a longitudinal axis of the device opening is disposed at a non-zero angle relative to a plane of the proximal surface. In some embodiments, the longitudinal axis of the device opening is substantially perpendicular to a plane of the proximal surface. In some embodiments, the coupling surface of each member defines a groove configured to receive a flange of an intraosseous device. In some embodiments, the coupling surface of each member defines a plurality of grooves each configured to receive a flange of an intraosseous device in a different position of the intraosseous device relative to the proximal surface of the member. In some embodiments, the plurality of grooves in the coupling surface are each shaped to correspond to a portion of an intraosseous device.

In some embodiments, each member comprises a lower sidewall, and one of the one or more flexible tabs is coupled to the lower sidewall. In some embodiments, the one or more flexible tabs each comprises: a double-sided tape layer having an upper side coupled to a lower surface of the lower sidewall; and a single-sided tape layer having an adhesive side coupled to an upper surface of the lower sidewall and to a portion of the upper side of the double-sided tape layer that is not coupled to the lower surface of the lower sidewall. In some embodiments, the one or more flexible tabs each comprises: a liner layer coupled to a lower side of the double-sided tape layer; where the liner layer is configured to be removable from the lower side of the double-sided tape layer such that the lower side of the double-sided tape layer can be coupled to skin of a patient. In some embodiments, the liner layer extends beyond at least one peripheral edge of the double-sided tape layer. In some embodiments, when the members are coupled together around the hub of an intraosseous device, and the tabs are coupled to skin, the apparatus may keep the intraosseous device to which it has been coupled (and, particularly, the hub of the device and any fitting and associated tubing connected to it) in a stable position relative to the patient by, for example, resisting movement of the device and any associated connector relative to the patient.

In some embodiments, at least one lateral dimension of at least one of the flexible tabs, when flattened, does not exceed 4 inches. In some embodiments, at least one lateral dimension of at least one of the flexible tabs, when flattened, does not exceed 3.1 inches. In some embodiments, if the members are coupled together, the members fit within a
rectangular volume no greater than 6 inches cubed. In some embodiments, if the members are coupled together, the members fit within a rectangular volume no greater than 4 inches cubed.

Some embodiments of the present kits comprise: three or more members each configured to be coupled to any of the other plurality of members such that the coupled members cooperate to encircle an intraosseous device to resist movement of the intraosseous device relative to the members; and a plurality of flexible tabs each coupled to at least one of the members and comprising an adhesive layer configured to be coupled to skin of a patient. In some embodiments, at least one of the three or members comprises one or more of the features of a member of the present apparatuses.

Some embodiments of the present components comprise: a member; and a flexible tab coupled to the member and comprising an adhesive layer configured to be coupled to skin of a patient; where the member is configured to be coupled a substantially identical member such that the coupled members cooperate to encircle an intraosseous device to resist movement of the intraosseous device relative to the members. In some embodiments, the apparatus is non-sterile. the member comprises one or more features of a member of the present apparatuses.

Some embodiments of the present methods comprise: coupling any embodiment of the present apparatuses to an intraosseous device having a portion extending into a bone of a patient; and coupling the adhesive layer of at least one of the one or more flexible tabs to the patient such that the apparatus resists motion of the members relative to the skin to which the adhesive layer is coupled. In some embodiments, the apparatus is non-sterile. coupling the apparatus to the intraosseous device is performed while the intraosseous device is coupled to a fluid source.

Some embodiments of the present apparatuses comprise: coupling a support apparatus to an intraosseous device having a portion extending into a bone of patient while the intraosseous device is coupled to a fluid source; and coupling the support apparatus to the skin of patient such that the support apparatus resists displacement of the intraosseous device relative to the skin to which the support apparatus is coupled.

In any embodiment of the present disclosure, the term "substantially" may be substituted with "within [a percentage] of" what is specified, where the percentage includes 5, 10, and/or 15 percent.

Any embodiment of any of the present devices and kits can consist of or consist essentially of – rather than comprise/include/contain/have – any of the described steps, elements, and/or features. Thus, in any of the claims, the term “consisting of” or “consisting
essentially of” can be substituted for any of the open-ended linking verbs recited above, in order to change the scope of a given claim from what it would otherwise be using the open-ended linking verb.

[0015] Details associated with the embodiments described above and others are presented below.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0016] The following drawings illustrate by way of example and not limitation. For the sake of brevity and clarity, every feature of a given structure is not always labeled in every figure in which that structure appears. Identical reference numbers do not necessarily indicate an identical structure. Rather, the same reference number may be used to indicate a similar feature or a feature with similar functionality, as may non-identical reference numbers. The figures are drawn to scale (unless otherwise noted), meaning the sizes of the depicted elements are accurate relative to each other for at least the embodiment depicted in the figures.

[0017] **FIG. 1** depicts a perspective view of one embodiment of the present stabilizers which includes two stabilizer members and two flexible tabs.

[0018] **FIG. 2** depicts a top view of the stabilizer of **FIG. 1**.

[0019] **FIG. 3** depicts a perspective cross-sectional view of the stabilizer of **FIG. 1** taken along the line 3-3 of **FIG. 1**.

[0020] **FIG. 4** depicts a side view of a member of the stabilizer of **FIG. 1** shown with an intraosseous device in a first position relative to the stabilizer.

[0021] **FIG. 5** depicts a side view of a member of the stabilizer of **FIG. 1** shown with an intraosseous device in a second position relative to the stabilizer.

[0022] **FIG. 6** depicts a perspective view of a member of the stabilizer of **FIG. 1**.

[0023] **FIGS. 7A-7C** depicts various views of a member and a flexible tab of the stabilizer of **FIG. 1**.

[0024] **FIGS. 8A-8G** depicts various views of the member of **FIG. 6**.

**DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS**

[0025] The term “coupled” is defined as connected, although not necessarily directly, and not necessarily mechanically; two items that are “coupled” may be unitary with each other. The terms “a” and “an” are defined as one or more unless this disclosure explicitly
requires otherwise. The term “substantially” is defined as largely but not necessarily wholly what is specified (and includes what is specified; e.g., substantially 90 degrees includes 90 degrees and substantially parallel includes parallel), as understood by a person of ordinary skill in the art.

5 [0026] The terms “comprise” (and any form of comprise, e.g., “comprises” and “comprising”), “have” (and any form of have, e.g., “has” and “having”), “include” (and any form of include, e.g., “includes” and “including”) and “contain” (and any form of contain, e.g., “contains” and “containing”) are open-ended linking verbs. As a result, a device or kit that “comprises,” “has,” “includes” or “contains” one or more elements possesses those one or more elements, but is not limited to possessing only those elements. Likewise, a method that “comprises,” “has,” “includes” or “contains” one or more steps possesses those one or more steps, but is not limited to possessing only those one or more steps.

[0027] Further, a device or structure that is configured in a certain way is configured in at least that way, but it can also be configured in other ways than those specifically described. As used in this disclosure, a part or component that is unitary with another part or component means that the parts are of a physically continuous piece of material (e.g., are not physically separate from one another). For example, two of the present members may be of unitary construction if molded or otherwise formed as a single piece of material (e.g., with a flexible piece of material joining the two members in such a way that their connection portions may fixedly couple the two members together, as described in more detail below, and that also maintains a flexible connection between the two members if their connection portions are not coupled together).

[0028] Some embodiments of the present stabilizers are configured to couple an intraosseous (sometimes referred to as an interosseous) device to various bones and/or through various sites on a patient (e.g., arm, leg, sternum, shoulder. Examples of such intraosseous devices include the EZ-IO line of products offered by Vidacare Corporation, San Antonio, Texas, USA; and may include a hub with a cannula and/or an intraosseous needle (the intraosseous needle may be removable after insertion of the device such that a portion of the device extends into a bone of a patent).

[0029] Referring now to the drawings, and more particularly to FIGS. 1-5, shown therein and designated by the reference numeral 10 is an embodiment of the present stabilizers. FIG. 1 depicts a perspective view of stabilizers 10 that includes two stabilizer members 14a, 14b, and two flexible tabs 18a, 18b. FIG. 2 depicts a top view of stabilizer 10. FIG. 3 depicts a perspective cross-sectional view of stabilizer 10 taken along the line 3-3 of
FIG. 1. FIG. 4 depicts a side view of member 14a of stabilizer 10 shown with an intraosseous device 5 in a first position relative to the stabilizer. FIG. 5 depicts a side view of member 14a of stabilizer 10 shown with intraosseous device 5 in a second position relative to the stabilizer.

In the embodiment shown, members 14a and 14b are configured to be coupled together (and are shown coupled together) such that members 14a and 14b cooperate to encircle intraosseous device 5 (e.g., such that neither member individually encircles device 5) to resist movement of intraosseous device 5 relative to members 14a and 14b. In some embodiments, stabilizer 10 comprises one or more flexible tabs (18a, 18b) each coupled to at least one of the members (14a, 14b) and comprising an adhesive layer (not shown) configured to be coupled to skin of a patient. For example, in the embodiment shown, stabilizer 10 comprises two flexible tabs 18a and 18b each coupled to a different one of members 14a and 14b, respectively. Once the flexible tabs have been coupled to skin, the stabilizer is designed to keep the intraosseous device to which it has been coupled (and, particularly, the hub of the device and any fitting and associated tubing connected to it) in a stable position relative to the patient, which may entail resisting movement of the device and any associated connector relative to the patient.

In some embodiments, members 14a, 14b are resilient and/or at least partially rigid. For example, members 14a, 14b may each have a portion (e.g., a portion configured to contact device 5) that is substantially rigid, and another portion configured to resiliently flex (e.g., be deflectable to be coupled to the other members, as described in more detail below). Members 14a and 14b may comprise any suitable material, such as, for example, plastic(s), metal(s), alloy(s), composite(s), or the like, that permits the members to function as described in this disclosure. In other embodiments, members 14a and 14b may have any suitable outer shape, such as, for example, arcuate, curved, square, and/or may be expanded or indented in some portions to improve a user’s ability to grip the member and/or the stabilizer.

In the embodiment shown, members 14a and 14b are substantially identical. As such, only a single member 14a is shown in each of FIGS. 4 and 5. FIG. 6 depicts a perspective view of member 14a without tab 18a. In other embodiments, members 14a and 14b may differ (e.g., may have different connection portions, shapes, and/or the like). In the embodiment shown, member 14a comprises two connection portions 22a and 22b. In the embodiment shown, connection portion 22a is configured as a male connection portion, and connection portion 22b is configured as a female connection portion. Stated another way, in the embodiment shown, male connection portion 22a is configured to be inserted into a
corresponding female connection portion 22b of another member (e.g., 14b), and female connection portion 22b is configured to receive a corresponding male connection portion 22a of another member (e.g., 14b).

[0033] In the embodiment shown, male connection portion 22a comprises a resilient barb 26, and the female connection portion comprises a ledge 30 configured such that if members 14a and 14b are coupled together (e.g., with male connection portion 22a of member 14a extending female connection portion 22b of member 14b, and with male connection portion 22a of member 14b extending into female connection portion 22b of member 14a), the resilient barb (26) of each member (14a or 14b) contacts the ledge (30) of the other member (14b or 14a) to resist separation of the members (14a and 14b). In the embodiment shown, barb 26 comprises an arm 34 configured to flex (be deflectable) relative to the rest of member 14a, and a projection 38 (e.g., a tapered projection), such that as members 14a and 14b are pressed together to be coupled, arm 34 of member 14a flexes inward (toward female connection member 22b of member 14a) until projection 38 moves past ledge 30 of member 14b, at which point arm 34 flexes outward such that projection 38 extends past ledge 30 and thereby mechanically resists separation of members 14a and 14b. In other embodiments, connection portions 22a and 22b can have any functional configuration, such as, for example: both connection portions 22a and 22b of member 14a may be configured as male connection portions, and both connection portions 22a and 22b of member 14b may be configured as female connection portions; each of connection portions 22a and 22b may comprise a male component and a female component; each of connection portions 22a and 22b can comprise a serrated or saw-tooth configuration; and/or the like.

[0034] In the embodiment shown, member 14a comprises a coupling surface 42 between connection portions 22a and 22b, and coupling surface 42 is configured such that if the two members are coupled together, the coupling surfaces cooperate to define a device opening 46 in which a portion of an intraosseous device can be positioned (e.g., as shown in FIGS. 1-3). In the embodiment shown, member 14a has a proximal surface 50 (e.g., at or near the plane of tab 18a shown in FIGS. 5-6) configured to face the patient’s skin. In the embodiment shown, members 14a and 14b are configured such that if members 14a and 14b are coupled together a longitudinal axis 54 of device opening 46 is disposed at a non-zero angle (e.g., 90 degrees) relative to a plane of proximal surface 50.

[0035] In the embodiment shown, device 5 comprises a hub 58, a flange 62, and a cannula 66 (e.g., a needle may extend through cannula 66 during insertion of cannula into a patient’s bone). In some embodiments, coupling surface 42 defines at least one groove 70
configured to receive a flange (e.g., 62) of an intraosseous device. For example, in the embodiment shown, coupling surface 42 defines a plurality of grooves 70a, 70b, 70c, 70d each configured to receive a flange (e.g., 62) of an intraosseous device in a different position of the intraosseous device relative to proximal surface 50 of the member (e.g., if flange 62 is received in groove 70a then flange may be adjacent the patient’s skin (or the position the patient’s skin would be absent an injury); and if flange 62 is received in any of grooves 70b, 70c, 70d then flange 62 may be spaced apart from a patient’s skin at a position predetermined by the position of the groove in which the flange is received. In the embodiment shown, grooves 70a, 70b, 70c, 70d are shaped to correspond to a portion of an intraosseous device (e.g., as shown, grooves 70a, 70b, 70c, 70d are tapered between a relatively larger proximal end closest proximal surface 50 and a relatively smaller distal end that is farther from proximal surface 50).

[0036] As shown, intraosseous device 5 may comprise a fitting 74 (e.g., a Luer lock fitting, or the like) to which a fluid source 78 (a structure from or through which fluid may be delivered to device 5, such as, for example, a tube couplable to an IV bag, and IV bag, a syringe, and/or the like). In the embodiment shown, member 14 has a height or thickness between proximal surface 50 and a distal surface 82 that permits fitting 74 to extend above distal surface 82 to be accessible while stabilizer 10 is coupled to device 5 and/or permits stabilizer 10 to be coupled to device 5 while a fluid source 78 is coupled to device 5. In some embodiments, stabilizer 10 is non-sterile (is not sterile).

[0037] FIGS. 7A-7C depicts various views of member 14a and flexible tab 18a coupled to member 14a (which may together be referred to as a component 100 of stabilizer 10). In the embodiment shown tab 18a is substantially identical to tab 18b. In the embodiment shown, member 14a is configured to be coupled a substantially identical member (e.g., 14b) such that the coupled members (14a and 14b) cooperate to encircle an intraosseous device (e.g., 5) to resist movement of the intraosseous device relative to the members. In some embodiments, member 14a comprises a lower sidewall 104, and one of the one or more flexible tabs (18a) is coupled to lower sidewall 104. For example, in the embodiment shown, tab 18a comprises: a double-sided tape layer 108 having an upper side 112 coupled to a lower surface 116 of lower sidewall 104; and a single-sided tape layer 120 having an adhesive lower side 124 (facing double-sided tape layer 108) coupled to an upper surface 128 of lower sidewall 104 and to a portion of upper side 112 of double-sided tape layer 108 that is not coupled to lower surface 116 of lower sidewall 104. In the embodiment shown, tab 18a also comprises: a liner layer 132 coupled to a lower side (not shown, but facing liner layer 132) of
double-sided tape layer 108; and liner layer 132 is configured to be removable from the lower side of double-sided tape layer 108 such that the lower side of the double-sided tape layer can be coupled to skin of a patient. In the embodiment shown, liner layer 132 includes a tab portion 136 that extends beyond at least one peripheral edge of double-sided tape layer 108.

In some embodiments, at least one lateral dimension (e.g., 140 shown in FIG. 7C) of at least one of the flexible tabs (e.g., 18a), when flattened (nor wrinkled, as shown in FIG. 7C), does not exceed 4 inches. For example, in the embodiment shown, lateral dimension 140, when tab 18a is flattened, does not exceed 3.1 inches.

FIGS. 8A-8G depict various views of member 14a that may assist in fully understanding the features of member 14a. In particular, FIG. 8A depicts a top view of member 14a; FIGS. 8B-8C depict front and back side views of member 14a; FIGS. 8D-8F depict left and right side views of member 14a; and FIGS. 8F-8G depicts upper perspective views of member 14a. In the embodiment shown, member 14a is configured such that if two members (e.g., 14a, 14b) are coupled together (as shown in FIGS. 1-2), the two coupled members fit within a rectangular volume no greater than 6 inches cubed. For example, in the embodiment shown, member 14a is configured such that if two members (e.g., 14a, 14b) are coupled together, the two coupled members fit within a rectangular volume no greater than 4 inches cubed. The dimensions shown in FIGS. 8A-8G are accurate for at least one embodiment of members 14a.

Some embodiments of the present kits comprise: three or more of the present members (e.g., 14a) each configured to be coupled to any of the other plurality of members such that the coupled members cooperate to encircle an intraosseous device to resist movement of the intraosseous device relative to the members (e.g., as shown in FIGS. 1-2); and a plurality of flexible tabs (e.g., 18a) each coupled to at least one of the members and comprising an adhesive layer configured to be coupled to skin of a patient.

Some embodiments of the present methods comprise: coupling one of the present apparatuses (e.g., stabilizer 10) to an intraosseous device (e.g., 5) having a portion (e.g., the cannula) extending into a bone of a patient; and coupling the adhesive layer (e.g., bottom side of double-sided tape layer 108) of at least one of the one or more flexible tabs (e.g., 18a) to the patient such that the apparatus (stabilizer) resists motion of the members (e.g., 14a, 14b) relative to the skin to which the adhesive layer (e.g., 108) is coupled. In some embodiments, coupling the apparatus to the intraosseous device is performed while the intraosseous device is coupled to a fluid source (e.g., 78).
Some embodiments of the present methods comprise: coupling a support apparatus (e.g., stabilizer 10) to an intraosseous device (e.g., 5) having a portion (e.g., cannula 66) extending into a bone of patient while the intraosseous device is coupled to a fluid source (e.g., 78); and coupling the support apparatus (e.g., 10) to the skin of patient such that the support apparatus resists displacement of the intraosseous device (e.g., 5) relative to the skin to which the support apparatus is coupled.

The various illustrative embodiments of the present devices and kits are not intended to be limited to the particular forms disclosed. Rather, they include all modifications, equivalents, and alternatives falling within the scope of the claims.

The claims are not intended to include, and should not be interpreted to include, means-plus- or step-plus-function limitations, unless such a limitation is explicitly recited in a given claim using the phrase(s) “means for” or “step for,” respectively.
CLAIMS

1. An apparatus comprising:
   two members configured to be coupled together such that the members cooperate to
   encircle an intraosseous device to resist movement of the intraosseous device
   relative to the members; and
   one or more flexible tabs each coupled to at least one of the members and comprising
   an adhesive layer configured to be coupled to skin of a patient.

2. The apparatus of claim 1, where the two members are substantially identical.

3. The apparatus of claim 1, where the two members each comprise two connection
   portions.

4. The apparatus of claim 3, where the two connection portions comprise a male
   connection portion and a female connection portion.

5. The apparatus of claim 4, where the male connection portion comprises a resilient
   barb, and the female connection portion comprises a ledge configured such that if the
   members are coupled together, the resilient barb of each member contacts the ledge of the
   other member to resist separation of the members.

6. The apparatus of any of claims 1-5, where the two members each comprise a coupling
   surface between the two connection portions, the coupling surface configured such that if the
   two members are coupled together, the coupling surfaces cooperate to define a device opening
   in which a portion of an intraosseous device can be positioned.

7. The apparatus of claim 6, where the members each have a proximal surface configured
   to face the patient's skin, and if the members are coupled together a longitudinal axis of the
   device opening is disposed at a non-zero angle relative to a plane of the proximal surface.

8. The apparatus of claim 7, where the longitudinal axis of the device opening is
   substantially perpendicular to a plane of the proximal surface.
9. The apparatus of claim 6, where the coupling surface of each member defines a groove configured to receive a flange of an intraosseous device.

10. The apparatus of claim 9, where the coupling surface of each member defines a plurality of grooves each configured to receive a flange of an intraosseous device in a different position of the intraosseous device relative to the proximal surface of the member.

11. The apparatus of claim 10, where the plurality of grooves in the coupling surface are each shaped to correspond to a portion of an intraosseous device.

12. The apparatus of any of claims 1-3, where each member comprises a lower sidewall, and one of the one or more flexible tabs is coupled to the lower sidewall.

13. The apparatus of claim 12, where the one or more flexible tabs each comprises:
   a double-sided tape layer having an upper side coupled to a lower surface of the lower sidewall; and
   a single-sided tape layer having an adhesive side coupled to an upper surface of the lower sidewall and to a portion of the upper side of the double-sided tape layer that is not coupled to the lower surface of the lower sidewall.

14. The apparatus of claim 13, where the one or more flexible tabs each comprises:
   a liner layer coupled to a lower side of the double-sided tape layer;
   where the liner layer is configured to be removable from the lower side of the double-sided tape layer such that the lower side of the double-sided tape layer can be coupled to skin of a patient.

15. The apparatus of claim 14, where the liner layer extends beyond at least one peripheral edge of the double-sided tape layer.

16. The apparatus of claim 12, where at least one lateral dimension of at least one of the flexible tabs, when flattened, does not exceed 4 inches.

17. The apparatus of claim 16, where at least one lateral dimension of at least one of the flexible tabs, when flattened, does not exceed 3.1 inches.
18. The apparatus of any of claims 1-17, where if the members are coupled together, the members fit within a rectangular volume no greater than 6 inches cubed.

19. The apparatus of claim 18, where if the members are coupled together, the members fit within a rectangular volume no greater than 4 inches cubed.

20. The apparatus of any of claims 1-19, where the apparatus is non-sterile.

21. A kit comprising:
three or more members each configured to be coupled to any of the other plurality of members such that the coupled members cooperate to encircle an intraosseous device to resist movement of the intraosseous device relative to the members;
and
a plurality of flexible tabs each coupled to at least one of the members and comprising an adhesive layer configured to be coupled to skin of a patient.

22. The kit of claim 21, where at least one of the three or members comprises one or more of the features of the members recited in claims 1-20.

23. A component comprising:
a member; and
a flexible tab coupled to the member and comprising an adhesive layer configured to be coupled to skin of a patient;
where the member is configured to be coupled a substantially identical member such that the coupled members cooperate to encircle an intraosseous device to resist movement of the intraosseous device relative to the members.

24. The component of claim 23, where the member comprises one or more of the features of the members recited in claims 1-20.
25. A method comprising:
coupling an apparatus of any of claims 1-20 to an intraosseous device having a portion extending into a bone of a patient; and
coupling the adhesive layer of at least one of the one or more flexible tabs to the patient such that the apparatus resists motion of the members relative to the skin to which the adhesive layer is coupled.

26. The method of claim 25, where coupling the apparatus to the intraosseous device is performed while the intraosseous device is coupled to a fluid source.

27. A method comprising:
coupling a support apparatus to an intraosseous device having a portion extending into a bone of patient while the intraosseous device is coupled to a fluid source;
coupling the support apparatus to the skin of patient such that the support apparatus resists displacement of the intraosseous device relative to the skin to which the support apparatus is coupled.