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(54) **KNOTLESS SUTURE ANCHOR WITH BREAKAWAY TIP**

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(71) Applicant: **Smith & Nephew, Inc.**, Memphis, TN (US)

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(72) Inventors: **Richard M. Lunn**, Memphis, TN (US); **Timothy Young**, Memphis, TN (US); **Matthew Edwin Koski**, Memphis, TN (US); **Jon-Paul Rogers**, Memphis, TN (US)

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(73) Assignee: **Smith & Nephew, Inc.**, Memphis, TN (US)

(57) **ABSTRACT**

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A one-piece knotless suture anchor with a breakaway distal tip is disclosed. The suture anchor includes a thin section connecting a distal anchor portion and proximal anchor portion. The thin section has a cutaway geometry allowing it to break in a repeatable manner. Force from a driver breaks the thin section connecting the distal and proximal anchor portions. The proximal anchor portion slides distally over the elongated member (either distal or proximal to the distal eyelet) and a repair suture is pinched between the distal and proximal anchor portions, or in between the bone tunnel walls and outer diameter of the sleeve, thereby fixing the repair suture in place without tying an arthroscopic knot.

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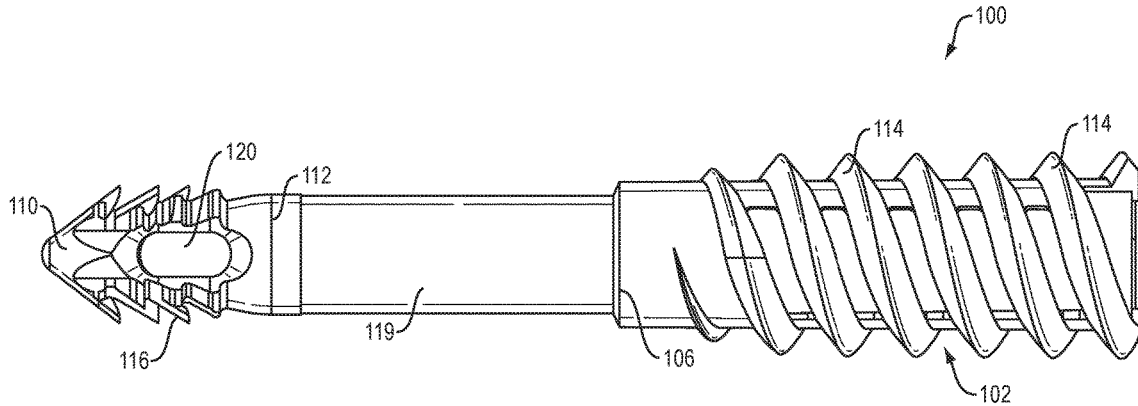
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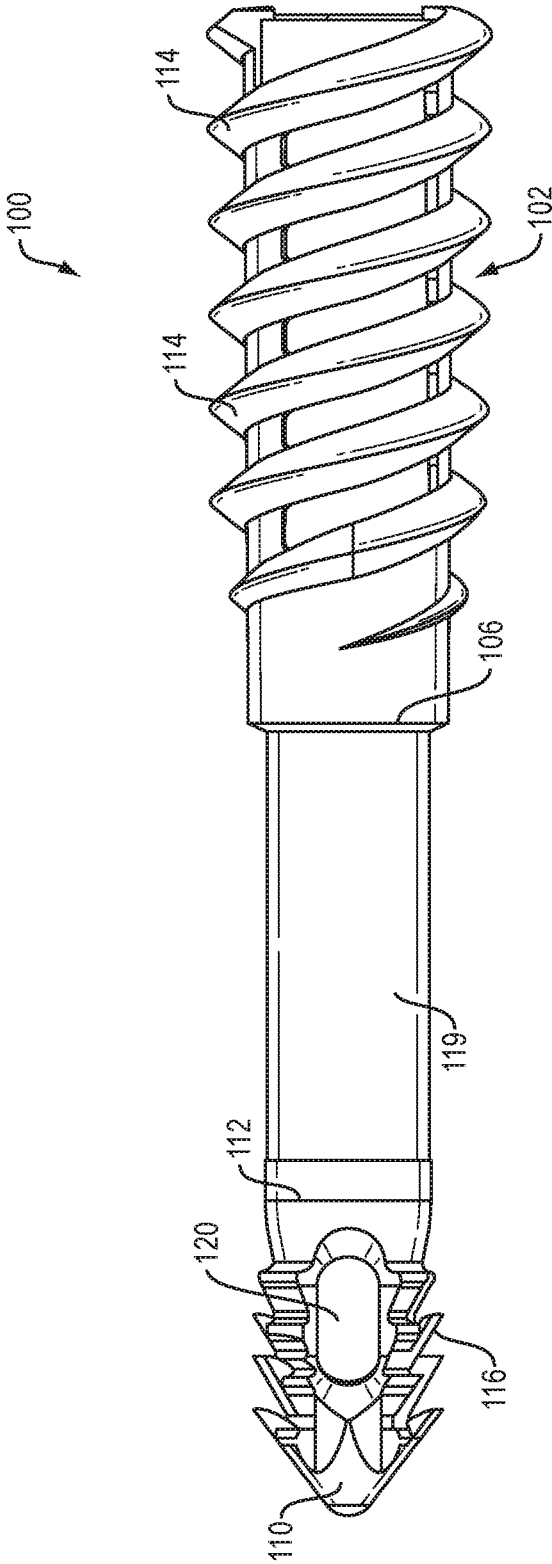


FIG. 1A

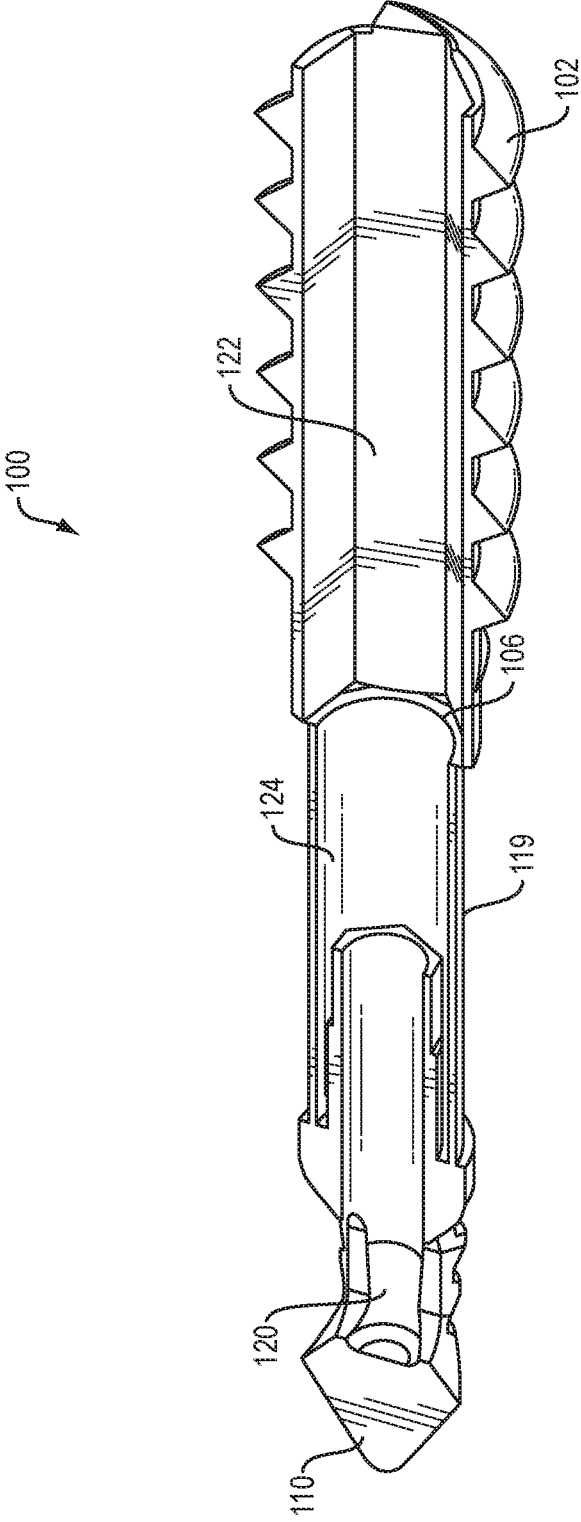


FIG. 1B

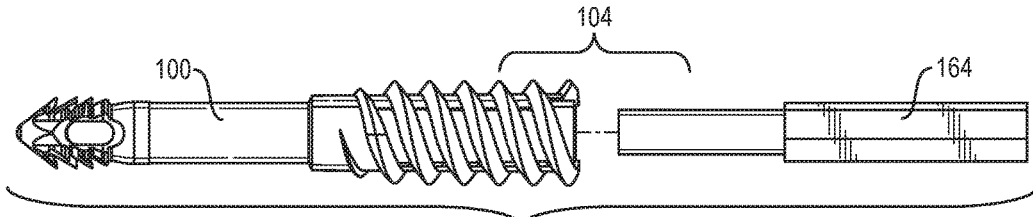


FIG. 1C

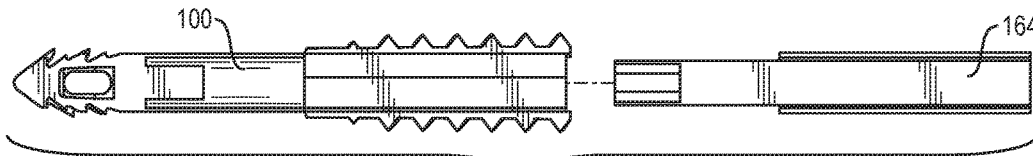


FIG. 1D

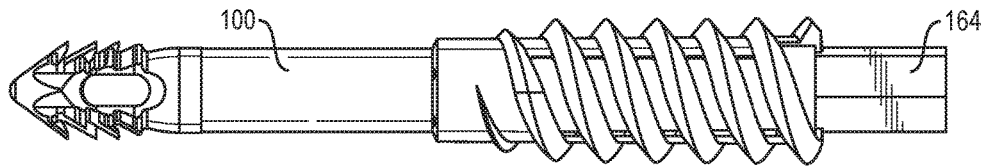


FIG. 1E

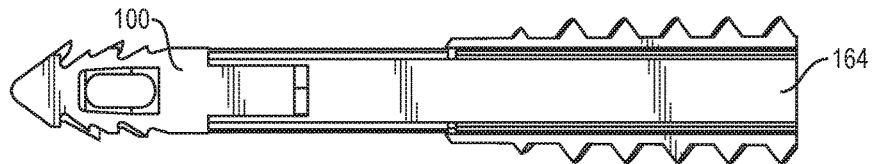


FIG. 1F

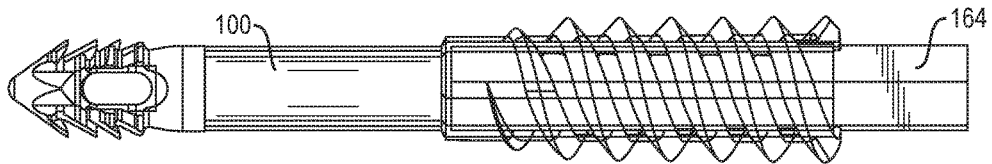


FIG. 1G

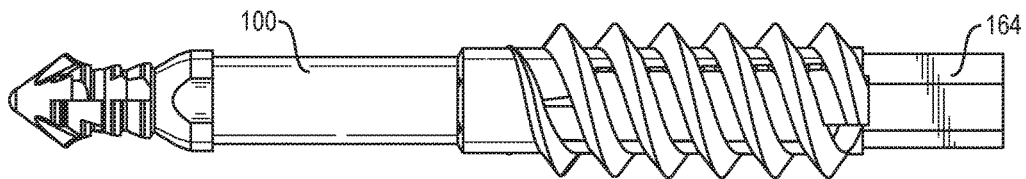


FIG. 1H

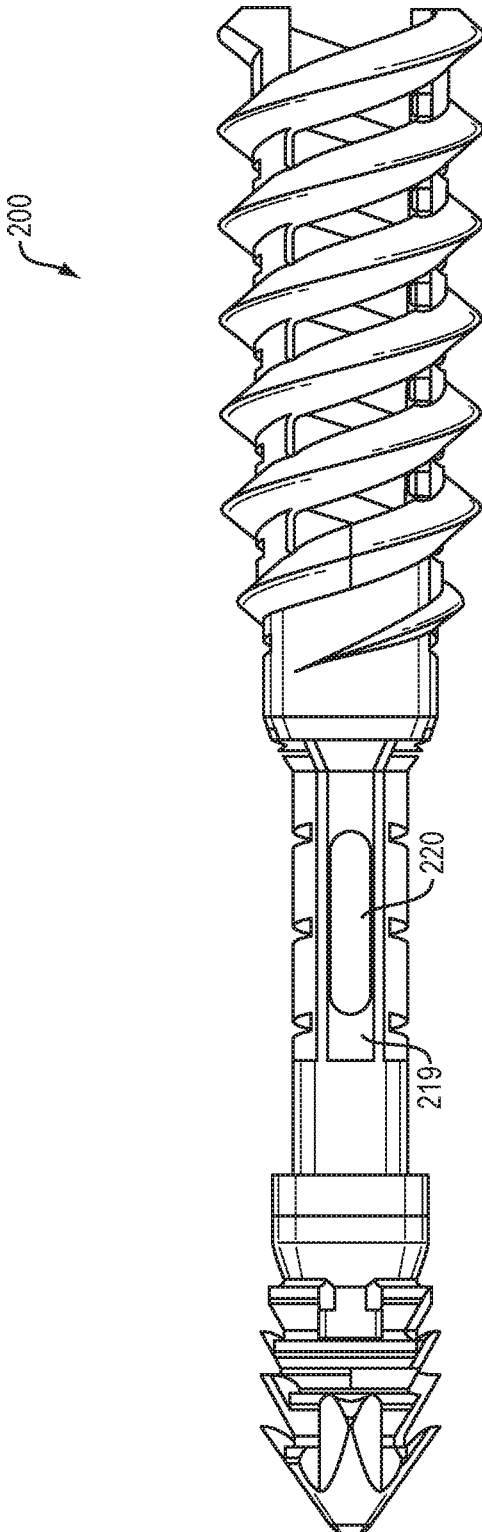


FIG. 2

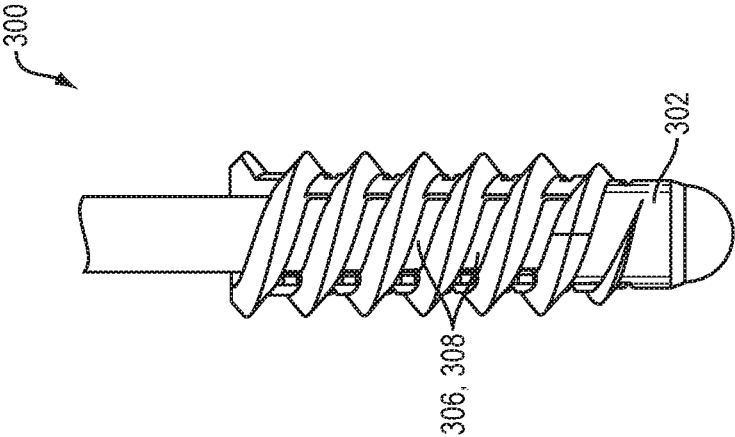


FIG. 3B

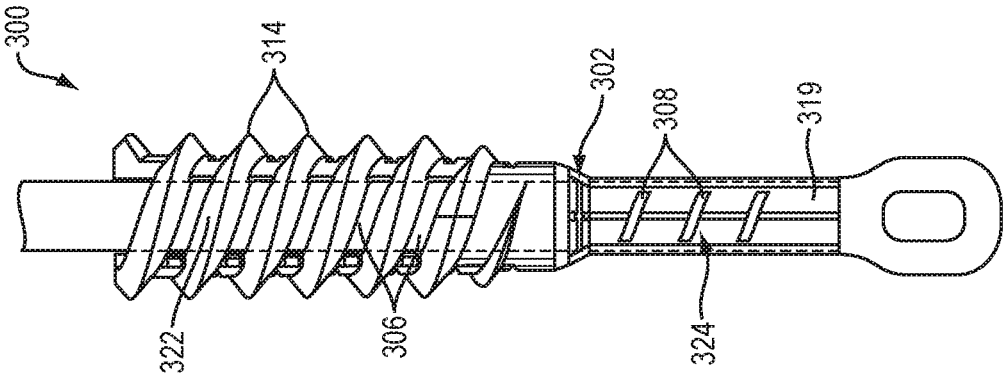


FIG. 3A

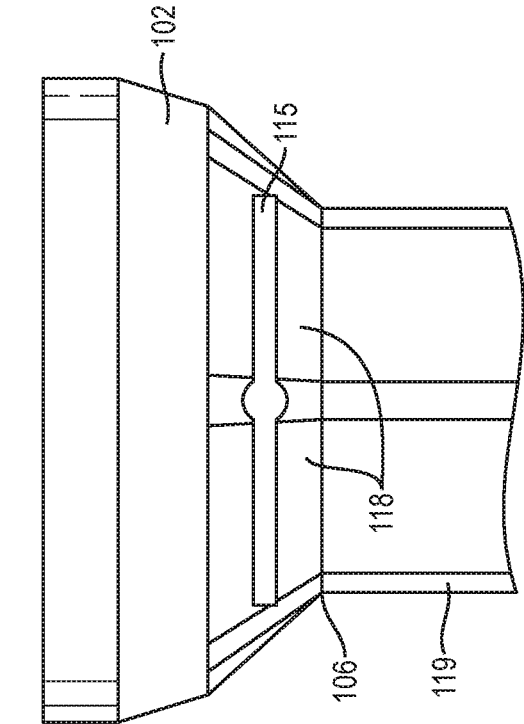


FIG. 4A

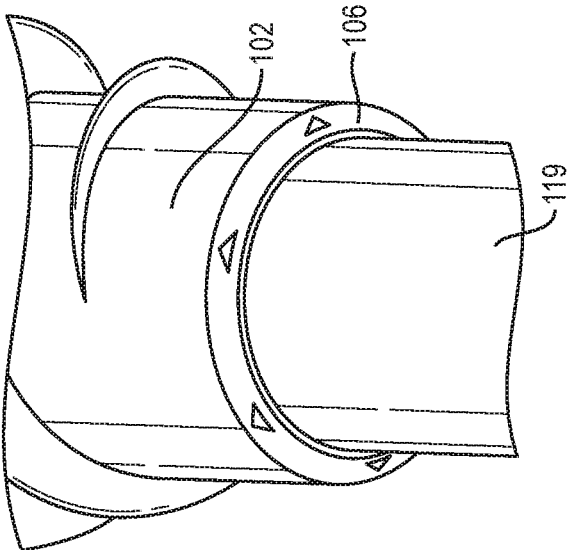


FIG. 4B

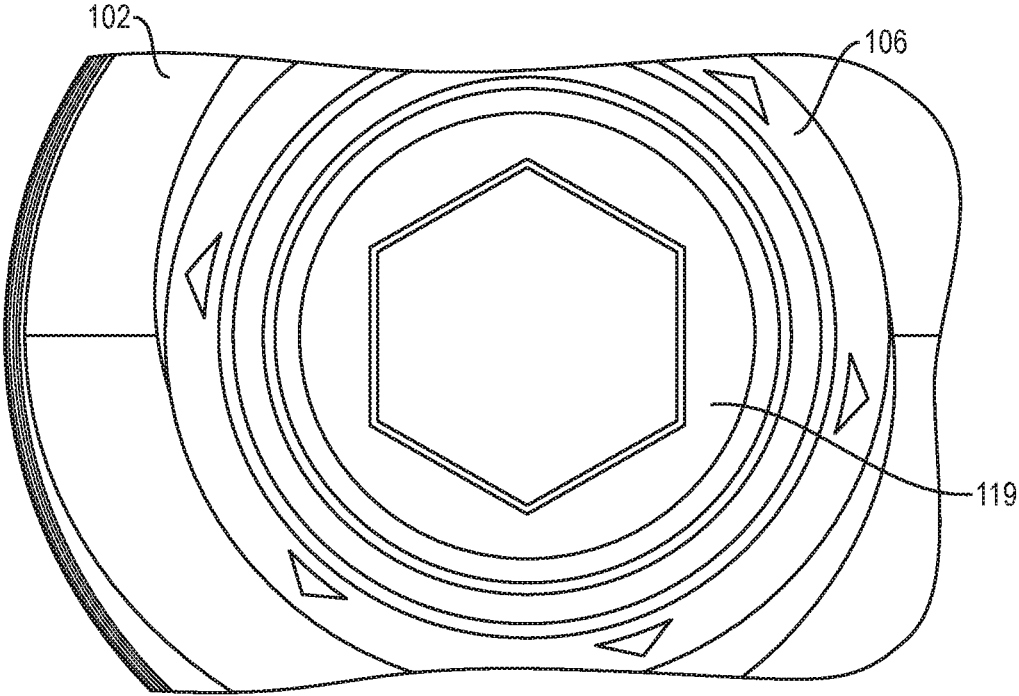


FIG. 5A

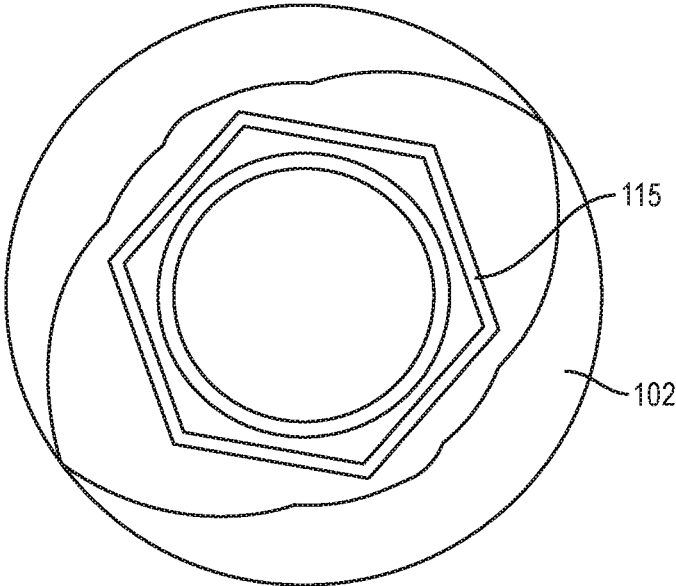


FIG. 5B

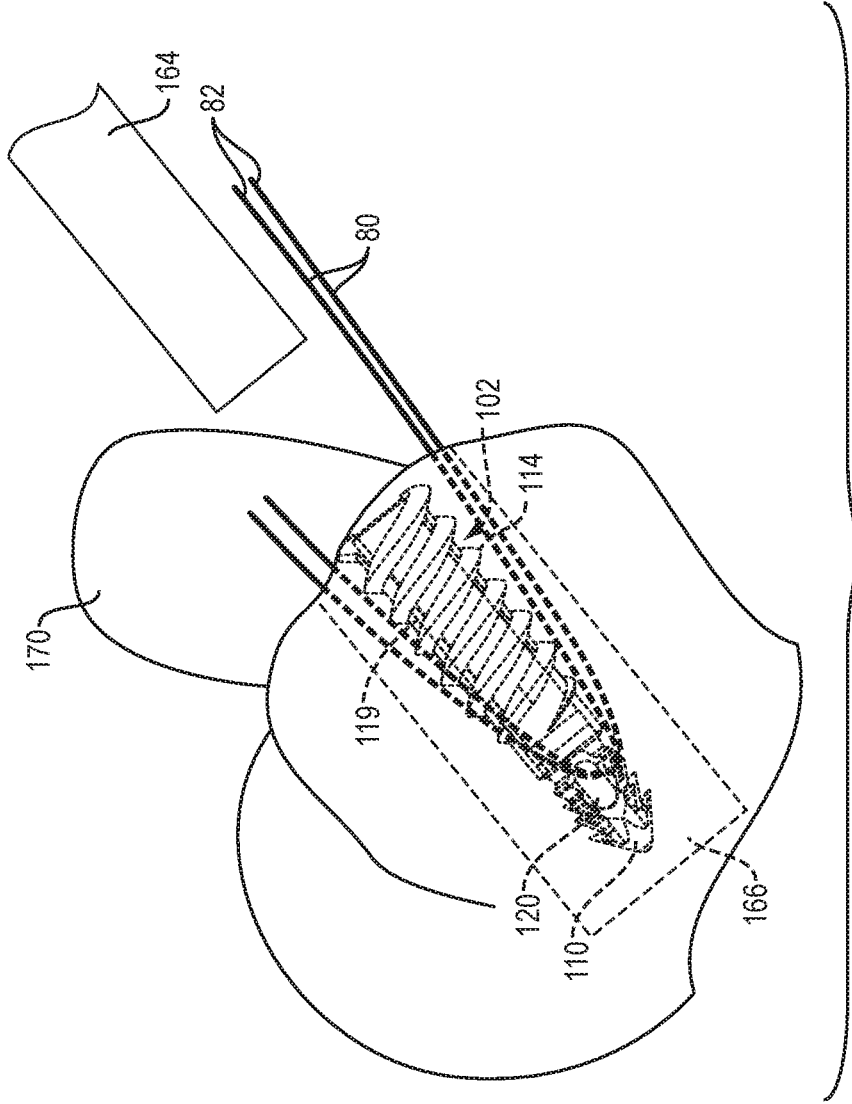
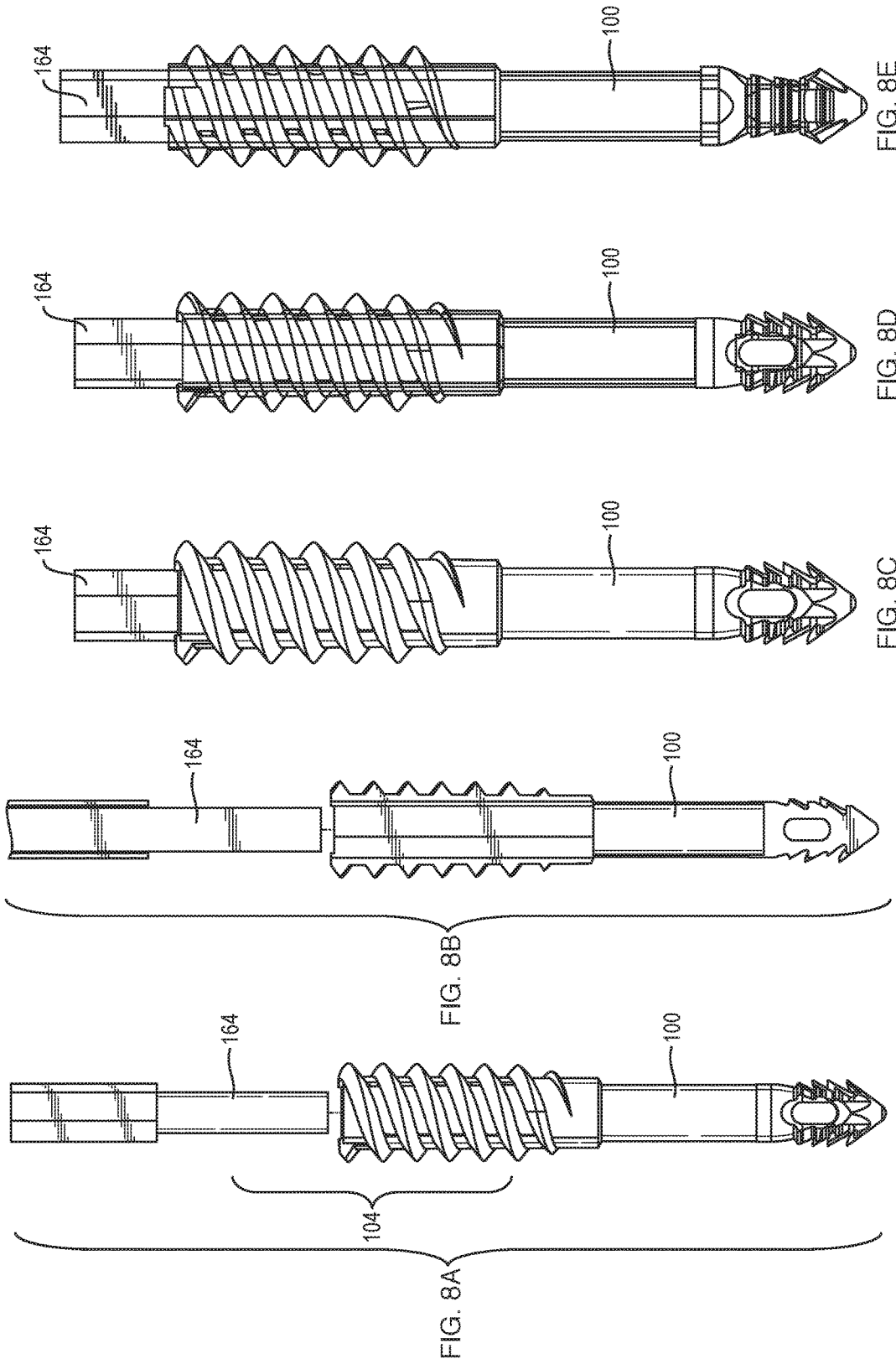
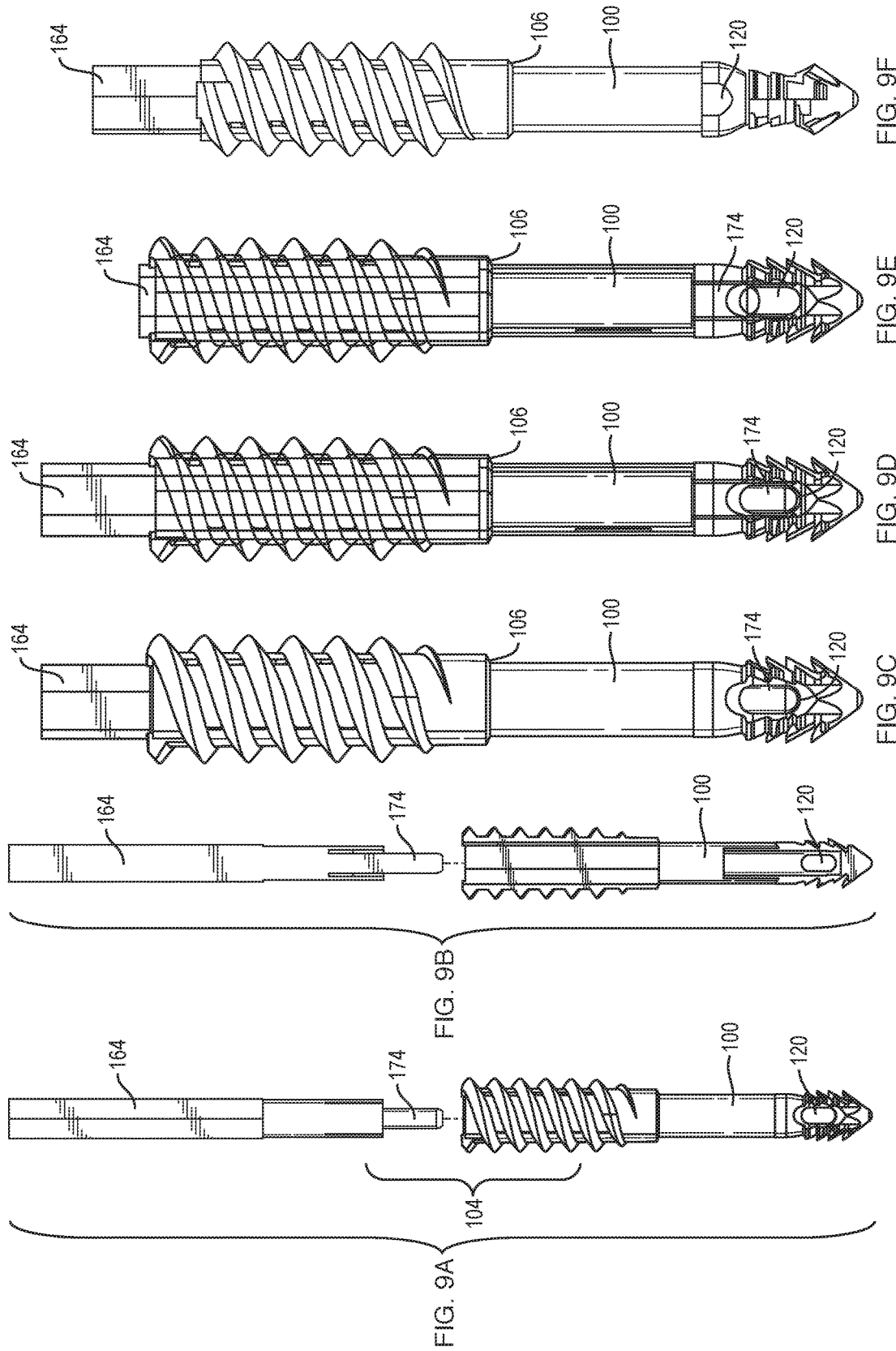


FIG. 7C





KNOTLESS SUTURE ANCHOR WITH BREAKAWAY TIP

FIELD

[0001] The present disclosure relates to knotless suture anchors for use in arthroscopic surgery and, more particularly, to a knotless suture anchor with a breakaway tip.

BACKGROUND

[0002] Arthroscopic surgeries (such as instability, rotator cuff, Achilles tendon, gluteus medius/maximus, and hamstring repairs) require torn soft tissue to be re-attached in an anatomically correct position. Suture anchors are typically the primary source of fixation for soft tissue repairs. Suture anchors can be knotless or tied suture devices.

[0003] Problems can arise in tied suture anchors which require the surgeon to be able to tie arthroscopic knots. These knots can be difficult and time-consuming to the arthroscopic surgery. Post-operative trauma can also be caused by prominent knot stacks. Therefore, knotless suture anchors are used by surgeons who do not wish to tie arthroscopic knots. Knotless anchors allow the surgeon to place the suture anchor, adjust the repair suture to their desired tension, and then fix the repair suture in place so it is unable to slide through the suture anchor. This fixing of the repair suture is done through a secondary procedural step where the anchor compresses the suture so it is no longer able to slide through the anchor.

[0004] One example of such a knotless suture anchor known in the art includes a cannulated plug or screw pre-loaded onto a driver that includes an eyelet at its distal end. A suture attached to soft tissue or graft is passed through the eyelet. The driver and the eyelet are then inserted into a pilot hole in a bone with the plug or screw remaining just outside the hole. The screw or plug is then fully advanced into the pilot hole by tapping or twisting the interference screw or plug until the cannulated plug or screw securely engages and locks in the eyelet implant so that the cannulated plug or screw with the engaged eyelet implant is engaged with the bone. When the cannulated plug or screw is fully deployed, the suture is locked. However, the disadvantages of current suture anchors are that they require two separate components for the eyelet and cannulated plug or screw which increase assembly complexity during manufacturing. Also, the surface of the eyelet is generally smooth and does not itself provide any engagement with the bone tunnel.

SUMMARY

[0005] Described herein is a one-piece knotless anchor with a breakaway distal tip. The anchor includes a thin section connecting a distal anchor portion and proximal anchor portion. The thin section has a cutaway geometry allowing it to break in a repeatable manner. Force from a driver breaks the thin section connecting the distal and proximal anchor portions. The proximal anchor portion slides distally over the thin section and a repair suture is pinched between the distal and proximal anchor portions, thereby advantageously fixing the repair suture in place without tying an arthroscopic knot. Alternatively, the suture may be pinched in between the advanced proximal portion of the anchor and inner walls of the bone tunnel.

[0006] Examples of the suture anchor include a suture anchor having a sleeve with a plurality of threads, which may be helical, along a longitudinal axis, an elongate member extending from a distal end of the sleeve, along the longitudinal axis, the elongate member being coupled to the sleeve by a break-away coupling, and a tip extending from a distal end of the elongate member, the tip being rigidly coupled to the elongate member. The sleeve, the elongate member, and the tip are rotationally coupled when the break-away coupling is intact and the sleeve is rotationally decoupled from the elongate member and tip when the break-away coupling is broken. The sleeve also has a first lumen, while the elongate member has a second lumen, the first and second lumens being co-axial with one another. The inner diameter of the first lumen of the sleeve is greater than the outer diameter of the elongate member so that when the break-away coupling is broken, the sleeve is adapted to slide over the outer surface of the elongate member between a first position, where the distal end of the sleeve is positioned proximal to the eyelet, and a second position, where the distal end of the sleeve is positioned distal to the eyelet.

[0007] Further examples of the suture anchor include a suture anchor having an eyelet extending through one of the elongate member and the tip. A suture extends through the eyelet, with the suture being interposed between the outer diameter of the elongate member and the inner diameter of the sleeve when the sleeve is in the second position. Alternatively, the suture may be interposed between the proximal portion of the anchor sleeve and inner walls of the bone tunnel with the anchor in the second position. The plurality of threads of the sleeve are spaced apart by first openings in communication with the first lumen. The elongate member also has a plurality of second openings in communication with the second lumen, so that the first and second openings are dimensioned to align when the sleeve is in the second position. This plurality of openings may align, advantageously permitting an open architecture anchor and thus promoting bony in-growth through the fenestrations and into the body of the anchor. The break-away coupling consists of a region of reduced cross-sectional area between the proximal end of the elongate member and the distal end of the sleeve or a plurality of ligaments spaced apart by cut-out regions extending transverse to the longitudinal axis through the elongate member, the ligaments connecting the proximal end of the elongate member to the distal end of the sleeve. Alternatively, the plurality of ligaments may be at an angle to the longitudinal axis. The break-away coupling is adapted to separate the elongate member from the sleeve upon application of an axial force and/or torque greater than a selected level at the break-away coupling.

[0008] Examples of the suture anchor assembly include an anchor as described above, together with an anchor driver having an elongate body and a driver tip positioned at a distal end of the driver body. The driver tip includes a first portion dimensioned for receipt within the first lumen of the anchor and a second portion, distal to the first portion, dimensioned for receipt within the second lumen of the anchor. The first portion of the driver tip and the inner walls of the first lumen are adapted to mate such the first portion of the driver tip is capable of transmitting a n axial and/or rotational force to the sleeve. The second portion of the driver tip is dimensioned to contact the proximal end of the tip such that the second portion of the driver tip is capable of transmitting an axial and or rotational force to the anchor

tip. The second portion of the driver tip and the inner walls of the second lumen are adapted to mate such the second portion of the driver tip is capable of transmitting a rotational force to the elongate member.

[0009] Examples of the method of anchoring a suture include the steps of creating a bone tunnel with other ancillary devices, passing suture through the desired tissue repair site, providing a suture anchor as described above, inserting a suture within the eyelet of the suture anchor, inserting the anchor into the bone tunnel, breaking the break-away coupling and distally advancing the sleeve over the outer surface of the elongate member to a position where the distal end of the sleeve is distal to the eyelet, with the suture interposed between the outer diameter of the elongate member and the inner diameter of the sleeve in the second position of the sleeve, or the suture interposed between the outer diameter of the sleeve and inner diameter of the bone tunnel wall. The tip and elongate member are axially and rotationally decoupled from the sleeve when the break-away coupling is broken. Distally advancing the sleeve includes rotationally advancing the threads through the bone hole surrounding the suture anchor while retaining the anchor tip and elongate member in place. Breaking the break-away coupling includes applying at least one of an axial force and/or torque greater than a selected level, to the first portion of the sleeve, while rigidly fixing the anchor tip. Distally advancing the sleeve further includes moving the sleeve into the second position. Optionally, a portion of the first and second openings which may or may not be present in the suture anchor are longitudinally aligned. Advantageously, the first portion of the driver tip and the second portion of the driver tip can rotate/translate independently of each other in order to transmit the necessary forces and reaction forces on the anchor body in order to break the anchor in a consistent manner.

[0010] The foregoing and other objects, features and advantages will be apparent from the following more particular description of the embodiments,

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1A is an illustration of a suture anchor of the present disclosure;

[0012] FIG. 1B is a sectional view of the suture anchor of FIG. 1A;

[0013] FIGS. 1C-H are additional views of the suture anchor of FIG. 1A together with a driver;

[0014] FIGS. 2-3B are illustrations of an alternate examples of the suture anchor;

[0015] FIGS. 4A-5B are illustrations of the break-away coupling of the suture anchor;

[0016] FIGS. 6A-6B are further views of the suture anchor assembly of FIGS. 1C-H;

[0017] FIGS. 7A-C are illustrations of an example of the method of the present disclosure; and

[0018] FIGS. 8A-9F are illustrations of an alternate examples of the suture anchor and driver.

DETAILED DESCRIPTION

[0019] In the description that follows, like components have been given the same reference numerals, regardless of whether they are shown in different examples. To illustrate an example(s) in a clear and concise manner, the drawings may not necessarily be to scale and certain features may be

shown in somewhat schematic form. Features that are described and/or illustrated with respect to one example may be used in the same way or in a similar way in one or more other examples and/or in combination with or instead of the features of the other examples.

[0020] The terms “comprise,” “include,” and/or plural forms of each are open ended and include the listed parts and can include additional parts that are not listed. “And/or” is open ended and includes one or more of the listed parts and combinations of the listed parts.

[0021] Referring now to FIG. 1A, an example of the suture anchor 100 of this disclosure includes a sleeve 102 having threads 114, and an elongate member 119 extending distally from sleeve 102. The threads 114 are shown as helical but may be any other geometry that can generate fixation within a bone tunnel (e.g. stacks of barbs). The anchor 100 may be a screw-in or pound-in design. The elongate member 119 is coupled to the sleeve 102 by a break-away coupling 106, as further described below. A tip 110 is rigidly coupled to the elongate member 119 at the opposite end from the break-away coupling 106. The tip 110 has a distal, barbed portion 116 and a proximal, non-barbed portion 112. Transverse eyelet 120 is shown as located in the barbed portion 116 for passing sutures therethrough, although the eyelet 120 may also be located in the non-barbed portion 112. The sleeve 102, the elongate member 119, and the tip 110 are rotationally coupled when the break-away coupling 106 is intact, while the sleeve 102 is rotationally decoupled from the elongate member 119 and the tip 110 when the break-away coupling 106 is broken. Also contemplated by this disclosure are examples of the tip 110 being fixed or rotatable, or capable of being screwed into a bone hole via threads, barbs or other suitable means. Alternatively or additionally, the proximal end of the sleeve 102 could rotate during the insertion process while breaking the break-away coupling 106 and then screwing the sleeve 102 into the bone hole.

[0022] FIG. 1B shows a cut-away view of the sleeve 102, the elongate member 119 and the tip 110 of the embodiment of FIG. 1a. The sleeve 102 includes a first lumen 122 and the elongate member 119 includes a second lumen 124. The first and second lumens 122, 124 are co-axial with one another. The inner diameter of the first lumen 122 is greater than the outer diameter of the elongate member 119. Therefore, when the break-away coupling 106 is broken, the sleeve 102 is capable of sliding over the outer surface of the elongate member 119 between a first position, where the distal end of the sleeve 102 is positioned proximal to the eyelet 120, and a second position, where the distal end of the sleeve 102 is positioned distal to the eyelet 120. Alternatively, the sleeve 102 may be slid over the elongate member 119 to an alternative location between the first and second position, where the distal end of the sleeve 102 is positioned proximal to a distal terminus of the eyelet 120, as long as the proximal end of the sleeve 122 is set below the surface of the bone tunnel. In this case, the suture may be interposed between the outer diameter of the sleeve 102 and the inner walls of the bone tunnel.

[0023] FIGS. 1C-H show additional views of the suture anchor 100 with an anchor driver 164, together forming an anchor/driver system 104. The views shown are an exploded view (FIG. 1C), a cross-section of the exploded view (FIG. 1D), an assembled view (FIG. 1E), a cross-section of the assembled view (FIG. 1F), an assembled view with the

suture anchor **100** shown as transparent (FIG. 1G) and the suture anchor **100** of FIG. 1A rotated 90 degrees (FIG. 1H). Examples of the anchor driver **164** will be described in more detail below.

[0024] FIGS. 2-3B illustrate further examples of the suture anchor **200** and **300**. In FIG. 2, the transverse eyelet **220** is shown as located in the elongate member **219**. In FIG. 3a the plurality of threads **314** of the sleeve **302** are spaced apart by first openings **306** in communication with the first lumen **322**. The elongate member **319** further has a plurality of second openings **308** in communication with the second lumen **324**. As shown in FIG. 3B, when the sleeve **302** is moved into in the second position, the first and second openings **306**, **308** are dimensioned to align. Advantageously, the openings **306**, **308** provide a space for bony ingrowth into the suture anchor **300**, which improves fixation strength of the suture anchor **300** and promotes better healing.

[0025] Turning now to FIG. 4A, a detailed illustration of the break-away coupling **106** of the suture anchor **100** is shown. The break-away coupling **106** includes a reduced cross-sectional area between the proximal end of the elongate member **119** and the distal end of the sleeve **102**. The break-away coupling **106** is adapted to separate the elongate member **119** from the sleeve **102** upon application of enough axial force and/or torque to break the break-away coupling **106**. In an alternative example shown in FIG. 4B, the break-away coupling **106** has a plurality of ligaments **118** spaced apart by cut-out regions **115** extending transverse to the longitudinal axis through the elongate member **119**, the ligaments connecting the proximal end of the elongate member **119** to the distal end of the sleeve **102**. Alternatively, the cut out regions **115** may also be placed at an angle to a transverse longitudinal axis of the elongated member **119**. FIGS. 5A and 5B illustrate section views of the break-away coupling **106**. That is, FIG. 5A shows a section view of the break-away coupling **106** of FIG. 4A, and FIG. 5B shows a section view of the break-away coupling **106** of FIG. 4B.

[0026] FIGS. 6A and 6B show an example of the suture anchor **100** as described in FIGS. 1A-H, and an anchor driver **164**, together forming the anchor/driver system **104**. As shown in FIG. 6A, the anchor driver **164** includes a driver body **156** and a driver tip **158** positioned at a distal end of the driver body **156**. As shown in FIG. 6B, the driver tip **158** includes a first portion **160** dimensioned for receipt within the first lumen **152** of the sleeve **102**, and a second portion **162** extending distally from the first portion **160**, dimensioned for receipt within the second lumen **154** of the elongated member **119**. The first portion **160** of the driver tip **158** and the inner walls of the first lumen **152** are adapted to mate such that the first portion **160** of the driver tip **158** is capable of transmitting a rotational force to the sleeve **102** when the driver **164** is turned. The second portion **162** of the driver tip **158** is dimensioned to contact the proximal end of the anchor tip **110** such that the second portion **162** of the driver tip **158** is capable of transmitting an axial force to the anchor tip **110** when the driver **164** is turned. The second portion **162** of the driver tip **158** and the inner walls of the second lumen **154** are also adapted to mate such the second portion **162** of the driver tip **158** is capable of transmitting a rotational force to the elongate member **119** when the driver **164** is turned. The first portion **160** of the driver **158** and the second portion **162** of the driver tip **158** are able to

rotate and/or translate independently of each other in order to apply the necessary reaction forces on the suture anchor **100** to break the break-away coupling **106**. The second portion **162** may also have a third portion **172** comprising, for example, prongs dimensioned for receipt within mating slots of the distal tip area of the suture anchor **100**. This configuration advantageously may provide further stability to the tip **110** during insertion into bone or during decoupling of the break-away coupling **106**.

[0027] Described herein is also a method for securing soft tissue to bone, which is illustrated in FIGS. 7A-C. As shown in FIG. 7A, a bone hole or socket **166** is created in a bone **168** at the location that a graft or tissue **170** is to be secured. Free ends **82** of a suture **80** are passed through the tissue or graft **170** at the desired points. The free ends **82** of the suture **80** are then passed through the eyelet **120** of the suture anchor **100**. As shown in FIG. 7B, the suture anchor **100** including the eyelet **120** is inserted into the bone hole **166** to the desired depth, with the sleeve **102** disposed just outside the bone hole **166**. Tension is applied to the suture **80** to position the tissue **170** at the desired location relative to the bone hole **166**. Once an adequate level of tension is achieved, the break-away coupling **106** is broken by applying a sufficient axial force and/or torque at the break-away coupling **106** so that and the tip **110** and elongate member **119** are axially and rotationally decoupled from the sleeve **102**. As shown in FIG. 7C, the sleeve **102** is then advanced distally over the outer surface of the elongate member **119** by advancing the threads **114** through the bone hole **166** surrounding the sleeve **102** while retaining the anchor tip **110** and elongate member **119** in place. The sleeve **102** is advanced in this manner to a position where the distal end of the sleeve **102** is distal to the eyelet **120** and wherein the suture **80** is interposed between the outer diameter of the elongate member **119** and the inner diameter of the sleeve **102**. Alternatively, the sleeve **102** may be advanced so that the distal end of the sleeve **102** is proximal to the eyelet **120** and the suture **80** may instead be impinged between the threads **114** of the sleeve **102** and the bone hole **166**. Once the sleeve **102** is fully inserted and the suture **80** is rigidly secured within the bone hole **166**, the driver **164** is removed and the free ends **82** ends of the sutures **80** protruding from the bone hole **166** are clipped short as close to the anchor **100** as possible.

[0028] FIGS. 8A-E and 9A-F show alternative examples of the anchor/driver system **104**. In FIGS. 8A-E, the driver **164** is shown without the third pronged portion **172** (FIG. 6B). The views shown are an exploded view (FIG. 8A), a cross-section of the exploded view (FIG. 8B), an assembled view (FIG. 8C), an assembled view with the suture anchor **100** shown as transparent (FIG. 8D) and the suture anchor **100** of FIG. 1A rotated 90 degrees (FIG. 1H). In FIGS. 9A-F, the driver **164** includes an additional inner plug **174**. The views shown are an exploded view (FIG. 9A), a cross-section of the exploded view (FIG. 9B), an assembled view (FIG. 9C), an assembled view with the suture anchor **100** shown as transparent with the inner plug **174** extended (FIG. 9D), an assembled view with the suture anchor **100** shown as transparent with the inner plug **174** slightly retracted (FIG. 9E), and the suture anchor **100** of FIG. 9A rotated 90 degrees (FIG. 9F). As particularly shown in FIG. 9E, the inner plug **174** can be variably retracted to allow for space in the eyelet **120** for suture placement or adjustment when

loading sutures, or while tensioning sutures before decoupling the break-away coupling **106**.

[0029] One skilled in the art will realize that embodiments of the disclosure may be embodied in alternative forms without departing from the spirit or essential characteristics thereof. The foregoing embodiments are therefore to be considered in all respects illustrative rather than limiting of the invention described herein. Scope of the disclosed embodiments is thus indicated by the appended claims, rather than by the foregoing description, and all changes that come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

1. An suture anchor comprising:

a sleeve having a plurality of threads and defining a longitudinal axis;

an elongate member extending from a distal end of the sleeve, along the longitudinal axis, the elongate member being coupled to the sleeve by a break-away coupling; and

a tip extending from a distal end of the elongate member, the tip being rigidly coupled to the elongate member; wherein the sleeve, the elongate member, and the tip are rotationally coupled when the break-away coupling is intact; and

wherein the sleeve is rotationally decoupled from the elongate member and tip when the break-away coupling is broken.

2. The suture anchor of claim **1**, wherein the sleeve comprises a first lumen and the elongate member comprises a second lumen co-axial with the first lumen.

3. The suture anchor of claim **2**, wherein an inner diameter of the first lumen of the sleeve is greater than an outer diameter of the elongate member.

4. The suture anchor of claim **1**, further comprising an eyelet extending through one of the elongate member and the tip.

5. The suture anchor of claim **4**, wherein, when the break-away coupling is broken, the sleeve is adapted to slide over an outer surface of the elongate member between a first position, where the distal end of the sleeve is positioned proximal to the eyelet, and a second position, where the distal end of the sleeve is positioned distal to the eyelet.

6. The suture anchor of claim **4**, further comprising one or more sutures extending through the eyelet, wherein the suture is interposed between an outer diameter of the elongate member and an inner diameter of the sleeve when the sleeve is in the second position.

7. The suture anchor of claim **2**, wherein the plurality of threads of the sleeve are spaced apart by first openings in communication with the first lumen and wherein the elongate member further comprises a plurality of second openings in communication with the second lumen.

8. The suture anchor of claim **7**, wherein the first and second openings are dimensioned to align when the sleeve is in a second position.

9. The suture anchor of claim **1**, wherein the break-away coupling comprises a region of reduced cross-sectional area between a proximal end of the elongate member and a distal end of the sleeve.

10. The suture anchor of claim **1**, wherein the break-away coupling comprises a plurality of ligaments spaced apart by cut-out regions extending transverse through or at an angle

to the longitudinal axis of the elongate member, the ligaments connecting a proximal end of the elongate member to a distal end of the sleeve.

11. The suture anchor of claim **1**, wherein the break-away coupling is adapted to separate the elongate member from the sleeve upon application of an axial force and/or a torque greater than a selected level at the break-away coupling.

12. The suture anchor of claim **3**, further comprising:

an anchor driver comprising an elongate body and a driver tip positioned at a distal end of the driver body, the driver tip further including:

a first portion dimensioned for receipt within the first lumen of the sleeve; and

a second portion, distal to the first portion, dimensioned for receipt within the second lumen of the elongate member.

13. The system of claim **12**, wherein the first portion of the driver tip and inner walls of the first lumen are adapted to mate such the first portion of the driver tip is capable of transmitting a rotational and/or axial force to the sleeve.

14. The system of claim **12**, wherein the second portion of the driver tip is dimensioned to contact a proximal end of the anchor tip such that the second portion of the driver tip is capable of transmitting an axial and/or rotational force to the anchor tip.

15. The system of claim **13**, wherein the second portion of the driver tip and inner walls of the second lumen are adapted to mate such the second portion of the driver tip is capable of transmitting a rotational force to the elongate member.

16. The suture anchor of claim **4**, wherein, when the break-away coupling is broken, the sleeve is adapted to slide over the outer surface of the elongate member between a first position, where the distal end of the sleeve is positioned proximal to the eyelet, and an alternative position, where the distal end of the sleeve is positioned proximal to a distal terminus of the eyelet.

17. The suture anchor of claim **4**, further comprising one or more sutures extending through the eyelet, wherein the suture is interposed between the plurality of threads of the sleeve and surrounding bone.

18. A method of anchoring a suture, comprising:

providing a suture anchor comprising:

a sleeve extending along a longitudinal axis, the sleeve having a plurality of threads and defining a first lumen;

an elongate member extending from a distal end of the sleeve, along the longitudinal axis, the elongate member being coupled to the sleeve by a break-away coupling;

a tip extending from a distal end of the elongate member, the tip being rigidly coupled to the elongate member; and

an eyelet formed in one of the elongate member and the sleeve;

inserting one or more sutures within the eyelet;

breaking the break-away coupling; and

distally advancing the sleeve over an outer surface of the elongate member.

19. The method of claim **18**, wherein the tip and elongate member are axially and rotationally decoupled from the sleeve when the break-away coupling is broken.

20. The method of claim **19**, further comprising, prior to breaking the break-away coupling, inserting the suture anchor and the one or more sutures into a bone hole.

21. The method of claim **20**, wherein distally advancing the sleeve comprises rotationally advancing the threads through the bone hole surrounding the suture anchor tip and elongate member which are retained in place.

22. The method of claim **18**, wherein breaking the break-away coupling comprises applying at least one of an axial force and/or a torque greater than a selected level at the break-away coupling.

23. The method of claim **18**, wherein the plurality of threads of the sleeve are spaced apart by first openings in communication with the first lumen and wherein the elongate member further comprises a plurality of second openings in communication with a second lumen formed within the elongate member.

24. The method of claim **23**, wherein distally advancing the sleeve further comprises moving the sleeve into the second position such that at least a portion of the first and second openings are longitudinally aligned.

25. The method of claim **18**, wherein the suture anchor further comprises a break-away coupling formed as a region

of reduced cross-sectional area between a proximal end of the elongate member and a distal end of the sleeve.

26. The method of claim **18**, wherein the suture anchor further comprises a break-away coupling formed as a plurality of ligaments spaced apart by cut-out regions extending transverse through or at an angle to the longitudinal axis of the elongate member, the ligaments connecting a proximal end of the elongate member a the distal end of the sleeve.

27. The method of claim **19**, wherein distally advancing the sleeve over the outer surface of the elongate member comprises distally advancing the sleeve to a position where the distal end of the sleeve is distal to the eyelet, wherein the suture is interposed between the outer diameter of the elongate member and the inner diameter of the sleeve in the second position of the sleeve.

28. The method of claim **19**, wherein distally advancing the sleeve over the outer surface of the elongate member comprises distally advancing the sleeve to a position where the distal end of the sleeve is proximal to a distal terminus of the eyelet, wherein the suture is interposed between the plurality of threads of the sleeve and surrounding bone in the alternative position of the sleeve.

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