



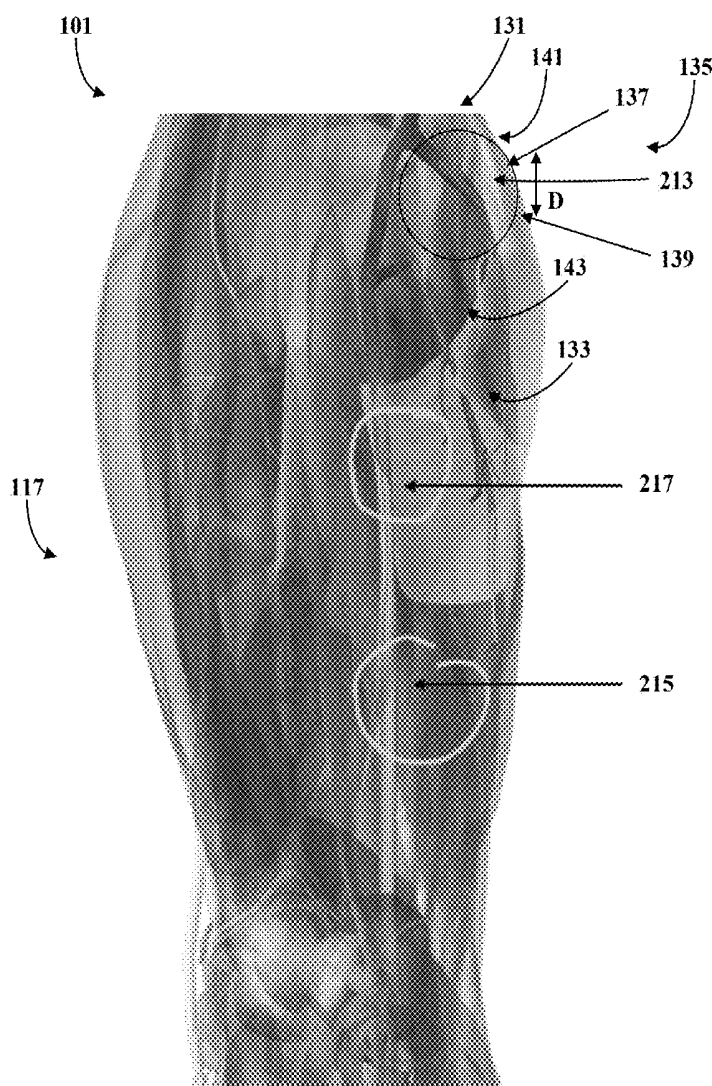
US 20200029883A1

(19) **United States**(12) **Patent Application Publication**
Sadeghi(10) **Pub. No.: US 2020/0029883 A1**(43) **Pub. Date: Jan. 30, 2020**(54) **METHOD AND SYSTEM FOR
NEUROHYDRODISSECTION**(52) **U.S. Cl.**CPC *A61B 5/4029* (2013.01); *A61M 5/178*
(2013.01); *A61B 8/0841* (2013.01); *A61B*
5/0053 (2013.01)(71) Applicant: **Payman Sadeghi**, Miami, FL (US)(72) Inventor: **Payman Sadeghi**, Miami, FL (US)(21) Appl. No.: **16/589,658**

(57)

ABSTRACT(22) Filed: **Oct. 1, 2019****Related U.S. Application Data**(63) Continuation-in-part of application No. 15/907,074,
filed on Feb. 27, 2018, now Pat. No. 10,456,419.(60) Provisional application No. 62/600,726, filed on Feb.
27, 2017, provisional application No. 62/871,405,
filed on Jul. 8, 2019.**Publication Classification**(51) **Int. Cl.***A61B 5/00* (2006.01)*A61B 8/08* (2006.01)*A61M 5/178* (2006.01)

A method of neurohydrodissection for treating a headache in a patient is disclosed. The method comprises the step of physically inspecting a patient and locating a first compression site of a nerve of the patient where the nerve passes through a tissue and is inflamed. The method comprises the step of ultrasound imaging the patient at the first compression site. The method comprises the step of inserting a syringe at the first compression site, wherein while the first compression site is being imaged, guiding the syringe to an intersection between the nerve and the tissue, injecting a solution with the syringe at the intersection and dissecting the nerve from the tissue. The method comprises the step of confirming with the patient whether a headache symptom has changed.



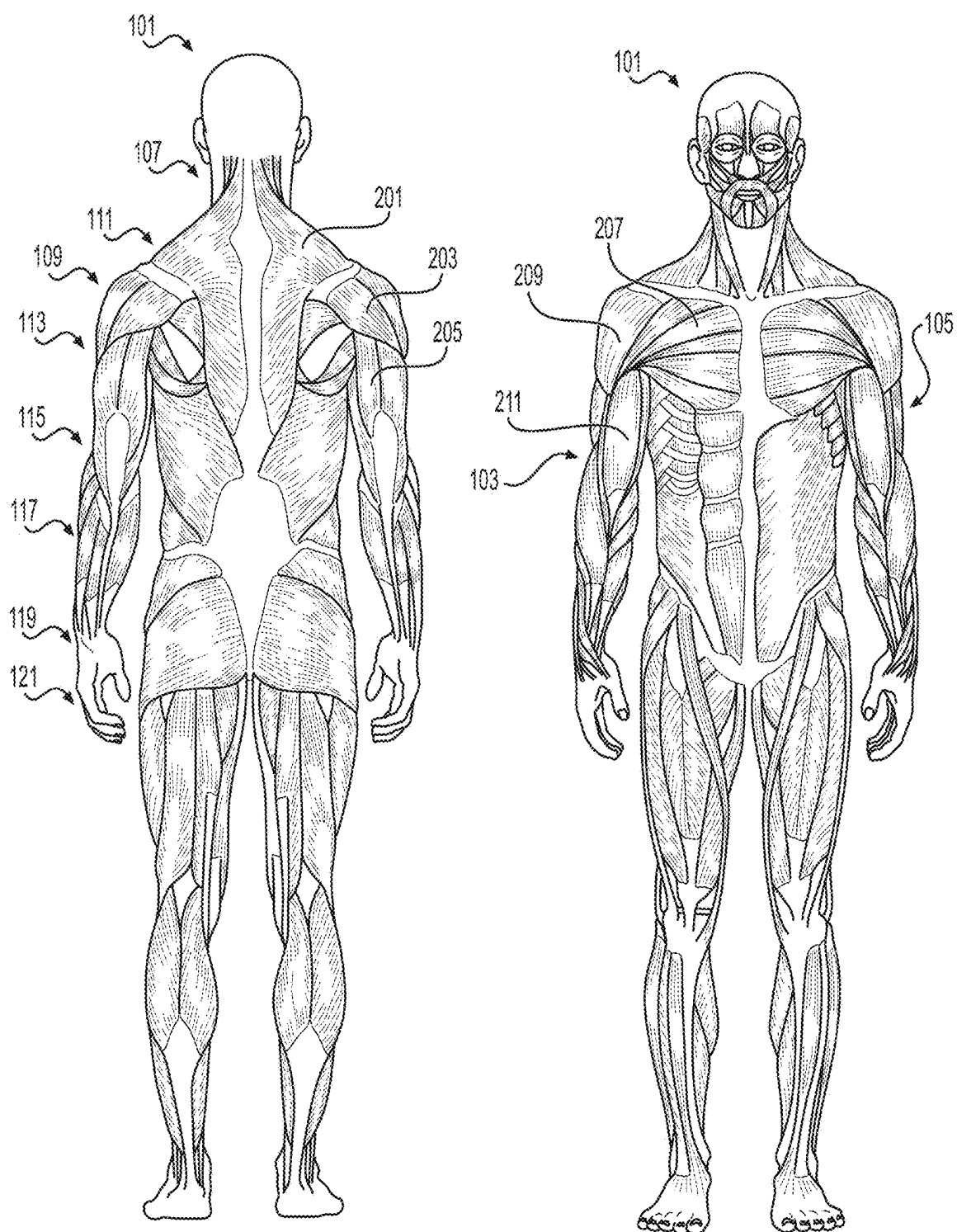


FIG. 1

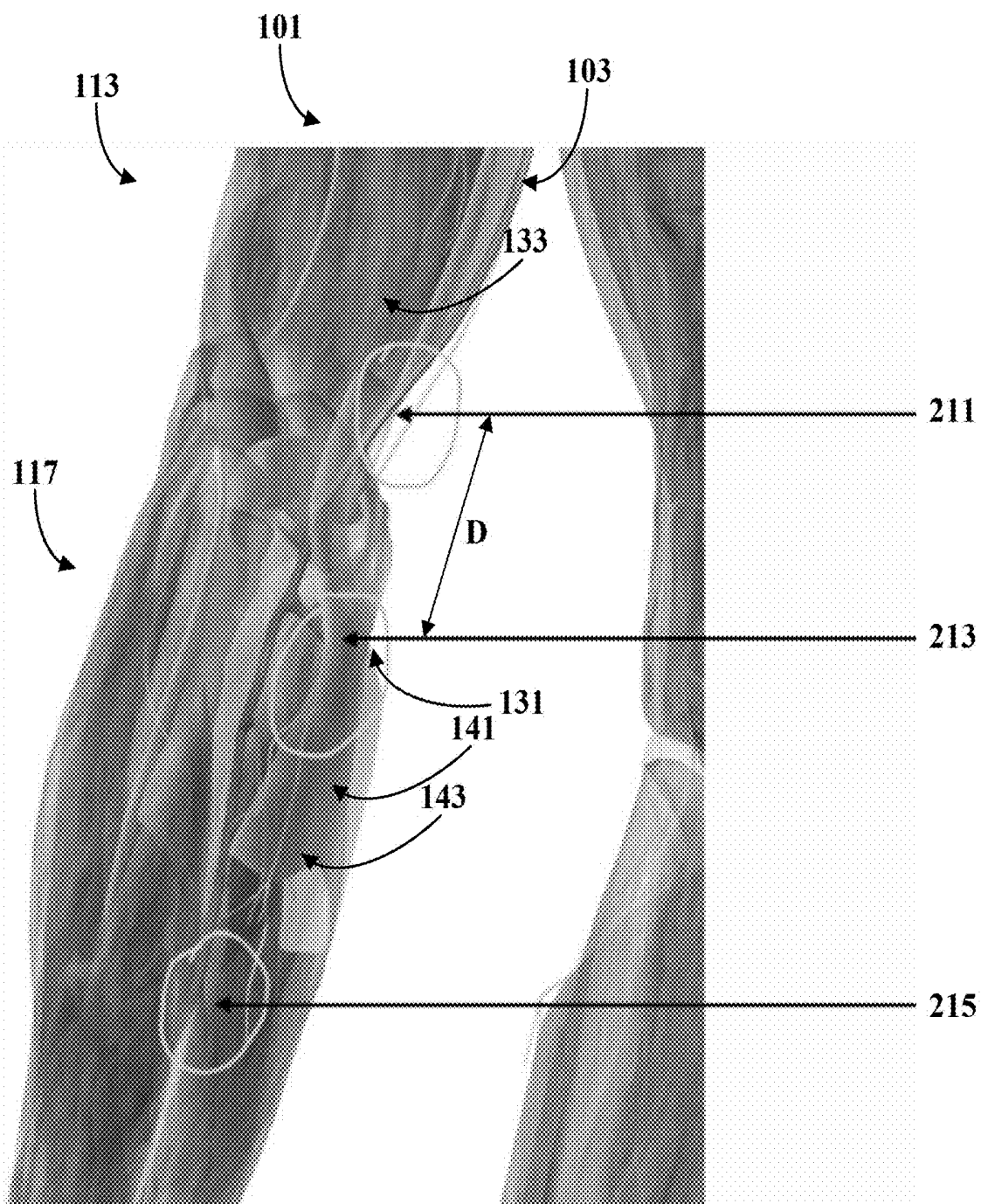


FIG. 2

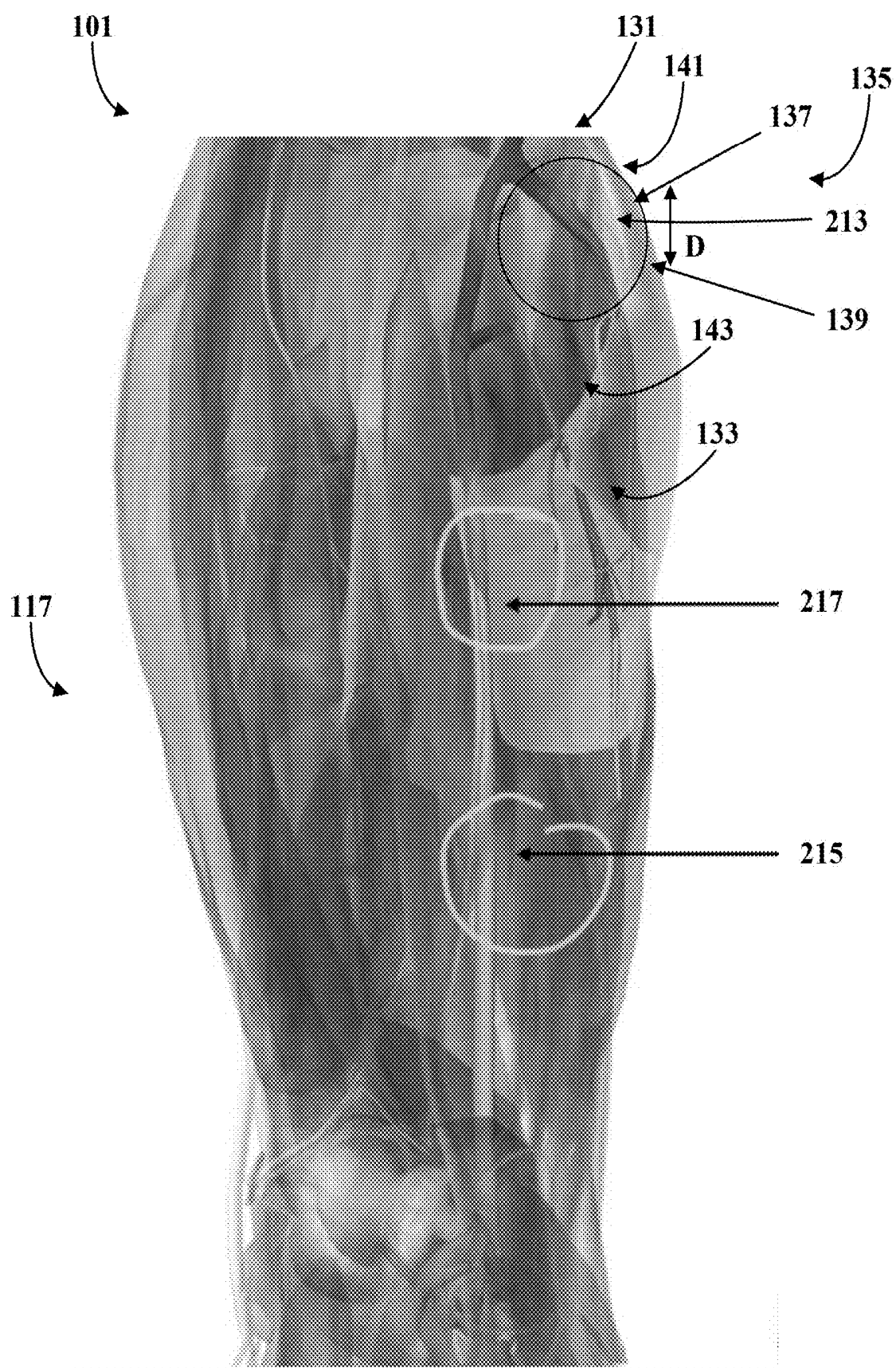
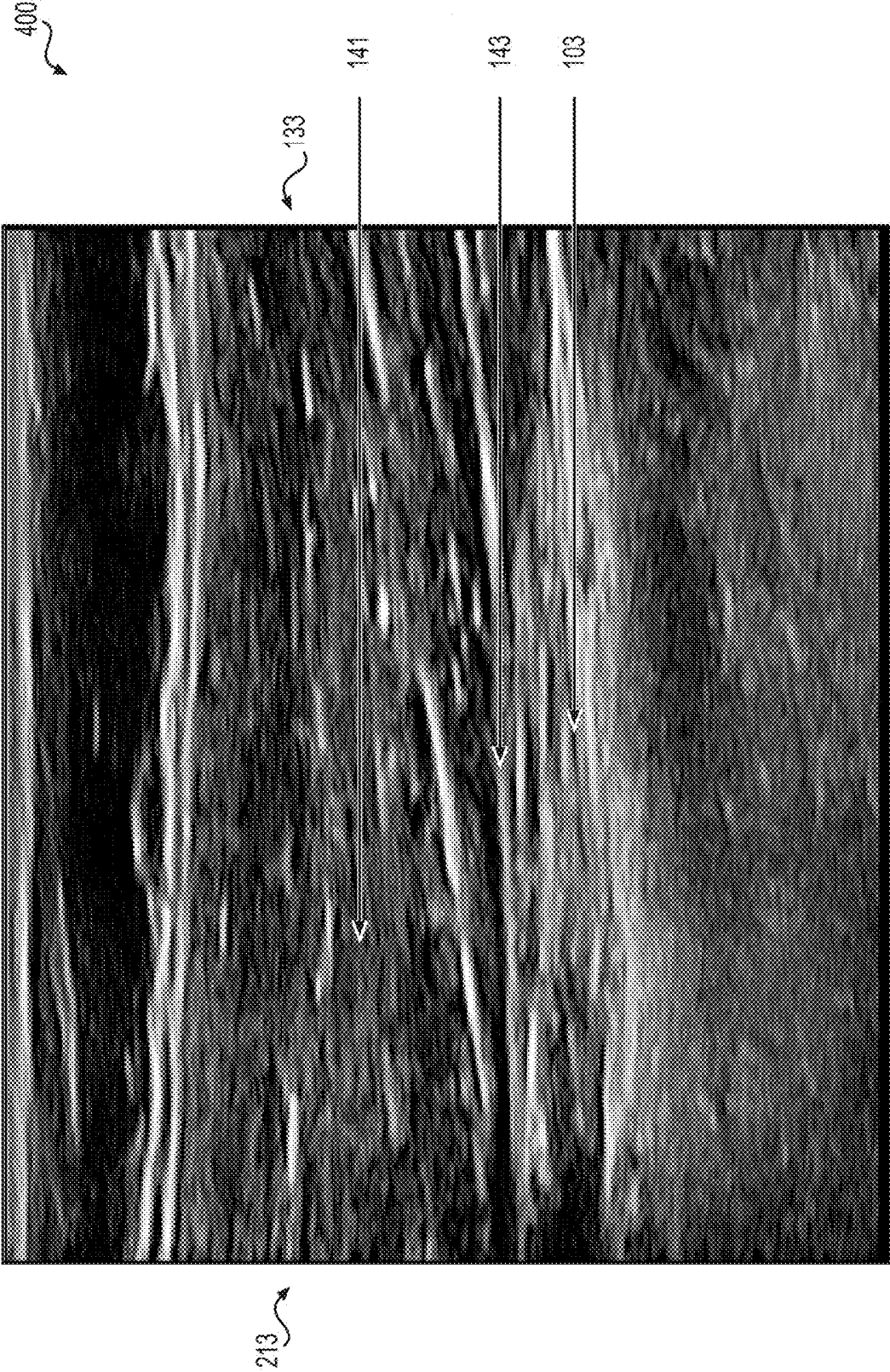


FIG. 3



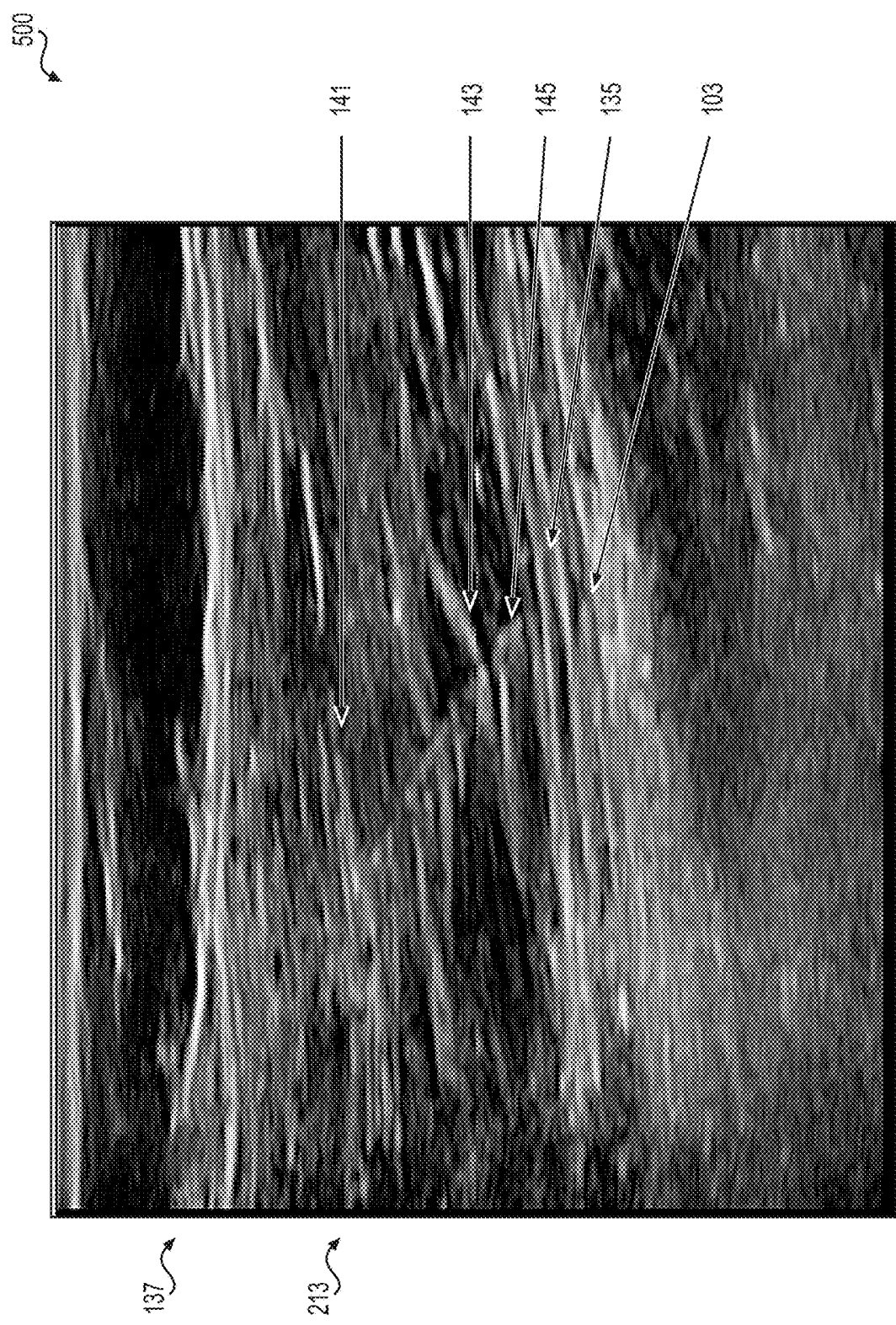


FIG. 5

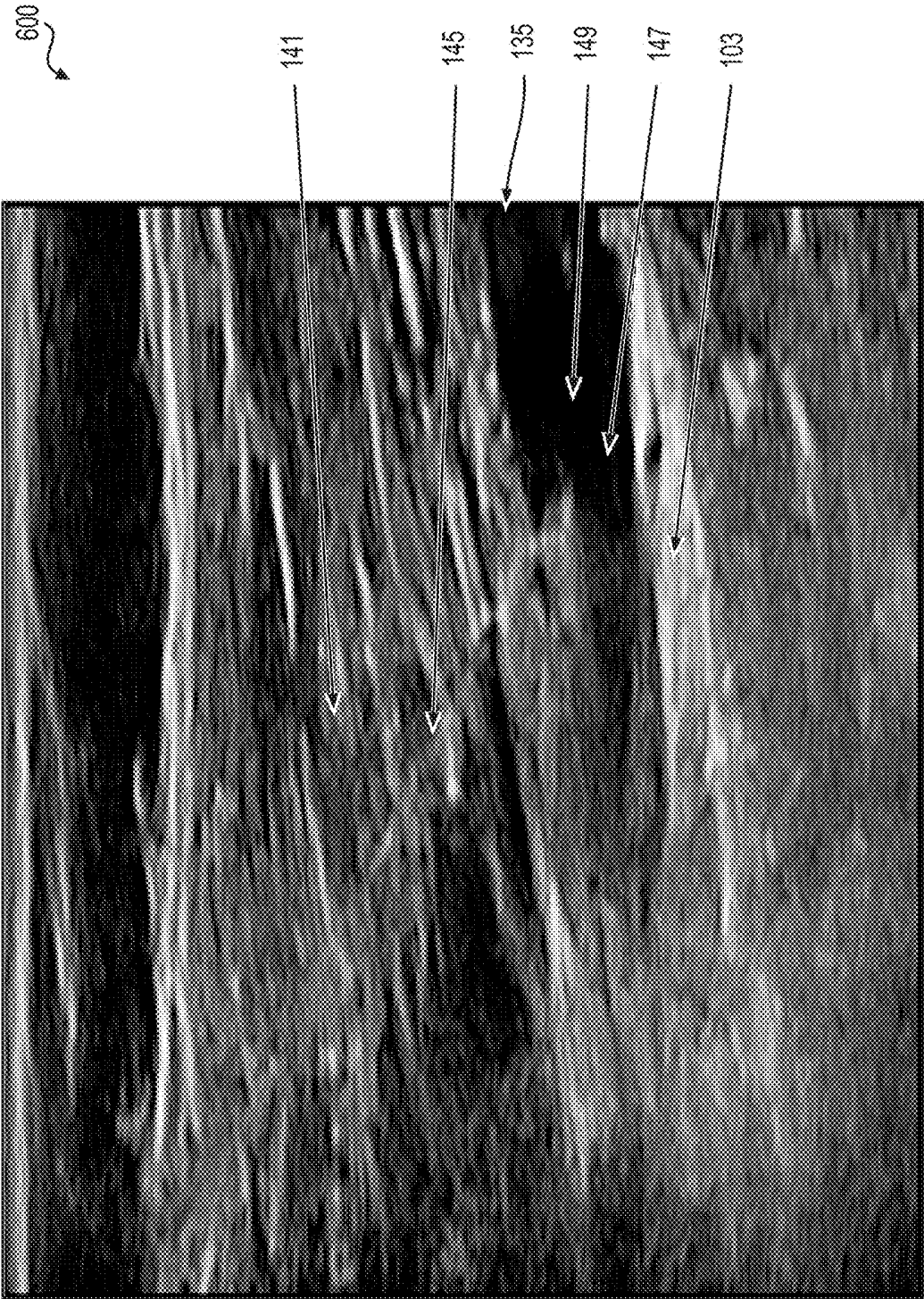


FIG. 6

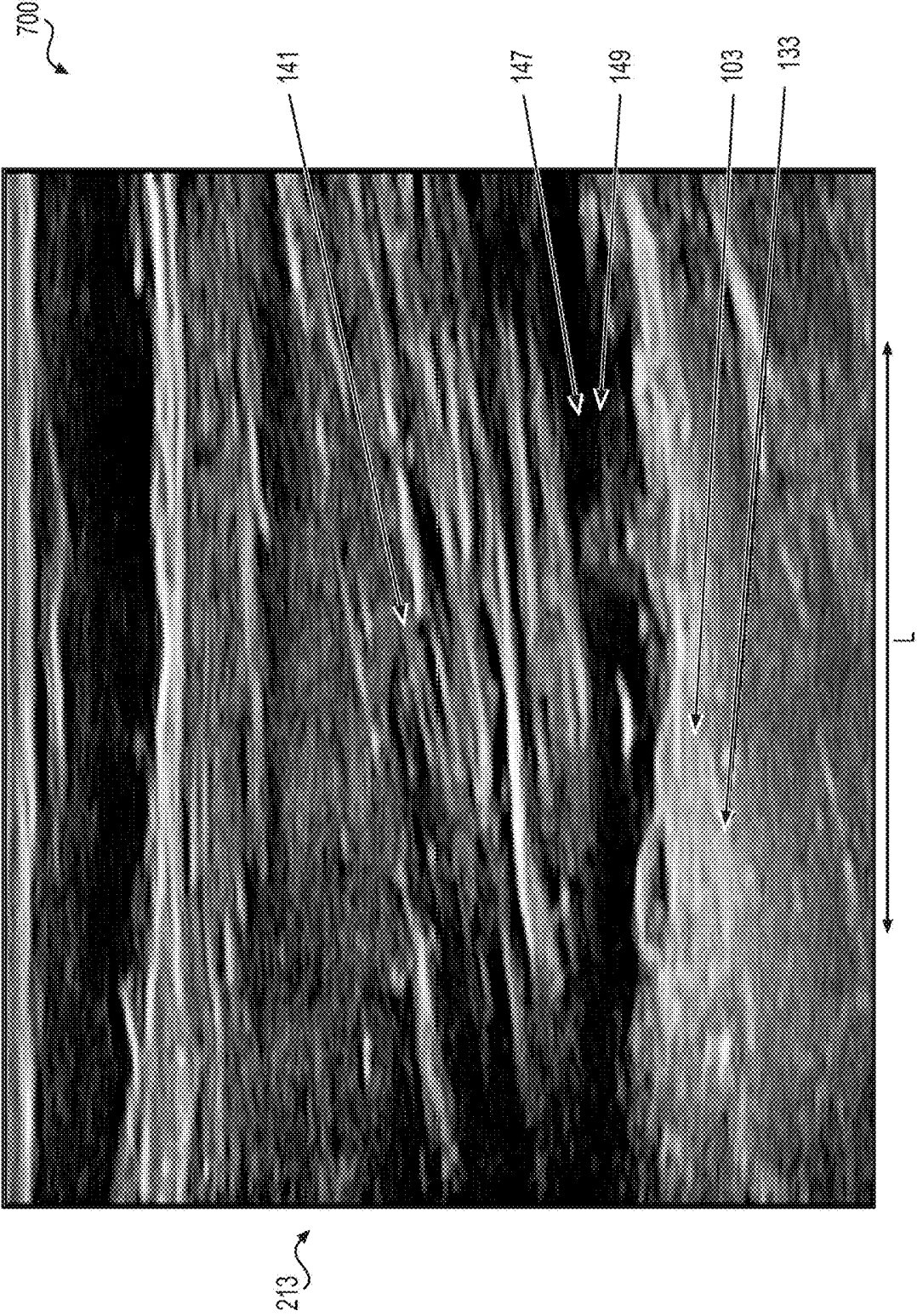
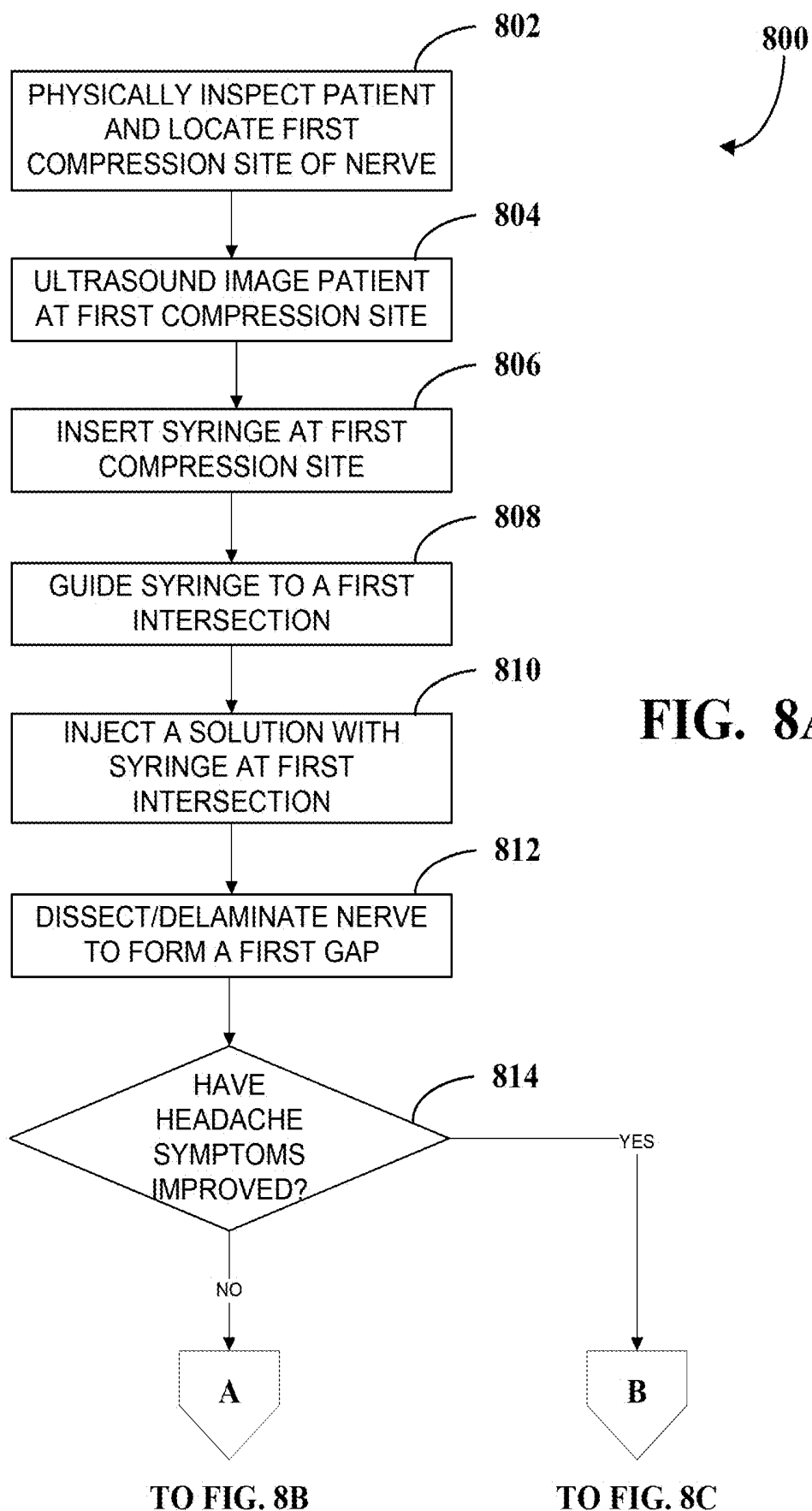
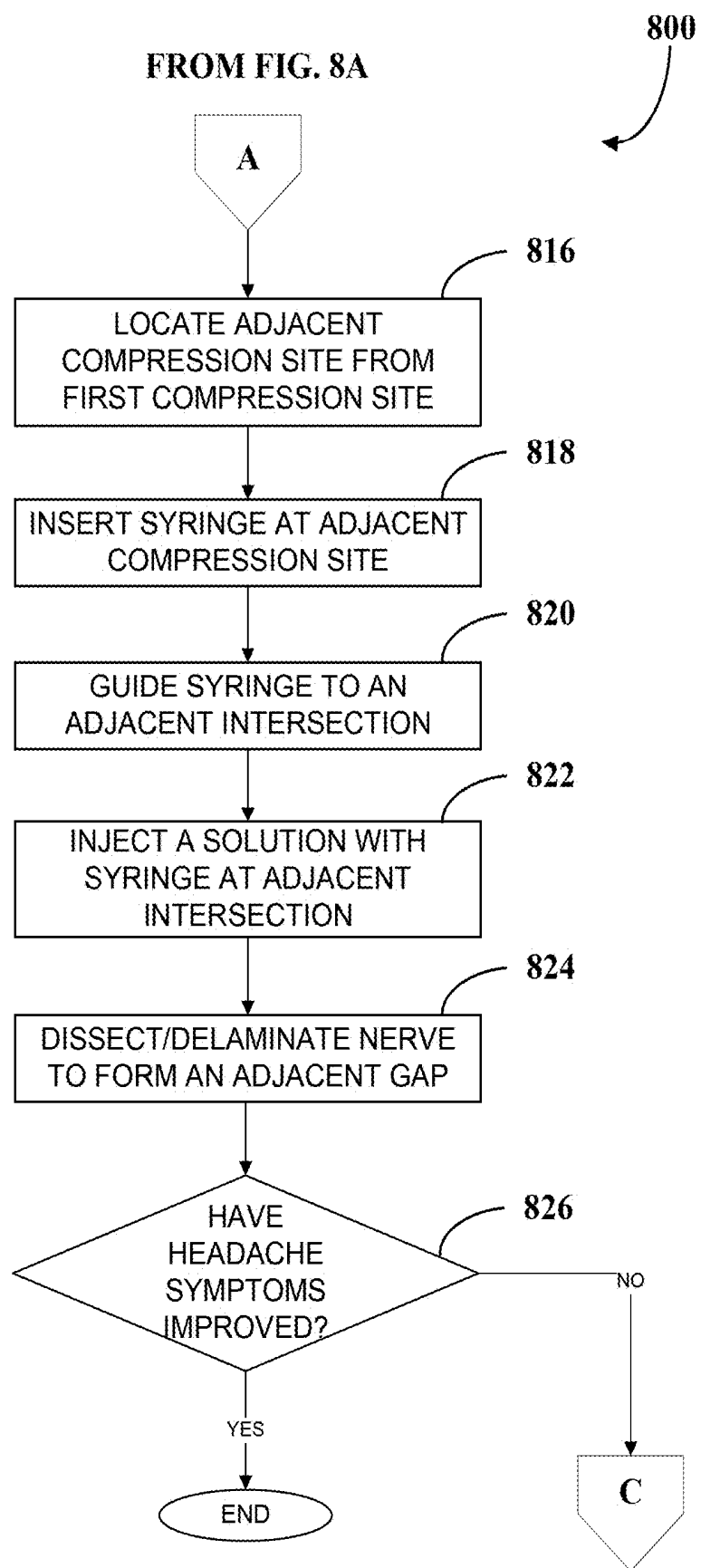
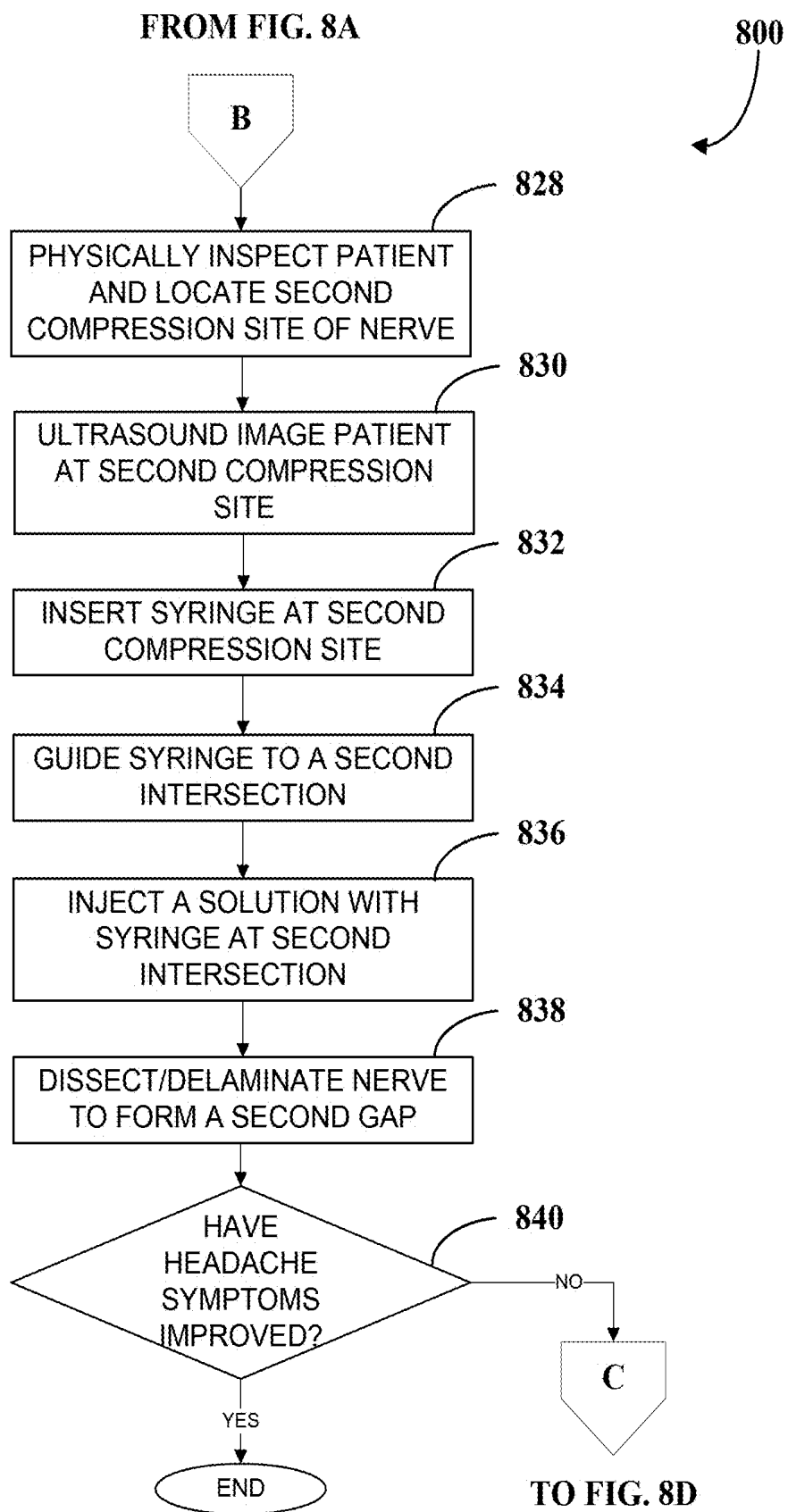
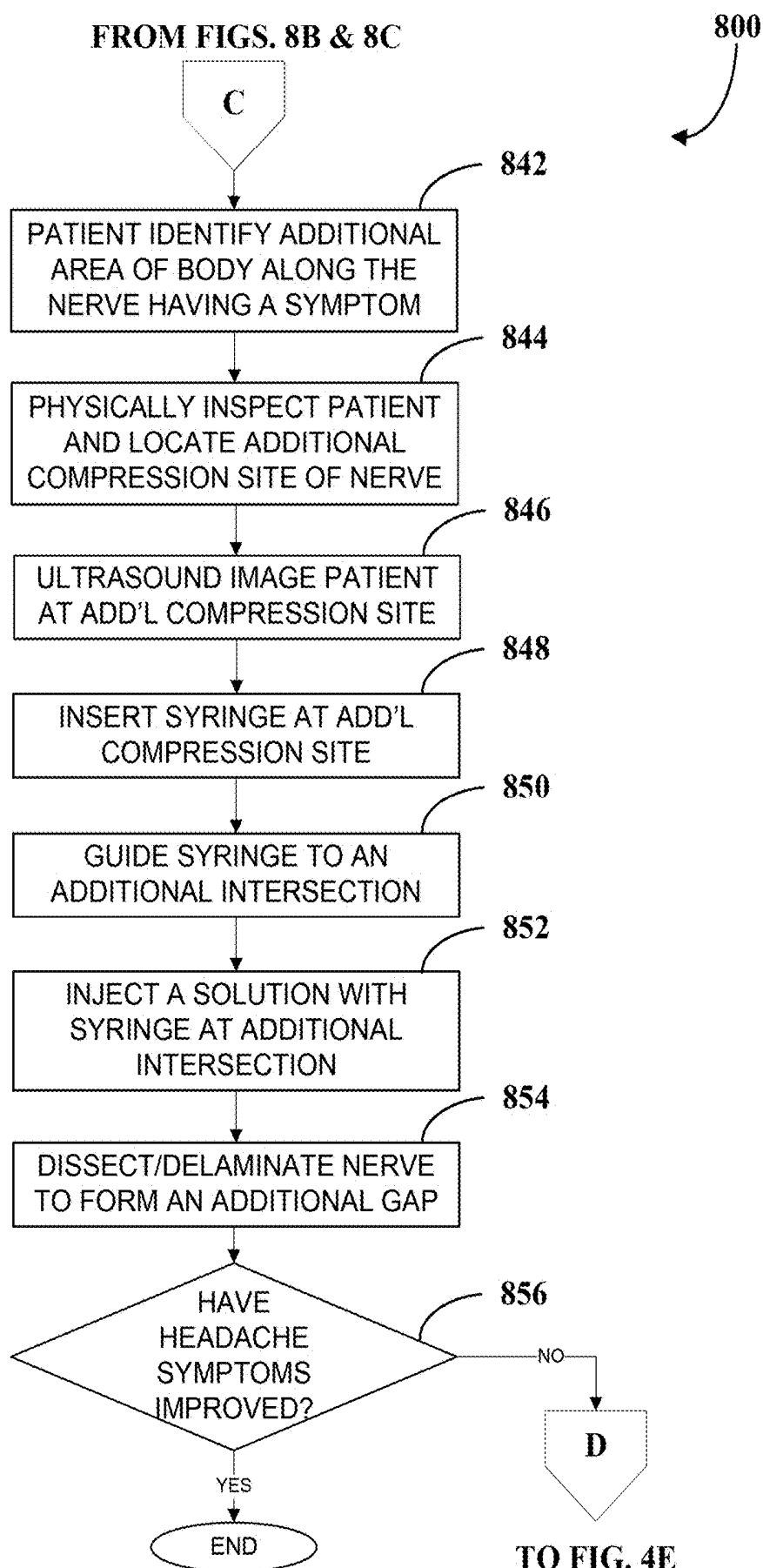


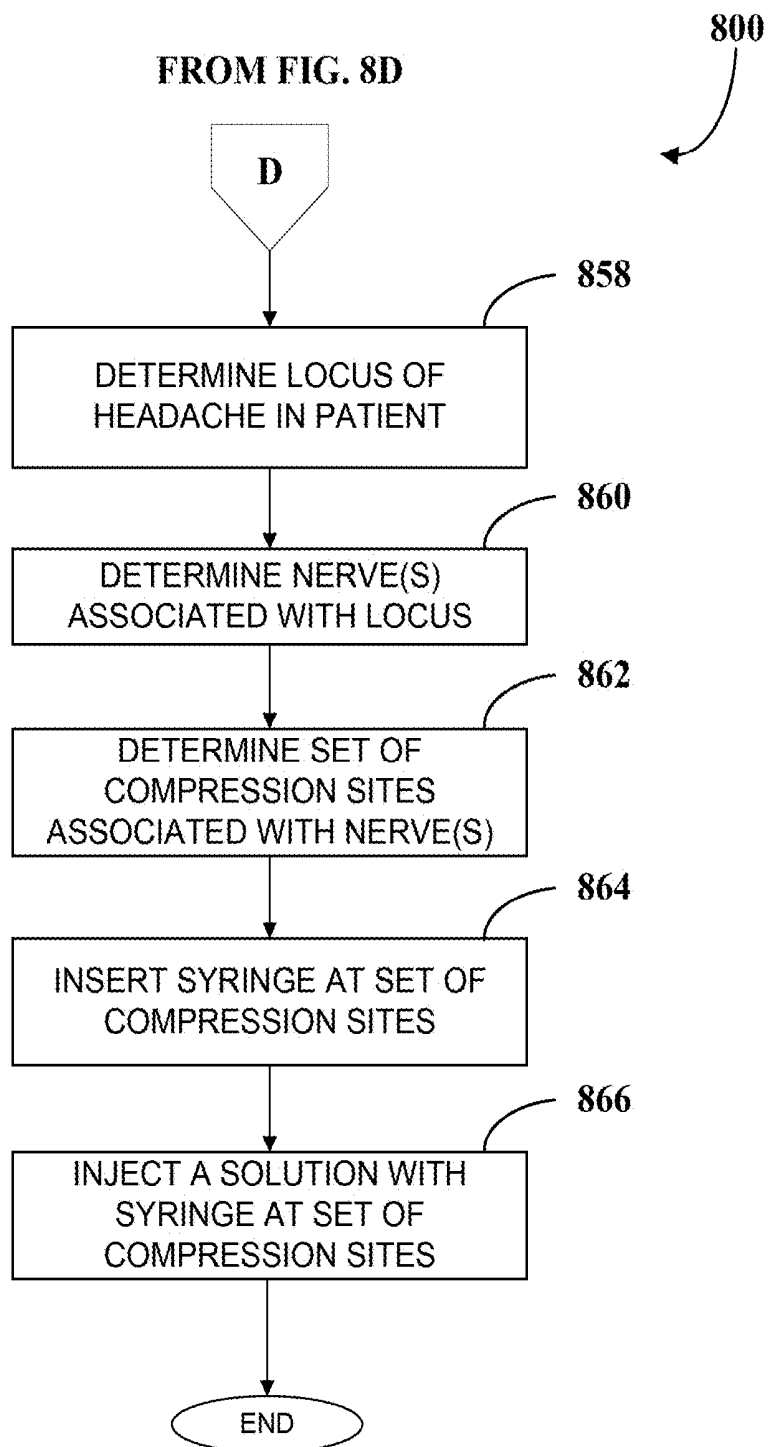
FIG. 7











METHOD AND SYSTEM FOR NEUROHYDRODISSECTION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 15/907,074, filed Feb. 27, 2018, which claims the benefit of U.S. Provisional Patent Application No. 62/600,726 filed on Feb. 27, 2017. This application also claims priority to and the benefit of U.S. Provisional Patent Application Ser. No. 62/871,405 filed Jul. 8, 2019, the entire disclosures of which are hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present disclosure relates generally to treating headaches. Specifically, this disclosure relates to a system and method for neurohydrodissection for treating all types of headaches by applying injections at inflamed nerves of the peripheral nervous system of a patient.

BACKGROUND

[0003] Headaches can be a debilitating problem for people who suffer them. For example, there are estimations that up to 15% of people globally are affected by migraine headaches. Migraine headaches are typically recurrent, often start during puberty, and can worsen during middle age. The symptoms may be quite severe and may include nausea, vomiting, and sensitivity to outside influences such as light, sound, or even smell. Unfortunately, migraines can be long lasting, sometimes up to three or more days. Accordingly, improvements in headache treatments continue to be of interest.

SUMMARY

[0004] This section provides a general summary of the present disclosure and is not a comprehensive disclosure of its full scope or all of its features, aspects, and objectives.

[0005] Disclosed herein is a method of neurohydrodissection for treating a headache in a patient. The method comprises the step of physically inspecting a patient and locating a first compression site of a nerve of the patient where the nerve passes through a tissue and is inflamed. The method comprises the step of ultrasound imaging the patient at the first compression site. The method comprises the step of inserting a syringe at the first compression site, wherein while the first compression site is being imaged, guiding the syringe to an intersection between the nerve and the tissue, injecting a solution with the syringe at the intersection and dissecting the nerve from the tissue. The method comprises the step of confirming with the patient whether a headache symptom has changed.

[0006] Also disclosed herein is a method of neurohydrodissection for treating a headache in a patient. The method comprises the step of physically inspecting a patient and locating a first compression site of a nerve of the patient where the nerve passes through at least one of muscle, fascia, and ligament and is inflamed. The method comprises the step of ultrasound imaging the patient at the first compression site. The method comprises the step of inserting a syringe at the first compression site, wherein while the first compression site is being imaged, guiding the syringe to an intersection between the nerve and the at least one of the

muscle, fascia, and ligament, injecting a solution with the syringe at the intersection and dissecting the nerve from the at least one of the muscle, fascia, and ligament. The method comprises the step of confirming with the patient whether a headache symptom has changed. The method comprises repeating at least some of the above steps for a second compression site.

[0007] Also disclosed herein is a method of neurohydrodissection for treating a symptom in a patient. The method comprises the step of inspecting a patient and locating a first compression site of a nerve that is inflamed. The method comprises the step of imaging the patient at the first compression site. The method includes the step of inserting a syringe at the first compression site, wherein the syringe includes a solution comprising dextrose 5% in water (D5W). The method includes the step of guiding the syringe to a first intersection of between the nerve and the at least one of the muscle, fascia, and ligament. The method includes the step of injecting the solution with the syringe at the first intersection. The method includes the step of dissecting the nerve from the at least one of the muscle, fascia, and ligament to form a gap. The method includes the step of confirming with the patient whether the symptom has changed. The method includes the step of repeating at least some of the above steps for a second compression site of the nerve.

[0008] Other technical features may be readily apparent to one skilled in the art from the following figures, descriptions, and claims.

[0009] Before undertaking the DETAILED DESCRIPTION below, it may be advantageous to set forth definitions of certain words and phrases used throughout this patent document. The terms “include” and “comprise,” as well as derivatives thereof, mean inclusion without limitation. The term “or” is inclusive, meaning and/or. The phrase “at least one of,” when used with a list of items, means that different combinations of one or more of the listed items may be used, and only one item in the list may be needed. For example, “at least one of: A, B, and C” includes any of the following combinations: A, B, C; A and B; A and C; B and C; and A and B and C.

[0010] Definitions for other certain words and phrases are provided throughout this patent document. Those of ordinary skill in the art should understand that in many if not most instances, such definitions apply to prior as well as future uses of such defined words and phrases.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The disclosure is best understood from the following detailed description when read in conjunction with the accompanying drawings. It is emphasized that, according to common practice, the various features of the drawings are not to-scale. On the contrary, the dimensions of the various features are arbitrarily expanded or reduced for clarity.

[0012] FIGS. 1A and 1B are schematic illustrations of a patient with exemplary embodiments of potential compression sites of median nerves in arms of the patient in accordance with aspects of the present disclosure.

[0013] FIG. 2 is a schematic illustration of an arm of the patient with exemplary embodiments of potential compression sites in the arm in accordance with aspects of the present disclosure.

[0014] FIG. 3 is an enlarged, schematic illustration of a nerve in an arm of the patient with a potential compression sites along the nerve in accordance with aspects of the present disclosure.

[0015] FIGS. 4-7 are ultrasound images of procedures in a process of treating compression sites in accordance with aspects of the present disclosure.

[0016] FIGS. 8A-E illustrate a flow diagram of exemplary methods for a treatment of headaches in accordance with aspects of the present disclosure.

DETAILED DESCRIPTION

[0017] FIGS. 1 through 8, discussed below, and the various embodiments used to describe the principles of the present disclosure in this patent document are by way of illustration only and should not be construed in any way to limit the scope of the disclosure. Those skilled in the art will understand that the principles of the present disclosure may be implemented in any suitably arranged system or device.

[0018] The underlying mechanisms of some headaches, such as migraine headaches (or migraines) are not fully known, but most current theories for the cause of migraines are central (i.e., thought to involve the nerves and blood vessels of the brain). Embodiments of the present disclosure treat headaches as a peripheral nerve system disorder (i.e., involving nerves and blood vessels outside of the brain) and not a central one. Limiting treatment of patients having headache symptoms by treating only the peripheral nervous systems of the patients (rather than the patients' central nervous systems) contradicts conventionally accepted practices of treating only the central nervous systems of the patients for headaches. Thus, in some embodiments, the treated nerve is not in the central nervous system of the patient; rather, the nerve can be in a peripheral nervous system of the patient. The treated nerve can be in the somatic nervous system of the peripheral nervous system of the patient.

[0019] Accordingly, the present disclosure can use injection treatments to repair inflamed nerves. For example, embodiments of a method of neurohydrodissection for preventing and/or treating a headache in a patient are disclosed. In the simplified, schematic views of FIGS. 1A, 1B and 2, the nerves of a patient 101 include median nerves 103, 105. Each median nerve 103, 105 extends from a neck 107, through a shoulder 109, adjacent a shoulder blade 111 (FIG. 1A; in the mid to upper back), and down an upper arm 113, an elbow 115, a forearm 117, a wrist 119, and a hand 121 of the patient 101. Although median nerves 103, 105 are shown and described, other nerves of the patient 101 may also be treated.

[0020] Each median nerve 103, 105 can have one or more compression sites 201-217 in the patient 101. As used herein, the term "compression site" of a nerve can be defined as the location in the patient 101 where the nerve 103 is, for example, changing course or direction and/or passes through body tissue, or tissue 133, of the patient 101. Such body tissue 133 can include at least one of muscle 141, fascia 143 (e.g., fascia lining of the tissue), and ligament where the nerve 103 is inflamed. In another embodiment, compression sites can be treated throughout the body to lessen or eliminate symptoms, such as pain symptoms.

[0021] As depicted in FIG. 2, the nerve 103 passes through one of the compression sites, such as compression site 213. A fibrous ring 131 can extend through the tissue 133 of the

compression site 213. The fibrous ring 131 can serve to protect the nerve 103 as it extends through the tissue 133. The tissue 133 can include muscle, fascia, ligament, or any other tissue. The nerve 103 can become inflamed and swell in or near the fibrous ring 131. The inflammation 135 (illustrated in FIG. 3) of the nerve 103 can extend beyond the fibrous ring 131 and the compression site 213.

[0022] In some embodiments, the compression sites 201-217 can be located in at least one of an arm 113, 117, shoulder 109, 111, and neck 107 of the patient 101. In other embodiments, a progression of the method can start at the hand 121 of the patient 101 and then sequentially progress in a proximal direction, relative to the patient 101, to follow the nerve 103 through the wrist 119, forearm 117, elbow 115, upper arm 113, shoulder 109, shoulder blade 111 (FIG. 1A), and neck 107 of the patient 101, or any other desired order.

[0023] Embodiments of the method can include physically inspecting (e.g., palpating) a patient 101 and locating a first compression site 213 of the nerve 103 of the patient 101. The first compression site 213 can be located where the nerve 103 passes through the tissue 133 and the nerve 103 is inflamed (e.g., at inflammation 135). In some embodiments, the method includes imaging the patient 101 at the first compression site 213, such as with ultrasound imaging. Other imaging techniques also can be used, such as magnetic resonance imaging (MRI) or any other desired technique.

[0024] Ultrasound images 400, 500, 600, 700 illustrate example images of the patient 101 during various stages of a method. In the ultrasound image 400 of FIG. 4, the tissue 133 includes muscle 141 and fascia lining, such as fascia 143. The nerve 103 is inflamed and effectively laminated with the fascia 143. Embodiments of the method can include inserting a syringe 145 (FIG. 5, ultrasound image 500) at a first injection site 137 at the first compression site 213 while the first compression site 213 is being imaged, as shown. The method can further include guiding the syringe 145 to an intersection between the nerve 103 and, in this case, the fascia 143. The method can further include injecting a solution with the syringe 145 at the intersection and dissecting or delaminating (see progression between FIGS. 6 and 7, ultrasound images 600, 700) the nerve 103 from the, in this case, the fascia 143 to form a gap 147 therebetween. The method also can include confirming with the patient 101 whether a headache symptom has changed.

[0025] Versions of the solution can include various compositions of fluid. For example, a solution 149 can comprise of dextrose 5% in water (D5W). The D5W can be used to treat inflammation 135. In another example, the solution 149 can consist only of dextrose 5% in water (D5W). In still other versions, the solution 149 can include at least one of saline and anesthetic. For example, the anesthetic can include lidocaine 1%, or any other desired anesthetics. In some embodiments, the solution 149 can include no more than about 10% of the anesthetic. The method also can include injecting a selected volume of the solution 149 into the patient 101. For example, the selected volume can be at least about five (5) cc, and can be not greater than about ten (10) cc of the solution 149. Alternatively, the selected volume can be in any range between either of these values, or any other desired values.

[0026] Each of the previously described procedures can be repeated for a second compression site 211 of the nerve 103. For example, the first compression site 213 can be located at a selected distance D (e.g., as illustrated in FIG. 2) from the

second compression site **211**. In some embodiments, the selected distance **D** can be approximately one cm, more than one cm, less than one cm, one or more inches, or any other desired distance. Some embodiments of the method include treating the first and second compression sites **213**, **211** in only an appendage of the patient **101**, or any other desired location. In other example, the second compression site **211** is proximal to the first compression site **213** relative to the patient **101**.

[0027] In some embodiments, a length **L** (e.g., illustrated in FIG. 7) of the dissection of the nerve **103** from the tissue **133** can be in a selected range. For example, the length **L** can be at least about one (1) cm. In other examples, the length **L** can be not greater than about five (5) cm. Alternatively, the length **L** can be in any range between either of these values, or any other desired values. Each compression site can have multiple injection sites, such as two or three, depending on the length (**L**) of the inflammation **135** of the nerve **101**. The entire length of the inflammation **135** of the nerve **103** can be treated.

[0028] In some embodiments, one or more additional insertions or injections of solution **149** can be required at each compression site. For example, the injecting procedure described herein can be repeated at a second injection site **139** (e.g., illustrated in FIG. 3). The second injection site **139** for the first compression site **213** can be adjacent to the first injection site **137** for the first compression site **213** at a selected distance **D** away from the first injection site **137**. Injecting solution at the second injection site **139** can further dissect the nerve **103** at the first compression site **213**. In some embodiments, the selected distance **D** can be at least about 0.5 cm, and can be not greater than about five (5) cm. Alternatively, the selected distance **D** can be in any range between either of these values or any other desired values.

[0029] Embodiments of the method can include performing other actions after performing the previously described procedures. For example, the method can further include prompting or asking the patient to identify any other area of the body along the nerve having another symptom, such as a headache symptom, and then repeating the treatment at the any desired area of the body identified by the patient.

[0030] Alternative embodiments of the method can include other procedures. For example, the method can further include determining a locus of the headache in the patient. The method can include determining one or more nerves associated with the locus of the headache. The method can include determining a set of compression sites that are associated with the one or more nerves. The method can include injecting the solution into the determined set of compression sites. In another embodiment, the one or more nerves associated with the locus of the headache can travel through the associated compression sites.

[0031] Embodiments of the method can further comprising repeating some or all of the prescribed procedures after an interval of time. For example, some patients can receive improved headache relief by repeating this treatment or procedure after one week. In other embodiments, some patients can receive improved headache relief by repeating the procedure at least about one time per week for at least about one week to about eight weeks, or any other desired time.

[0032] FIGS. 8A-E illustrate flow diagrams of a method **800** for the prevention and/or treatment of headaches according to embodiments of this disclosure. In this embodi-

ment, the method **800** can be performed on a patient **101** by a doctor or any other desired healthcare professional.

[0033] Beginning at block **802**, when, for example, after the doctor has determined that the patient **101** is a candidate for injections to remedy headache symptoms, the doctor can physically inspect a patient **101**. The doctor can locate a first compression site **213** of a nerve **103** of the patient **101**. At the first compression site **213**, the nerve **103** passes through a tissue **133**, such as a muscle **141**, fascia **143**, ligament, or any other desired tissue. The nerve **103** can be inflamed at the first compression site **213**. Then, at block **804**, ultrasound images of the patient **101** at the first compression site **213** are taken.

[0034] At block **806**, a syringe **145** can be inserted at the first compression site **213**. The syringe **145** can be inserted while the first compression site **213** is being imaged.

[0035] At block **808**, the syringe **145** can be guided to an intersection (e.g., a first intersection) between the nerve **103** and the tissue **133**. At block **810**, a solution **149**, such as D5W, can be injected using the syringe **145** at the intersection. At block **812**, nerve **103** can be dissected or delaminated to form a gap **147** (e.g., a first gap).

[0036] At decision block **814**, the doctor can take different courses of action based on how the patient **101** is responding to the treatment. The end result of this choice can include another form of further treatment.

[0037] If the headache symptoms have improved, then then the doctor can proceed to block **828** (discussed in more detail below). If the headache symptoms of the patient **101** have not improved, the doctor can repeat some of the previous steps at least one more time for the first compression site **213**. The repeated steps can be administered adjacent to the first injection site **137** for the first compression site **213** at a selected distance away **D** from the first injection site **137**. In doing so, the nerve **103** can be further dissected at the first compression site **213**.

[0038] More specifically, at block **816**, the doctor can locate an adjacent compression site from the first compression site **213**. At block **818**, the doctor can insert the syringe **145** at the adjacent compression site. At block **820**, the doctor can guide the syringe **145** to an adjacent intersection. At block **822**, the doctor can inject the patient **101** with the solution **149** at the adjacent intersection. At block **824**, the doctor can dissect or delaminate the nerve **103** to form an adjacent gap. At decision block **826**, the doctor can take different courses of action based on how the patient **101** is responding to the treatment. If the headache symptoms have improved, then the treatment (e.g., method **800**) can end. If the headache symptoms have not improved, then the doctor can proceed to block **842**.

[0039] If the headache symptoms of the patient have improved after the methods described in blocks **802-812**, then at block **828**, the doctor can repeat blocks **802-812** for a second compression site **211** of the nerve **103**. Other compression sites also can be treated. At block **828**, the patient can be physically inspected and a second compression site **211** of the nerve **103** can be located. At block **830**, ultrasound images can be produced at the second compression site **211** of the patient **101**. At block **832**, the syringe **145** can be inserted at the second compression site **211**. At block **834**, the syringe **145** can be guided to a second intersection. At block **836**, the solution **149** can be injected into the patient **101** at a second intersection (e.g., between the nerve **103** and the tissue **133**). At block **838**, the nerve

can be dissected or delaminated to form a second gap between the nerve **103** and the tissue **133** (e.g., the muscle **141**, the fascia **143**, ligaments, or any other desired tissue). If the headache symptoms have improved, then the treatment (e.g., method **800**) can end. If the headache symptoms have not improved, then the method **800** can proceed to block **842**.

[0040] At this point, an initial treatment can be finished. The patient can be allowed to recover and monitored for progress. At decision blocks **826** and **840**, the doctor can take different courses of action based on how the patient **101** is responding. The end result of this choice can include another form of further treatment. If the headache symptoms have improved, the method **800** can end. If the headache symptoms have not improved, at block **842**, the doctor can ask the patient **101** to identify any additional area of the body of the patient **101** along a nerve having another symptom, and blocks **802-812** can be repeated at the additional area of the body of the patient **101**.

[0041] For example, at block **844**, the patient **101** is physically inspected and an additional compression site is located. At block **846**, an ultrasound image of the patient **101** is taken at the additional compression site. At block **848**, a syringe **145** is inserted at the additional compression site. At block **850**, the syringe **145** is guided to an additional intersection, for example, between the nerve **103** and the tissue **133**. At block **852**, the solution **149** can be injected using a syringe **145** at the additional intersection. At block **854**, the nerve **103** is dissected or delaminated to form an additional gap.

[0042] At decision block **856**, a check-up is performed on the patient **101** to determine whether the patient **101** has responded positively to the treatment and, if so, whether the patient **101** needs further treatment. If the patient **101** has substantially stopped having headaches, then no further treatment may be necessary (or the patient **101** may decide to forego further treatment) and the method **800** ends. If the doctor determines that the patient **101** is a candidate for further treatment, and the patient **101** agrees to the treatment, then the method **800** proceeds to block **858**.

[0043] At block **858**, a locus of continuing headaches is determined in the patient **101**. As discussed above, this may be facilitated by the already-performed treatment, as it is likely that the treatment will have had some therapeutic effect, which may have reduced the severity of the headache.

[0044] At block **860**, one or more nerves associated with the locus of the headache is determined. At block **862**, a set of compression sites that are associated with the one or more nerves is determined. The one or more nerves associated with the locus of the headache can travel through the associated compression sites. At block **864**, the syringe **145** can be inserted into the patient **101** at the set of compression sites. At block **866**, the solution is injected into the determined set of compression sites of the patient **101**. This should reduce or eliminate the headache symptoms. The method **800** ends thereafter.

[0045] FIGS. **1-8** can include additional and/or fewer components and/or steps in an alternative order and are not limited to those illustrated in this disclosure.

[0046] Although the present disclosure has been described with exemplary embodiments, various changes and modifications may be suggested to one skilled in the art. It is

intended that the present disclosure encompass such changes and modifications as fall within the scope of the appended claims.

[0047] None of the description in this application should be read as implying that any particular element, step, or function is an essential element that must be included in the claim scope. The scope of patented subject matter is defined only by the claims. Moreover, none of the claims is intended to invoke 35 U.S.C. § 112(f) unless the exact words “means for” are followed by a participle.

[0048] While the disclosure has been described in connection with certain embodiments, it is to be understood that the disclosure is not to be limited to the disclosed embodiments but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures as is permitted under the law.

What is claimed is:

1. A method of neurohydrodissection for treating a headache in a patient, comprising:

- (a) physically inspecting a patient and locating a first compression site of a nerve of the patient where the nerve passes through tissue and is inflamed;
- (b) ultrasound imaging the patient at the first compression site;
- (c) inserting a syringe at the first compression site, wherein while the first compression site is being imaged, guiding the syringe to an intersection between the nerve and the tissue, injecting a solution with the syringe at the intersection and dissecting the nerve from the tissue; and
- (d) confirming with the patient whether a headache symptom has changed.

2. The method of claim 1, further comprising:

- (e) repeating steps (a)-(d) for a second compression site of the nerve.

3. The method of claim 2, wherein the first compression site is located at a distance of about 1 cm to about 5 cm away from the second compression site.

4. The method of claim 2, wherein the first and second compression sites are located in an appendage of the patient.

5. The method of claim 4, wherein a progression of the method starts at the appendage of the patient and sequentially progresses from a distal to proximal direction relative to the patient, to follow the nerve through at least two of a hand, a wrist, a forearm, an elbow, an upper arm, a shoulder, and a neck of the patient.

6. The method of claim 2, wherein the second compression site is proximal to the first compression site relative to the patient.

7. The method of claim 2, further comprising repeating steps (a)-(e) at least about 1 time per week for at least about 1 week to about 8 weeks.

8. The method of claim 1, wherein a length of the neurohydrodissection of the nerve from the tissue is in a range of about 1 cm to about 5 cm.

9. The method of claim 1, repeating step (c) at least one more time for the first compression site but adjacent to a first injection site for the first compression site at a selected distance away from the first injection site to further dissect the nerve at the first compression site, wherein the selected distance is in a range of about 0.5 cm to about 5 cm.

10. The method of claim 1, wherein the solution comprises dextrose 5% in water (D5W).

11. The method of claim 1, further comprising:
determining a locus of the headache in the patient;
determining one or more nerves associated with the locus of the headache;
determining a set of compression sites that are associated with the one or more nerves, wherein the one or more nerves associated with the locus of the headache travel through the associated compression sites; and
injecting the solution into the determined set of compression sites.

12. A method of neurohydrodissection for treating a headache in a patient, comprising:

- (a) physically inspecting a patient and locating a first compression site of a nerve of the patient where the nerve passes through at least one of muscle, fascia, and ligament and the nerve is inflamed;
- (b) ultrasound imaging the patient at the first compression site;
- (c) inserting a syringe at the first compression site, wherein while the first compression site is being imaged, guiding the syringe to an intersection between the nerve and the at least one of the muscle, fascia, and ligament, injecting a solution with the syringe at the intersection and dissecting the nerve from the at least one of the muscle, fascia, and ligament;
- (d) confirming with the patient whether a headache symptom has changed; and
- (e) repeating steps (a)-(d) for a second compression site of the nerve.

13. The method of claim 12, further comprising:
determining a locus of the headache in the patient;
determining one or more nerves associated with the locus of the headache;
determining a set of compression sites that are associated with the one or more nerves, wherein the one or more nerves associated with the locus of the headache travel through the associated compression sites; and

injecting the solution into the determined set of compression sites.

14. The method of claim 12, wherein after performing steps (a)-(e), further comprising:
asking the patient to identify an additional area of the patient along the nerve having another headache symptom, and then repeating steps (a)-(d) at the additional area of the patient.

15. The method of claim 12, wherein the solution comprises at least one of saline and anesthetic.

16. The method of claim 12 wherein the solution comprises no more than about 10% of anesthetic.

17. The method of claim 12, wherein the nerve is in a peripheral nervous system of the patient.

18. The method of claim 12, wherein step (c) comprises injecting at least about 5 cc of the solution to no more than about 10 cc of the solution.

19. A method of neurohydrodissection for treating a symptom in a patient, comprising:

- (a) inspecting a patient and locating a first compression site of a nerve that is inflamed;
 - (b) imaging the patient at the first compression site;
 - (c) inserting a syringe at the first compression site, wherein the syringe includes a solution comprising dextrose 5% in water (D5W);
 - (d) guiding the syringe to a first intersection of between the nerve and the at least one of the muscle, fascia, and ligament;
 - (e) injecting the solution with the syringe at the first intersection;
- dissecting the nerve from the at least one of the muscle, fascia, and ligament to form a gap;
- (d) confirming with the patient whether the symptom has changed; and
 - (e) repeating steps (a)-(d) for a second compression site of the nerve.

20. The method of claim 19, wherein the first and second compression sites are located in at least one of an arm, a shoulder, and a neck of the patient.

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专利名称(译)	神经水解剖的方法和系统		
公开(公告)号	US20200029883A1	公开(公告)日	2020-01-30
申请号	US16/589658	申请日	2019-10-01
[标]发明人	SADEGHI PAYMAN		
发明人	SADEGHI, PAYMAN		
IPC分类号	A61B5/00 A61B8/08 A61M5/178		
CPC分类号	A61M5/178 A61B5/0053 A61B5/4029 A61B8/0841 A61B5/055 A61B5/4041 A61B5/4893 A61B17/3203 A61B2017/320044		
优先权	62/600726 2017-02-27 US 62/871405 2019-07-08 US		
外部链接	Espacenet USPTO		

摘要(译)

公开了一种用于治疗患者头痛的神经水解剖法。该方法包括以下步骤：对患者进行身体检查，并在神经穿过组织并发炎的地方定位患者神经的第一压缩部位。该方法包括在第一压缩部位对患者进行超声成像的步骤。该方法包括以下步骤：在第一压缩部位插入注射器，其中，在对第一压缩部位进行成像的同时，将注射器引导至神经与组织之间的相交处，在该相交处用注射器注入溶液并解剖来自组织的神经。该方法包括与患者确认头痛症状是否已经改变的步骤。

