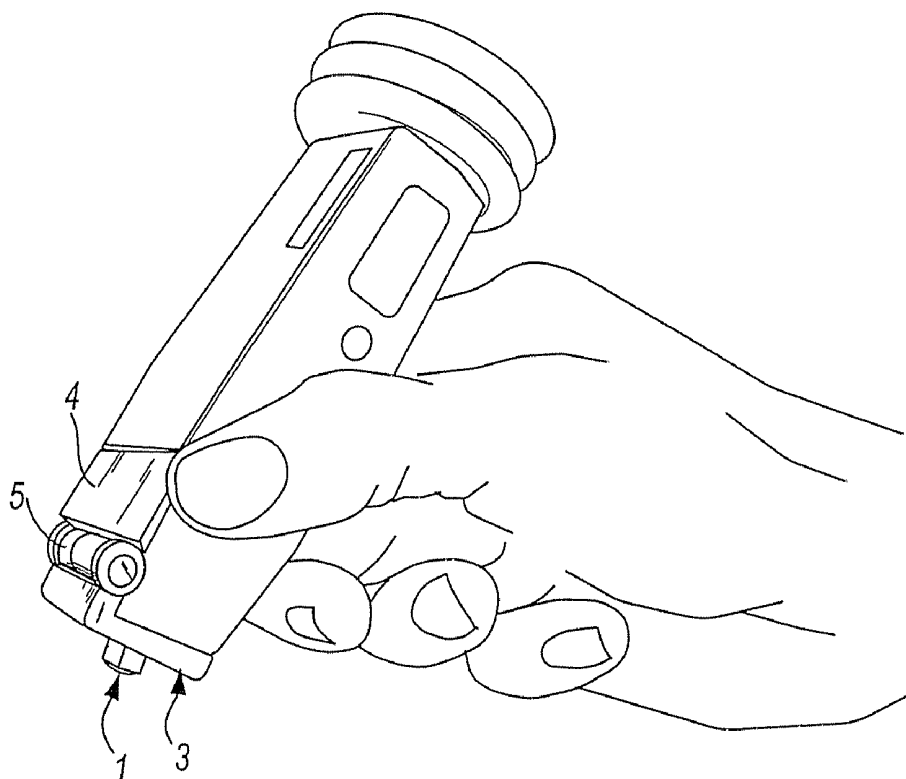




US 20070225605A1

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0225605 A1**
Swanbom (43) **Pub. Date: Sep. 27, 2007**(54) **METHOD AND DEVICE FOR MARKING
SKIN DURING AN ULTRASOUND
EXAMINATION**(60) Provisional application No. 60/264,359, filed on Jan.
25, 2001.**Publication Classification**(76) Inventor: **Rebecca L. Swanbom**, Paonia, CO
(US)(51) **Int. Cl.**
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(52) **U.S. Cl.** **600/437**Correspondence Address:
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DENVER, CO 80202(57) **ABSTRACT**(21) Appl. No.: **11/753,037**(22) Filed: **May 24, 2007**

A method and device for marking a patient's skin during an ultrasound examination to denote a feature of interest. The device comprises a first portion and a second portion. The first portion is adapted for attachment of the device to an ultrasound transducer. The second portion is adapted for marking the skin of the patient to denote the feature of interest. The first and second portions are rotatably attached to each other. During an ultrasound examination of the patient to locate the feature of interest, the second portion is rotated so that it is spaced away from the patient's skin. The ultrasound examination is conducted in the normal manner until the feature of interest is located, at which time the second portion is rotated so that it contacts and marks the patient's skin to denote the feature of interest.

Related U.S. Application Data(63) Continuation-in-part of application No. 10/968,563,
filed on Oct. 18, 2004, now Pat. No. 7,223,238, which
is a continuation-in-part of application No. 10/057,
272, filed on Jan. 24, 2002, now Pat. No. 6,805,669.

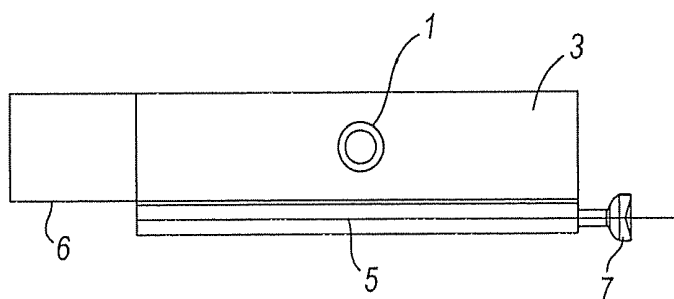


FIG. 1A

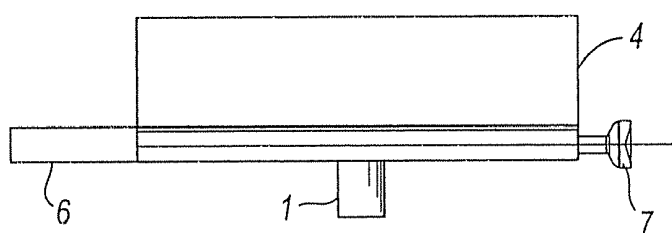


FIG. 1C

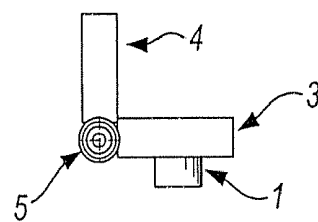


FIG. 1D

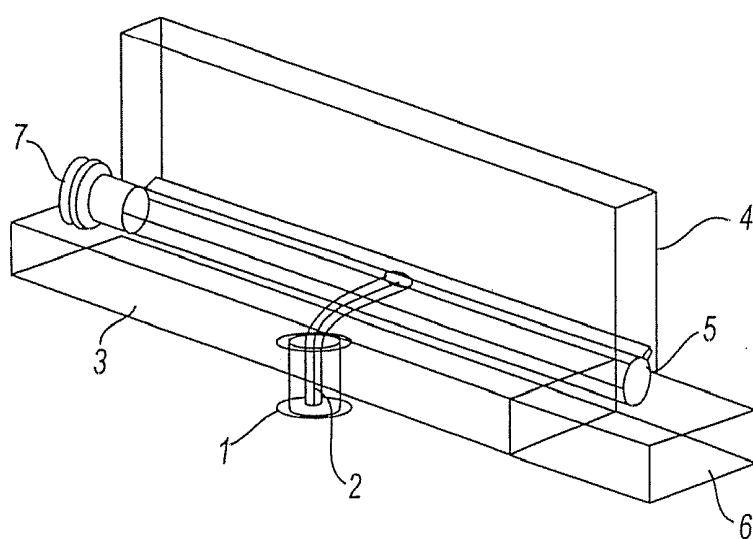


FIG. 1B

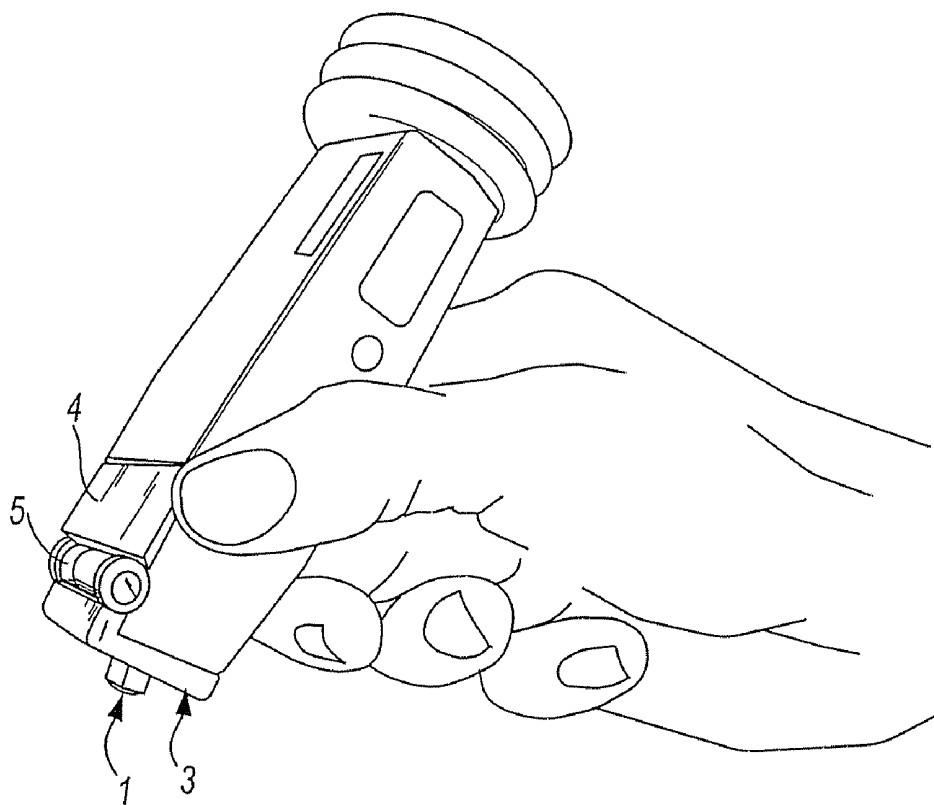


FIG. 1E

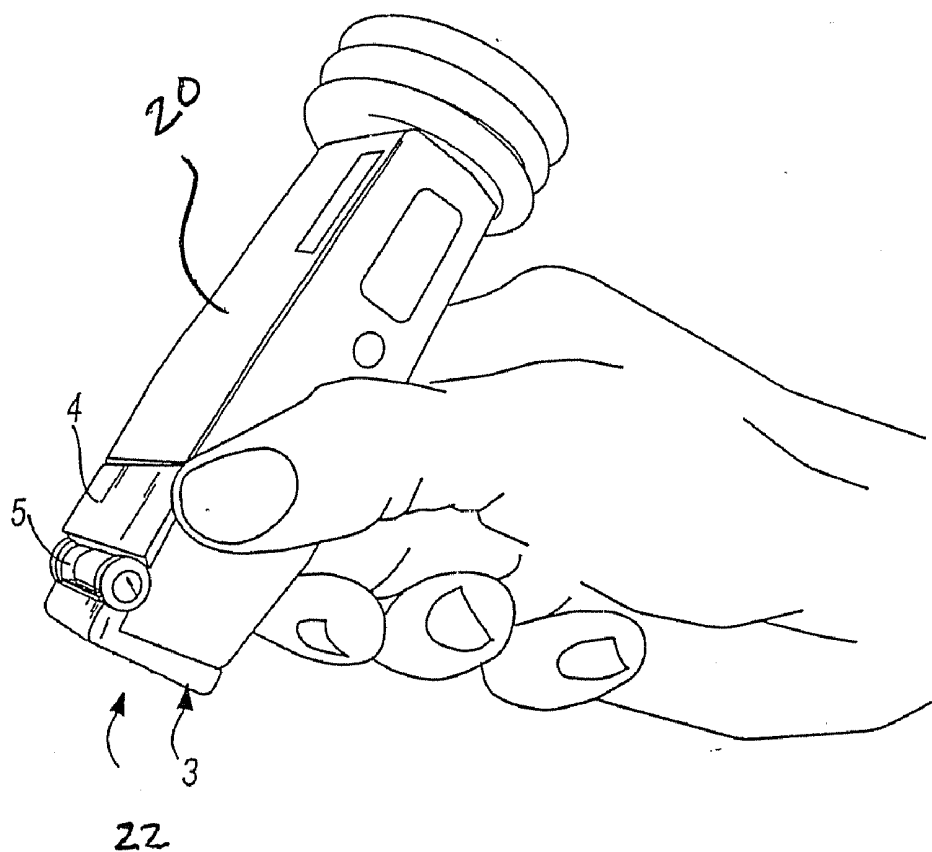


FIG. 2

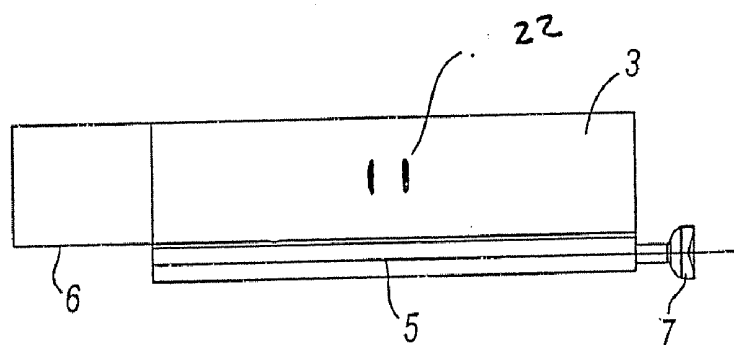


FIG. 3

METHOD AND DEVICE FOR MARKING SKIN DURING AN ULTRASOUND EXAMINATION

RELATED APPLICATION

[0001] The present invention is a continuation-in-part of U.S. patent application Ser. No. 10/968,563 filed on Oct. 18, 2004, which is a continuation-in-part of U.S. patent application Ser. No. 10/057,272 filed on Jan. 24, 2002, now issued U.S. Pat. No. 6,805,669, which claims priority from U.S. Provisional Patent Application No. 60/264,359 filed in Jan. 25, 2001. The entire disclosure of the prior applications are considered to be part of the disclosure of the accompanying application and are hereby incorporated by reference.

FIELD OF THE INVENTION

[0002] The invention relates to a method and diagnostic ultrasound accessory for marking a patient's skin during an ultrasound examination.

BACKGROUND OF THE INVENTION

[0003] Never before has the diagnostic ultrasound examination been such an integral part of a physician's arsenal. With the expanding technology of medical imaging modalities and medical interventions, the global trend is towards less invasive medical procedures. Therefore, even more emphasis and value have been placed on the precision of pre-interventional diagnostic imaging modalities, including ultrasound.

[0004] Historically, a common application of ultrasound has been an ultrasound evaluation of a patient's greater saphenous vein prior to its use as a conduit for arterial surgical reconstruction for lower extremity revascularization in order to salvage a patient's ischemic leg. The ultrasound evaluation is done to save operation time, so the surgeon can avoid making an unnecessarily long incision down the entire length of the patient's leg, which often has non-healing wounds or gangrene present, and so the surgeon can avoid making an incision in the patient's leg only to discover that the desired vein is in a different location, is absent, is duplicated, or is not suitable for use. To determine whether a vein will be suitable, its patency, transverse diameter, quality and location are evaluated by an ultrasound technologist. If the vein is adequate, its course is marked on the patient's skin with a permanent marking pen.

[0005] The following procedure is one currently used to preform the ultrasound evaluation and marking of a patient's greater saphenous vein. A diagnostic ultrasound machine, ordinarily with a 7-10 MHZ linear array transducer, is used. The ultrasound technologist visually estimates the center of the face of the transducer and denotes it with a permanent marking pen line directly on the transducer housing. Another technique is to apply a transducer cover to protect the transducer housing and to mark the cover. The medial aspect of the patient's leg is prepped with alcohol to remove gel residues, lotions or oils. Ultrasound gel is applied, and the leg is scanned to track and mark the vein site, generally at two centimeter increments. The technologist visually centers the vein in the middle of the ultrasound screen, which should appear to correspond with the center of the transducer. The technologist slightly tilts the transducer and wipes the gel from the patient's skin beneath the transducer, with a cloth, while maintaining the transducer contact and, hence, posi-

tion on the skin. The patient is asked to remove the cap from a permanent marking pen and to place it in the technologist's hand. The technologist marks a dot at the approximate site on the skin based on his/her visual estimation of the center of the transducer. The lights in the room are usually turned off throughout the ultrasound examination. Time is allowed for the ink to dry. Ultrasound gel is reapplied, and the area is re-scanned to confirm that the mark corresponds with the target vessel. Frequently, an error in marking is made, and an alcohol swab is used to erase the mark and the marking process is repeated. This tedious and cumbersome procedure is repeated over the entire length of at least one of the patient's legs. Often it is necessary to assess all four of the patient's extremities to find enough vein for a long composite vein bypass graft. Upon completion of the evaluation and marking, the room is re-lit, gel residue is removed, and the dot marks are lightly swabbed with alcohol to remove any residual gel. Generally, a new marker is now used to re-mark the skin and connect the dots. The patient is instructed not to wash off the marks, and the patient may need to re-mark them at home if the surgery is not scheduled for a few days. If a second technologist is available, one technologist will operate the ultrasound transducer and ultrasound machine controls, while the other technologist wipes away the gel and marks the skin.

[0006] Obviously, this method of marking the skin is inherently inaccurate, laborious, and unsophisticated for ultrasound technologists, physicians and other ultrasound operators. Numerous other ultrasound-guided skin-marking procedures are also in use, and all of them are equally deficient as the one just described. While ultrasound methods for identifying targets prior to physician intervention are becoming more valuable, with numerous applications, accuracy is lost because of the crude and cumbersome techniques employed for marking the skin above a feature of interest.

SUMMARY OF THE INVENTION

[0007] Accordingly, one of the objects of the present invention is to increase the accuracy and efficiency of ultrasound-guided skin-marking procedures.

[0008] Another object of the present invention is to enable an ultrasound operator to more easily produce a more accurate mark on a patient's skin above a feature of interest.

[0009] Yet another object of the present invention is to enable an ultrasound operator to produce a mark on a patient's skin above a feature of interest in a more technologically precise and sophisticated manner.

[0010] It is a further object of the present invention to provide a method for marking skin above a feature of interest during an ultrasound evaluation which is more accurate and efficient than current procedures.

[0011] It is another object of the present invention to provide a preferably disposable diagnostic ultrasound accessory for marking skin above a feature of interest that makes ultrasound-guided skin-marking procedures more accurate and efficient than current procedures.

[0012] It is a further object of the present invention to provide a preferably disposable diagnostic ultrasound accessory for marking skin above a feature of interest that is easily operated during use.

[0013] It is a particular object of this invention to provide a simple, yet highly accurate, easily-manipulated, preferably disposable diagnostic ultrasound accessory which an ultrasound technologist or operator can readily attach to an ultrasound transducer.

[0014] It is also a particular object of this invention to provide a simple, yet highly accurate, easily-manipulated, preferably disposable diagnostic ultrasound accessory, the overall geometry of which is designed for optimal ergonomics, accuracy and efficiency.

also appreciate, a portion of the marking element could also be incorporated into the hinge or first element, such as by being retractable.

[0018] The present invention is further directed to a method of marking a patient's skin at a feature of interest during an ultrasound examination comprising the location of a feature of interest by conducting an ultrasound examination using a device that has a first element (a portion of the marking element could be incorporated/retracted into the hinge or first element) rotatably attached to a second element, a marking element capable of marking a patient's skin

of a reticle within the ultrasound image field helps guide the technologist's field of view with alternating focus. With the use of such a reticle, the technologist is able to more quickly and precisely line up the correct target zone for analysis.

[0023] The present invention provides for a method and device for guiding the ultrasound transducer during an ultrasound examination. In one embodiment of the present invention, the ultrasound technologist's examination movements are guided by a substantially vertical reticle appearing on the ultrasound imaging monitor/display. The vertical reticle is created by the interference of ultrasound waves produced by the acoustic interface of the ultrasound transducer. Materials that generally absorb, diverge, scatter or reflect ultrasound waves can be used to create the vertical reticle. Such materials can be imbedded in the transducer and/or can be attached as an accessory (e.g., including a cap that fits over the face of the transducer), to create an image of a vertical reticle. As ultrasound waves are produced, the interference material diverts a portion of ultrasound waves resulting in a negative image that appears on the ultrasound image monitor as a reticle. The technologist may then use the reticle (like crosshairs or any other suitable type of targeting device image) to identify the location of the area of study.

[0024] In one embodiment of the invention, the interference material can be comprised of various combinations of shape, density, wall thickness, and wall rigidity to provide for the desired shape and emphasis of the reticle produced. In a preferred embodiment, interference material is used to create two substantially vertical reticles at a set or predetermined distance. The two vertical reticles allow for the delineation of left and right (or in alternatively and/or in combination, top and bottom) margins and/or borders. The reticles may be used to align the area of study for further examination or imaging. In another embodiment of the invention, the distance between the reticles may be calibrated to a fixed distance. Once calibrated, the technologist may use the reticles to determine the approximate linear size of an area of study or lesion.

[0025] Another embodiment of this invention is directed to an electronic method, which produces a vertical reticle appearing on the ultrasound imaging monitor/display. The ultrasound operator has the option when to activate this electronic artifact reticle. Various combinations of electronic methods used to send, receive, store, and display the ultrasound information can be designed/programmed to create a narrow column void of imaging information. In one embodiment of the present invention, the ultrasound beam-firing configuration or array scanning pattern and pulse sequences are designed to produce the reticle. Additionally, the signals from one or a combination of several ultrasound transducer elements can electronically be temporarily ignored or blocked to guide/refine the technologist's/ultrasound operator's field of view.

[0026] In particular embodiments of the present invention, the mark left on the skin indicates a particular orientation of the ultrasound transducer at the time the mark was made. This is particularly helpful to achieve the reproducibility of any particular scanning operation in that the orientation of the transducer may dictate whether the same field of view is achieved. For example, if a second opinion or diagnosis is requested or required, it is now possible using this embodi-

ment of the present invention to have a technician or physician orient a transducer in a position so that pertinent anatomical features can be viewed in substantially almost identical conditions as an initial scan. The particular marking of skin is therefore preferably performed such that orientation lines, angles, etc. can be discerned. By way of illustration and not in any means intended to be limiting, a heart-shaped mark can be utilized such that the sharp point of the heart can indicate the direction to which a transducer can be reapplied to the skin at the same angle, orientation, etc. as when the identical mark was made. Any symbol, figure, etc. (e.g., an arrow, pointing finger, etc.) can be used to indicate such directional positioning of the transducer against a patient's skin. In the event ink or other marking material is utilized, a temporary "tattoo" indicating the orientation of the transducer in relationship to the skin can be utilized for such purpose.

[0027] In still other embodiments, an image is taken of the transducer in its particular relationship to a patient's physical anatomy in order to recreate such situation for a second opinion or second diagnosis purposes. For example, an inexpensive digital camera can be mounted in order to take a picture of a person's body part (e.g., arm) as the transducer contacts the arm in order to memorialize the particular angles, position, location on the particular part of a person's body part being imaged. The image can then be stored and then reused to orient the transducer in the event a second imaging of the arm is required. Thus, the present invention provides for several redundant ways in which to achieve the correct repositioning of the transducer in relation to a patient in order to achieve better imaging results and thus provide for confirmational data to be gathered and recorded.

[0028] Thus, in one aspect of the present invention, a method is provided for guiding an ultrasound transducer by locating a feature of interest and conducting an ultrasound examination of a patient using an ultrasound transducer, such transducer comprising an ultrasound permeable ultrasound accessory having first and second elements movable with respect to each other. The second element preferably has a surface adapted to contact a patient to generate a negative image reticle on a video monitor/display. The second element also has a feature that denotes the orientation of the transducer when the second element is moved into contact with a person's skin. By moving the second element of the ultrasound transducer to contact a patient's skin, a mark is made on the person's skin that denotes the orientation of the transducer at the time the mark is made. The negative image reticle can be then relied upon to guide a user of an ultrasound transducer to locate the features of interest. An image capturing device, such as a camera, can also be operatively or operationally associated with the transducer so that an image can be formed when the second element of the ultrasound accessory is in contact with a person's skin, thus providing an image for displaying the orientation of the transducer in relation to a physical attribute of a patient.

[0029] This summary of the invention is not intended to fully describe each and every potentially important aspect of the present invention. One of skill in the art will understand from the entire specification, including the drawings, claims, detailed description, etc., the full scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] FIGS. 1A-E: Top view (FIG. 1A), isometric view (FIG. 1B), front view (FIG. 1C), and side view (FIG. 1D) of a device according to the invention. FIG. 1E shows the device attached to an ultrasound transducer.

[0031] FIG. 2 is a perspective view of an operator/user handling a device in accordance with the present invention.

[0032] FIG. 3 is a top view of one embodiment of the present invention.

DETAILED DESCRIPTION

[0033] The present invention provides a method and device (e.g., an ultrasound accessory) for marking a patient's skin. In one embodiment, the device comprises a first portion/element and a second portion, with the first portion being rotatably attached to the second portion. In a preferred embodiment of the device, the first portion 4 and second portion 3 of the device are attached to each other by means of a hinge 5 (see FIGS. 1A-E). Other means of rotating the second portion with respect to the first portion can be used instead of a hinge. Such means are well known in the art. For instance, two spherical, spaced-apart protrusions attached to one side of the second portion could be snap-fit into two hollow grooves or indents formed on one side of the first portion.

[0034] The first portion is adapted so that the device that can be readily attached to and removed from a diagnostic ultrasound transducer. For instance, the first portion of the device will be sized and shaped to so that it can be attached to the ultrasound transducer (see FIG. 1E).

[0035] In addition, the first portion of the device will preferably be equipped with a means for properly aligning and/or attaching the device to the transducer for optimal accuracy. The device is aligned to the ultrasound transducer in a manner which assures that the mark made on the patient's skin by the device, once aligned by the ultrasound operator, will be precisely centered on the ultrasound image which has been produced on the screen by the transducer. For example, a spatial ruler sticker could be incorporated onto the device to facilitate determining the exact center of the transducer during placement of the device.

[0036] The first portion of the device is preferably securely attached to the transducer. Any means of removable attachment can be used, including e.g., an adhesive sticker, velcro, snap or slide. In an alternate and preferred embodiment of the invention, attachment elements for the device can be integrated with the ultrasound transducer housing. The ultrasound transducer can be manufactured with a coupling system, which may include a snap or slide connector, lockjoint or matching shape type of coupling on the transducer housing, which matches a counterpart on the marking device. Since the marking device is preferably separable from the transducer, it can be disposed of, or cleaned, after each patient use. Thus, in one embodiment of the present invention a disposable device is contemplated, while in others, a re-usable, preferably sterilizable device is employed.

[0037] The second portion of the device is preferably not attached to the transducer and is rotated relative to the first portion so that it is spaced away from the skin of a patient

during the ultrasound examination to identify a feature or features of interest. The second portion is equipped with a marker element for marking the skin of the patient. For instance, the marker element may be an element for indenting the skin of the patient and/or an element for marking the skin of a patient with permanent or other suitable ink, paint, crayon, grease, marker, etc. (hereinafter generally referred to as "ink"). When a feature of interest is observed, the second portion is rotated toward the skin of the patient until the marker element comes into contact with and marks the patient's skin.

[0038] When the marker element is an element for indenting a patient's skin, it can be made of any material and can be any shape which allows for the making of an indent in the patient's skin. Preferably, the shape of the skin contacting element and the pressure used to apply the same against the skin is selected to provide a marking that is sufficient to be viewed and/or felt (palpated) on the skin by an operator of the device, for a period of at least about 3 seconds, more preferably about 5 seconds, and most preferably more than about 7 seconds. Preferably the pressure and/or shape is not sufficient to penetrate the skin in a manner that will cause bleeding. For instance, it can be a hollow cylinder attached to the second portion of the device (see FIG. 1B), a perpendicularly-centered projection from the surface of the second portion, or the like, permanently attached (e.g., by gluing) to, or integral with, the second portion.

[0039] With reference to FIGS. 1A-E, the second portion 3 is preferably spaced away from the skin of the patient during an ultrasound examination to locate a feature of interest. When a feature of interest is observed, the second portion 3 is rotated about the hinge 5 until the marker (indent) element 1 is in contact with the patient's skin. The second portion can be rotated either manually, or additionally fitted with a finger tab 6 or by depressing a spring-loaded mechanism which rotates the second portion toward the skin of the patient. Depressing the second portion causes the formation of an indent in the patient's skin representing the relative position of the feature of interest. The indent element will leave a slightly reddened and depressed mark which may be any shape, such as a circle, and is preferably no more than 5 mm in its greatest dimension to minimize discomfort for the patient and to provide a precise target for the physician. The indent will remain visible for a period of time at least long enough to complete the ultrasound examination. Once the ultrasound examination is completed and all of the features of interest have been marked with indents, the ultrasound gel can be removed from the skin of the patient, and the indents marked with ink using a permanent marking pen to preserve the marks for a longer period of time, if desired.

[0040] In other preferred embodiments, the device is configured so that the patient's skin can be marked with ink or is configured so that the patient's skin can be marked with ink, indents, or both, at the option of the ultrasound operator. To mark a patient's skin with ink, the device may comprise an incorporated ink delivery system. Methods of marking with ink include, but are not limited to, a retractable ink stamp or pre-inked wick type applicator mechanism whereby the opening of the marker element 1 is additionally nested with a retractable ink delivery system 2 or other element of an ink dispensing system (see FIG. 1B). This embodiment further comprises a communication with a

hollow hinge **5** and regulator **7**, allowing for the supply of an ink from a retractable ink stamp or pre-inked wick-type applicator mechanism through an ink delivery system outlet **2**, through the gel, to the skin. The stamp or wick applicator mechanism may be retracted inside the marker element **1** between marking sites to avoid unnecessary marks. Inside the marker element **1**, it can be further retracted so that it may be encased in a housing provided by the second portion **3** and hinge **5**. A channel may connect the ink delivery system **2** to an ink reservoir through an otherwise hollow hinge **5**. The deployment of the stamp or wick applicator mechanism through the channel is controlled by a regulator **7** at the end of the hinge **5** which prevents or allows the stamp or wick applicator mechanism or ink to be deployed through the channel to the ink delivery system **2**. An alternate may consist of, but is not limited to, an opening at the distal end of the ink delivery system **2** through which ink, sealed in a liquid-tight state, is introduced through the applicator which is nested inside the marker element **1**. The flow of ink through the channel is preferably controlled by a regulator **7** at the end of the hinge **5**, which deploys ink through the channel to the ink delivery system outlet **2**.

[0041] The device of the present invention may be made of any suitable material(s). Preferably, the device is made of a plastic material which is suitable for the manufacture of disposable devices and which is highly permeable to ultrasonic beams and gives rise to minimal reverberation and attenuation of reflected ultrasonic beams.

[0042] The device and method of the invention can be used in any ultrasound examination where it is desired to mark features of interest on the skin of the patient (a human patient or non-human animal patient) being examined. The device and method of the invention may also be used in intravaginal ultrasound examinations, as well as in intraoperative ultrasound examinations. Specific types of ultrasound examinations in which the method and device of the invention can be used include:

[0043] Venous vascular applications, such as vein mapping prior to harvest, perforator vein marking prior to surgical ligation, lesser saphenous origin prior to surgical ligation or venous valves prior to valvuloplasty or transposition surgery, denoting proximal end of deep venous thromboses to monitor for propagation on follow up studies, denoting thrombus length for investigational purposes to determine propagation patterns for various low molecular weight heparins/also whether prolonged treatment with anticoagulation improves long term lysis, marking subclavian or femoral vein for catheterization procedures, venous malformation prior to percutaneous ablation;

[0044] Arterial vascular applications, such as marking the length of occlusion or site of arterial graft stenosis prior to focal surgical revision or prior to insertion of a stent or endostent, marking patent section of target artery prior to bypass surgery which may be poorly visualized on angiography or magnetic resonance angiography, marking fistula prior to focal surgical revision, marking for ultrasound-guided pseudoaneurysm repair by manual compression or thrombin injection and for follow-up scan possibly with re-injection, marking small pseudoaneurysms for surgical repair, mapping radial artery prior to harvest for conduit for

cardiac surgery, denoting Vasoseal™ migration, marking carotid bifurcation prior to endarterectomy surgery without arteriogram, marking optimal transcranial doppler window;

[0045] General ultrasound examinations, such as marking breast lesion prior to needle biopsy, marking breast implant leaks, marking thyroid abnormality prior to needle guided biopsy, other tissue or cyst prior to biopsy, fluid aspiration, marking amniotic pocket prior to amniocentesis, marking a hernia prior to surgical repair, denoting extremity pathology, denoting foreign object, pericardiocentesis, renal pelvis aspiration, possible ultrasound contrast usages; and

[0046] Veterinary ultrasound, such as initial diagnostic ultrasound, marking for liver aspiration, mass aspiration, cystocytosis, evaluating lung pathology, biopsies, detecting organ or tissue abnormalities, assess size of cysts and tumors.

[0047] The device and method of the present invention provide for an easy, fast, efficient and accurate ultrasound examination. For example, using the method and device of the present invention, the examination and marking of the greater saphenous vein can be performed in about 40-50% of the time that it takes to perform the conventional examination and marking procedure. The device is simple and easy to use and is inexpensive to fabricate, making increased accuracy and precision very affordable.

[0048] FIG. 2 shows one embodiment of the present invention, which provides a device for guiding an ultrasound transducer **20** during an ultrasound examination. In one embodiment, the device comprises a first element **4** and a second element **3**, with the first element being attached for movement to the second element **3**. In a preferred embodiment of the device, the first element **4** and second element **3** of the device are operatively associated with each other by means of a hinge **5** or any other suitable adjustable connection feature. The first element **4** is preferably secured to the ultrasound transducer **20**. The second element **3** is preferably not permanently fixed or attached to the transducer **20** so that it can be rotated away, or otherwise moved, from the end of the transducer **20** when not in use. As shown in FIG. 3 the second element **3** is equipped with two segments of ultrasound wave interference material **22**. The second element **3** may be equipped with or employ various different shapes and sizes of interference material to achieve the desired result (e.g. crosshair shape, circular shape, square outline, thick lines, thin lines, etc.) of effective guidance of the transducer during an examination.

[0049] In certain embodiments, ultrasound wave interference material can be integrated within the transmitting end of the ultrasound transducer **20**.

[0050] While various embodiments of the present invention have been described in detail, it will be apparent that further modifications and adaptations of the invention will occur to those skilled in the art. It is to be expressly understood that such modifications and adaptations are within the spirit and scope of the present invention.

What is claimed is:

1. A method of guiding an ultrasound transducer comprising:

(a) locating a feature of interest by conducting an ultrasound examination of a patient using an ultrasound transducer, said ultrasound transducer comprising an ultrasound permeable ultrasound accessory having a first element adapted for movement with respect to a second element, said second element having a surface adapted to contact said patient to generate a negative image reticle on a video monitor/display, said second element having a feature that denotes the orientation of said transducer when said second element is moved into contact with a person's skin;

(b) moving said second element of said ultrasound accessory to contact a patient's skin and making a mark on said person's skin that denotes the orientation of said transducer at the time said mark is made; and

(c) relying upon said negative image reticle to guide a user of said ultrasound transducer to locate features of interest.

2. The method of claim 1, further comprising positioning an image capturing device and taking an image after said moving step is performed.

3. The method as set forth in claim 1, further comprising rotating said second element with respect to said first element.

4. An ultrasound accessory for marking a patient's skin comprising:

(a) a first element adapted to be attached to an ultrasound transducer;

(b) a second element adapted for movement with respect to said first element, said second element contacting a surface subject to ultrasound examination, wherein at least one of said first element and said second element are comprised of an ultrasound permeable material, and wherein at least one of said first element and said second element are movably associated with each other, said second element having at least a portion comprising substantially ultrasound impermeable material that facilitates the generation of a visual feature on an ultrasound image;

(c) a marking element capable of marking a patient's skin with ink, paint, crayon or grease, said marking element attached to said second element, said marking element comprising a substantially perpendicularly-centered projection on said second element of said ultrasound

accessory that denotes the orientation of said transducer at the time said patient's skin is marked; and

(d) a means for aligning said ultrasound accessory to assure a mark made by said marking element corresponds to an ultrasound image produced by said transducer.

5. The accessory as set forth in claim 4, wherein said second element is rotatably movable with respect to said first element.

6. The accessory of claim 4, further comprising an image capturing device operationally associated with said transducer such that an image can be taken at the time a mark is made on a patient's skin, said image displaying the orientation of said transducer in relation to a physical attribute of said patient.

7. An ultrasound accessory for marking a patient's skin comprising:

(a) a first element adapted to be attached to an ultrasound transducer;

(b) a second element adapted for movement with respect to said first element, said second element contacting a surface subject to ultrasound examination, wherein at least one of said first element and said second element are comprised of an ultrasound permeable material, and wherein at least one of said first element and said second element are movably associated with each other, said second element having at least a portion comprising substantially ultrasound impermeable material that facilitates the generation of a visual feature on an ultrasound image;

(c) a marking element capable of marking a patient's skin with ink, paint, crayon or grease, said marking element attached to said second element, said marking element comprising a substantially perpendicularly-centered projection on said second element of said ultrasound accessory that denotes the orientation of said transducer at the time said patient's skin is marked, said marking element conveying to a patient's body a mark selected from the group consisting of an arrow, a heart and a pointing finger; and

(d) a means for aligning said ultrasound accessory to assure a mark made by said marking element corresponds to an ultrasound image produced by said transducer.

8. The accessory as set forth in claim 7, wherein said second element is rotatably movable with respect to said first element.

* * * * *

专利名称(译)	用于在超声检查期间标记皮肤的方法和装置		
公开(公告)号	US20070225605A1	公开(公告)日	2007-09-27
申请号	US11/753037	申请日	2007-05-24
[标]申请(专利权)人(译)	SWANBOM REBECCA大号		
申请(专利权)人(译)	SWANBOM REBECCA大号		
当前申请(专利权)人(译)	SWANBOM REBECCA大号		
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发明人	SWANBOM, REBECCA L.		
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外部链接	Espacenet USPTO		

摘要(译)

一种用于在超声检查期间标记患者皮肤以表示感兴趣特征的方法和设备。该装置包括第一部分和第二部分。第一部分适于将装置附接到超声换能器。第二部分适于标记患者的皮肤以表示感兴趣的特征。第一和第二部分可旋转地彼此连接。在对患者进行超声检查以定位感兴趣的特征期间，旋转第二部分使其与患者的皮肤隔开。以正常方式进行超声检查，直到找到感兴趣的特征，此时第二部分旋转，使得它接触并标记患者的皮肤以表示感兴趣的特征。

