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(54) **ELECTROSURGICAL DEVICE FOR SELECTIVE CUTTING OF TISSUE**

ELEKTROCHIRURGISCHE VORRICHTUNG ZUM SELEKTIVEN SCHNEIDEN VON GEWEBE

DISPOSITIF ELECTROCHIRURGICAL DE COUPE SELECTIVE DE TISSUS

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Description

BACKGROUND OF THE INVENTION

[0001] There are numerous medical and surgical procedures wherein el electrosurgical probes are used to cut and/or cauterize tissue. Numerous monopolar and bipolar electrosurgical probes are available on the market today. Electrosurgical probes typically comprises a probe tip that is permanently or releasably attached to a handpiece. The handpiece is sized and configured to be grasped by the human hand. The probe tip typically extends distally from the handpiece. The distal end of each probe tip typically has a specific shape (e.g., straight, curved, hook shaped, looped, square, ball, spatula, needle, ball, L-shaped, forceps, clamps, etc.). The probe tip typically incorporates one or more electrodes that, when energized, cause the probe tip to heat. The handpiece may be adapted for connection to an electrosurgical signal generator, which provides energy to heat the probe tip. In some cases, insulation may surround all but the distal-most end of the probe tip to prevent peripheral tissue damage or capacative couplance. In many cases, the temperature of the probe tip is variable and may be controlled by a rheostat or other apparatus for varying the amount of electrical current that passes through the electrode(s) at the probe tip. Examples of electrosurgical generators, hahdpieces and/or probe tips include those that are commercially available from Bovie Medical Corporation, St. Petersburg, Florida; Hi-Top/W. J. Surgical, Elizabethtown, Pennsylvania, ValleyLab Division of Tyco Healthcare Group LP, Boulder, Colorado and ProSurg, Inc., San Jose, California.

[0002] US-A-5 269 782 discloses a bifurcated electrosurgical instrument. US-B-6 283 961 discloses an electrosurgical instrument having electrodes on one side and an insulating surface on the other side to minimize undesirable current flow into adjacent tissue or fluids.

[0003] While the electrosurgical probes of the prior art have been used to cut many different types of tissue, there are still certain surgical procedures wherein electrosurgical probes have not been used due to concerns about inadvertent burning or damaging delicate nearby tissues.

[0004] One example of a procedure that has heretofore not typically been performed using electrosurgical devices is the removal of epiretinal membranes from the eye. An epiretinal membrane (sometimes referred to as macular pucker, premacular fibrosis or surface-wrinkling retinopathy) is an abnormal, transparent or translucent, collagen-containing membrane that forms between the inner limiting membrane of the retina and the cortex of the vitreous body. As the epiretinal membrane contracts, it causes the retina to become distorted or wrinkled thereby disturbing the patient's vision. Visual symptoms may vary from very mild symptoms to very severe symptoms. Patients may experience blurred vision or loss of central acuity. Patients may also experience distorted vision in which straight lines appear to be bent or curved; or objects appear to be distorted in shape and form. Rarely, epiretinal membranes can damage the retina so severely that the patient can almost lose central vision and only see with their peripheral vision.

[0005] The treatment epiretinal membrane generally involves surgery to remove the epiretinal membrane. In such surgery, an ophthalmologic surgeon initially performs a *vitrectomy* wherein a vitrectomy cutter is used to remove the vitreous body from the posterior chamber of the eye. After the vitreous body has been removed, the surgeon gently peels the epiretinal membrane off of the surface of the retina using fine instruments. The epiretinal membrane may be attached to the retina at discrete attachment points. Thus, the peeling of the membrane from the retina can result in some undesirable tugging or traction on the retina with potential tearing and bleeding of the retina, or even local detachment of the retina. After the epiretinal membrane has bees successfully removed, the macula typically flattens out and the patient's symptoms slowly improve. The majority of patients get improvement of vision following the operation, however some distortion of vision and/or loss of visual acuity may remain post-surgically.

[0006] At present there remains a need in the art for the development of new electrosurgical devices that provide for control over the area in which heat generated by the device can cause substantial cutting and/or coagulation of tissue, thereby elimination unwanted collateral damage during the procedure.

SUMMARY OF THE INVENTION

[0007] The present invention provides a device according to claim 1. Preferred embodiments are defined in the dependent claims.

[0008] Further aspects and elements of the invention will be understood by those of skill in the art upon reading the detailed description of specific examples set forth herebelow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Figure 1 is a perspective view of a system incorporating an electrosurgical tissue cutting device of the present invention.

Figure 2 is an enlarged perspective view of section 2 of Figure 1.

Figures 3-4A show several steps in a method for using an electrosurgical probe of the present invention to remove an epiretinal membrane from the eye of a human or animal subject.

Figure 5 is a cross-sectional view of the distal end of an electrosurgical probe of the present invention illustrating the power zones that are present when the device is in use.

DETAILED DESCRIPTION

[0010] The following detailed description, and the drawings to which it refers, are provided for the purpose of describing and illustrating certain preferred embodiments or examples of the invention only, and no attempt has been made to exhaustively describe all possible embodiments or examples of the invention. Thus, the following detailed description and the accompanying drawings shall not be construed to limit, in any way, the scope of the claims recited in this patent application and any patent(s) issuing therefrom.

[0011] Figures 1-2 and 5 show an example of one embodiment of a device for cutting or coagulating tissue in accordance with the present invention. The device 10 shown in these figures comprises an elongate member 14 having a foot member 16 formed on its distal end. The foot member 16 is bifurcated or divided, as shown, into a first (or right) foot member portion 22 and a second (or left) foot member portion 20. An open area 24 exists between the first and second foot member portions 22, 20. The foot member 16 and each foot member portion 22, 20 has an upper surface US and a lower surface LS. An electrically and thermally insulating covering 30 is formed on the foot member 16. In this example, the insulating covering 30 covers the entire foot member 16 including the upper US and lower LS surfaces thereof. It will be appreciated, however, that in some embodiments of the device 10 the insulating covering 30 may be disposed only on the lower surface LS of the foot member 16 or only on the lower surfaces LS of the foot member portions 22, 20. As may be seen in the cross section of figure 5, the foot member 16 may be formed of conductive core material such as metal (e.g., medical grade stainless steel) and the covering 30 may be formed of a coating disposed on the surface of the core material. The coating that forms the insulating covering 30 may comprise a dielectric polymer such as polyimide and may be applied by any suitable means including but not limited to; single layer dip coating, multi layer dip coating, painting, powder coating (e.g., electro static), vapor deposition, etc.

[0012] At least one electrode is located on the upper surface US of the foot member 60. The device 10 shown in this example is bipolar, so a first electrode 28 is located on the upper surface of the first foot member portion 22 and a second electrode 26 is located on the upper surface of the second foot member portion 20. When energized, these electrodes will create a tissue damaging thermal zone above the upper surface US of the foot member 60 as well as above and somewhat into the open area 24 that exists between the first and second foot member portions 22, 20. As illustrated in Figure 5, when the electrodes 26, 28 are energized, the tissue damaging thermal zone above the above the upper surface US will actually comprise a high power zone HPZ and a medium power zone MPZ, both of which are sufficient to cut or coagulate tissue. Thus, the effective tissue damaging thermal zone will include both the high power zone HPZ and the medium power zone MPZ.

[0013] As shown in Figure 2, the device 10 may optionally include one or more lumens that extend through the elongate member 14 and terminate in apertures 34, 36 such that fluid or matter may be infused and/or aspirated through the device. In some embodiments two (2) lumens (not shown) may be included and those lumens may terminate in two separate apertures 34, 36, thereby allowing for simultaneous infusion and aspiration through the device 10.

[0014] The device 10 of the present invention may optionally be used as part of a system 12, one example of which is shown in Figure 1. The basic components of this system 12 include an includes an electrical current source, such as an electrosurgical generator 76 and electrosurgical foot pedal 80 which controls the electrosurgical generator to deliver desired amount(s) of energy to the electrode(s) 26, 28 on the device 10. If the device 10 includes optional aspiration and/or infusion lumen(s), the system 12 may additionally include an aspiration pump module 74 and aspiration foot pedal 78 and/or a source of irrigation fluid 72. These components of the system may be independent or may be mounted on a surgical roller cart 70, as shown. Control of the system functions during procedures may be accomplished by moving the electrosurgical foot pedal 80 which controls the electrosurgical generator to deliver desired amount(s) of energy to the electrode(s) 26, 28 and, optionally, moving the aspiration foot pedal 78 to control the aspiration pump 74 and/or varying the height of the source of infusion fluid 72 to change the gravity fed pressure or flow rate of infusion fluid through the optional infusion lumen of the device 10. In some embodiments, footpedals 78, 80 may be combined into a single multifunctional unit. A pinch valve, or other means, may also be incorporated in the console to control flow of the irrigation fluid to the device 10. As an option, all of the basic control functions of system 12 may be integrated into a single footpedal to facilitate use.

[0015] The device 10 may be provided as a pre-sterilized, single-use disposable probe or tip that is attachable to a standard electrosurgical handpiece 18. Alternatively it may be permanently attached to or formed integrally of a handpiece, cannula, catheter, endoscope or other apparatus.

[0016] The device 10 and system 12 are useable to perform a variety of procedures wherein it is desired to

Examples of Methods Wherein the Device of the Present Invention is Used to *Selectively Cut or Coagulate Tissue*

1) Detachment of Retinal Membrane Overgrowths in the Posterior Segment of the Eye

[0017] One example is the use of the above-described device to remove an epiretinal membrane from the eye of a human or animal subject. Certain steps of this meth-

od are shown in Figures 3-4A.

With reference to Figures 3-4A, in this example, the epiretinal membrane ERM is an abnormal, transparent or translucent, collagen-containing membrane that is formed between the inner limiting membrane of the retina R and the cortex of the vitreous body which fills the posterior chamber PC of the eye. This epiretinal membrane is adhered or attached to the retina R at discrete adhesion points AP. Thus, because of these adhesion points AP, as the epiretinal membrane contracts, it will create traction on the retina causing the retina to become distorted or wrinkled and thereby disturbing the patient's vision.

[0018] To remove the epiretinal membrane ERM in this example, the ophthalmologic surgeon initially performs a *vitrectomy* wherein a vitrectomy cutter is used to remove the vitreous body from the posterior chamber PC of the eye in accordance with well known technique. After the vitreous body has been removed, the surgeon will insert the device 10 of the present invention into the posterior chamber as shown in Figure 3 and will advance the device 10 to a position, as shown in Figures 4 and 4A, where an adhesion point AP extends through the open area 24 between the first and second foot portions 22, 20, the remainder of the epiretinal membrane ERM is above the upper surface US of the foot portion 16 and the retina R is below the lower surface LS of the foot portion 16. With the device 10 so positioned, the electrodes 26, 28 are energized to cause cutting or destruction of the portion of the epiretinal membrane ERM located at the adhesion point AP while the foot member portions 22, 20 and insulating cover 30 substantially protect the retina R from electrical or thermal damage during energization of the electrodes 22, 20. This procedure is repeated for each adhesion point AP located, thereby releasing the epiretinal membrane ERM from the retina R and enabling the surgeon to proceed with removal of the epiretinal membrane ERM in accordance with standard technique without undesirable tugging or traction on the retina with potential tearing, bleeding or even local detachment of the retina. Thus, the procedure may be accomplished with decreased potential for retinal tears, bleeding or other trauma.

[0019] Although Figures 3-4A specifically show a method for detaching an epiretinal membrane, it will be appreciated that the device 10 may be used in a substantially similar manner as described elsewhere in this application to perform a wide variety of procedures wherein tissue is to be selectively cut or coagulated without causing substantial damage to neighboring tissues. Some examples of these other methods wherein the device 10 is used are described in the additional examples set forth herebelow.

2) Selective Cauterization of Retinal Vessels in the Posterior Segment of the Eye

[0020] As a result of certain diseased states, often related to diabetes, retinal vascular abnormalities can occur. Initially, diabetic retinopathy often involves weakening and bleeding from retinal vessels. In later stages, new vessels often begin to proliferate and even grow into the vitreous, obscuring vision. Treatment often involves focal laser photocoagulation, where a laser is used to create tiny spots of photocoagulation, either directed or scattered across the retina. The device 10 and/or system 12 of the present invention could provide an effective means of selectively coagulating vessels of the retina or extending from the retina while limiting the thermal trauma to adjacent retinal tissue.

3) Gum/Oral Surgery Dissection

[0021] Often dental procedures and oral surgical procedures involve gum dissection. These dissections are often performed near teeth, roots, nerves, or other sensitive structures. In addition, gum tissue is highly vascularized and cutting leads to significant bleeding. The device 10 and/or system 12 of the present invention could provide a superior means for cutting of gum tissue while protecting adjacent sensitive tissues and structures and reducing bleeding.

4) Dermatology Procedures

[0022] Dermatology procedures involve selective ablation of particular growths, cutting of skin where depth of trauma needs to be controlled to protect underlying tissues, and requires control of bleeding. The device 10 and/or system 12 of the present invention would provide a means for performing such procedures wherein the energy could be applied in such a manor as to provide distinct advantages for said procedures.

5) Selective Ablation/Removal of Tumors or Other Tissue Growths

[0023] Cancerous tumors and other abnormal tissue growths often challenging or deemed "inoperable" because of being located adjacent to or too intimately with vital organs or sensitive tissues. The device 10 and/or system 12 of the present invention would provide surgeons with a means for better directing the energy used for tumor ablation and removal allowing for such procedures to be better performed in the vicinity of vital organs or sensitive tissues. In addition, such procedures could also be performed with less trauma to adjacent normal tissues, even if they are not particularly vital or sensitive, reducing healing time and limiting the local trauma. Tumors or noncancerous growths such as some dermatological lesions that are pedunculated may be removed using the device 10 by positioning the device

6) Brain and Neurological Surgical Procedures

[0024] Neurological procedures and brain surgery often involve delicate tissue cutting and/or removal or treat-

ment of hemorrhagic sites in close proximity to nerves and/or sensitive tissues such as brain tissue. In these cases, The device 10 and/or system 12 of the present invention could offer the advantage of facilitating such tissue cutting and/or removal or treatment of hemorrhagic sites while minimizing trauma to such adjacent nerve or brain tissues.

7) Vocal Cord Surgery

[0025] The vocal cords are often effected by abnormal growths (e.g., nodules) that must be carefully removed while minimizing damage to the delicate vocal cords. The device 10 and/or system 12 of the present invention would offer the surgeon a superior means of removing these abnormal growths while minimizing exposure of the adjacent vocal cord tissues to trauma.

8) Heart Surgery

[0026] The device 10 and/or system 12 of the present invention may offer an effective means of cutting the membranous tissue structures of the heart, including the pericardium and endocardium or other cardiac tissue while protecting the underlying myocardium and/or the critical vascular structures that perfuse the heart or other structures (e.g., myocardium, a coronary or cardiac blood vessel, tendonous chord, papillary muscle, heart valve, trabeculae, cardiac nodal tissue, coronary venous sinus, septum or other normal cardiac tissue). Catheter-based or minimally-invasive implementations of the device 10 and/or system 12 of the present invention could also be advantageous for selective ablations (e.g., ablating arrhythmogenic pathways or tissue) and tissue or prosthetic valve procedures, valvuloplasty or anuloplasty procedures, etc.

8) Liver Dissection

[0027] Surgical procedures on the liver often require cutting of liver tissue while controlling bleeding and minimizing trauma to the larger vascular structures that crisscross the hepatic tissues in a complex array. The device 10 and/or system 12 of the present invention would offer the surgeon a superior manner of controlling bleeding while cutting through liver tissue and minimizing damage to adjacent vasculature and tissue.

9) Ear Nose and Throat (ENT) Surgical Procedures

[0028] ENT surgical procedures often involve working in small confined passageways (for example the sinuses) to cut/coagulate tissue near sensitive adjacent structures and tissues. The device 10 and/or system 12 of the present invention would offer the ENT surgeon a means for operating in very confined spaces while selectively avoiding trauma to adjacent tissues that are necessarily in close geometric proximity due to the limited operating space.

10) Arthroscopic Procedures

[0029] Arthroscopic procedures often involve tissue cutting in a wet field environment. Often it is desired to selectively cut tissue (cartilage, tendon, etc.) from adjoining structures where minimizing the trauma to said adjoining structures (for example, bone) would be desirable to facilitate healing. Also, bleeding obscures the visual field in these procedures. Thus, The device 10 and/or system 12 of the present invention could provide the arthroscopic surgeon a superior means for affecting said procedures.

11) Colonoscopy and Other Oral or Gastrointestinal Procedures

[0030] Removal of tumors, polyps and/or other growths from the gastrointestinal tract or alimentary canal for therapeutic or diagnostic (e.g., biopsy) purposes can induce unwanted bleeding and/or unintentional damage to adjacent tissue, such as bowel perforation. The device 10 and/or system 12 of the present invention can be used for cutting and/or removal of tumors, polyps and/or other growths and/or collection of biopsy samples from the walls of the alimentary canal (e.g., the rectum, colon, small intestine, duodenum, stomach, esophagus, oropharynx, tongue or oral cavity) without causing substantial bleeding, perforation of the alimentary canal or other damage to the wall of the alimentary canal.

[0031] Although the invention has been described above with respect to certain embodiments and examples, it is to be appreciated that such embodiments and examples are non-limiting and are not purported to define all embodiments and examples of the invention. Indeed, those of skill in the art will recognize that various modifications may be made to the above-described embodiments and examples without departing from the scope of the following claims.

Claims

1. A device for cutting or coagulating tissue, said device comprising:

an elongate member (14) having a distal end;
; left and right foot members extending angularly from and to one side of the distal end of the elongate member (14) such that an open space (24) exists between the right and left foot members, said left and right foot members (20, 22) having proximally facing upper surfaces (US) and distally facing lower surfaces (LS);
an electrode (28) on the upper surface of the right foot member (22);
an electrode (26) on the upper surface of the left

foot member (20); and **characterized by**
an electrically and thermally insulating covering (30) formed on at least the lower surfaces of the right and left foot members, such that
when the electrodes are energized tissue located proximally of the open space (24) is thermally cut or coagulated without causing substantial thermal cutting and/or coagulation of tissue located distally of the lower surfaces (LS) of the right and left foot members (20, 22).

2. A system comprising a device according to Claim 1 in combination with an electrosurgical generator for energizing the electrodes.

3. A device according to Claim 1 wherein a furcated member extends from the distal end of the elongate member and wherein the right foot member comprises a right furcation of the furcated member and the left foot member comprises a left furcation of the furcated member.

4. A device according to Claim 1 wherein an electrically and thermally insulating covering is formed on the upper and lower surfaces of the at least one foot members and wherein the electrodes are located on top of the electrically and thermally insulating covering.

5. A device according to Claim 1 further comprising at least one lumen useable for infusion of fluid or matter and/or aspiration of fluid or matter.

6. A device according to Claim 5 wherein the device comprises first and second lumens such that fluid or matter may be infused through one lumen while fluid or matter is aspirated through the other lumen.

7. A device according to Claim 1 wherein the insulating covering comprises a coating.

8. A device according to Claim 7 wherein the insulating covering comprises a polymer coating.

9. A device according to Claim 8 wherein the polymer coating comprises a polyimide coating.

10. A device according to Claim 7 wherein the covering comprises a coating that has been applied by a coating method selected from the group consisting of:

single layer dip coating
multi layer dip coating
painting
electrostatic powder coating; and
vapor deposition.

11. A device according to Claim 1 further comprising a handpiece (11) from which the elongate member (14) extends.

12. A device according to Claim 11 wherein the elongate member (14) is releasable from the handpiece (11).

13. A device according to Claim 12 wherein the elongate member (14) is disposable and the handpiece (11) is reusable.

14. A device according to Claim 11 wherein the elongate member is permanently attached to or integrally formed with the handpiece (11).

15. A device according to Claim 14 wherein the handpiece (11) and elongate member (14) are autoclavable.

16. A system comprising a device according to Claim 1 in combination with a cannula through which the device is insertable.

17. A system according to Claim 16 wherein the cannula comprises a rigid cannula.

18. A system according to Claim 16 wherein the cannula comprises a flexible catheter or percutaneously insertable catheter.

19. A system comprising a device according to Claim 1 in combination with an endoscope that is useable to view the positioning of the device within the body of a human or animal subject.

20. A system according to Claim 19 wherein the endoscopic device is selected from the group consisting of:

gastrointestinal endoscopes;
dental endoscopes;
sigmoidoscopes;
colonoscopes;
laparoscopes;
thoracoscopes;
cystoscopes; and
arthroscopes.

Patentansprüche

1. Eine Vorrichtung zum Schneiden oder Koagulieren von Gewebe, wobei die Vorrichtung Folgendes umfasst:

ein langgestrecktes Bauteil (14) mit einem distalen Ende;
linke und rechte Fußteile, die sich unter einem Winkel von und zu einer Seite des distalen En-

des des langgestreckten Bauteils (14) derart erstrecken, dass ein offener Raum (24) zwischen den rechten und linken Fußteilen vorhanden ist, wobei die linken und rechten Fußteile (20, 22) proximal gerichtete obere Oberflächen (US) und distal gerichtete untere Oberflächen (LS) aufweisen;
eine Elektrode (28) auf der oberen Oberfläche des rechten Fußteils (22); und
eine Elektrode (26) auf der oberen Oberfläche des linken Fußteils (20);

dadurch gekennzeichnet, dass eine elektrisch und thermisch isolierende Abdeckung (30) auf zumindest den unteren Oberflächen der rechten und linken Fußteile ausgebildet ist, derart, dass wenn den Elektroden Energie zugeführt wird, das Gewebe, das proximal zu dem offenen Raum (24) gelegen ist, thermisch geschnitten oder koaguliert wird, ohne dass ein wesentliches thermisches Schneiden und/oder Koagulieren des Gewebes hervorgerufen wird, das distal von der unteren Oberfläche (LS) der rechten und linken Fußteile (20, 22) gelegen ist.

2. Ein System, das eine Vorrichtung nach Anspruch 1 in Kombination mit einem elektrochirurgischen Generator zur Zuführung von Energie an die Elektroden umfasst.

3. Eine Vorrichtung nach Anspruch 1, bei der sich ein gegabeltes Bauteil von dem distalen Ende des langgestreckten Bauteils erstreckt, und bei der der rechte Fußteil eine rechte Gabelung des gegabelten Bauteils umfasst, und der linke Fußteil eine linke Gabelung des gegabelten Bauteils umfasst.

4. Eine Vorrichtung nach Anspruch 1, bei der eine elektrisch und thermisch isolierende Abdeckung auf den oberen und unteren Oberflächen des zumindest einen Fußteils ausgebildet ist, und bei der die Elektroden auf der Oberseite der elektrisch und thermisch isolierenden Abdeckung angeordnet sind.

5. Eine Vorrichtung nach Anspruch 1, die weiterhin zumindest ein Lumen umfasst, das für die Infusion von Flüssigkeit oder Material und/oder das Absaugen von Flüssigkeit oder Material verwendbar ist.

6. Eine Vorrichtung nach Anspruch 5, bei der die Vorrichtung erste und zweite Lumina umfasst, derart, dass Flüssigkeit oder Material durch eines der Lumina infundiert werden kann, während Flüssigkeit oder Material durch das andere Lumen abgesaugt wird.

7. Eine Vorrichtung nach Anspruch 1, bei der die isolierende Abdeckung eine Beschichtung umfasst.

8. Vorrichtung nach Anspruch 7, bei der die isolierende Abdeckung eine Polymer-Beschichtung umfasst.

9. Vorrichtung nach Anspruch 8, bei der die Polymer-Beschichtung eine Polyimid-Beschichtung umfasst.

10. Eine Vorrichtung nach Anspruch 7, bei der die Abdeckung eine Beschichtung umfasst, die durch ein Beschichtungsverfahren aufgebracht wurde, das aus der Gruppe ausgewählt ist, die aus Folgendem besteht:

Einzelschicht-Tauchbeschichtung
Mehrschicht-Tauchbeschichtung
Bemalen
elektrostatische Pulverbeschichtung; und
Abscheidung aus der Dampf-Phase.

11. Eine Vorrichtung nach Anspruch 1, die weiterhin ein Handstück umfasst, von dem aus sich das langgestreckte Bauteil (14) erstreckt.

12. Eine Vorrichtung nach Anspruch 11, bei der das langgestreckte Bauteil von dem Handstück (11) lösbar ist.

13. Eine Vorrichtung nach Anspruch 12, bei der das langgestreckte Bauteil (14) zum einmaligen Gebrauch bestimmt ist und das Handstück (11) wiederverwendbar ist.

14. Eine Vorrichtung nach Anspruch 11, bei der das langgestreckte Bauteil dauerhaft an dem Handstück (11) angebracht oder einstückig mit diesem ausgebildet ist.

15. Eine Vorrichtung nach Anspruch 14, bei der das Handstück (11) und das langgestreckte Bauteil (14) autoklavierbar sind.

16. Ein System mit einer Vorrichtung nach Anspruch 1 in Kombination mit einer Kanüle, durch die hindurch die Vorrichtung einsetzbar ist.

17. System nach Anspruch 16, bei dem die Kanüle eine starre Kanüle umfasst.

18. Ein System nach Anspruch 16, bei dem die Kanüle einen flexiblen Katheter oder einen perkutan einführbaren Katheter umfasst.

19. Ein System mit einer Vorrichtung nach Anspruch 1 in Kombination mit einem Endoskop, das verwendbar ist, um die Positionierung der Vorrichtung innerhalb des Körpers eines menschlichen oder tierischen Patienten zu betrachten.

20. Ein System nach Anspruch 19, bei dem die Endos-

kop-Vorrichtung aus der Gruppe ausgewählt ist, die aus Folgendem besteht:

gastrointestinale Endoskope;
dentale Endoskope;
Sigmoidoskope;
Kolonoskope;
Laparoskope;
Thorakoskope;
Zystoskope; und
Arthroskope.

Revendications

1. Dispositif pour couper ou coaguler du tissu, ledit dispositif comprenant :

un élément allongé (14) ayant une extrémité distale ;
des éléments de pied gauche et droit s'étendant de manière angulaire à partir de et vers un côté de l'extrémité distale de l'élément allongé (14) de sorte qu'il existe un espace ouvert (24) entre les éléments de pied droit et gauche, lesdits éléments de pied gauche et droit (20, 22) ayant des surfaces supérieures (US) orientées de manière proximale, et des surfaces inférieures (LS) orientées de manière distale ;
une électrode (28) sur la surface supérieure de l'élément de pied droit (22) ;
une électrode (26) sur la surface supérieure de l'élément de pied gauche (20) ;
et **caractérisé par** un couvercle électriquement et thermiquement isolant (30) formé au moins sur les surfaces inférieures des éléments de pied droit et gauche, de sorte que lorsque les électrodes sont alimentées, le tissu positionné de manière proximale par rapport à l'espace ouvert (24) est coupé ou coagulé thermiquement sans provoquer de coupe et/ou de coagulation thermique substantielle du tissu positionné de manière distale par rapport aux surfaces inférieures (LS) des éléments de pied droit et gauche (20, 22).

2. Système comprenant un dispositif selon la revendication 1, en combinaison avec un générateur électrochirurgical pour alimenter les électrodes.

3. Dispositif selon la revendication 1, dans lequel un élément bifurqué s'étend à partir de l'extrémité distale de l'élément allongé et dans lequel l'élément de pied droit comprend une bifurcation droite de l'élément bifurqué et l'élément de pied gauche comprend une bifurcation gauche de l'élément bifurqué.

4. Dispositif selon la revendication 1, dans lequel un couvercle électriquement et thermiquement isolant est formé sur les surfaces supérieures et inférieures d'au moins l'un des éléments de pied et dans lequel les électrodes sont positionnées sur le dessus du couvercle électriquement et thermiquement isolant.

5. Dispositif selon la revendication 1, comprenant en outre au moins une lumière pouvant être utilisée pour la perfusion d'un fluide ou d'une matière et/ou l'aspiration d'un fluide ou d'une matière.

6. Dispositif selon la revendication 5, dans lequel le dispositif comprend des première et seconde lumières de sorte que du fluide ou une matière peut être infusé(e) par une lumière alors que le fluide ou la matière est aspiré(e) par l'autre lumière.

7. Dispositif selon la revendication 1, dans lequel le couvercle isolant comprend un revêtement.

8. Dispositif selon la revendication 7, dans lequel le couvercle isolant comprend un revêtement polymère.

9. Dispositif selon la revendication 8, dans lequel le revêtement polymère comprend un revêtement de polyimide.

10. Dispositif selon la revendication 7, dans lequel le couvercle comprend un revêtement qui a été appliqué par un procédé de revêtement choisi dans le groupe consistant en :

revêtement par immersion monocouche ;
revêtement par immersion multicouche ;
peinture ;
revêtement par poudrage électrostatique ; et
dépôt en phase vapeur.

11. Dispositif selon la revendication 1, comprenant en outre une pièce à main (11) à partir de laquelle s'étend l'élément allongé (14).

12. Dispositif selon la revendication 11, dans lequel l'élément allongé (14) est amovible de la pièce à main (11).

13. Dispositif selon la revendication 12, dans lequel l'élément allongé (14) est jetable et la pièce à main (11) est réutilisable.

14. Dispositif selon la revendication 11, dans lequel l'élément allongé est fixé de manière permanente ou formé de manière solidaire avec la pièce à main (11).

15. Dispositif selon la revendication 14, dans lequel la pièce à main (11) et l'élément allongé (14) peuvent être stérilisés à l'autoclave.

16. Système comprenant un dispositif selon la revendication 1, en combinaison avec une canule par le biais de laquelle le dispositif peut être inséré.

17. Système selon la revendication 16, dans lequel la canule comprend une canule rigide.

18. Système selon la revendication 16, dans lequel la canule comprend un cathéter souple ou un cathéter pouvant être inséré par voie percutanée.

19. Système comprenant un dispositif selon la revendication 1, en combinaison avec un endoscope qui peut être utilisé pour observer le positionnement du dispositif à l'intérieur du corps d'un sujet humain ou animal.

20. Système selon la revendication 19, dans lequel le dispositif endoscopique est choisi dans le groupe consistant en :

endoscopes gastro-intestinaux ;
endoscopes dentaires ;
sigmoïdoscopes ;
coloscopes ;
laparoscopes ;
thorascopes ;
cystoscopes ; et
arthroscopes.

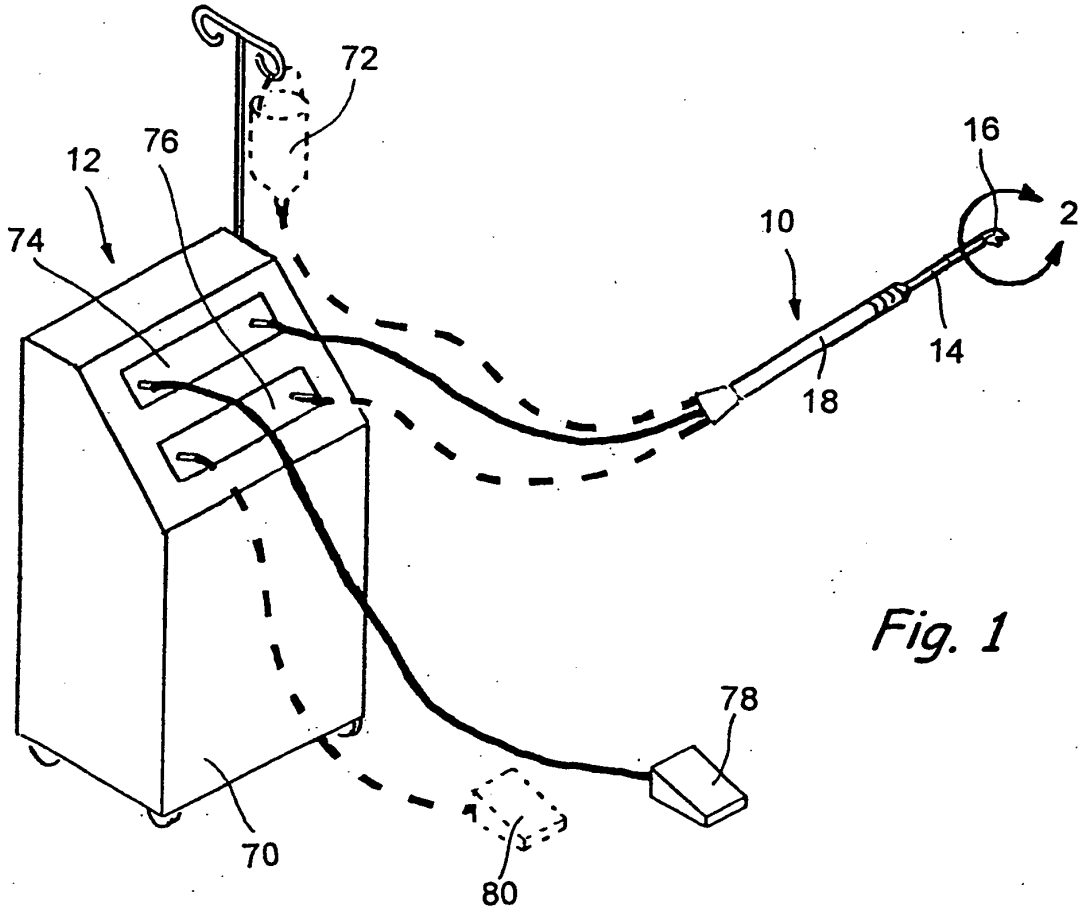

Fig. 1

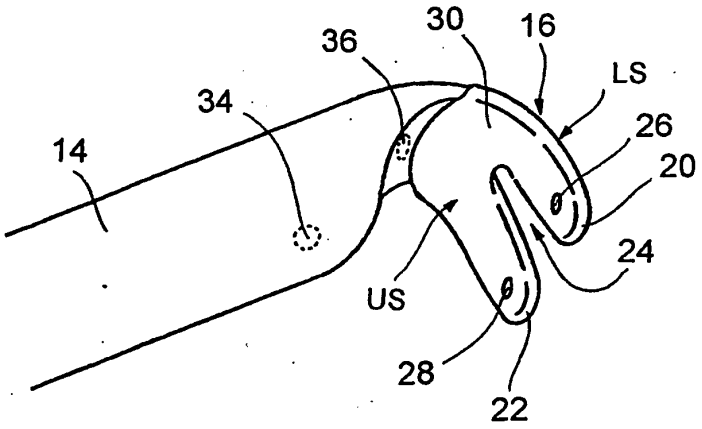

Fig. 2

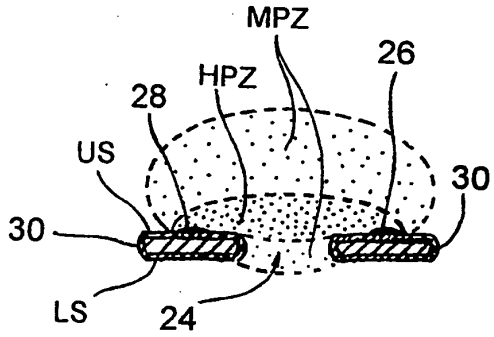

Fig. 5

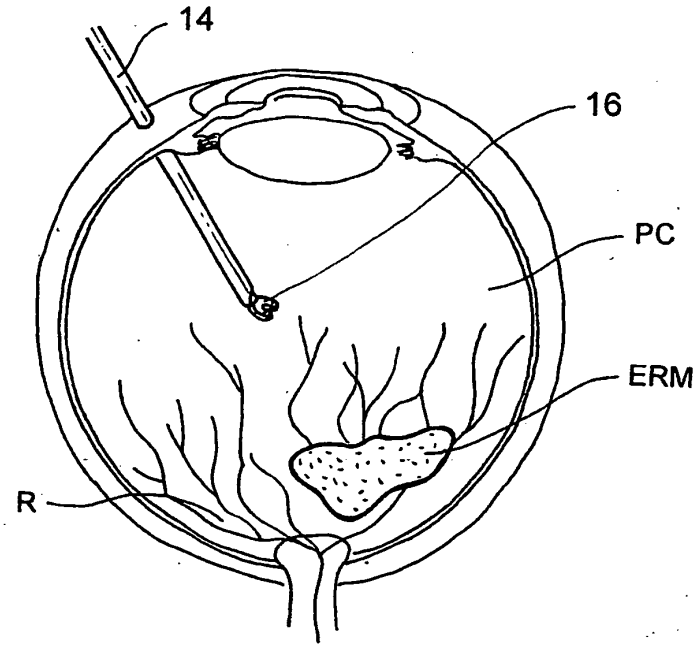

Fig. 3

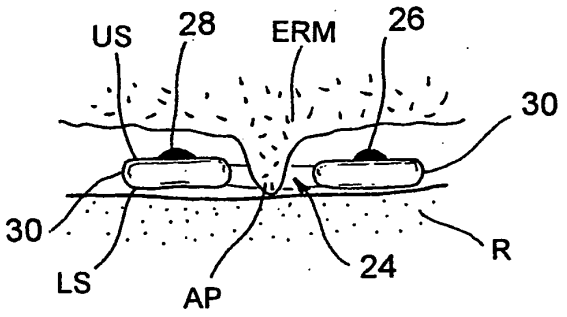

Fig. 4A

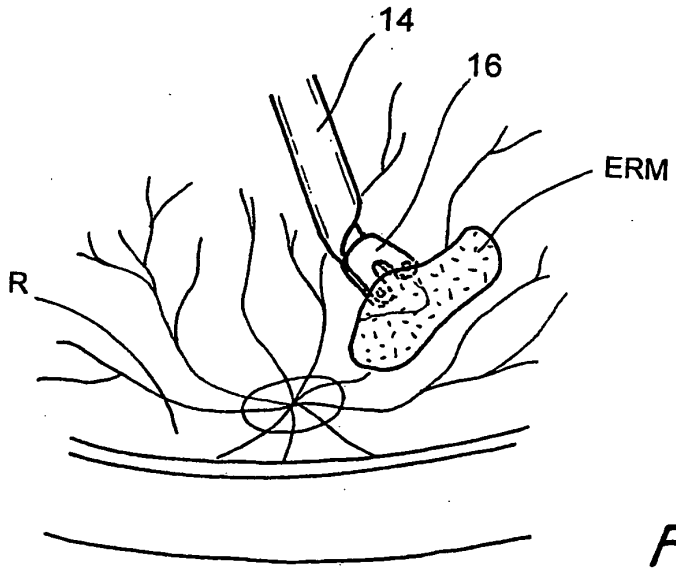

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 6283961 B **[0002]**

专利名称(译)	用于选择性切割组织的电外科设备		
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当前申请(专利权)人(译)	NEOMEDIX CORPORATION		
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其他公开文献	EP1633267A4 EP1633267A2		
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摘要(译)

用于切割或凝结组织的方法和装置。一种装置包括具有远端的细长构件（14），从细长构件的远端延伸的至少一个脚构件（16），所述脚构件（16）具有上表面（US）和下表面（ LS），至少在脚构件的下表面上形成的电绝缘和热绝缘覆盖物以及在脚构件（16）的上表面上的至少一个电极（26,28）。在操作中，至少一个电极（26,28）被激励，以便引起位于脚构件（16）的上表面上方的组织的切割或凝固，同时不会对位于下构件下表面下方的组织造成实质性损坏。脚部件（16）。