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(54) **APPARATUS FOR ENDOSCOPIC COLECTOMY**

GERÄT FÜR DIE ENDOSKOPISCHE KOLEKTOMIE

APPAREIL POUR COLECTOMIE ENDOSCOPIQUE

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(56) References cited:
WO-A-01/74235
WO-A-99/16359
US-A- 4 643 184
US-A- 5 207 695
US-A- 5 653 690
US-A- 5 827 265
US-A- 5 941 908
US-A- 6 036 702
US-A- 6 068 638
US-A1- 2002 082 625
US-B1- 6 485 496

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Description

[0001] The present invention relates generally to surgical apparatus. More particularly, it relates to apparatus for performing endoscopic colectomy.

BACKGROUND OF THE INVENTION

[0002] Endoscopy studies the intralumenal aspects of hollow organs of the upper and lower intestine including the esophagus, stomach and the colon through cannulation of the lumen via the mouth or anus. Endoscopic polypectomy is presently limited to a submucosal resection. The endoscopist is often unable to completely resect a sessile polyp or lesion and therefore the patient is subjected to subsequent definitive surgery, i.e. resection of the base of the tumor. Endoscopic polypectomy can be used to debulk sessile masses but it is unable to resect mural disease. Incomplete resection of a sessile polyp may destroy the biopsy specimen and alter the relationship of the gross specimen given to the pathologist thereby resulting in the pathologist possibly providing incorrect or incomplete study results. The endoscopist is also unable to correct uncommon, but life threatening, procedural complications such as perforations. Other cases where resection is required are invasive tumors, perforation from different causes, inflammatory bowel disease, diverticulosis and others.

[0003] Surgical approaches for resecting diseased tissue are largely practiced by making large laparotomy incisions or using minimally invasive techniques such as laparoscopic surgery in which tissues are resected and repaired through small incisions.

[0004] There are numerous surgical devices enabling surgeons to resect diseased tissue and subsequently anastomose remaining tissue either through a conventional incision or using a laparoscope and making one or more relatively small incisions. Additionally, endoscopically assisted stapling devices are known which enable surgeons to remotely anastomose lumenal structures such as the bowel. Endoscopically assisted bowel anastomosis nevertheless typically requires extralumenal assistance via a traditional laparotomy incision or use of a laparoscope.

[0005] Trends in surgery are towards minimally invasive procedures as evidenced by developments including laparoscopic cholecystectomy, laparoscopic appendectomy and laparoscopically assisted partial colectomies and hernia repairs. All of these minimally invasive procedures involve introducing a laparoscope through the abdominal wall and creating other associated openings to gain access to the peritoneal cavity in order to perform the necessary surgical procedure. Typically, general anesthesia is required. Endoscopically possible procedures include polypectomy, mucosectomy, and cauterization. During "laparoscopic colectomy" today the colon is separated from its omentum laparoscopically and then the colon is exteriorized out of the abdominal cavity, through a laparotomy incision where the resection and anastomosis are performed extracorporeally.

[0006] Disadvantages of the laparoscopic method include the need to traverse the abdominal wall, increased operating time secondary to the lack of exposure for the procedure and possibly the need to convert to an "open" laparotomy in the course of performing the procedure.

[0007] Present stapling techniques in surgery are for the most part functionally adequate but limited. Devices exist including the GIA and EEA staplers which can be used to transect tissue in a linear or circular fashion, respectively, with subsequent anastomosis with staples. The linear GIA is relatively versatile. The EEA is primarily suited for lower colonic circular anastomosis after a lesion has been surgically removed (via laparotomy or laparoscopically) or during a colostomy takedown procedure.

[0008] The rigid post of the EEA stapler severely limits its use, as well as requiring that an open procedure be utilized. The steerable endoscopic stapler is useful in allowing for more bowel accessibility; however, it remains dependent upon transabdominal surgical exposure prior to utilization. While laparoscopic surgical instruments have been used for bowel anastomosis, in such procedures the bowel is exteriorized through the laparoscopic incision and anastomosed extracorporeally or in an augmented stapled side-to-side fashion.

[0009] U.S. Patents 5,868,760 and 6,264,086 describe a method and apparatus for performing endolumenal resection of tissue, in particular for removal of diseased portions of a patient's colon. This purely endolumenal approach to colostomy does not fully address the surgical anatomy of the colon. As is well known, the colon and other viscera are connected and supported within the abdomen by the omentum, a membranous extension of the peritoneum that carries the blood supply to the colon. Resection of more than a small portion of the colon requires mobilization of the colon from the omentum and ligation or cauterization of the blood vessels supplying that portion of the colon. This aspect is not addressed by the endolumenal approach described; therefore it would be suitable for resecting only small portions of the colon.

[0010] Commonly owned and copending U.S. Patent Application Serial Nos. 09/790,204 filed February 20,2001 (now U.S. Patent No. 6,468,203); 09/969,927 filed October 2, 2001 (now U.S. Patent No. 6,610,007); and 10/229,577 filed August 27, 2002 (now U.S. Patent No. 6,858,005), describe steerable colonoscopes that uses serpentine motion to facilitate rapid and safe insertion of the colonoscope into a patient's colon. The technology described therein can also be used in conjunction with the methods and apparatus of the present invention to facilitate endoscopic colectomy or resection of any other part of the gastrointestinal system including, but not limited to, the esophagus, duodenum, jejunum and ileum or any other tubular organ like the bronchus.

[0011] US 6,068,638 discloses a welding catheter system for welding together the openings in a cardiac vein

and coronary artery around a passageway created between the vein and artery. The system comprises a proximal welding catheter and a distal welding catheter, each provided with an inflatable balloon. After creation of the passageway the distal welding catheter is advanced over a guidewire, through the passageway and into the coronary artery. The distal welding catheter's balloon is then inflated. Subsequently the proximal welding catheter is advanced over the distal welding catheter, so that its balloon is positioned within the cardiac vein proximally of the passageway. By then inflating the proximal welding catheter's balloon and pulling the two balloons together, the edges of the openings in the coronary artery and cardiac vein walls can be brought into contact. The balloons and welding catheters are equipped with welding means. After welding, the balloons are deflated and the apparatus is removed, leaving the openings in the walls of the coronary artery and cardiac vein fused around their perimeters.

[0012] US 5,653,690 discloses a catheter for retrograde perfusion of the heart through the coronary sinus. The catheter has an infusion lumen for introducing fusion liquid into the heart and a retention means such as an inflatable balloon. This inflatable balloon can have retention enhancements, such as proximally sloping spikes or barbed protuberances, provided on its surface to help to keep it firmly in place.

[0013] WO 99/16359 discloses a sutureless anastomotic technique using a bioadhesive. The technique involves apposing apertures in the organs to be joined and applying the bioadhesive, thereby joining the apertures in the organs and allowing movement of fluid or semi-solid material from one of the two organs to the second organ. The device has two inflatable balloons for holding the apertures together while the bioadhesive is applied.

[0014] WO 01/74235 A1 discloses a steerable endoscope having an elongated body with a selectively steerable distal portion and an automatically controlled proximal portion. The endoscope body is inserted into a patient and the selectively steerable distal portion is used to select a desired path within the patient's body. When the endoscope body is advanced, an electronic motion controller operates the automatically controlled proximal portion to assume the selected curve of the selectively steerable distal portion. Another desired path is selected with the selectively steerable distal portion and the endoscope body is advanced again. As the endoscope body is further advanced, the selected curves propagate proximally along the endoscope body, and when the endoscope body is withdrawn proximally, the selected curves propagate distally along the endoscope body. This creates a serpentine motion in the endoscope body that allows it to negotiate tortuous curves along a desired path through or around and between organs within the body.

SUMMARY OF THE INVENTION

[0015] According to the present invention there is provided the endoscopic device of claim 1.

[0016] As will be described below, the endoscopic device of the present invention maybe used for performing endoscopic colectomy combining the advantages of the laparoscopic and endoluminal approaches.

[0017] For example, the diseased portion of the colon to be resected is identified using either laparoscopic and/or colonoscopic techniques or using another imaging modality. A colectomy device mounted on a colonoscope grasps the colon wall at two sites adjacent to a diseased portion of the colon. Using laparoscopic techniques, the diseased portion of the colon is separated from the omentum and the blood vessels supplying it are ligated or cauterized. The colon wall is transected to remove the diseased portion and the excised tissue is removed using the laparoscope or drawn into the colectomy device for later removal upon withdrawal of the colonoscope. The colectomy device approximates the two ends of the colon and performs an end-to-end anastomosis. If the part to be resected is a tumor, prior to the resection, the edges of the segment to be resected will be stapled to seal it and prevent spillage of malignant cells to the healthy tissue.

[0018] The apparatus of the present invention provide a number of benefits not realized by the prior art approaches to colectomy. As stated above, the purely endolumenal approach does not provide for separation of the colon from the omentum, which is necessary when resecting more than just a small portion of the colon wall. By combining laparoscopic techniques with a colonoscope-mounted colectomy device, the present invention overcomes this deficiency in the prior art allowing a more comprehensive approach to colectomy. Unlike prior art laparoscopic techniques, however, the colon does not need to be exteriorized for excision of the diseased portion or anastomosis of the remaining colon. The colonoscope-mounted colectomy device approximates the ends of the colon and performs an anastomosis from the interior of the lumen of the colon. The excised tissue can be drawn into the colectomy device for removal through the lumen of the colon along with the colonoscope or can be taken out by the laparoscope, which can be done through a very small incision in the patient's skin. The prior art approach also does not protect from leaking of malignant cells to the periphery. This idea will enable sealing of the tissue with staples at its ends to prevent such leakage. Optionally, it will be done with the help of a laparoscopic device that will serve as an anvil. Unlike the prior art procedure, the present invention will optionally use a balloon inflated in the lumen of the colon or any other resected organ before stapling, and by this assure the anastomosis will be ideal with the best possible approximation of the edges.

[0019] The use of colonoscopic techniques in the present invention provides another benefit not realized

by a purely laparoscopic approach. Since colonoscopic examination is at present the most definitive diagnostic method for identifying diseases of the colon, locating the lesions through the exterior of the colon by laparoscopy or even by direct visualization can be somewhat problematic. Using the colonoscope to identify and isolate the diseased portion of the colon from within the lumen helps assure that the correct portions of the colon wall are excised and makes clean surgical margins without residual disease more assured as well.

[0020] In a preferred embodiment, the present invention utilizes a steerable colonoscope as described in U.S. Patent Application Serial Nos. 09/790,204 (now U.S. Patent No. 6,468,203); 09/969,927 now U.S. Patent No. 6,610,007; and 10/229,577 now U.S. Patent No. 6,858,005.

[0021] The steerable colonoscope described therein provides a number of additional benefits for performing endoscopic colectomy according to the present invention. The steerable colonoscope uses serpentine motion to facilitate rapid and safe insertion of the colonoscope into the patient's colon, which allows the endoscopic colectomy method to be performed more quickly and more safely. Beyond this however, the steerable colonoscope has the capability to create a three-dimensional mathematical model or map of the patient's colon and the location of any lesions identified during the initial examination. Lesions found during a previous examination by CT, MRI or any other imaging technology can also be mapped onto the three-dimensional mathematical model of the colon. By generating a three-dimensional map of the colon, the system knows where each part of the endoscope is in the colon and will be able to localize the two parts of the dissecting and stapling system exactly in the desired location. During surgery, this information can be used to quickly and accurately return the colonoscope to the location of the identified lesions where the colonoscope-mounted colectomy device will be used to complete the endoscopic colectomy procedure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022]

FIG 1 is a phantom drawing illustrating a diseased portion of the colon being separated from the omentum using laparoscopic techniques through a small incision in a patient's abdomen.

FIG 2 is a cutaway drawing illustrating a steerable colonoscope with a colectomy device mounted thereon being inserted through the lumen of a patient's colon.

FIG 3 is a cutaway drawing showing the gripping mechanism of the colonoscope-mounted colectomy device expanded within the lumen of the colon.

FIG 4 illustrates the colon after the diseased portion has been excised and removed with the colonoscope-mounted colectomy device in position to approximate the transected ends of the colon.

FIG 5 illustrates the colonoscope-mounted colectomy device performing an end-to-end anastomosis to complete the endoscopic colectomy procedure.

DETAILED DESCRIPTION OF THE INVENTION

[0023] FIG 2 is a cutaway drawing illustrating a steerable colonoscope **100** with a colectomy device **102** mounted thereon being inserted through the lumen of a patient's colon. As mentioned before, the same technique may apply for every other tubular shaped organ. Preferably, the steerable colonoscope **100** is constructed as described in U.S. Patent Application Serial Nos. 09/790,204 (now U.S. Patent No. 6,468,203); 09/969,927 now U.S. Patent No. 6,610,007; and 10/229,577 now U.S. Patent No. 6,858,005, with multiple articulating segments that are controlled to move with a serpentine motion that facilitates insertion and withdrawal of the colonoscope with a minimum of contact and stress applied to the colon walls. In addition, the control system of the steerable colonoscope **100** has the capability to construct a three-dimensional mathematical model or map of the colon as it advances through lumen under control of the operator. The three-dimensional mathematical model of the colon and the location and nature of any lesions identified in the course of an initial colonoscopic examination can be stored and used in performance of the endoscopic colectomy procedure. In alternate embodiments, the colectomy device **102** of the present invention may be mounted on a colonoscope of a different design and construction.

[0024] The colectomy device **102** can be permanently or removably mounted on the steerable colonoscope **100**. The colectomy device **102** has a distal component **104** and a proximal component **106**. The distal component **104** and the proximal component **106** each have an expandable member **108** and a gripping mechanism **110** for gripping the wall of the colon. The expandable member **108** may be an inflatable balloon or a mechanically expandable mechanism. The gripping mechanism **110** may comprise a plurality of circumferentially located ports within which attachment points **112**, e.g., needles, hooks, barbs, etc., may be retractably positioned about an exterior surface of the expandable member **108**. Alternatively, the gripping mechanism **110** may utilize a vacuum gripper through a plurality of circumferentially located ports around the distal component **104** and/or the proximal component **106** or other known gripping mechanisms. In the case of the vacuum gripper, gripping mechanism **110** is in fluid communication through the ports and through the colonoscope **100** to the proximal end of the colonoscope **100** to a vacuum pump (not shown). At least one, and optionally both, of the distal component **104** and the proximal component **106** are movable longitudinally with respect to the body of the steerable colonoscope **100**. Rails, grooves or the like **114** may be provided on the body of the steerable colonoscope **100** for

guiding the longitudinal movement of the distal component **104** and the proximal component **106**.

[0025] In addition, the colectomy device **102** includes a surgical stapler **116** or other anastomosis mechanism. The surgical stapler **116** is carried on either the distal component **104** or the proximal component **106** and a stapler anvil **118** is carried on the other of these components. The surgical stapler **116** may be configured similarly to any number of conventional stapling devices which are adapted to actuate staples into tissue. Another option is that there is a stapler and an anvil on both components for stapling and sealing the edges. Optionally, the colectomy device **102** may include a cutting device and/or electrocautery and/or a laser device for transecting the colon wall. Optionally, the colectomy device **102** may also include a vacuum mechanism or the like for drawing the excised tissue into the colectomy device **102** for later removal along with the steerable colonoscope **100**.

[0026] FIG 2 shows the steerable colonoscope **100** with the expandable members 108 of the distal component **104** and the proximal component **106** in a contracted or deflated condition for easy passage through the lumen of the patient's colon. The control system of the steerable colonoscope **100** monitors the position of each segment of the colonoscope **100** as it is advanced within the colon and can signal to the operator when the segments carrying the distal component **104** and the proximal component **106** of the colectomy device **102** are correctly positioned with respect to a previously detected lesion in the colon. Alternatively, the control system of the steerable colonoscope **100** can be programmed to advance the colonoscope **100** automatically through the lumen of the colon and to stop it when the distal component **104** and the proximal component **106** of the colectomy device **102** are correctly positioned with respect to the lesion in the colon. Alternatively, the control system will be able to automatically guide and deliver the two components to the desired location after the colonoscope has been inserted to the colon.

[0027] FIG 3 is a cutaway drawing showing the expandable members **108** of the distal component **104** and the proximal component **106** of the colonoscope-mounted colectomy device **102** expanded within the lumen of the colon so that the gripping mechanism **110** grips the wall of the colon. The distal component **104** and the proximal component **106** may be expanded through any number of expansion devices. For instance, they may be radially expanded upon spoke-like support structures or they may be configured to radially expand in a rotational motion until the desired expansion diameter is attained. At this point, with the diseased portion of the colon identified and isolated by the colonoscope-mounted colectomy device **102**, the diseased portion is separated from the omentum and the blood vessels supplying it are ligated and/or cauterized using laparoscopic techniques. FIG 1 is a phantom drawing illustrating a diseased portion of the colon being separated from the omentum using laparoscopic techniques through a small incision in a patient's abdomen.

[0028] Next, the diseased portion of the colon is excised by transecting the colon at the proximal and distal end of the diseased portion. The colon may be transected using laparoscopic techniques or using a cutting mechanism and/or electrocautery device mounted on the colectomy device **102.** The excised tissue is removed using the laparoscope or drawn into the colectomy device **102** for later removal upon withdrawal of the steerable colonoscope **100**. FIG 4 illustrates the colon after the diseased portion has been excised and removed with the colonoscope-mounted colectomy device **102** in position to approximate the transected ends of the colon.

[0029] The remaining ends of the colon are approximated one to the other by moving the distal component **104** and/or the proximal component **106** longitudinally with respect to the body of the steerable colonoscope **100**, as shown by the arrows. Optionally, the proximal component **106** may be longitudinally translated towards the distal component **104** or both components **104, 106** may be approximated simultaneously towards one another. The ends of the colon are stapled to one another to create an end-to-end anastomosis **120** using the surgical stapler **116** and stapler anvil **118** on the colectomy device **102**. Once the ends of the tissue have been approximated, staples or other fastening devices, e.g., clips, screws, adhesives, sutures, and combinations thereof, etc., may be actuated through the surgical stapler **116** such that they pierce both ends of the tissue against the stapler anvil **118**. FIG illustrates the colonoscope-mounted colectomy device performing an end-to-end anastomosis **120** to complete the endoscopic colectomy procedure. Once the anastomosis **120** is complete, the expandable members **108** of the distal component **104** and the proximal component **106** are deflated or contracted and the steerable colonoscope **100** and the colectomy device **102** are withdrawn from the patient's body. The expanded members will assure a very accurate end-to-end anastomosis and prevent stenosis that can happen as a result of inaccurate approximation of the two ends.

[0030] In an alternative method using the colonoscope-mounted colectomy device **102,** the diseased portion of the colon may be excised using a cutting device within the colectomy device **102** after the ends of the diseased portion have been approximated and anastomosed. The excised tissue is drawn into the colectomy device **102** and removed when the steerable colonoscope **100** is withdrawn from the patient.

[0031] In another alternative method, the colectomy procedure may be performed entirely from the endolumenal approach using the colonoscope-mounted colectomy device 102 without laparoscopic assistance. This method would be particularly advantageous for resection of small portions of the colon where it may not be necessary to mobilize an extended portion of the colon from the omentum to achieve successful approximation and

anastomosis. The three-dimensional mapping capability of the steerable colonoscope **102** would be used to locate previously identified lesions without laparoscopic assistance.

[0032] While the present invention has been described herein with respect to the exemplary embodiments and the best mode for practicing the invention, it will be apparent to one of ordinary skill in the art that many modifications, improvements and subcombinations of the various embodiments, adaptations and variations can be made to the invention without departing from the scope of the claims.

Claims

1. An endoscopic device for approximating wall tissue within the lumen of a hollow body organ, comprising:

an elongated body (100) having a plurality of articulatable segments and a steerable distal portion, wherein each of the segments is configurable to assume a selected shape along an arbitrary path when the elongated body is advanced distally or proximally along the lumen;
a first tissue approximation component (104) positioned about the elongated body (100) and adapted to expand radially into contact with a first circumferential region of the lumen wall about the first component;
a plurality of tissue gripping regions (110) circumferentially located about the first component (104) and adapted to adhere to the contacted first circumferential region of the lumen wall;
a second tissue approximation component (106) positioned about the elongated body (100) proximally of the first component (104) and adapted to expand radially into contact with a second circumferential region of the lumen wall about the second component; and
a plurality of tissue gripping regions (110) circumferentially located about the second component (106) and adapted to adhere to the contacted second circumferential region of the lumen wall;
wherein at least one of the first and second components is capable of longitudinal translation along the elongated body (100) to cause the adhered first and second regions of the lumen wall to become adjacent to one another and wherein the first and second components are adapted to securely fasten together the adjacent first and second regions of the lumen wall.

2. The endoscopic device of claim 1 wherein the first and the second tissue approximation components (104, 106) each comprise a radially expandable ring (108).

3. The endoscopic device of claim 1 wherein the first and the second tissue approximation components (104, 106) each comprise a radially expandable balloon (108).

4. The endoscopic device of claim 1 wherein the plurality of tissue gripping regions (110) on each of the first and the second tissue approximation components (104, 106) comprise vacuum ports.

5. The endoscopic device of claim 1 wherein the plurality of tissue gripping regions (110) on each of the first and the second tissue approximation components (104, 106) comprise retractable fasteners (112).

6. The endoscopic device of claim 5 wherein the retractable fasteners (112) are selected from the group consisting of needles, hooks, and barbs.

7. The endoscopic device of any one of the preceding claims wherein the first tissue approximation component (104) is adapted to slide longitudinally towards the second tissue approximation component (106) along at least a portion of the elongated body (100) within rails or grooves (114) defined along the elongated body to cause the adhered first region of the lumen wall to become adjacent to the adhered second region of the lumen wall.

8. The endoscopic device of any one of claims 1 to 6 wherein the second tissue approximation component (106) is adapted to slide longitudinally towards the first tissue approximation component (104) along at least a portion of the elongated body (100) within rails or grooves (114) defined along the elongated body to cause the adhered first region of the lumen wall to become adjacent to the adhered second region of the lumen wall.

9. The endoscopic device of any one of claims 1 to 6 wherein the first and the second tissue approximation components (104, 106) are each adapted to slide longitudinally towards one another along at least a portion of the elongated body (100) within rails or grooves (114) defined along the elongated body to cause the adhered first region of the lumen wall to become adjacent to the adhered second region of the lumen wall.

10. The endoscopic device of any one of the preceding claims wherein the first or the second tissue approximation component (104, 106) contains a plurality of fasteners adapted to fasten the first region to the second region of the lumen wall.

11. The endoscopic device of claim 10 wherein the fasteners are selected from the group consisting of sta-

ples, clips, screws, adhesives, sutures, and combinations thereof.

Patentansprüche

1. Endoskopiegerät zum Annähern an ein Wandgewebe in dem Lumen eines Hohlkörperorgans, umfassend:

   einen länglichen Körper (100) mit mehreren gelenkig anbringbaren Segmenten und einem steuerbaren distalen Abschnitt, wobei jedes der Segmente konfigurierbar ist, um eine ausgewählte Form entlang eines beliebigen Pfades anzunehmen, wenn der längliche Körper distal oder proximal entlang des Lumens bewegt wird;
   eine erste Gewebeannäherungskomponente (104), welche um den länglichen Körper (100) angeordnet und ausgestaltet ist, um sich radial in einen Kontakt mit einem ersten Umfangsbereich der Lumenwand um die erste Komponente auszudehnen;
   eine Mehrzahl von Gewebegreifbereichen (110), welche in Umfangsrichtung um die erste Komponente (104) angeordnet und ausgestaltet sind, um an dem kontaktierten ersten Umfangsbereich der Lumenwand zu haften;
   eine zweite Gewebeannäherungskomponente (106), welche proximal der ersten Komponente (104) um den länglichen Körper (100) angeordnet und ausgestaltet ist, um sich radial in einen Kontakt mit einem zweiten Umfangsbereich der Lumenwand um die zweite Komponente auszudehnen; und
   eine Mehrzahl von Gewebegreifbereichen (110), welche in Umfangsrichtung um die zweite Komponente (106) angeordnet und ausgestaltet sind, um an dem kontaktierten zweiten Umfangsbereich der Lumenwand zu haften;
   wobei die erste und/oder die zweite Komponente zu einer Bewegung in Längsrichtung entlang des länglichen Körpers (100) in der Lage ist, um zu bewirken, dass der anhaftende erste und zweite Bereich der Lumenwand benachbart zueinander angeordnet sind, und wobei die erste und die zweite Komponente ausgestaltet sind, um zusammen den benachbarten ersten und zweiten Bereich der Lumenwand sicher zu befestigen.

2. Endoskopiegerät nach Anspruch 1, wobei die erste und die zweite Gewebeannäherungskomponente (104, 106) jeweils einen radial ausdehnbaren Ring (108) umfassen.

3. Endoskopiegerät nach Anspruch 1, wobei die erste und die zweite Gewebeannäherungskomponente (104, 106) jeweils einen radial ausdehnbaren Ballon (108) umfassen.

4. Endoskopiegerät nach Anspruch 1, wobei die Mehrzahl von Gewebegreifbereichen (110) auf jeder der ersten und der zweiten Gewebeannäherungskomponente (104, 106) Vakuumanschlüsse umfasst.

5. Endoskopiegerät nach Anspruch 1, wobei die Mehrzahl von Gewebegreifbereichen (110) auf jeder der ersten und der zweiten Gewebeannäherungskomponente (104, 106) zurückziehbare Befestigungsmittel (112) umfassen.

6. Endoskopiegerät nach Anspruch 5, wobei die zurückziehbaren Befestigungsmittel (112) ausgewählt sind aus der Gruppe, welche besteht aus Nadeln, Haken und Widerhaken.

7. Endoskopiegerät nach einem der vorhergehenden Ansprüche, wobei die erste Gewebeannäherungskomponente (104) ausgestaltet ist, um in Längsrichtung zu der zweiten Gewebeannäherungskomponente (106) entlang zumindest einem Abschnitt des länglichen Körpers (100) in Schienen oder Vertiefungen (114), welche entlang des länglichen Körpers definiert sind, zu gleiten, um zu bewirken, dass der anhaftende erste Bereich der Lumenwand in der Nachbarschaft des anhaftenden zweiten Bereichs der Lumenwand angeordnet ist.

8. Endoskopiegerät nach einem der Ansprüche 1 bis 6, wobei die zweite Gewebeannäherungskomponente (106) ausgestaltet ist, um in Längsrichtung zu der ersten Gewebeannäherungskomponente (104) entlang zumindest einem Abschnitt des länglichen Körpers (100) in Schienen oder Vertiefungen (114), welche entlang des länglichen Körpers definiert sind, zu gleiten, um zu bewirken, dass der anhaftende erste Bereich der Lumenwand in der Nachbarschaft des anhaftenden zweiten Bereichs der Lumenwand angeordnet ist.

9. Endoskopiegerät nach einem der Ansprüche 1 bis 6, wobei die erste und die zweite Gewebeannäherungskomponente (104, 106) jeweils ausgestaltet sind, um in Längsrichtung entlang zumindest einem Abschnitt des länglichen Körpers (100) zueinander in Schienen oder Vertiefungen (114), welche entlang des länglichen Körpers definiert sind, zu gleiten, um zu bewirken, dass der anhaftende erste Bereich der Lumenwand in der Nachbarschaft des anhaftenden zweiten Bereichs der Lumenwand angeordnet ist.

10. Endoskopiegerät nach einem der vorhergehenden Ansprüche, wobei die erste oder die zweite Gewebeannäherungskomponente (104, 106) mehrere Befestigungsmittel enthält, welche ausgestaltet

sind, um den ersten Bereich an dem zweiten Bereich der Lumenwand zu befestigen.

11. Endoskopiegerät nach Anspruch 10, wobei die Befestigungsmittel ausgewählt sind aus der Gruppe, welche besteht aus Klammern, Clips, Schrauben, Klebstoffen, Nähten und Kombinationen davon.

Revendications

1. Dispositif endoscopique destiné à rapprocher des tissus de paroi à l'intérieur de la lumière d'un organe corporel creux, comprenant :

un corps allongé (100) comportant une pluralité de segments articulés et une partie distale orientable, dans lequel chacun des segments est conçu pour adopter une forme sélectionnée le long d'un trajet arbitraire lorsque le corps allongé avance de façon distale ou de façon proximale le long de la lumière ;
un premier composant de rapprochement des tissus (104) positionné autour du corps allongé (100) et adapté pour se déployer radialement en venant en contact avec une première région circonférentielle de la paroi de la lumière autour du premier composant ;
une pluralité de régions de saisie de tissus (110) disposées de façon circonférentielle autour du premier composant (104) et adaptées pour adhérer à la première région circonférentielle contactée de la paroi de la lumière ;
un second composant de rapprochement des tissus (106) positionné autour du corps allongé (100) de façon proximale par rapport au premier composant (104) et adapté pour se déployer radialement en venant en contact avec une seconde région circonférentielle de la paroi de la lumière autour du second composant ; et
une pluralité de régions de saisie de tissus (110) disposées de façon circonférentielle autour du second composant (106) et adaptées pour adhérer à la seconde région circonférentielle contactée de la paroi de la lumière ;
dans lequel au moins l'un des premier et second composants peut effectuer un mouvement de translation longitudinale le long du corps allongé (100) pour amener les première et seconde régions collées de la paroi de la lumière à se trouver adjacentes l'une par rapport à l'autre et dans lequel les premier et second composants sont adaptés pour fixer solidement ensemble les première et seconde régions adjacentes de la paroi de la lumière.

2. Dispositif endoscopique selon la revendication 1, dans lequel les premier et second composants de rapprochement des tissus (104, 106) comportent chacun un anneau radialement expansible (108).

3. Dispositif endoscopique selon la revendication 1, dans lequel les premier et second composants de rapprochement des tissus (104, 106) comportent chacun un ballonnet radialement expansible (108).

4. Dispositif endoscopique selon la revendication 1, dans lequel la pluralité de régions de saisie de tissus (110) sur chacun des premier et second composants de rapprochement des tissus (104, 106) comportent des orifices d'aspiration.

5. Dispositif endoscopique selon la revendication 1, dans lequel la pluralité de régions de saisie de tissus (110) sur chacun des premier et second composants de rapprochement des tissus (104, 106) comportent des attaches rétractables (112).

6. Dispositif endoscopique selon la revendication 5, dans lequel les attaches rétractables (112) sont sélectionnées parmi le groupe constitué d'aiguilles, de crochets, et de barbelures.

7. Dispositif endoscopique selon l'une quelconque des précédentes revendications, dans lequel le premier composant de rapprochement des tissus (104) est adapté pour glisser longitudinalement vers le second composant de rapprochement des tissus (106) le long d'au moins une partie du corps allongé (100) à l'intérieur de rails ou de rainures (114) définis le long du corps allongé pour amener la première région collée de la paroi de la lumière à se trouver adjacente à la seconde région collée de la paroi de la lumière.

8. Dispositif endoscopique selon l'une quelconque des revendications 1 à 6, dans lequel le second composant de rapprochement des tissus (106) est adapté pour glisser longitudinalement vers le premier composant de rapprochement des tissus (104) le long d'au moins une partie du corps allongé (100) à l'intérieur de rails ou de rainures (114) définis le long du corps allongé pour amener la première région collée de la paroi de la lumière à se trouver adjacente à la seconde région collée de la paroi de la lumière.

9. Dispositif endoscopique selon l'une quelconque des revendications 1 à 6, dans lequel les premier et second composants de rapprochement des tissus (104, 106) sont chacun adaptés pour glisser longitudinalement l'un vers l'autre le long d'au moins une partie du corps allongé (100) à l'intérieur de rails ou de rainures (114) définis le long du corps allongé pour amener la première région collée de la paroi de la lumière à se trouver adjacente à la seconde région collée de la paroi de la lumière.

10. Dispositif endoscopique selon l'une quelconque des précédentes revendications, dans lequel le premier ou le second composant de rapprochement des tissus (104, 106) comporte une pluralité d'attaches adaptées pour fixer la première région à la seconde région de la paroi de la lumière.

11. Dispositif endoscopique selon la revendication 10, dans lequel les attaches sont sélectionnées parmi le groupe constitué d'agrafes, de clips, de vis, d'adhésifs, de sutures, et de combinaisons de ces derniers.

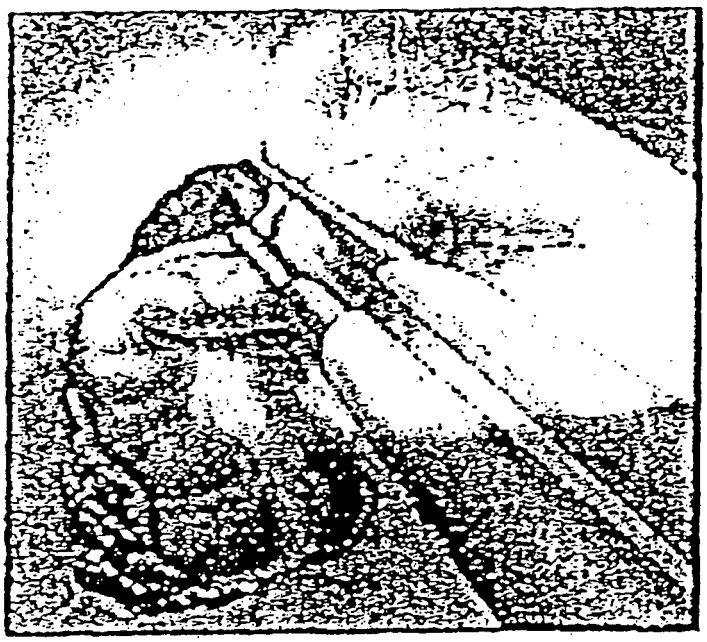


FIG 1

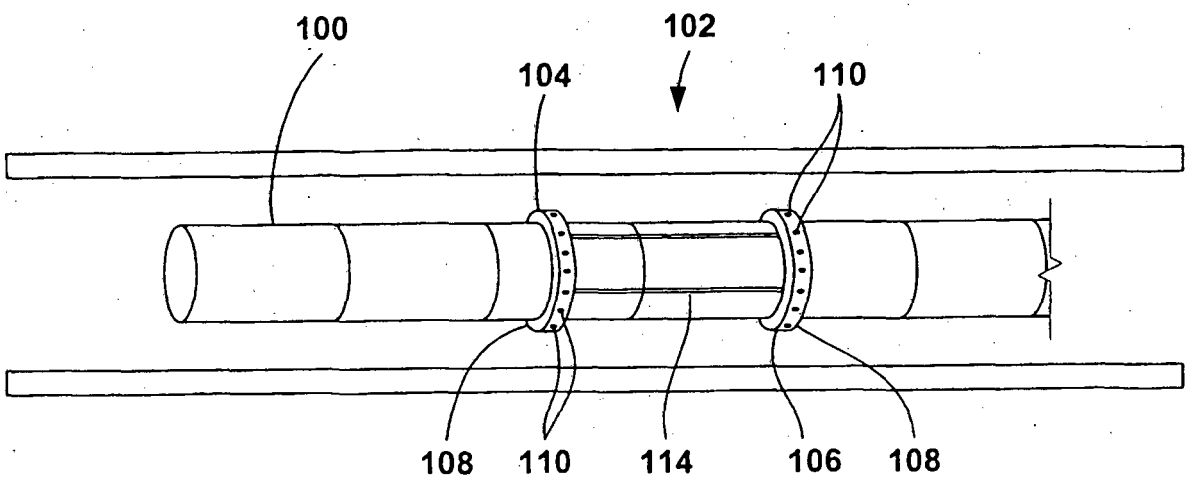
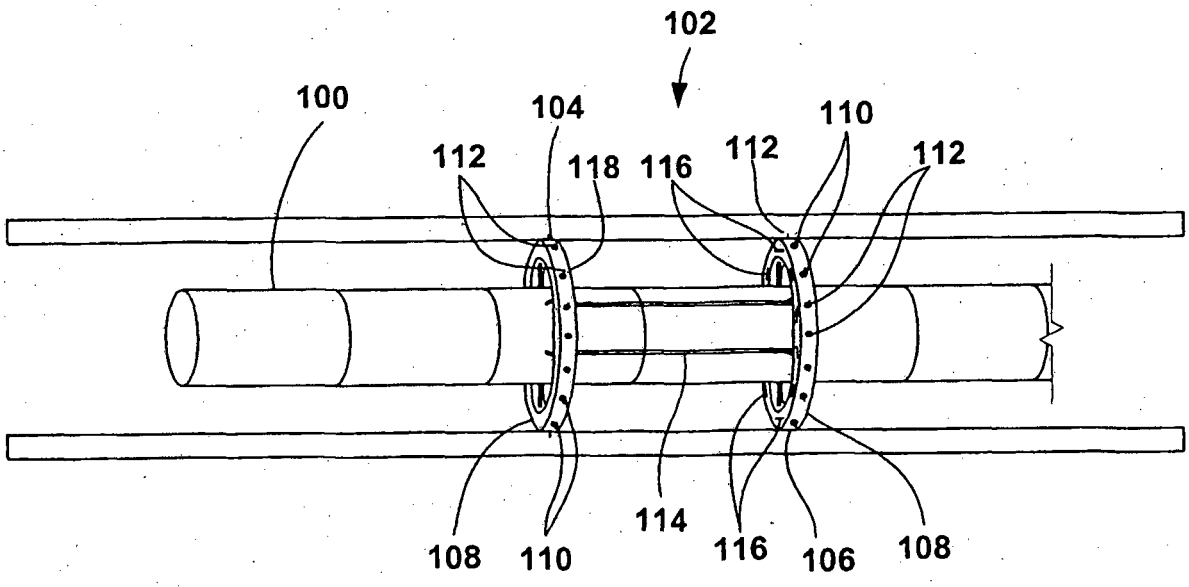

100
102
104
110
108
110
114
106
108

FIG 2


102
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112
118
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112
112
114
116
108
110
106
108

FIG 3

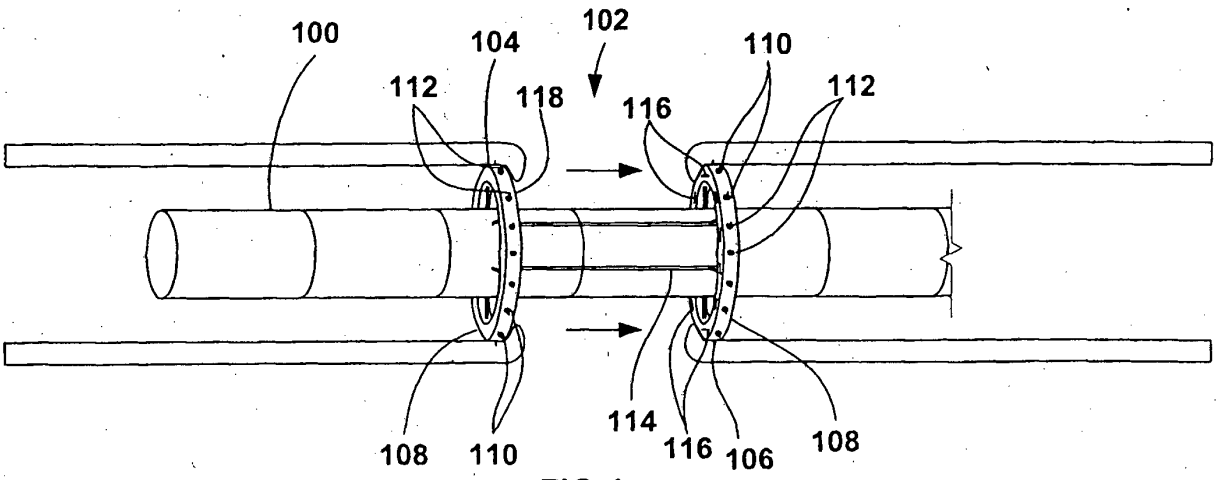
100
104
102
110
112
118
116
112
108
110
114
116
106
108

FIG 4

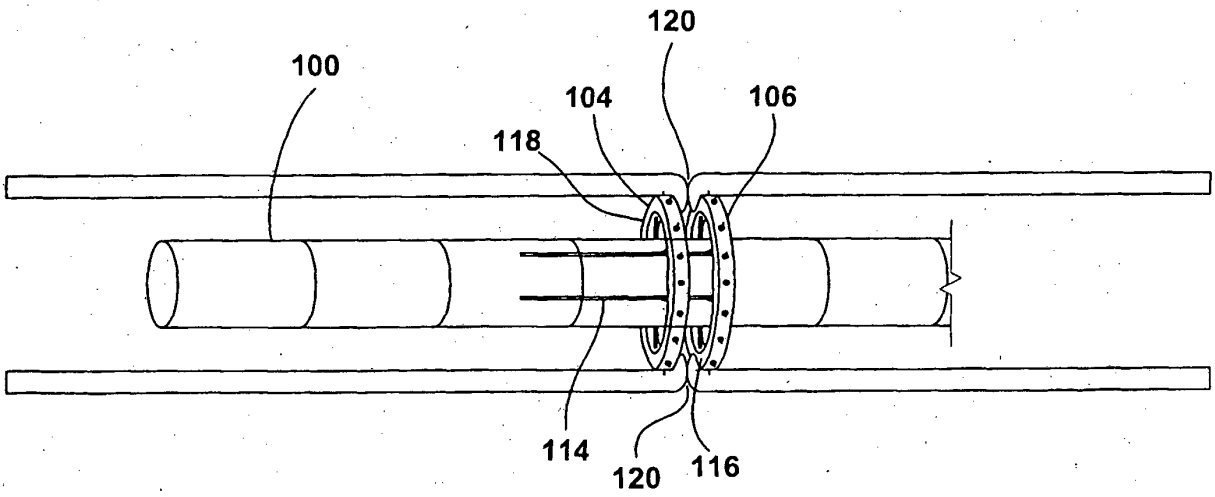
120
100
104
106
118
114
120
116

FIG 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5868760 A **[0009]**
- US 6264086 B **[0009]**
- US 79020401 A **[0010]**
- US 6468203 B **[0010] [0020] [0023]**
- US 09969927 B **[0010] [0020] [0023]**
- US 6610007 B **[0010] [0020] [0023]**
- US 10229577 B **[0010] [0020] [0023]**
- US 6858005 B **[0010] [0020] [0023]**
- US 6068638 A **[0011]**
- US 5653690 A **[0012]**
- WO 9916359 A **[0013]**
- WO 0174235 A1 **[0014]**
- US 790204 A **[0020] [0023]**

专利名称(译)	用于内窥镜结肠切除术的装置		
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[标]申请(专利权)人(译)	新引导系统公司		
申请(专利权)人(译)	NEOGUIDE系统公司.		
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优先权	60/347674 2002-01-09 US		
其他公开文献	EP1469781A4 EP1469781A2		
外部链接	Espacenet		

摘要(译)

本文描述了用于内窥镜结肠切除术的设备和方法。 具有第一和第二组织接近装置的结肠切除装置安装在彼此分离的结肠镜上。 在展开结肠切除术装置期间，结肠的患病部分位于组织逼近装置之间。 组织逼近装置沿径向膨胀，使得它们在与结肠的患病部位相邻的两个位置处接触并抓住结肠壁。 将患病部位与大网膜分开，并使用腹腔镜将其切开，或将其拉入结肠镜中，以便随后取出。 然后在结肠镜上将组织逼近装置推向彼此，以使结肠的两个自由边缘彼此接触，并在其中使用组织逼近装置作为外科缝合器将它们彼此固定在一起，以形成端到端的吻合 。

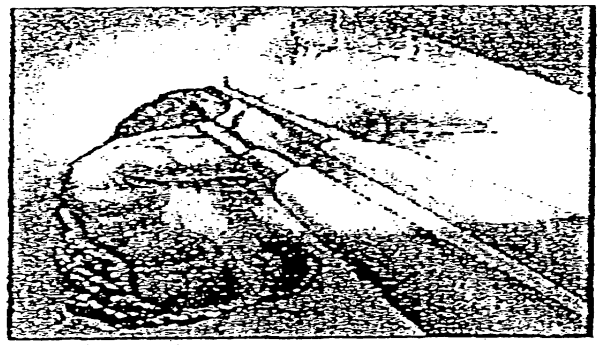

FIG 1