Surgical Retractor

FIELD

[0001] This application relates generally to surgical retractors and associated attachments and connectors.

BACKGROUND

[0002] This section is intended to provide a background or context to the invention that is recited in the claims. The description herein may include concepts that could be pursued but are not necessarily ones that have been previously conceived or pursued. Therefore, unless otherwise indicated herein, what is described in this section is not prior art to the description and claims in this application and is not admitted to be prior art by inclusion in this section.

[0003] Abdominal operations in both emergency and elective surgery settings require adequate exposure of abdominal contents in order for the surgeon to properly visualize areas of injury or disease. This is typically accomplished by the use of static metal retractors.

[0004] Two of the most common retractor mechanisms in current use are the Balfour retractor and the Bookwalter retractor. Each of these retractors presents advantages and disadvantages in their design and use. The Balfour retractor consists of a frame with integrated metal blades on a ratchet system which, when engaged, retracts the abdominal wall laterally, thereby exposing the abdominal contents and allowing the surgeon to operate. The Bookwalter mechanism consists of a supporting frame attached to the operating table upon which a rigid non-adjustable metal ring is attached to which retractor blades are then attached individually.

[0005] The Balfour retractor is perhaps the most commonly utilized abdominal retractor due its simple design, ease of use, and rapid exposure of the abdomen, particularly in trauma and emergency surgery settings when time is of the essence. Since it does not require the attachment of a metal frame to the operating room bed, as with the Bookwalter retractor, valuable time is not wasted, and it can be quickly inserted after the abdominal incision is created.

[0009] Despite the popularity of the Bookwalter retractor it also presents several limitations. The Bookwalter retractor mechanism involves fixation to the operating room table which requires attachment by a non-sterile individual in the operating room. Occasionally this may cause concerns in maintenance of the sterile field, as the surgeon may need to place his hands below the sterile barrier in order to assist and properly place the retractor arm. In addition, the multiple arms which require setup before surgical retraction is achieved mandates a significant amount of time in instrument setup, rendering this system inadequate for emergency settings or operations when time is of the essence. The circumferential ring used in the Bookwalter system is not expandable and frequently limits the placement of additional retractors in both the longitudinal and transverse axes. In addition, the fixed sizes of the rings do not allow adjustment of retraction depending on the individual physical characteristics of each patient and various types and sizes of wounds or incisions. The Bookwalter system also requires frequent repositioning by the surgical team during its use. After the Bookwalter system is set up and attached to the bed frame, the ring system is thereby fixed in place and additional retractors are attached. However, as the operation progresses and surgical exposure requirements change, the system needs to be repositioned to place the static non-expandable ring into the correct location. This requires interruption of the operation, removal of the retractor blades, repositioning of the ring, and reattachment of the retractor blades, again requiring significant time. There is an existing need for additional retractor systems.

SUMMARY

[00010] According to a first aspect of the present invention, there is provided a surgical retractor assembly comprising a first frame segment including a middle section disposed between a first end and a second end. The surgical retractor assembly may further include a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, the pair of end sections maintaining a substantially parallel orientation with respect to each other, each of the pair of end sections including a top surface and a bottom surface. The surgical retractor assembly may further include a pair of connectors, the pair of connectors being configured for coupling the first frame segment to the second frame segment. Each of the pair of connectors may include a ratchet housing for connecting one of the pair of connectors to one of the ends of the first frame segment. A channel is formed within the ratchet housing, the channel being shaped to receive a top surface or a bottom surface of one of the end sections of the second frame segment. A ratchet fastener is configured for holding the one of the end

sections of the second frame segment within said channel. Thus, for example, the surgical retractor assembly may comprise frame segments that may be vertically overlaid upon each other and coupled together. Once coupled together, the frame segments may define an adjustable frame that may be expanded or contracted so as to help visual a patient wound or incision. For example, in one preferred embodiment, the channels of the pair of connectors may be configured to receive the top surfaces of the end sections of the second frame segment when the pair of connectors are vertically overlaid on top of the second frame segment and lowered so that the end sections of the second frame segment are received within the channels. Notably, this allows the frame segments to be coupled together in certain situations where the first frame segment is already in use in a medical procedure and without requiring a surgeon to step or lean back from the surgical table.

[00011] According to a second aspect of the present invention, there is provided a surgical retractor assembly comprising a first frame segment including a middle section disposed between a first end and a second end, and a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, the pair of end sections maintaining a substantially parallel orientation with respect to each other, each of the pair of end sections including a top surface and a bottom surface. The surgical retractor assembly may further include a pair of connectors, the pair of connectors configured for coupling the first frame segment to the second frame segment in order to form a retractor frame, and at least one blade assembly. The at least one blade assembly may include a blade including a front blade face, the front blade face configured to be disposed adjacent a tissue wall of a wound or incision. The surgical retractor assembly my further include at least one blade block configured for mounting the at least one blade assembly on the retractor frame, the blade block being configured for selectively orienting the front blade face in the direction of the tissue wall. Accordingly, the surgical retractor assembly may be formed into a frame more easily in an emergency situation while avoiding inadvertent damage to the patient's tissues when a blade is incorrectly positioned away from the tissue wall.

[00012] According to a third aspect of the present invention, there is provided a surgical retractor assembly comprising a first frame segment including a middle section disposed between a first end and a second end. The surgical retractor assembly may further include a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, the pair of end sections maintaining a substantially parallel orientation with respect to each other, each of the pair of end sections including a top surface and a bottom surface. The surgical

retractor assembly may further include a pair of connectors, the pair of connectors configured for coupling the first frame segment to the second frame segment in order to form a retractor frame. The first end of the first frame segment may be art of an extended substantially straight first end section, and the second end of the first frame segment being part of an extended substantially straight second end section. The first end section of the first frame segment and the second end section of the first frame segment extending from the same side of the middle section, the first end section and the second end section being outwardly canted away from each other at an angle suitable to reduce a risk of racking when expanding the retractor frame.

[00013] In some embodiments, a surgical retractor assembly may include a first frame segment, a second frame segment and a pair of connectors for connecting the first frame segment to the second frame segment during retractor frame assembly, the surgical retractor assembly comprising: said first frame segment, the first frame segment including an intermediate section, a first end section, and a second end section, the intermediate section disposed between the first end section and the second end section, the first and second end sections projecting from the same side of the first intermediate section; said second frame segment, the second frame segment including an intermediate section, a first end section, and a second end section, the intermediate section disposed between the first end section and the second end section, the first and second end sections projecting from the same side of the first intermediate section; and said pair of connectors including a first connector configured for coupling to the first end section of the first frame segment and a second connector configured for coupling to the second end section of the first frame segment; wherein each of the pair of connectors includes a channel configured for receiving an end section of the second frame segment when the end section and the channel are aligned about in parallel with each other and vertically overlaid.

[00013a] According to a fourth aspect of the present invention, there is provided a surgical retractor assembly comprising:

a first frame segment including a middle section disposed between a first end and a second end;

a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, said pair of end sections maintaining a substantially parallel orientation with respect to each other, each of said pair of end sections including a top surface and a bottom surface;

a pair of connectors, the pair of connectors configured for coupling the first frame segment to the second frame segment in order to form a retractor frame, each of the pair of connectors comprising:

a ratchet housing configured for connecting the ratchet housing to said first frame segment;

a channel formed within the ratchet housing, the channel being shaped to receive a top surface or a bottom surface of one of the end sections of said second frame segment;

wherein said channel is disposed within said ratchet housing at an angle suitable to reduce a risk of racking when said retractor frame is expanded; and

a ratchet fastener configured for holding the one of the end sections of said second frame segment within said channel.

[00013b] According to a fifth aspect of the present invention, there is provided a connector for an adjustable surgical retractor including a frame formed upon coupling a first frame segment to a second frame segment, the first frame segment including a middle section disposed between a first end and a second end, the second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, said pair of end sections maintaining a substantially parallel orientation with respect to each other, each of said pair of end sections including a top surface and a bottom surface, the connector comprising:

a ratchet housing;

a channel formed within the ratchet housing, the channel being shaped to receive a top surface or a bottom surface of one of the end sections of the pair of end sections of said second frame segment; and

a ratchet fastener configured for holding the one of the end sections of the pair of end sections of said second frame segment within said channel.

BRIEF DESCRIPTION OF THE DRAWINGS

[00014] FIG. 1 is a perspective view of an embodiment of a surgical retractor assembled and shown in an expanded configuration.

[00015] FIG. 2 is a top plan view of the surgical retractor of FIG. 1 assembled and shown in an expanded configuration.

[00016] FIG. 3 is a bottom plan view of the surgical retractor of FIG. 1 assembled and shown in an expanded configuration.

CLAIMS

What is claimed is:

1. A surgical retractor assembly comprising:

    a first frame segment including a middle section disposed between a first end and a second end;

    a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, said pair of end sections maintaining a substantially parallel orientation with respect to each other, each of said pair of end sections including a top surface and a bottom surface;

    a pair of connectors, the pair of connectors being configured for coupling the first frame segment to the second frame segment, each of the pair of connectors comprising:

        a ratchet housing for connecting one of the pair of connectors to one of the ends of said first frame segment;

        a channel formed within the ratchet housing, the channel being shaped to receive a top surface or a bottom surface of one of the end sections of said second frame segment; and

        a ratchet fastener configured for holding the one of the end sections of said second frame segment within said channel.

2. The surgical retractor assembly of claim 1, each of the pair of connectors further comprising a lock operable by a user to actuate the ratchet fastener so as to provide access to the channel and allow said one of the end sections of said second frame segment to be received within the channel, the ratchet fastener being configured to automatically hold the end section within the channel when said lock is not engaged by said user.

3. The surgical retractor assembly of claim 2, the channels of each of said pair of connectors being shaped to receive a top surface of one of the end sections of said second frame segment so that said pair of connectors may be vertically overlaid on top of said pair of end sections of said second frame segment and coupled thereto so as to form a retractor frame.

4. The surgical retractor assembly of claim 3 wherein said first frame segment has a width that is no more than about 75% of a width of the second frame segment.

5. The surgical retractor assembly of claim 1 said first segment having a width that is no more than about 75% of a width of the second frame segment.

6. The surgical retractor assembly of claim 1, the first end of said first frame segment being part of an extended substantially straight first end section and the second end of said first frame segment being part of an extended substantially straight second end section;

    the first end section of the first frame segment and the second end section of the first frame segment extending from the same side of the middle section of the first frame segment and maintaining a substantially parallel orientation with respect to each other.

7. The surgical retractor assembly of claim 1 further including a wing disposed adjacent at least one of said pair of connectors, the wing being configured for mounting one or more frame attachments thereto.

8. The surgical retractor assembly of claim 7 wherein said wing is vertically spaced apart from a retractor frame formed upon coupling the first frame segment to the second frame segment, the wing positioned for attachment of a Bookwalter style attachment and providing access to adjustment levers disposed thereon.

9. The surgical retractor assembly of claim 1, further comprising:

    wherein coupling of the first frame segment to the second frame segment may be used to form an adjustable retractor frame;

    at least one blade assembly, the at least one blade assembly including a blade including a front blade face, the front blade face configured so as to be disposed adjacent a tissue wall of a wound or incision;

    at least one blade block configured for mounting the at least one blade assembly on said retractor frame, the blade block configured for selectively orienting the front blade face in the direction of said tissue wall.

10. The surgical retractor assembly of claim 9, the at least one blade block including a blade block housing comprising an opening sized to receive a blade post, the opening being shaped so as to allow the blade post to be inserted within the opening in an orientation that directs the front blade face in a direction for engagement with said

tissue wall, the opening being shaped to prevent the blade assembly from being inserted in an orientation that directs the front blade face in a direction away from said tissue wall.

11. The surgical retractor assembly of claim 10, wherein the blade block housing includes a slot shaped so as to allow the blade post to pass therethrough when the blade post is in an orientation that directs the front blade face in the direction of said tissue wall.

12. The surgical retractor assembly of claim 1, the first end of said first frame segment being part of an extended substantially straight first end section and the second end of said first frame segment being part of an extended substantially straight second end section;

the first end section and the second end section being outwardly canted away from each other at an angle suitable to reduce a risk of racking when expanding a frame formed upon coupling the first frame segment and the second frame segment together.

13. The surgical retractor assembly of claim 1 said channel being configured to receive a top surface of the end sections of said second frame segment when said one of the pair of connectors is vertically overlaid on top of the second frame segment and lowered so as to receive the top surface within said channel.

14. A surgical retractor assembly comprising:

a first frame segment including a middle section disposed between a first end and a second end;

a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, said pair of end sections maintaining a substantially parallel orientation with respect to each other, each of said pair of end sections including a top surface and a bottom surface;

a pair of connectors, the pair of connectors configured for coupling the first frame segment to the second frame segment in order to form a retractor frame;

at least one blade assembly, the at least one blade assembly including a blade including a front blade face, the front blade face configured to be disposed adjacent a tissue wall of a wound or incision; and

at least one blade block configured for mounting the at least one blade

assembly on said retractor frame, the blade block configured for selectively orienting the front blade face in the direction of said tissue wall.

15. The surgical retractor assembly of claim 14, the at least one blade block including a blade block housing comprising an opening sized to receive a blade post, the opening being shaped so as to allow the blade post to be inserted within the opening in an orientation that directs the front blade face in a direction for engagement with said tissue wall, the opening being shaped to prevent the blade assembly from being inserted in an orientation that directs the front blade face in a direction away from said tissue wall.

16. The surgical retractor assembly of claim 14, the first end of said first frame segment being part of an extended substantially straight first end section and the second end of said first frame segment being part of an extended substantially straight second end section;

the first end section of the first frame segment and second end section of the first frame segment extending from the same side of the middle section, the first end section and the second end section being outwardly canted away from each at an angle suitable to reduce a risk of racking when expanding said retractor frame.

17. A surgical retractor assembly comprising:

a first frame segment including a middle section disposed between a first end and a second end;

a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, said pair of end sections maintaining a substantially parallel orientation with respect to each other, each of said pair of end sections including a top surface and a bottom surface;

a pair of connectors, the pair of connectors configured for coupling the first frame segment to the second frame segment in order to form a retractor frame;

the first end of said first frame segment being part of an extended substantially straight first end section and the second end of said first frame segment being part of an extended substantially straight second end section;

the first end section of the first frame segment and second end section of the first frame segment extending from the same side of the middle section, the first end section and the second end section being outwardly canted away from each other at an angle suitable to reduce a risk of racking when expanding the retractor frame.

18. The surgical retractor assembly of claim 17 wherein said angle is between about 0.01° to about 1.30°.

19. A surgical retractor assembly comprising:

a first frame segment including a middle section disposed between a first end and a second end;

a second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, said pair of end sections maintaining a substantially parallel orientation with respect to each other, each of said pair of end sections including a top surface and a bottom surface;

a pair of connectors, the pair of connectors configured for coupling the first frame segment to the second frame segment in order to form a retractor frame, each of the pair of connectors comprising:

a ratchet housing configured for connecting the ratchet housing to said first frame segment;

a channel formed within the ratchet housing, the channel being shaped to receive a top surface or a bottom surface of one of the end sections of said second frame segment;

wherein said channel is disposed within said ratchet housing at an angle suitable to reduce a risk of racking when said retractor frame is expanded; and

a ratchet fastener configured for holding the one of the end sections of said second frame segment within said channel.

20. A connector for an adjustable surgical retractor including a frame formed upon coupling a first frame segment to a second frame segment, the first frame segment including a middle section disposed between a first end and a second end, the second frame segment including an intermediate section and a pair of end sections projecting from the same side of the intermediate section, said pair of end sections maintaining a

substantially parallel orientation with respect to each other, each of said pair of end sections including a top surface and a bottom surface, the connector comprising:

a ratchet housing;

a channel formed within the ratchet housing, the channel being shaped to receive a top surface or a bottom surface of one of the end sections of the pair of end sections of said second frame segment; and

a ratchet fastener configured for holding the one of the end sections of the pair of end sections of said second frame segment within said channel.

21. The connector of claim 20 further comprising a lock operable by a user to actuate the ratchet fastener so as to provide access to the channel and allow said one of the end sections of said second frame segment to be received within the channel, the ratchet fastener being configured to automatically hold the end section within the channel when said lock is not engaged by said user.

22. The surgical retractor assembly of claim 21 wherein said lock comprises a slide lock.