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CLAIMS

1. A surgical clamping device comprising:

a body;

a pair of clamping members extending from the body; and

an electronic controller housed within the body and coupled to control movement of at least one of the clamping members to control a pressure exerted by the clamping members on a blood vessel clamped therebetween.

2. The device of claim 1, comprising:

a micro-motor coupled to the controller;

a power supply coupled to the micro-motor and the controller and

a micro-gearbox coupled to the micro-motor and to at least one of the clamping members.

3. The device of claim 1 or 2, wherein the clamping members are one or more of the following: elongate; tapered.

4. The device of any preceding claim, wherein the body comprises at least one actuator coupled to the controller wherein actuation of the at least one actuator causes the controller to increase or decrease the pressure exerted by the clamping members.

5. The device of any preceding claim, wherein the body comprises a first pair of opposed actuators coupled to the controller wherein actuation of the first pair of opposed actuators causes the controller to increase the pressure exerted by the clamping members.

6. The device of any preceding claim, wherein the body comprises a second pair of opposed actuators coupled to the controller wherein actuation of the second pair of opposed actuators causes the controller to decrease the pressure exerted by the clamping members.

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7. The device of any preceding claim, comprising at least one blood flow sensor mounted to at least one of the clamping members to detect blood flow in the blood vessel.

8. The device of claim 7, wherein the clamping members either side of the blood vessel are locked in place once the at least one blood flow sensor detects that blood flow has been occluded or constricted to the desired extent.

9. The device of any preceding claim, comprising an output device for displaying information relating to the device, including an indication of the blood flow measured by at least one blood flow sensor.

10. The device of any preceding claim, comprising at least one sensor mounted to at least one of the clamping members to detect one or more of the following characteristics of the blood vessel clamped between the clamping members: a calibre of the blood vessel; a thickness of a wall of blood vessel; a mass of the blood vessel.

11. The device of claim 10, wherein the controller adjusts a pressure applied by the clamping members according to the detected calibre, wall thickness or mass.

12. The device of any preceding claim, wherein one or more of the clamping members comprises one or more of the following on at least part thereof: a non-slip coating; a soft cushioning layer.

13. The device of any preceding claim, wherein one or more of the clamping members comprise a channel for receiving the blood vessel.

14. The device of claim 13, wherein the channel comprises a central ridge.

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15. The device of any preceding claim, wherein at least one of the clamping members comprises a projection aligned with a recess in the other clamping member to determine a minimum separation for the clamping members.

16. The device of any preceding claim, wherein the body comprises an arcuate platform for receiving the blood vessel.

17. The device of any preceding claim, wherein the clamping members are made from a flexible material allowing the shape of the clamping members to be conformed to a blood vessel to be clamped.

18. The device of any preceding claim, wherein the clamping members are integrally formed with the body or are detachable from the body.

19. The device of any preceding claim, wherein the clamping members are adjustable relative to the body in a vertical plane and/or a horizontal plane plane.

20. The device of claim 18 or 19, wherein the clamping members occupy one of the following: a plurality of predetermined angles relative to the body; any position within a predetermined range of angles.

21. The device of any of claims 18 to 20, wherein the body comprises a ratchet mechanism or gearing mechanism for securing the elongate clamping members at the predetermined angles.

22. The device of any preceding claim, wherein a length of the elongate clamping members is selectable from a plurality of predetermined lengths.

23. The device of preceding claim, wherein the controller is implemented via a micro-electro-mechanical-system (MEMS).

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24. The device of any preceding claim, wherein the elongate clamping members and/or the body are disposable or are reusable.

25. The device of any preceding claim, comprising a magnifying device coupled to the body or one of the clamping members.

26. The device of any preceding claim, wherein at least one clamping member comprises an inclined portion for receiving a blood vessel.

27. The device of any preceding claim, wherein the body comprises a mounting member for coupling the device to an applicator.

28. A surgical clamping device comprising:

a body that releasably connects to an arm of an applicator;

a pair of clamping members extending from the body; and

an actuator housed within the body and coupled to control movement of at least one of the clamping members to control a pressure exerted by the clamping members on a blood vessel clamped therebetween.

29. The device of claim 28, comprising at least one actuator arm coupled between the actuator and at least one of the clamping members.

30. The device of claim 28 or 29, wherein the actuator comprises a coupling member to couple the device to the applicator for controlling the device.

31. The device of any of claims 28 to 30, wherein the body comprises one or more of the following: one or more electrodes for connection to respective electrodes of the applicator; a mounting guide for alignment with a recess of the applicator.

32. The device of any of claims 28 to 31, comprising one or more of the following:

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at least one blood flow sensor mounted to at least one of the clamping members to detect blood flow in the blood vessel;

a non-slip coating on at least part of one or more of the clamping members;

a soft cushioning layer on at least part of one or more of the clamping members.

33. An applicator for use with the surgical clamping device as claimed in any one of the preceding claims.

34. An applicator for use with a surgical clamping device, the applicator comprising:

a body housing at least one input device, at least one output device and a microcontroller coupled to the input and output devices;

an arm connected to the body at a proximal end; and

a head at a distal end of the arm for connection to the surgical clamping device, the head in communication with the microcontroller.

35. The applicator of claim 34, wherein the arm comprises a cylindrical sleeve member connected to the body and an elongation member housed within the cylindrical sleeve member.

36. The applicator of claim 35, comprising a linear actuator for controlling extension and retraction of the elongation member relative to the cylindrical sleeve member.

37. The applicator of claim 35 or 36, comprising a locking mechanism in the cylindrical sleeve member to prevent the elongation member from sliding out of the sleeve member.

38. The applicator of any of claims 34 to 37, wherein the head comprises a frame supporting a ball member which can pan and tilt relative to the frame.

39. The applicator of claim 38, wherein the ball member comprises an interface for coupling the surgical clamping device to the head.

40. The applicator of any of claims 34 to 39, comprising at least one micro-motor in the head to control the orientation and position of the surgical clamping device attached to the head.

41. The applicator of any of claims 34 to 40, wherein the arm is flexible.

42. An applicator for use with a surgical clamping device, the applicator comprising:

a body housing at least one input device, at least one output device, a micro-motor and a microcontroller coupled to the input and output devices and the micro-motor;

an actuation mechanism coupled to the micro-motor;

an arm connected to the body at a proximal end; and

a connecting rod housed within the arm, a proximal end of the connecting rod coupled to the actuation mechanism and a distal end connectable to the surgical clamping device.

43. The applicator of claim 42, wherein the connecting rod can be rotated bi-directionally in a clockwise and anticlockwise direction.

44. The applicator of claim 42 or 43, wherein the connecting rod can be extended and retracted.

45. The applicator of any one of claims 42 tor 44, wherein a distal end of the arm comprises one or more of the following: one or more electrodes for connection with respective electrodes of the surgical clamping device; a recess for receiving a mounting guide of the surgical clamping device.

46. The applicator of any of claims 34 to 45, comprising an electromagnetic system controlled by the microcontroller for controlling connection and disconnection of the surgical clamping device and the applicator.

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47. A surgical clamping device comprising a body and a pair of elongate clamping members extending from the body to clamp a blood vessel therebetween,

wherein the pair of elongate clamping members are made of a flexible material such that a shape of the pair of elongate clamping members is adjustable; and/or

wherein an angle between the pair of elongate clamping members and the body is adjustable in a vertical and horizontal plane.

CLAIMS

1. A surgical clamping device comprising:

a body;

a pair of clamping members extending from the body; and

an electronic controller housed within the body and coupled to control movement of at least one of the clamping members to control a pressure exerted by the clamping members on a blood vessel clamped therebetween.

2. The device of claim 1, comprising:

a micro-motor coupled to the controller;

a power supply coupled to the micro-motor and the controller and

a micro-gearbox coupled to the micro-motor and to at least one of the clamping members.

3. The device of claim 1 or 2, wherein the clamping members are one or more of the following: elongate; tapered.

4. The device of any preceding claim, wherein the body comprises at least one actuator coupled to the controller wherein actuation of the at least one actuator causes the controller to increase or decrease the pressure exerted by the clamping members.

5. The device of any preceding claim, wherein the body comprises a first pair of opposed actuators coupled to the controller wherein actuation of the first pair of opposed actuators causes the controller to increase the pressure exerted by the clamping members.

6. The device of any preceding claim, wherein the body comprises a second pair of opposed actuators coupled to the controller wherein

actuation of the second pair of opposed actuators causes the controller to decrease the pressure exerted by the clamping members.

7. The device of any preceding claim, comprising at least one blood flow sensor mounted to at least one of the clamping members to detect blood flow in the blood vessel.

8. The device of claim 7, wherein the clamping members either side of the blood vessel are locked in place once the at least one blood flow sensor detects that blood flow has been occluded or constricted to the desired extent.

9. The device of any preceding claim, comprising an output device for displaying information relating to the device, including an indication of the blood flow measured by at least one blood flow sensor.

10. The device of any preceding claim, comprising at least one sensor mounted to at least one of the clamping members to detect one or more of the following characteristics of the blood vessel clamped between the clamping members: a calibre of the blood vessel; a thickness of a wall of blood vessel; a mass of the blood vessel.

11. The device of claim 10, wherein the controller adjusts a pressure applied by the clamping members according to the detected calibre, wall thickness or mass.

12. The device of any preceding claim, wherein one or more of the clamping members comprises one or more of the following on at least part thereof: a non-slip coating; a soft cushioning layer.

13. The device of any preceding claim, wherein one or more of the clamping members comprise a channel for receiving the blood vessel.

14. The device of claim 13, wherein the channel comprises a central ridge.

15. The device of any preceding claim, wherein at least one of the clamping members comprises a projection aligned with a recess in the other clamping member to determine a minimum separation for the clamping members.

16. The device of any preceding claim, wherein the body comprises an arcuate platform for receiving the blood vessel.

17. The device of any preceding claim, wherein the clamping members are made from a flexible material allowing the shape of the clamping members to be conformed to a blood vessel to be clamped.

18. The device of any preceding claim, wherein the clamping members are integrally formed with the body or are detachable from the body.

19. The device of any preceding claim, wherein the clamping members are adjustable relative to the body in a vertical plane and/or a horizontal plane.

20. The device of claim 18 or 19, wherein the clamping members occupy one of the following: a plurality of predetermined angles relative to the body; any position within a predetermined range of angles.

21. The device of any of claims 18 to 20, wherein the body comprises a ratchet mechanism or gearing mechanism for securing the elongate clamping members at the predetermined angles.

22. The device of any preceding claim, wherein a length of the elongate clamping members is selectable from a plurality of predetermined lengths.

23. The device of preceding claim, wherein the controller is implemented via a micro-electro-mechanical-system (MEMS).

24. The device of any preceding claim, wherein the elongate clamping members and/or the body are disposable or are reusable.

25. The device of any preceding claim, comprising a magnifying device coupled to the body or one of the clamping members.

26. The device of any preceding claim, wherein at least one clamping member comprises an inclined portion for receiving a blood vessel.

27. The device of any preceding claim, wherein the body comprises a mounting member for coupling the device to an applicator.

28. A surgical clamping device comprising:

a body that releasably connects to an arm of an applicator;

a pair of clamping members extending from the body; and

an actuator housed within the body and coupled to control movement of at least one of the clamping members to control a pressure exerted by the clamping members on a blood vessel clamped therebetween.

29. The device of claim 28, comprising at least one actuator arm coupled between the actuator and at least one of the clamping members.

30. The device of claim 28 or 29, wherein the actuator comprises a coupling member to couple the device to the applicator for controlling the device.

31. The device of any of claims 28 to 30, wherein the body comprises one or more of the following: one or more electrodes for connection to respective electrodes of the applicator; a mounting guide for alignment with a recess of the applicator.

32. The device of any of claims 28 to 31, comprising one or more of the following:

at least one blood flow sensor mounted to at least one of the clamping members to detect blood flow in the blood vessel;

a non-slip coating on at least part of one or more of the clamping members;

a soft cushioning layer on at least part of one or more of the clamping members.

33. An applicator for use with the surgical clamping device as claimed in any one of the preceding claims.