

Claims

1. A device for repair of a region within an ear via a natural orifice, characterized in that, the device comprises:
 - a body, the body comprising:
 - a first port for visibly identifying the region to be sealed, the region being inside the ear; and
 - a second port through which a seal can be introduced into the ear through the device.
2. The device of claim 1, characterized in that, the region comprises a perforation of a tympanic membrane of the ear.
3. The device of claim 1 or 2, characterized in that, the device is a speculum.
4. The device of any one of claims 1 to 3, characterized in that, the first port comprises a magnifying member for magnifying the region inside the ear.
5. The device of any one of claims 1 to 4, characterized in that, the first port is arranged to maintain visibility of the region during delivery of the seal through the second port.
6. The device of any one of claims 1 to 5, characterized in that, the second port comprises an engagement member for engaging a delivery device, the delivery device being for delivering the seal to the region.
7. The device of claim 6, characterized in that, the engagement member is configured to engage the delivery device to fix a longitudinal position of the delivery device relative to the second port.
8. The device of claim 6 or 7, characterized in that, the engagement member comprises a twist lock fixture.
9. The device of any one of claims 1 to 5, characterized in that, the body tapers distally to facilitate introduction of a distal end of the device into the ear.
10. The device of claim 2, characterized in that, comprising two or more ports, said ports including the first and second ports.

11. The device of claim 10, characterized in that, at least one of said two or more ports is configured to receive:

- a surgical device for performing a surgical operation on tissue at the region inside the ear;
- a fluid delivery device for delivering fluid to the seal when the seal has been introduced into the ear; and
- the fluid, and
- the at least one of said two or more ports is configured to deliver the fluid to the seal when the seal has been introduced into the ear.

12. The device of claim 11, characterized in that, the surgical operation comprises removing tissue from around the perforation.

13. A method for repairing a tympanic membrane through a natural orifice of an ear, comprising:

- inserting, through a device according to any one of claims 1 to 12, an introducer into the ear via the natural orifice, so that the introducer extends at least into a perforation in the tympanic membrane;
- delivering a seal from the introducer to a distal side of the tympanic membrane; and
- attaching the seal to the distal side.

14. The method of claim 13, further comprising topically anaesthetising an internal region of the ear.

15. The method of claim 13 or 14, further comprising performing debridement of the tympanic membrane around the perforation.

16. The method of any one of claims 13 to 15, wherein inserting the introducer into the ear via the natural orifice, so that the introducer extends at least into a perforation in the tympanic membrane, comprises:

- inserting the introducer to a position proximal on the tympanic membrane;
- advancing a guidewire through the perforation; and
- advancing the introducer along the guidewire and into the perforation.

17. The method of claim 16, further comprising retracting the guidewire after advancing the introducer along the guidewire and into the perforation.

18. The method of any one of claims 13 to 17, wherein delivering the seal from the introducer comprises using a pusher to push the seal from the introducer.

19. The method of claim 18, further comprising drawing the seal back against the distal side of the tympanic membrane.

20. The method of any one of claims 13 to 19, wherein attaching the seal to the distal side is performed by adhering the seal to the distal side using at least one of glue, gel or foam.

21. The method of any one of claims 13 to 20, wherein the seal is a graft comprising a first body and a second body, the first and second bodies being connected, and wherein delivering the seal from the introducer comprises:

- advancing the graft so that the first body is positioned distally of the tympanic membrane;

- withdrawing the introducer to a location proximal of the tympanic membrane; and

- advancing the graft so that the second body so at least part of the tympanic membrane is between the first body and second body.

22. The method of claim 21, wherein the first body and the second body form a double umbrella shape.

23. The method of any one of claims 13 to 22, further comprising withdrawing the introducer after attaching the seal.

24. The method of any one of claims 13 to 23, further comprising introducing a device according to any one of claims 1 to 12 at least partially into the ear, wherein inserting the introducer into the ear via the natural orifice comprises inserting the introducer into the second port of the device.

25. The method of claim 24, wherein the body tapers distally and introducing the device into the ear comprises introducing the device until the body abuts the ear.

26. The method of claim 24 or 25, wherein introducing the device into the ear comprises aligning the second port with a perforation in a tympanic membrane so that insertion of the introducer causes the introducer to extend through the perforation.

27. The method of any one of claims 13 to 26, wherein attaching the seal to the tympanic membrane comprises:

attaching a suture to the seal; and

after the seal has been delivered to the distal side of the tympanic membrane, pulling the suture to bring the seal against the distal side.

28. The method of any one of claims 13 to 26, wherein attaching the seal to the tympanic membrane comprises at least one of:

delivering fluid to the seal through the device to expand the seal to a formed shape; and

warming the seal to a temperature sufficient for the seal to expand to the formed shape.

29. A kit, characterized in that, comprising:

a device according to any one of claims 1 to 12;

a graft for covering the region being repaired; and

an introducer for introducing the graft through the device.