CLAIMS

What is claimed is:

1. A multimodal abrading device (30) for forming a fusion implant (5) insertion location in a sacroiliac joint (3), the abrading device (30) comprising:

an abrading head (32) at a distal end of the abrading device (30), the abrading head (32) having:

abrading surfaces (33) on each of a first pair of opposing sides, the abrading surfaces (33) comprising one or more teeth, barbs, blades, ridges, slots, broaches, or other members capable of abrading a cortical bone of the sacroiliac joint (3); and

an open tip (34) comprising a cutting edge (36) disposed at a leading edge of the open tip (34), the cutting edge (36) configured to cut bone tissue in the sacroiliac joint (3); and

a slide hammer assembly (40) at a proximal end of the abrading device (30), the slide hammer assembly (40) having a released position that enables operation of the slide hammer assembly (40), and a locked position that prohibits operation of the slide hammer assembly (40).

2. The multimodal abrading device (30) of claim 1, wherein the abrading head (32) further comprises a void and a second pair of opposing sides (35), each of the second pair

of opposing sides (35) having an opening for enabling lateral ingress into and egress from the void.

3. The multimodal abrading device (30) of claim 1, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip (34), an interface between the open tip (34) and the distal edge comprising a substantially straight cutting edge (36).

4. The multimodal abrading device (30) of claim 1, wherein the abrading head (32) further comprises a void and a second pair of opposing sides (35), each side of the second pair of opposing sides (35) comprising a curved distal portion terminating at the open tip (34), the interface between the open tip (34) and the curved distal portion comprising a curved cutting edge (36).

5. The multimodal abrading device (30) of claim 2, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip (34), the interface between the open tip (34) and the distal edge comprising a substantially straight cutting edge (36).

6. The multimodal abrading device (30) of claim 5, wherein each side of the second pair of opposing sides (35) comprises a curved distal portion terminating at the open tip (34), the interface between the open tip (34) and the curved distal portion comprising a curved cutting edge (36).

7. The multimodal abrading device (30) of claim 4, wherein the curved distal portion of each side of the second pair of opposing sides (35) comprises a taper toward its opposite side of the second pair (35).

8. The multimodal abrading device (30) of claim 7, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip (34), the interface between the open tip (34) and the distal edge comprising a substantially straight cutting edge (36).

9. A multimodal abrading device (30) for forming a fusion implant (5) insertion location in a sacroiliac joint (3), the abrading device (30) comprising:

an abrading head (32) at a distal end of the abrading device (30), the abrading head (32) having:

abrading surfaces (33) on each of a first pair of opposing sides, the abrading surfaces (33) comprising one or more teeth, barbs, blades, ridges, slots, broaches, or other members capable of abrading a cortical bone of the sacroiliac joint (3); and

an open tip (34) comprising a cutting edge (36) disposed at a leading edge of the open tip (34), the cutting edge (36) configured to cut bone tissue in the sacroiliac joint (3); and

a slide hammer assembly (40) at a proximal end of the abrading device (30), the slide hammer assembly (40) having a released position that enables operation of the slide hammer assembly (40), a locked position that

prohibits operation of the slide hammer assembly (40), and a releasing means for transitioning the slide hammer assembly between the locked position and the released position.

10. The multimodal abrading device (30) of claim 9, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip (34), the interface between the open tip (34) and the distal edge comprising a substantially straight cutting edge (36).

11. The multimodal abrading device (30) of claim 10, wherein the abrading head (32) further comprises a void and a second pair of opposing sides (35), each side of the second pair of opposing sides (35) comprising a curved distal portion terminating at the open tip (34), the interface between the open tip (34) and the curved distal portion comprising a curved cutting edge (36).

12. The multimodal abrading device (30) of claim 11, wherein the curved distal portion of each side of the second pair of opposing sides (35) comprises a taper toward its opposite side of the second pair (35).

13. The multimodal abrading device (30) of claim 9, wherein the slide hammer assembly (40) further comprises:

a collar (41) on the abrading device (30), the collar (41) having internal threads (42) and external threads (43);

a slide hammer shaft (44) having a threaded end (45) for mating with the internal threads (42) of the collar (41) on the abrading device (30), and having a slide stop end (46) opposite from the threaded end (45); and

a hammer sleeve (31) having a hollow, cylindrical bore comprising an internal diaphragm (47) and a threaded connector (48) configured for mating with the external threads (43) of the collar (41) such that when mated the hammer sleeve (31) is engaged in the locked position, the diaphragm (47) having a diaphragm opening (49) sized to permit sliding passage of the slide hammer shaft (44) and block passage of the slide stop end (46).

14. The multimodal abrading device (30) of claim 13, wherein the abrading head (32) further comprises a void and a second pair of opposing sides (35), each of the second pair of opposing sides (35) having an opening for enabling lateral ingress into and egress from the void.

15. The multimodal abrading device (30) of claim 13, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip (34), the interface between the open tip (34) and the distal edge comprising a substantially straight cutting edge (36).

16. The multimodal abrading device (30) of claim 13, wherein the abrading head (32) further comprises a void and a second pair of opposing sides (35), each side of the second pair of opposing sides (35) comprising a curved distal portion terminating at the open tip

(34), the interface between the open tip (34) and the curved distal portion comprising a curved cutting edge (36).

17. The multimodal abrading device (30) of claim 14, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip (34), the interface between the open tip (34) and the distal edge comprising a substantially straight cutting edge (36).

18. The multimodal abrading device (30) of claim 17, wherein each side of the second pair of opposing sides (35) comprises a curved distal portion terminating at the open tip (34), the interface between the open tip (34) and the curved distal portion comprising a curved cutting edge (36).

19. The multimodal abrading device (30) of claim 16, wherein the curved distal portion of each side of the second pair of opposing sides (35) comprises a taper toward its opposite side of the second pair (35).

20. The multimodal abrading device (30) of claim 19, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip (34), the interface between the open tip (34) and the distal edge comprising a substantially straight cutting edge (36).

CLAIMS

What is claimed is:

1. A multimodal abrading device for forming a fusion implant insertion location in a sacroiliac joint, the abrading device comprising:

an abrading head at a distal end of the abrading device, the abrading head having:

abrading surfaces on each of a first pair of opposing sides, the abrading surfaces comprising one or more teeth, barbs, blades, ridges, slots, broaches, or other members capable of abrading a cortical bone of the sacroiliac joint; and

an open tip comprising a cutting edge disposed at a leading edge of the open tip, the cutting edge configured to cut bone tissue in the sacroiliac joint; and

a slide hammer assembly at a proximal end of the abrading device, the slide hammer assembly having a released position that enables operation of the slide hammer assembly, and a locked position that prohibits operation of the slide hammer assembly.

2. The multimodal abrading device of claim 1, wherein the abrading head further comprises a void and a second pair of opposing sides, each of the second pair of opposing sides having an opening for enabling lateral ingress into and egress from the void.

3. The multimodal abrading device of claim 1, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip, an interface between the open tip and the distal edge comprising a substantially straight cutting edge.

4. The multimodal abrading device of claim 1, wherein the abrading head further comprises a void and a second pair of opposing sides, each side of the second pair of opposing sides comprising a curved distal portion terminating at the open tip, the interface between the open tip and the curved distal portion comprising a curved cutting edge.

5. The multimodal abrading device of claim 2, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip, the interface between the open tip and the distal edge comprising a substantially straight cutting edge.

6. The multimodal abrading device of claim 5, wherein each side of the second pair of opposing sides comprises a curved distal portion terminating at the open tip, the interface between the open tip and the curved distal portion comprising a curved cutting edge.

7. The multimodal abrading device of claim 4, wherein the curved distal portion of each side of the second pair of opposing sides comprises a taper toward its opposite side of the second pair.

8. The multimodal abrading device of claim 7, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip, the interface between the open tip and the distal edge comprising a substantially straight cutting edge.

9. A multimodal abrading device for forming a fusion implant insertion location in a sacroiliac joint, the abrading device comprising:

an abrading head at a distal end of the abrading device, the abrading head having:

abrading surfaces on each of a first pair of opposing sides, the abrading surfaces comprising one or more teeth, barbs, blades, ridges, slots, broaches, or other members capable of abrading a cortical bone of the sacroiliac joint; and an open tip comprising a cutting edge disposed at a leading edge of the open tip, the cutting edge configured to cut bone tissue in the sacroiliac joint; and

a slide hammer assembly at a proximal end of the abrading device, the slide hammer assembly having a released position that enables operation of the slide hammer assembly, a locked position that prohibits operation of the slide hammer assembly, and a releasing means for transitioning the slide hammer assembly between the locked position and the released position.

10. The multimodal abrading device of claim 9, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip, the interface between the open tip and the distal edge comprising a substantially straight cutting edge.

11. The multimodal abrading device of claim 10, wherein the abrading head further comprises a void and a second pair of opposing sides, each side of the second pair of opposing sides comprising a curved distal portion terminating at the open tip, the interface between the open tip and the curved distal portion comprising a curved cutting edge.

12. The multimodal abrading device of claim 11, wherein the curved distal portion of each side of the second pair of opposing sides comprises a taper toward its opposite side of the second pair.

13. The multimodal abrading device of claim 9, wherein the slide hammer assembly further comprises:

a collar on the abrading device, the collar having internal threads and external threads;

a slide hammer shaft having a threaded end for mating with the internal threads of the collar on the abrading device, and having a slide stop end (46) opposite from the threaded end; and

a hammer sleeve having a hollow, cylindrical bore comprising an internal diaphragm and a threaded connector configured for mating with the external threads of the collar such that when mated the hammer sleeve is engaged in the locked position, the diaphragm having a diaphragm opening sized to permit sliding passage of the slide hammer shaft and block passage of the slide stop end.

14. The multimodal abrading device of claim 13, wherein the abrading head further comprises a void and a second pair of opposing sides, each of the second pair of opposing sides having an opening for enabling lateral ingress into and egress from the void.

15. The multimodal abrading device of claim 13, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip, the interface between the open tip and the distal edge comprising a substantially straight cutting edge.

16. The multimodal abrading device of claim 13, wherein the abrading head further comprises a void and a second pair of opposing sides, each side of the second pair of opposing sides comprising a curved distal portion terminating at the open tip, the interface between the open tip and the curved distal portion comprising a curved cutting edge.

17. The multimodal abrading device of claim 14, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip, the interface between the open tip and the distal edge comprising a substantially straight cutting edge.

18. The multimodal abrading device of claim 17, wherein each side of the second pair of opposing sides comprises a curved distal portion terminating at the open tip, the interface between the open tip and the curved distal portion comprising a curved cutting edge.

19. The multimodal abrading device of claim 16, wherein the curved distal portion of each side of the second pair of opposing sides comprises a taper toward its opposite side of the second pair.

20. The multimodal abrading device of claim 19, wherein each side of the first pair of opposing sides is a substantially planar member having a distal edge terminating at the open tip, the interface between the open tip and the distal edge comprising a substantially straight cutting edge.

21. A decorticating device for forming a fusion implant insertion location in a sacroiliac joint, the abrading device comprising:

an abrading head at a distal end of the abrading device, the abrading head having:

abrading surfaces on each of a first pair of opposing sides, the abrading surfaces comprising one or more teeth, barbs, blades, ridges, slots, broaches, or other members capable of abrading a cortical bone of the sacroiliac joint;

an open tip comprising a cutting edge disposed at a leading edge of the open tip, the cutting edge configured to cut bone tissue in the sacroiliac joint; and

a void and a second pair of opposing sides, each side of the second pair of opposing sides comprising a curved distal portion terminating at the open tip, the interface between the open tip and the curved distal portion comprising a curved cutting edge.

22. The decorticating device of claim 21, wherein each of the second pair of opposing sides has an opening for enabling lateral ingress into and egress from the void.