

CLAIMS

1. A system, comprising:
a radiation source; and
a controller, configured to:
5 define a treatment zone on a capsule of an eye of a subject, and
 subsequently to defining the treatment zone, form an opening in the capsule by
irradiating multiple target regions within the treatment zone in an iterative process that
includes, during each one of multiple iterations of the process:
 acquiring an image of at least part of the capsule,
10 based on the acquired image, designating one of the target regions, and
 causing the radiation source to irradiate the designated target region.
2. The system according to claim 1, wherein the capsule is a posterior capsule.
3. The system according to claim 2, wherein the controller is configured to define the
treatment zone by:
15 based on at least one initial image of the eye, identifying an anterior-capsule opening in an
anterior capsule of the eye, and
 defining the treatment zone such that the treatment zone lies entirely behind the anterior-
capsule opening.
4. The system according to claim 1, wherein the controller is configured to define the
20 treatment zone by:
 based on at least one initial image of the eye, identifying an edge of an iris of the eye, and
 defining the treatment zone such that the treatment zone lies entirely within the edge.
5. The system according to claim 1, wherein the controller is configured to define the
treatment zone by:
25 based on at least one initial image of the eye, identifying one or more features of a
prosthetic intraocular lens (IOL) in the eye,
 in response to the features, calculating an estimated position of the IOL, and
 defining the treatment zone in response to the estimated position.
6. The system according to claim 1, wherein, during at least one of the iterations, designating
30 the target region includes:
 based on the acquired image, identifying tissue of the capsule at a last-designated one of
the target regions, and
 in response to identifying the tissue, redesignating the last-designated one of the target

regions.

7. The system according to claim 1, wherein, during at least one of the iterations, designating the target region includes:

5 based on the acquired image, identifying a portion of a perimeter of the opening that is farther from a boundary of the treatment zone than are other portions of the perimeter, and designating the target region at a predefined distance from the identified portion of the perimeter.

8. The system according to claim 1, wherein, during at least one of the iterations, designating the target region includes:

10 based on the image, identifying a fold within the treatment zone, and in response to identifying the fold, designating the target region such that the target region overlaps the fold.

9. The system according to claim 1, wherein, during at least one of the iterations, designating the target region includes:

15 based on the acquired image, ascertaining that a perimeter of the opening is stable, and in response to the ascertaining, designating the target region.

10. The system according to any one of claims 1-9, wherein the controller is configured to form the opening subsequently to a designation of a sequence of tentative target regions, and

20 wherein, during at least one of the iterations, designating the target region includes:

based on the acquired image, ascertaining that a distance between a next one of the tentative target regions and a perimeter of the opening is greater than a predefined threshold distance, and

25 in response to ascertaining that the distance is greater than the predefined threshold distance, designating, as the target region, the next one of the tentative target regions.

11. The system according to claim 10, wherein, during at least one other one of the iterations, designating the target region includes:

based on the acquired image, ascertaining that the distance is not greater than the predefined threshold distance, and

30 in response to ascertaining that the distance is not greater than the predefined threshold distance, designating, as the target region, the tentative target region following the next one of the tentative target regions.

12. The system according to claim 10, wherein, during at least one other one of the iterations,

designating the target region includes:

based on the acquired image, ascertaining that the distance is not greater than the predefined threshold distance, and

in response to ascertaining that the distance is not greater than the predefined threshold
5 distance, designating the target region by applying an offset to a location of the next one of the tentative target regions.

13. The system according to any one of claims 1-9, wherein the controller is further configured to:

define a target boundary on the capsule, and

10 terminate the iterative process in response to ascertaining that the opening reaches a predefined threshold percentage of the target boundary.

14. The system according to claim 13, wherein the controller is configured to define the target boundary by placing the target boundary at a predefined offset inward from a boundary of the treatment zone.

15. A method, comprising:

defining a treatment zone on a capsule of an eye of a subject; and

subsequently to defining the treatment zone, forming an opening in the capsule by irradiating multiple target regions within the treatment zone in an iterative process that includes, during each one of multiple iterations of the process:

20 acquiring an image of at least part of the capsule,

based on the acquired image, designating one of the target regions, and

causing a radiation source to irradiate the designated target region.

16. The method according to claim 15, wherein the capsule is a posterior capsule.

17. The method according to claim 16, wherein defining the treatment zone comprises:

25 based on at least one initial image of the eye, identifying an anterior-capsule opening in an anterior capsule of the eye; and

defining the treatment zone such that the treatment zone lies entirely behind the anterior-capsule opening.

18. The method according to claim 15, wherein defining the treatment zone comprises:

30 based on at least one initial image of the eye, identifying an edge of an iris of the eye; and defining the treatment zone such that the treatment zone lies entirely within the edge.

19. The method according to claim 15, wherein defining the treatment zone comprises:

based on at least one initial image of the eye, identifying one or more features of a prosthetic intraocular lens (IOL) in the eye;

in response to the features, calculating an estimated position of the IOL; and

defining the treatment zone in response to the estimated position.

- 5 20. The method according to claim 15, wherein, during at least one of the iterations, designating the target region includes:

based on the acquired image, identifying tissue of the capsule at a last-designated one of the target regions, and

- 10 in response to identifying the tissue, redesignating the last-designated one of the target regions.

21. The method according to claim 15, wherein, during at least one of the iterations, designating the target region includes:

based on the acquired image, identifying a portion of a perimeter of the opening that is farther from a boundary of the treatment zone than are other portions of the perimeter, and

- 15 designating the target region at a predefined distance from the identified portion of the perimeter.

22. The method according to claim 15, wherein, during at least one of the iterations, designating the target region includes:

based on the image, identifying a fold within the treatment zone, and

- 20 in response to identifying the fold, designating the target region such that the target region overlaps the fold.

23. The method according to claim 15, wherein, during at least one of the iterations, designating the target region includes:

based on the acquired image, ascertaining that a perimeter of the opening is stable, and

- 25 in response to the ascertaining, designating the target region.

24. The method according to any one of claims 15-23,

wherein forming the opening comprises forming the opening subsequently to a designation of a sequence of tentative target regions, and

wherein, during at least one of the iterations, designating the target region includes:

- 30 based on the acquired image, ascertaining that a distance between a next one of the tentative target regions and a perimeter of the opening is greater than a predefined threshold distance, and

in response to ascertaining that the distance is greater than the predefined threshold

distance, designating, as the target region, the next one of the tentative target regions.

25. The method according to claim 24, wherein, during at least one other one of the iterations, designating the target region includes:

5 based on the acquired image, ascertaining that the distance is not greater than the predefined threshold distance, and

in response to ascertaining that the distance is not greater than the predefined threshold distance, designating, as the target region, the tentative target region following the next one of the tentative target regions.

26. The method according to claim 24, wherein, during at least one other one of the iterations, 10 designating the target region includes:

based on the acquired image, ascertaining that the distance is not greater than the predefined threshold distance, and

15 in response to ascertaining that the distance is not greater than the predefined threshold distance, designating the target region by applying an offset to a location of the next one of the tentative target regions.

27. The method according to any one of claims 15-23, further comprising:

defining a target boundary on the capsule; and

terminating the iterative process in response to ascertaining that the opening reaches a predefined threshold percentage of the target boundary.

20 28. The method according to claim 27, wherein defining the target boundary comprises defining the target boundary by placing the target boundary at a predefined offset inward from a boundary of the treatment zone.

29. A computer software product comprising a tangible non-transitory computer-readable medium in which program instructions are stored, which instructions, when read by a controller, 25 cause the controller to:

define a treatment zone on a capsule of an eye of a subject, and

subsequently to defining the treatment zone, form an opening in the capsule by irradiating multiple target regions within the treatment zone in an iterative process that includes, during each one of multiple iterations of the process:

30 acquiring an image of at least part of the capsule,
based on the acquired image, designating one of the target regions, and
causing a radiation source to irradiate the designated target region.