Claims

What is claimed is:

1. A lens for an eye, the lens comprising a zone with a first power profile for images received by the retina on the fovea, a zone with a second power profile for images received by the peripheral retina on the nasal side, a zone with a third power profile, different from at least the second power profile, for images received by the peripheral retina on the temporal side, and a lens stabilizing mechanism for orienting the lens on the eye, wherein the first power profile is selected to provide clear or acceptable vision and the second and third power profiles are selected to affect the progression of refractive error.

2. The lens of claim 1, wherein the lens is a contact lens or a spectacle lens.

3. The lens of claim 1, wherein the lens comprises a corneal implant or orthokeratology lens and wherein the first to third power profiles are effected as a reshaping of the cornea of the eye.

4. A lens for affecting the progression of myopia in an eye, the lens comprising a nasal optic zone and a temporal optic zone for refracting light to be received by the peripheral retina so as to be focused on or in front of the retina, wherein the nasal optic zone and the temporal optic zone have different refractive powers.

5. A lens for affecting the progression of hyperopia in an eye, the lens comprising a nasal optic zone and a temporal optic zone for refracting light to be received by the peripheral retina so as to be focused on or behind the retina, wherein the nasal optic zone and temporal optic zone have different refractive powers.

6. The lens of claim 4 or claim 5 further comprising a central optic zone with a refractive power to correct on-axis vision of the eye.

7. The lens of claim 4 or claim 5 wherein the nasal optic zone has an increased power relative to a power on-axis and the temporal optic zone has a decreased power relative to the power on-axis.

8. The lens of claim 4 or claim 5 wherein the temporal optic zone has an increased power relative to an on-axis power and the nasal optic zone has a decreased power relative to the on-axis power.

9. The lens of claim 4 or claim 5 further comprising a central optic zone between the nasal and the temporal optic zones, the central optic zone being asymmetrical about a vertical meridian through the lens, so as to extend across horizontal half meridians of the lens to different extents, wherein the vertical and horizontal meridians refer to the orientation of the lens caused by a stabilizing mechanism.

10. The lens of claim 9, wherein the central optic zone is not plano and includes a refractive power for correcting defocus.

11. The lens of claim 4 or claim 5, wherein the nasal optic zone and the temporal optic zone both include a substantially constant refractive power in a vertical direction, wherein the vertical direction is with reference to the orientation of the lens caused by the stabilizing mechanism.

12. The lens of claim 4 or claim 5, wherein the nasal and temporal optic zones have a vertical height of between 0.5 mm and 3 mm.

13. The lens of claim 12, further comprising a central optic zone with a refractive power to correct on-axis vision of the eye, wherein the lens has a refractive power substantially equal to the refractive power of the central optic zone above and below the nasal and temporal optic zones.

14. The lens of claim 4 or claim 5, further comprising a central optic zone with a refractive power to correct on-axis vision of the eye, wherein the central optic zone is substantially rotationally symmetrical.

15. The lens of claim 4 or claim 5, further comprising a central optic zone with a refractive power to correct on-axis vision of the eye, wherein the central optic zone is elongate in a vertical direction across the lens, wherein the vertical direction is with reference to the orientation of the lens caused by a stabilizing mechanism.

16. The lens of claim 15, wherein the lens is a contact lens with an optic zone and a carrier and wherein the central optic zone extends in the vertical direction across substantially the entire optic zone.

17. The lens of claim 4 or claim 5, wherein one of the nasal optic zone and temporal optic zone has a power selected to place peripheral images on the retina and the other zone has a power selected to place peripheral images off the retina.

18. A method of treating an eye with refractive error, the method comprising providing for clear or substantially clear foveal vision while simultaneously reducing or eliminating asymmetry in images received by the peripheral retina and controlling the position of the images received in the peripheral retina so as to affect the stimulus for eye growth to reduce or stop the progression of refractive error.

19. A method of treating an eye with progressive refractive error, the method comprising measuring the refractive characteristics of the eye at the fovea and in the peripheral retina, determining whether the eye is asymmetric in the peripheral retina in at least a horizontal meridian, and if the eye is asymmetric in the peripheral retina, treating the eye by affecting the refractive characteristics of the eye in the peripheral retina taking account of the asymmetry while simultaneously providing for clear or substantially clear foveal vision.

20. A method of treating an eye with myopia comprising measuring the refractive characteristics of the eye at the central and peripheral retina to obtain on-axis and off-axis measurements respectively, determining from said measuring that the eye has asymmetrical off-axis refractive characteristics and affecting the refractive properties of an ocular system comprising the eye to provide clear or acceptable vision on-axis and to control the position of the image of peripheral objects to onto or in front of the retina so as to also reduce said asymmetry for at least one off-axis angle.

21. A method of treating an eye with hyperopia comprising measuring the refractive characteristics of the eye at the central and peripheral retina to obtain on-axis and off-axis measurements respectively, determining from said measuring that the eye has asymmetrical off-axis refractive characteristics and affecting the refractive

properties of an ocular system comprising the eye to provide clear or acceptable vision on-axis and to control the position of the image of peripheral objects to onto or behind the retina so as to also reduce said asymmetry for at least one off-axis angle.

22. The method of claim 20 or claim 21, wherein the ocular system comprises lens for the eye, the lens comprising a first zone with a first power profile selected to provide said clear or acceptable vision on-axis, a second zone with a second power profile, which controls the position of the image of peripheral objects received on the nasal side of the retina, and a third zone with a third power profile, which controls the position of the image of peripheral objects received on the temporal side of the retina, wherein at least the second and third power profiles are different so as to reduce said asymmetry.

23. The method of claim 22, wherein the lens is a lens selected from the group comprising a contact lens and a spectacle lens.

24. The method of claim 20 or claim 21, wherein the step of affecting the refractive properties of an ocular system comprising the eye comprises applying an orthokeratology lens to the eye, the orthokeratology lens providing said clear or acceptable vision on-axis and controlling the position of the image of peripheral objects by reshaping the cornea.

25. The method of claim 20 or claim 21, wherein the step of affecting the refractive properties of an ocular system comprising the eye comprises inserting a corneal implant into the eye, the corneal implant providing said clear or acceptable vision on-axis and controlling the position of the image of peripheral objects by reshaping the cornea.

Claims

What is claimed is:

1. A lens for an eye, the lens comprising a zone with a first power profile for images received by the retina on the fovea, a zone with a second power profile for images received by the peripheral retina on the nasal side, a zone with a third power profile, different from at least the second power profile, for images received by the peripheral retina on the temporal side, and a lens stabilizing mechanism for orienting the lens on the eye, wherein the first power profile is selected to provide clear or acceptable vision and the second and third power profiles are selected to address the progression of refractive error.

2. The lens of claim 1, wherein the lens is a contact lens or a spectacle lens.

3. The lens of claim 1, wherein the lens comprises a corneal implant or orthokeratology lens and wherein the first to third power profiles are effected as a reshaping of the cornea of the eye.

4. A lens for addressing the progression of myopia in an eye, the lens comprising a nasal optic zone and a temporal optic zone, wherein each zone is for refracting light to be received by the peripheral retina so as to be focused on or in front of the retina, wherein the nasal optic zone and the temporal optic zone have different refractive powers.

5. A lens for addressing the progression of hyperopia in an eye, the lens comprising a nasal optic zone and a temporal optic zone, wherein each zone is for refracting light to be received by the peripheral retina so as to be focused on or behind the retina, wherein the nasal optic zone and temporal optic zone have different refractive powers.

6. The lens of claim 4 or claim 5 further comprising a central optic zone with a refractive power to correct on-axis vision of the eye.

7. The lens of claim 4 or claim 5 wherein the nasal optic zone has an increased power relative to a power on-axis and the temporal optic zone has a decreased power relative to the power on-axis.

8. The lens of claim 4 or claim 5 wherein the temporal optic zone has an increased power relative to an on-axis power and the nasal optic zone has a decreased power relative to the on-axis power.

9. The lens of claim 4 or claim 5 further comprising a central optic zone between the nasal and the temporal optic zones, the central optic zone being asymmetrical about a vertical meridian through the lens, so as to extend across horizontal half meridians of the lens to different extents, wherein the vertical and horizontal meridians refer to the orientation of the lens caused by a stabilizing mechanism.

10. The lens of claim 9, wherein the central optic zone is not plano and includes a refractive power for correcting defocus.

11. The lens of claim 4 or claim 5, wherein the nasal optic zone and the temporal optic zone both include a substantially constant refractive power in a vertical direction, wherein the vertical direction is with reference to the orientation of the lens caused by the stabilizing mechanism.

12. The lens of claim 4 or claim 5, wherein the nasal and temporal optic zones have a vertical height of between 0.5 mm and 3 mm.

13. The lens of claim 12, further comprising a central optic zone with a refractive power to correct on-axis vision of the eye, wherein the lens has a refractive power substantially equal to the refractive power of the central optic zone above and below the nasal and temporal optic zones.

14. The lens of claim 4 or claim 5, further comprising a central optic zone with a refractive power to correct on-axis vision of the eye, wherein the central optic zone is substantially rotationally symmetrical.

15. The lens of claim 4 or claim 5, further comprising a central optic zone with a refractive power to correct on-axis vision of the eye, wherein the central optic zone is elongate in a vertical direction across the lens, wherein the vertical direction is with reference to the orientation of the lens caused by a stabilizing mechanism.

16. The lens of claim 15, wherein the lens is a contact lens with an optic zone and a carrier and wherein the central optic zone extends in the vertical direction across substantially the entire optic zone.

17. The lens of claim 4 or claim 5, wherein one of the nasal optic zone and temporal optic zone has a power selected to place peripheral images on the retina and the other zone has a power selected to place peripheral images off the retina.

18. A method of treating an eye with refractive error, the method comprising providing for clear or substantially clear foveal vision while simultaneously reducing or eliminating asymmetry in images received by the peripheral retina and controlling the position of the images received in the peripheral retina so as to affect the stimulus for eye growth to reduce or stop the progression of refractive error.

19. A method for an eye with progressive refractive error, the method comprising measuring the refractive characteristics of the eye at the fovea and in the peripheral retina, determining whether the eye is asymmetric in the peripheral retina in at least a horizontal meridian, and if the eye is asymmetric in the peripheral retina, treating the eye by affecting the refractive characteristics of the eye in the peripheral retina taking account of the asymmetry while simultaneously providing for clear or substantially clear foveal vision.

20. A method for an eye with myopia comprising measuring the refractive characteristics of the eye at the central and peripheral retina to obtain on-axis and off-axis measurements respectively, determining from said measuring that the eye has asymmetrical off-axis refractive characteristics and affecting the refractive properties of an ocular system comprising the eye to provide clear or acceptable vision on-axis and to control the position of the image of peripheral objects to onto or in front of the retina so as to also reduce said asymmetry for at least one off-axis angle.

21. A method for an eye with hyperopia comprising measuring the refractive characteristics of the eye at the central and peripheral retina to obtain on-axis and off-axis measurements respectively, determining from said measuring that the eye has asymmetrical off-axis refractive characteristics and affecting the refractive properties of an ocular system comprising the eye to provide clear or acceptable vision on-axis and to control the position of the image of peripheral objects to onto or behind the retina so as to also reduce said asymmetry for at least one off-axis angle.

22. The method of claim 20 or claim 21, wherein the ocular system comprises lens for the eye, the lens comprising a first zone with a first power profile selected to provide said clear or acceptable vision on-axis, a second zone with a second power profile, which controls the position of the image of peripheral objects received on the nasal side of the retina, and a third zone with a third power profile, which controls the position of the image of peripheral objects received on the temporal side of the retina, wherein at least the second and third power profiles are different so as to reduce said asymmetry.

23. The method of claim 22, wherein the lens is a lens selected from the group comprising a contact lens and a spectacle lens.

24. The method of claim 20 or claim 21, wherein the step of affecting the refractive properties of an ocular system comprising the eye comprises applying an orthokeratology lens to the eye, the orthokeratology lens providing said clear or acceptable vision on-axis and controlling the position of the image of peripheral objects by reshaping the cornea.

25. The method of claim 20 or claim 21, wherein the step of affecting the refractive properties of an ocular system comprising the eye comprises inserting a corneal implant into the eye, the corneal implant providing said clear or acceptable vision on-axis and controlling the position of the image of peripheral objects by reshaping the cornea.