CLAIMS

1. An orthokeratology lens designating method comprising

a database building process of repeating a trial process in which a mounting process of mounting an orthokeratology lens on a cornea at a position centering on a pupil of a patient whose head is in an erect state, an image information acquiring process of continuously or intermittently acquiring images of the orthokeratology lens moving on the cornea, and a movement data detecting process of detecting a movement speed and a movement direction of the orthokeratology lens from the acquired image information are sequentially performed on a plurality of orthokeratology lenses, and a selection process of determining whether or not data of the acquired movement speed and movement direction is within a certain range, and when the data is within the certain range, selecting a lens as the orthokeratology lens to be used for the patient in order to build a lens database, provided that the selected orthokeratology lens is assigned as a registered lens, by storing registered patient data that includes at least registered cornea D data, out of registered lens correction D data having lens correction D data of the registered lens at a contact portion with the cornea, the registered cornea D data having D data of the cornea at the contact portion before mounting the registered lens, registered corneal diameter data having corneal diameter data of the patient, and registered pupil diameter data having pupil diameter data of the patient, and registration stage data having

data that indicates in which stage of a plurality of correction stages, including first, second, and later stages, the registered lens is mounted on the cornea;

a patient data acquiring process of acquiring patient data including at least patient cornea D data, out of the patient cornea D data having D data of a patient's cornea to be corrected, patient corneal diameter data having data of a corneal diameter, and patient pupil diameter data having data of a pupil diameter;

a patient stage data acquiring process of acquiring patient stage data that indicates which stage of a plurality of correction stages the present mounting of an orthokeratology lens corresponds to, on the patient's cornea to be corrected; and

a lens designating process of retrieving the registered lens having the registered cornea D data that is the closest to the acquired patient cornea D data and the same registration stage data as the patient stage data in the lens database, and designating the retrieved registered lens as an orthokeratology lens to be used for the patient.

2. The orthokeratology lens designating method according to claim 1, wherein

the registered patient data in the database building process has registered myopia or hyperopia data that has data representing whether the registered lens is used for correction of myopia or hyperopia and presbyopia,

the patient data in the patient data acquiring process has patient myopia or hyperopia data that has data representing whether

the lens is used for correction of myopia or hyperopia and presbyopia, and

the lens designating process retrieves the registered lens having the registered cornea D data that is the closest to the acquired patient cornea D data and the same registered myopia or hyperopia data and the same registration stage data as the registered myopia or hyperopia data and the patient stage data in the lens database, respectively and designates the retrieved registered lens as an orthokeratology lens to be used for the patient.

3. The orthokeratology lens designating method according to claim 1 or 2, wherein

in the selection process in the database building process, when conditions that the movement speed is more than 0 and 10 mm/sec or less, and the movement direction is within an angle of 6 degrees or less rightward or leftward with respect to a normal that extends perpendicularly downward from a pupil, are satisfied, the lens is selected as the orthokeratology lens to be used for the patient.

4. The orthokeratology lens designating method according to any one of claims 1 to 3, wherein

in the database building process, the lens database is built by storing cornea D and lens D difference data that is a difference between patient cornea D data of the cornea before mounting the orthokeratology lens and the registered lens correction D data of the mounted orthokeratology lens.

5. The orthokeratology lens designating method according to any

one of claims 1 to 4, wherein

in the lens designating process, when a difference between the acquired patient cornea D data and the closest registered cornea D data is a certain value or more,

the retrieved registered lens is assigned as a first lens, and the registered lens having the registered cornea D data that is the second closest to the acquired patient cornea D data is assigned as a second lens, and the registered cornea D data and the registered lens correction D data are assigned as first cornea D data and first lens correction D data in the first lens, and are assigned as second cornea D data and second lens correction D data in the second lens, and

a lens D difference per unit cornea D is calculated by a ratio between cornea D difference data between the first cornea D data and the second cornea D data and lens correction D difference data between the first lens correction D data and the second lens correction D data,

corrected lens D data is calculated by adding or subtracting a product of the lens D difference and a difference between the patient cornea D data in the acquired patient data and the first cornea D data to or from the first lens correction D data, and

the orthokeratology lens having this corrected lens D data is designated as the orthokeratology lens to be used for the patient.

6. The orthokeratology lens designating method according to claim 5, comprising:

a process of calculating, when the lens D difference ΔL between the first lens correction D data and the second lens correction D data is a certain value or more, values of m types of correction D in which each of αL, $2\alpha L$, … and $m\alpha L$ is added to the corrected lens D data, and m types of correction D in which each of αL, $2\alpha L$, … and $m\alpha L$ is subtracted from the corrected lens D data provided that $\Delta L/m = \alpha L$ and m is an integer of $3 \leq m \leq 10$;

a process of producing test lenses having the respective two m types of correction D; and

a process of trying the two m types of test lenses on the patient to designate the optimal test lens as the orthokeratology lens for use in treatment.

7. The orthokeratology lens designating method according to claim 5 or 6, wherein

in the database building process, the lens D data, the patient data, and the stage data about the orthokeratology lens designated on a basis of the lens D difference is stored to build the lens database.

8. The orthokeratology lens designating method according to claim 5, comprising:

a lens manufacturing process of manufacturing a corrected orthokeratology lens on a basis of the corrected lens D data.

9. An orthokeratology lens designating and supplying method comprising, in any of claims 1 to 8,

a registered lens correction D data transmitting process of

transmitting the registered lens correction D data of the designated orthokeratology lens to a lens manufacturing device, and

a lens manufacturing process of accepting the transmitted registered lens correction D data, and manufacturing the orthokeratology lens to be used for the patient on the basis of the registered lens correction D data.

10. The orthokeratology lens designating and supplying method according to claim 9, comprising

a patient data transmitting process of transmitting the patient data and the patient stage data acquired in the patient data acquiring process and the patient stage data acquiring process, to a lens designating server that executes the lens designating process through the Internet.

11. The orthokeratology lens designating and supplying method according to claim 9, wherein

the lens manufacturing process comprises:

a process of receiving the registered lens correction D data transmitted in the registered lens correction D data transmitting process by a terminal device that executes the patient data acquiring process; and

a registered lens correction D data transmitting process of transmitting the received registered lens correction D data to the lens manufacturing device.

12. The orthokeratology lens designating and supplying method according to claim 10, wherein

in the registered lens correction D data transmitting process, the registered lens correction D data is transmitted to the lens manufacturing device directly or through the Internet from the lens designating server and the manufactured orthokeratology lens is sent for the patient.

13. The orthokeratology lens designating and supplying method according to claim 9, comprising

a test lens data transmitting process of transmitting test lens data having the two m types of correction D to the lens manufacturing device, and

a test lens manufacturing process of manufacturing a test lens by the lens manufacturing device on a basis of the transmitted test lens data.

14. An orthokeratology lens designating system comprising a selecting device, a database server, a lens designating server connected to the database server, and a terminal device that can be connected to the lens designating server,

the selecting device includes a lens movement data acquiring device that includes a lens imaging camera configured to image an orthokeratology lens mounted on a cornea at a position centering on a pupil of a patient whose head is in an erect state to continuously or intermittently acquire images of the orthokeratology lens moving on the cornea, and a lens movement data detecting device configured to detect lens movement data having data about at least a movement speed and a movement direction of the orthokeratology lens from

image information of the orthokeratology lens moving on the cornea acquired by the lens imaging camera; and an assessing device configured to determine whether or not the acquired lens movement data is within a certain range, and assess the orthokeratology lens that is within the certain range as an orthokeratology lens suited for use for the patient,

the selecting device is configured such that, provided that the orthokeratology lens that is suited for use for the patient is assigned as a registered lens, registered lens correction D data having data of lens correction D of the registered lens at a contact portion with the cornea of the patient, registered patient data including at least registered cornea D data, out of the registered cornea D data having D data of the cornea to be corrected at the contact portion, registered corneal diameter data having corneal diameter data of the patient, and registered pupil diameter data, and registration stage data having data that indicates in which stage of a plurality of correction stages, including first, second, and later stages, the registered lens is mounted on the cornea are outputted to the database server,

the database server is configured to build a database by storing the registered patient data and the registration stage data on the registered lens,

the terminal device includes a patient data acquiring device configured to acquire patient data including at least patient cornea D data, out of the patient cornea D data having D data of a patient's

cornea to be corrected, patient corneal diameter data having data of a corneal diameter, and patient pupil diameter data having data of a pupil diameter, and a patient stage data acquiring device configured to acquire patient stage data that indicates in which stage of the plurality of correction stages, including the first, second, and later stages, the next orthokeratology lens is mounted on the patient's cornea to be corrected, and the terminal device is configured to be capable of transmitting the patient data and the patient stage data to the lens designating server, and

the lens designating server is configured to retrieve the registered lens having the registered cornea D data that is the closest to the acquired patient cornea D data and the same registration stage data as the patient stage data in the database, and designate the retrieved registered lens as an orthokeratology lens to be used for the patient.

15. The orthokeratology lens designating system according to claim 14, wherein

the selecting device is configured to output registered myopia or hyperopia data that has data representing whether the registered lens is used for correction of myopia or hyperopia and presbyopia, to the database server,

the database server is configured to build a database by storing the registered myopia or hyperopia data,

the terminal device is configured to be capable of transmitting patient myopia or hyperopia data that has data representing whether

the lens is used for correction of myopia or hyperopia and presbyopia, to the lens designating server, and

the lens designating server is configured to retrieve the registered lens having the registered cornea D data that is the closest to the acquired patient cornea D data, the same registered myopia or hyperopia data as the acquired patient myopia or hyperopia data, and the same registration stage data as the acquired patient stage data from the database, and designate the retrieved registered lens as an orthokeratology lens to be used for the patient.

16. The orthokeratology lens designating system according to claim 15, wherein

when conditions that the movement speed is more than 0 and 10 mm/sec or less, and the movement direction is within an angle of 6 degrees or less rightward or leftward with respect to a normal that extends perpendicularly downward from a pupil, are satisfied, the assessing device is configured to select the lens as the orthokeratology lens to be used for the patient.

17. The orthokeratology lens designating system according to claim 15 or 16, wherein

the database server is configured to build a lens database by storing cornea D and lens D difference data that is a difference between patient cornea D data of the cornea before mounting the orthokeratology lens and the registered lens correction D data of the mounted orthokeratology lens.

18. The orthokeratology lens designating system according to any

one of claims 15 to 17, wherein

the lens designating server is configured,

when a difference between the acquired patient cornea D data and the registered cornea D data closest thereto is a certain value or more,

to assign the retrieved registered lens as a first lens, and the registered lens having the registered cornea D data that is the second closest to the patient cornea D data in the acquired patient data as a second lens,

to assign the registered cornea D data and the registered lens correction D data as first cornea D data and first lens correction D data in the first lens, and as second cornea D data and second lens correction D data in the second lens, and

to calculate a lens correction D difference per unit cornea correction D data difference by a ratio between cornea D difference data between the first cornea D data and the second cornea D data and lens correction D difference data between the first lens correction D data and the second lens correction D data,

to calculate corrected lens correction D data by adding or subtracting a product of the lens correction D difference and a difference between the patient cornea D data in the acquired patient data and the first cornea D data to or from the first lens correction D data, and

to designate the orthokeratology lens having this corrected lens correction D data as the orthokeratology lens to be used for

the patient.

19. The orthokeratology lens designating system according to claim 18, wherein

the lens designating server is configured to calculate, when the lens D difference ΔL between the first lens correction D data and the second lens correction D data is a certain value or more, values of m types of correction D in which each of αL, $2\alpha L$, ⋯ and $m\alpha L$ is added to the corrected lens correction D, and m types of correction D in which each of αL, $2\alpha L$, ⋯ and $m\alpha L$ is subtracted from the corrected lens correction D provided that $\Delta L/m = \alpha L$ and m is an integer of $3 \leq m \leq 10$, and to output data for manufacturing test lenses having the respective two m types of correction D.

20. The orthokeratology lens designating system according to claim 18, wherein

the database server is configured to build the lens database by storing the corrected lens correction D data, the patient data, and the patient stage data about the orthokeratology lens designated on a basis of the lens correction D difference data as the registered lens correction D data, registered patient data, and registered stage data, respectively.

21. The orthokeratology lens designating system according to any one of claims 15 to 20, wherein

the lens movement data detecting device is an image analysis device, and the selecting device is a central controlling device that stores data of allowable values for the movement speed and

the movement direction in advance.

22. An orthokeratology lens designating and supplying system, in any of claims 14 to 21, further comprising a lens manufacturing device, wherein

the lens manufacturing device is configured to manufacture the same orthokeratology lens to be mounted on the patient as the registered lens, on a basis of the registered lens correction D data of the designated orthokeratology lens.

23. The orthokeratology lens designating and supplying system according to claim 22, wherein

the terminal device includes a lens data accepting and transmitting device configured to accept the registered lens correction D data of the registered lens corresponding to the designated orthokeratology lens transmitted from the lens designating server, and to output the accepted registered lens correction D data to the lens manufacturing device.

24. The orthokeratology lens designating and supplying system according to claim 23, wherein

the lens manufacturing device is annexed to the terminal device.

25. The orthokeratology lens designating and supplying system according to claim 24, wherein

the terminal device includes a lens data request transmitting function that requests the lens designating server to send the lens data of the registered lens designated as the orthokeratology lens

to the terminal device.

26. The orthokeratology lens designating and supplying system according to claim 22, wherein

the lens manufacturing device is configured to accept directly or through the Internet the registered lens correction D data from the lens designating server.

27. The orthokeratology lens designating and supplying system according to claim 19, wherein

the lens designating server is configured to send the data for manufacturing test lenses having the respectively two m types of correction D to the lens manufacturing device.