

## NEW CUSTOMIZABLE CONTACT LENS TO CORRECT PRESBYOPIA

### DESCRIPTION OF THE TECHNOLOGY

New multifocal contact lens has been developed to compensate presbyopia (age-related near vision deterioration). It is made of oxygen permeable rigid material, with scleral bearing (that is, the outermost and white layer of the eyeball), which are fully customizable according to the specific anatomical properties of the eye and with a variable overall diameter depending on the iris of the patient.

This novel contact lens, which allow an aligned and adequate fitting to the corneal-conjunctival profile of the patient, comprise three different areas: corneal, limbar and scleral.

For the fitting of this contact lens, it is necessary to consider the following variables: refraction of the patient, near addition, level of primary and secondary ocular spherical aberration, pupil dynamics pattern and kappa angle magnitude.

Its development has been based on the optimization of depth of focus by combining different types of optical aberrations that are stable as the stability of the peripheral bearing of the lens avoids the induction of decentrations. For such purpose, a wide variety of Zernike third to sixth order optical aberration induction options have been used.

### MARKET APPLICATION SECTORS

The present invention is framed in the field of **Optics**. In particular, it relates to a multifocal scleral contact lens to compensate presbyopia. It is optically customizable according to the specific needs of each patient.

### TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

New multifocal scleral contact lenses, made of oxygen permeable rigid material and with optical personalization for each patient, offer the following **advantages** over the designs currently on the market:

- It rests only on the conjunctival-scleral surface (this lens **does not bear at any point on the surface of the cornea**), minimizing the risk for continuous friction between the lens and the cornea, allowing a fitting providing **maximum comfort**.
- It presents a **great variety of options** to induce **stable** optical aberrations according to the needs and the optical peculiarities of the patient's eye.
- It allows an optimization of the depth of focus leading to **excellent levels of visual quality**.
- In the case of patients with a peculiar pupil dynamics or a very marked kappa angle, the contact lens can be modified to adapt it to these factors, thus achieving an even **greater optimization of the results**.
- The scleral support in the 360° confers a **greater stability** to the lens, minimizing the movement and the decentration, and therefore contributing to an **optimum vision for both near and far**.
- It takes into account the naso-temporal asymmetry of the profile of the corneo-scleral junction, which **minimizes both the decentration and the movement of the lens**.
- The **fitting** of the contact lens is easy, personalized and specific for each patient, providing **great levels of comfort** and **excellent visual quality**.
- The high failure rates provided of current multifocal contact lenses are overcome with this lens.

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### CURRENT STATE OF DEVELOPMENT

This technology has been developed on a **laboratory scale**. A batch of prototypes has been manufactured and **successfully validated** in different patients. The manufacturing process is reliable and reproducible.

Currently, the **CE marking** is being processed, which will allow its commercialization at international level.

### INTELLECTUAL PROPERTY RIGHTS

The present invention is protected through **patent application**:

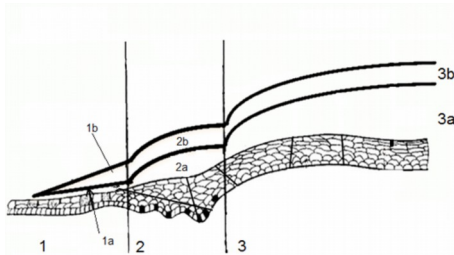
- *Title of the patent: "Lente de contacto multifocal escleral".*
- *Application number: P201631236.*
- *Application date: 21<sup>th</sup> September 2016.*

### COLABORATION SOUGHT

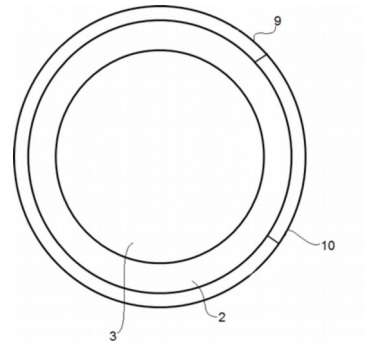
It is looking for companies interested in acquiring this invention for commercial exploitation through:

- License agreement.
- Development of new applications.
- Carry out technical reports and scientific advice for companies.

### RELATED IMAGES



**Image 1:** Cross section image showing the profile of the contact lens and how it is related to the different structures of the eye: corneal (3), limbus (2) and conjunctival-scleral surface (1). In addition, the posterior (a) and anterior (b) surfaces of each of these areas can be seen.



**Image 2:** Frontal profile of the contact lens showing the different areas: corneal area (3), limbar area (2), temporal scleral area (9) and nasal scleral area (10).

### CONTACT

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