

# DEVICE FOR MEASURING THE BIOMECHANICAL PROPERTIES OF THE CORNEA

## Technology for Licensing

### Keywords:

Intraocular pressure, torsion waves, shear waves, ocular biomechanical properties.

### Description:

Corneal damage, manifested as changes at the microstructure level, can cause partial or total blindness. Early diagnosis of these changes could be achieved by evaluating biomechanical properties, mainly elasticity. Currently, there is a variety of elastography devices, however, they still do not fully adapt to the diversity of ocular morphology of different animals and humans, so their improvement is necessary.

Researchers at the University of Granada have developed a device capable of measuring the biomechanical properties of the cornea using torsion waves.

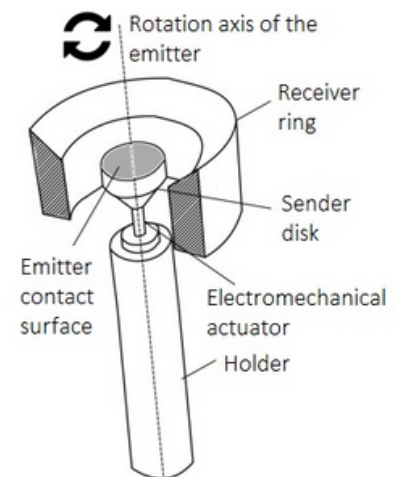
The device consists of an emitter, a receiver, and the electronics necessary for its operation. The emitter is an electromechanical actuator that comes into contact with the cornea and rotates on its axis, generating shear waves that spread radially. The receptor ring, coupled to the curvature of the cornea, collects the waves that travel through the sample through electrodes.

Thanks to the collected signals, not only biomechanical properties can be measured, the device can also be implemented to provide diagnostics such as keratoconus, chemical burn evaluation or eyeball aging detection.

Ultrasonic elastography device based on torsion waves suitable for measuring mechanical properties that allow early diagnosis of various eye problems and evaluation of corneal lesions or assessment of intraocular pressure.

## Advantages and Benefits

- » Greater reliability of results by not depending on geometric estimates.
- » Personalization of corneal treatment.
- » Early detection of diseases such as corneal ectasia.
- » Diagnosis of pathologies such as keratoconus, through stiffness measurements and viscosity measurements.
- » Evaluation of corneas damaged by different aggressions such as chemical burns, inflammation of the cornea or fibrosis.
- » Measurement of intraocular pressure appropriately using corneal biomechanical parameters.
- » Evaluation of artificial corneas.
- » Indicative of degeneration or aging of the cornea.



**Device schematic for measuring the biomechanical properties of the cornea**

Actuación en el marco del Proyecto ILIBERIS: Actuaciones Singulares de Transferencia de Conocimiento en el CEI Biotic. Objetivo prioritario OP.01 "Potenciar la investigación, el desarrollo tecnológico y la innovación"

### Patent status:

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