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Keratoconus:
the solution arises
from light

Solutions in sight
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The final frontier for keratoconus treatment

Known as **Corneal Cross-Linking**, it is the most advanced technique for treating **keratoconus**. It is used to strengthen the corneal structure by using **the synergistic action between riboflavin (vitamin B2) and UV-A rays** to create new collagen bonds.

Dr. Roberto Pinelli, the founder of SERI Lugano, has developed a variant of this technique. It is called **Accelerated Transepithelial Osmotic Corneal Cross-Linking**. It is a method that **does not require the removal of the corneal epithelium** - the most external, superficial part of the cornea - because it acts through it. Hence the term trans-epithelial. In fact, the ultraviolet light reaches the riboflavin below the corneal surface **thanks to the penetration capacity of a specific eyewash, ParaCel®, which conveys the light to where its action is needed, without unnecessarily removing the epithelium.**

The treatment is completely non-invasive and pain-free. It has the advantage that it can be repeated several times, halting the progress of keratoconus and, in most cases, avoiding corneal transplantation. Not needing to remove the epithelium is a considerable plus for the patient both in terms of postoperative comfort (no scraping the cornea to free it from the epithelium, the treatment is painless even many hours later), and in terms of visual recovery (the reconstitution of the epithelium on a cornea with keratoconus could lead to a worsening of visual capacity).

How does osmotic corneal cross-linking work?

The treatment consists of **applying the ParaCel® eye-wash to the surface of the cornea**. ParaCel® was developed by Dr. Pinelli (patent granted to the American multinational Avedro Inc, who market it worldwide). **Each eye is then exposed to UV-A rays for three minutes** (while in a first generation, non-accelerated, cross-linking, each eye would be exposed for thirty minutes).

Thanks to the osmotic power of ParaCel®, riboflavin penetrates the corneal surface by a few microns and by the dynamic action of ultraviolet light (UV-A rays) draws the corneal lamellae closer together: **the synergistic action of the two components creates new bonds within the cornea**.

In this way, the corneal structure is strengthened, and the **progressive wear of its surface is slowed down**. Keratoconus does not regress, the disease does not heal, but its development is halted, to the patient's understandable satisfaction. In some cases, there have been slight improvements in visual capacity or quality of vision. However, this is not the goal of the treatment.



What are its advantages?

- **No need to remove the epithelium** (safer procedure)
- **Fast outpatient procedure, pain-free and without the need for convalescence** (the patient can quickly resume normal daily activities).
- **The procedure can be repeated** as required
- **Corneal reinforcement**
- **Slowing down / prevention of corneal wear** arising from the keratoconus
- **You can postpone or even avoid a corneal transplant**

Who is it for?

Those with keratoconus and suffering from its symptoms:

- Blurred and distorted vision
- Photophobia (light sensitivity)
- Sudden flashes
- Need to change glasses frequently due to the progressive loss of vision.
- Abrupt vision loss (due to the apex of the cone becoming opaque).



A world-renowned method

Accelerated Osmotic Transepithelial Corneal Cross-linking is an innovative technique. It has enjoyed **outstanding results, which have been internationally acclaimed.**

Its theoretical foundations, the method, and the results are **widely documented in international peer-reviewed scientific publications**, reporting exceptionally positive outcomes.

Dr. Pinelli is a leading international keratoconus expert. He has published numerous articles in the field and holds frequent continuing education and update courses worldwide: this is why **SERI Lugano is a renowned reference centre of excellence for this treatment.**

What is keratoconus?

Keratoconus **is a change in the cornea's curvature, which takes on the shape of a cone instead of keeping its normal dome shape.** The name "keratoconus" derives from the Greek "kerathokonus" and means "conical cornea." Since the cornea, together with the crystalline lens, is responsible for focusing images coming from the outside, **its deformation induces irregular astigmatism, often associated with myopia.** Keratoconus can be bilateral and manifest in both eyes at different times. It is a **disorder that progresses slowly, can take several years to develop, and may stop at any stage** of its development.

The Switzerland Eye Research Institute (SERI Lugano) is a centre for research and innovation in vision science. Founded in Lugano in 2013, it offers solutions for all visual impairments (including presbyopia) through scientifically validated, non-invasive, bilateral procedures that are consistently pain-free.

SERI Lugano not only deals with the correction of visual defects, but also offers services recognized by LAMal (the Swiss Federal Law on Health Insurance) for personalized diagnosis and treatment in all areas of ophthalmology, from retinal disorders to pediatric ophthalmology.

Under its Scientific Director, Dr. Roberto Pinelli, SERI Lugano is continuously developing its research in the fields of vision science, medical ophthalmology, paediatric ophthalmology, and the use of nutraceuticals and light in ophthalmology.

SERI Lugano delivers a range of treatments, whether medical or involving a range of photon-based procedures, which are always in keeping with the most innovative, safe, and effective scientific developments. These results have been brought about through continuous ongoing research and state-of-the-art diagnostic and procedural tools and technology.

The treatment procedures are many and varied; the approach is completely personalized and based on the use of sophisticated equipment. The latest generation of advanced technology is always combined with the technical and interpersonal skills of the various specialists who work within the institute.

SERI Lugano is inspired by, and committed to, an institutional culture of excellence in the field of vision science and in patient satisfaction.

Switzerland Eye Research Institute SA (SERI Lugano)



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