

# Photocoagulator

PASCAL® Synthesis™



The PASCAL Vision  
Unparalleled control.  
Life-changing results.

PASCAL | The most trusted  
pattern scanning Laser Technology



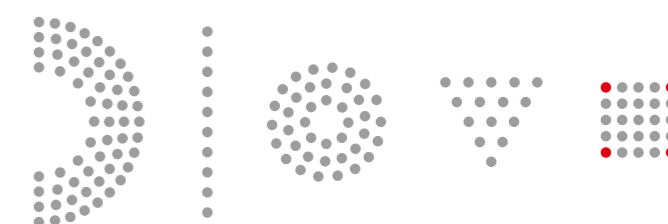
## A foundation of innovation

PASCAL represents a quantum leap in ophthalmic treatment technology and is committed to helping you deliver the best results for your patients. Top physicians choose PASCAL because of its advanced technology, ease of use, and superior clinical outcomes.

Nearly a decade ago, our **Pattern Scanning Laser (PASCAL)** technology revolutionized ophthalmic laser photocoagulation, offering faster, high-quality treatments and greater patient comfort. Today, PASCAL is the most trusted laser technology among ophthalmologists worldwide.

Developed in partnership with Stanford University, the PASCAL method of photocoagulation treats retinal and glaucoma disorders using a single spot or a user-selected pattern array. Most importantly, it was designed to provide greater safety, control and flexibility for you with greater comfort and effectiveness for your patients.

This is the PASCAL Vision.



*“Pattern scanning method is  
the preferred way and I believe  
it’s standard of care”*

- Mark S. Blumenkranz, MD  
HJ Smead Professor and Chair Director of the Byers Eye Institute  
at Stanford University

# The PASCAL advantage

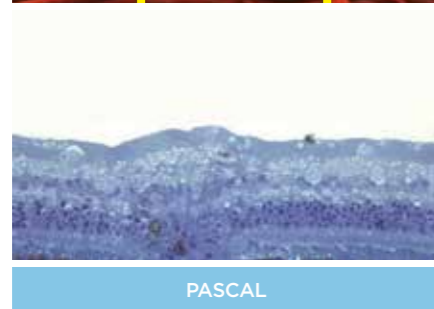
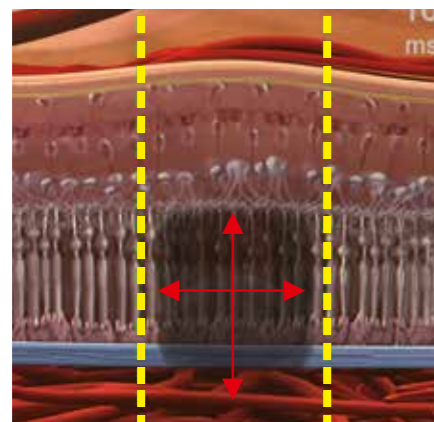


## Experience the PASCAL advantage

Superior technology and input from clinical experts has resulted in laser system that treat patients faster, safer, and more effectively with greater comfort. The best tool for you, the best treatment for your patients.

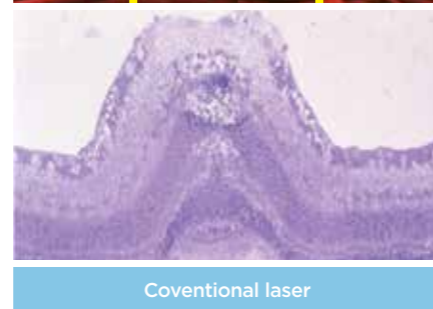
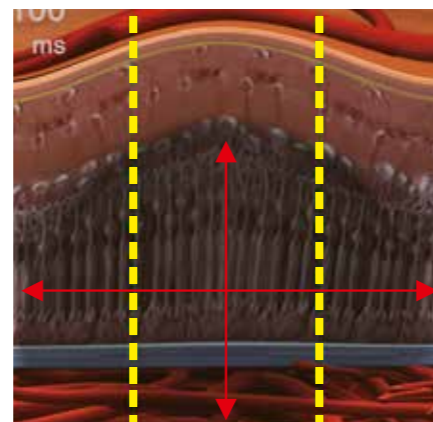
## Faster procedures, less damage

Unlike conventional laser burns, PASCAL's shorter pulse duration (10 ms) results in faster procedures with less pain, collateral damage and scarring for your patients.



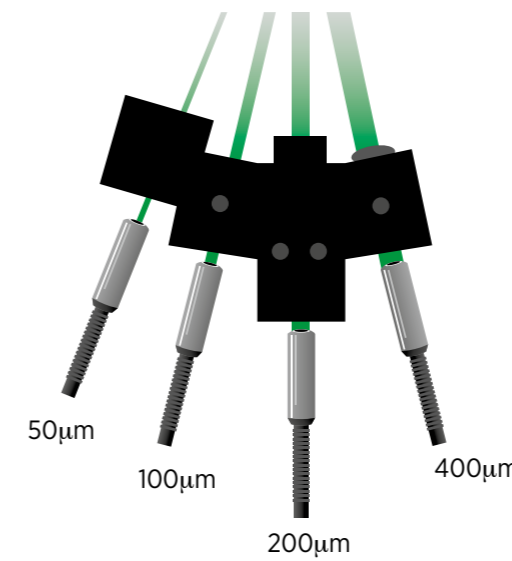
PASCAL

Less pain, less destruction



Conventional laser

More painful, cellular destruction



## Precision spots with multi-fiber beam technology

PASCAL's proprietary multi-fiber beam delivery results in easier to focus, predictable and uniform spots. Physicians using PASCAL lasers continue to share that the consistency of the burn during photocoagulation is "better" than competing lasers. This is due mainly to the wide depth of focus from the multi-fiber beam optics found in all PASCAL lasers.

## Unique fiber beam design

PASCAL incorporates separate fibers (one for each spot size) into each system. Compared to other technologies, PASCAL's unique fiber beam design offers a more consistent and focused spot size for each treatment.

- Longer and more constant depth of focus for all spot sizes
- Consistent uptake at each spot
- Uniform and consistent energy distribution for all spot sizes

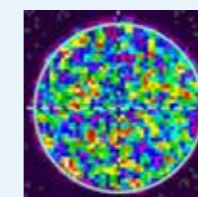
## PASCAL multi-fiber beam delivery

Delivers multiple spots onto the retina, ensuring consistent uptake.



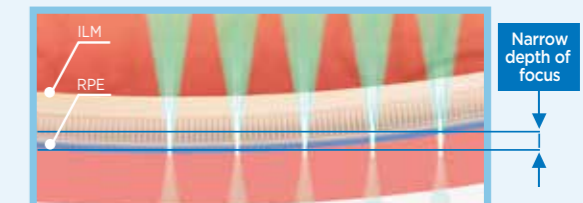
Wide depth of focus

PASCAL has uniform energy distribution



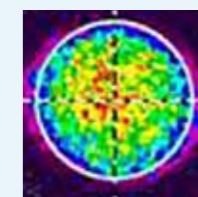
## Other lasers

Zoom optics and narrow depth of focus may compromise the ability to scan a larger area with consistent uptake.



Narrow depth of focus

Other lasers have "hot spots" in the beam profile



*"The result is greater patient comfort with decreased pain. Much safer, much more effective."*

- Pravin U. Dugel, MD  
Retinal Consultants of Arizona



At its core, the PASCAL treatment works on the basic principles of laser therapy, heating tissue through the absorption of light energy. However, PASCAL goes many steps further to minimize damage and reduce pain using various spot patterns, shorter pulses and sub-threshold treatment options such as Endpoint Management and Pattern Scanning Laser Trabeculoplasty (PSLT). PASCAL's multi-functional design allows physicians to treat both retinal and glaucoma disorders.

Simply put, PASCAL gives your practice more - more control, more confidence and most importantly, the ability to change more patients' lives.

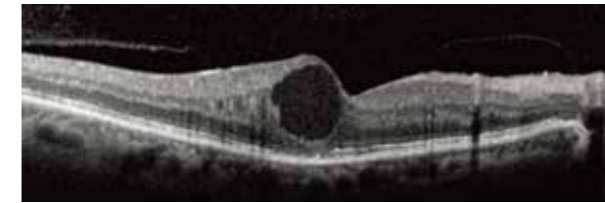
**The benefits for physicians and patients are substantial**

**More control:**  
Offers superior control by providing the ability to deliver exacting laser endpoints through precise settings and repeatable energy delivery.

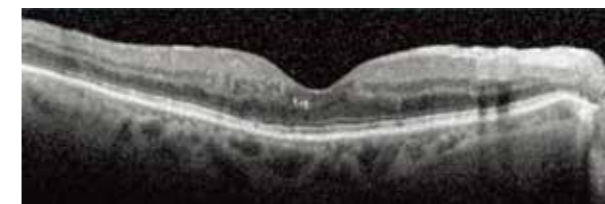
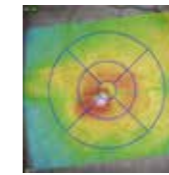
**More flexibility:**  
Tissue-sparing sub-threshold treatment options and multi-spot titration capabilities provide more treatment options than ever before.

**Less discomfort:**  
Shorter pulses contribute to a reduction in the pain a patient may feel during treatment. Endpoint Management further improves this by controlling and reducing both time and power being delivered. Even the patterns themselves are designed to improve comfort by delivering the Landmark reference points last, as these have the highest output.

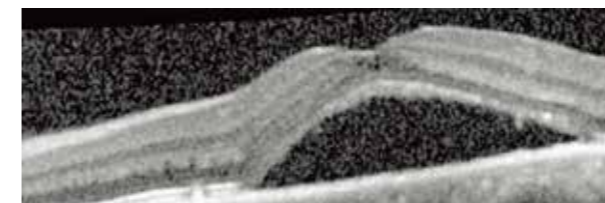
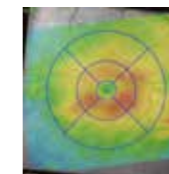
**Less uncertainty:**  
Endpoint Management offers a level of accuracy no other tissue-sparing laser application can match. This advanced technology offers simplicity of control to achieve and track the desired endpoint throughout the procedure.



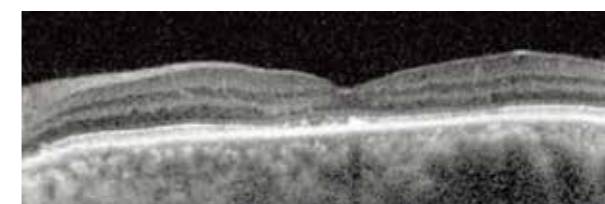
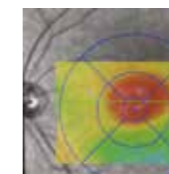
Pre-EpM VA 20/60



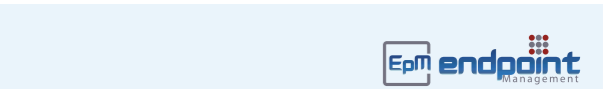
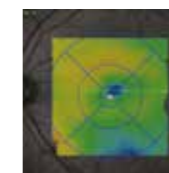
1 year and 9 months Post-EpM VA 20/20



Pre-EpM VA 20/60



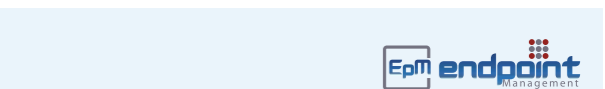
1 year Post-EpM VA 20/20



**Diabetic Macular Edema**

**Physician:** Dr. Daniel Lavinsky | Porto Alegre, Rio Grande do Sul, Brazil

**Patient:** 64 years old with Type 2 DM for over 20 years. Severe nonproliferative diabetic retinopathy with macular edema OU. Patient submitted to one intravitreal injection of Ranibizumab. She had a panic attack during the procedure and refused additional injections.



**Central Serous Retinopathy**

**Physician:** Dr. Daniel Lavinsky | Porto Alegre, Rio Grande do Sul, Brazil

**Patient:** 46 years old, male with decreased visual acuity since childhood due to nystagmus. Patient refused use of steroids or other medications.

\*Lavinsky D, Palanker D. Non Damaging photothermal therapy for the retina: initial clinical experience with chronic central serous retinopathy. Retina. 2015;35(2):213-22.

*“When using **Endpoint Management**, I have seen very nice long term results in decreasing fluid and improved visual results.”*

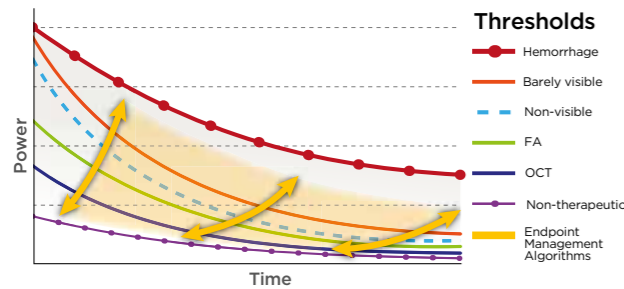
- Daniel Lavinsky, MD  
Federal University of Rio Grande do Sul Porto Alegre, Brazil

# Non-damaging treatment for retinal disorders



## Sub-threshold, non damaging Endpoint Management™

Endpoint Management (EpM) is a non-damaging\* retinal laser therapy that uses a unique algorithm to control laser power and pulse duration, optimizing the therapeutic effect of the laser at sub-visible levels.



By using Endpoint Management with PASCAL lasers, you can adjust the treatment from barely visible down to various non-damaging levels, even down to completely non-detectable points while maintaining clinical efficacy. All of this adds up to safer, more effective treatment for your patients.



Case: "Endpoint Management's unique "Landmark" feature outlines the treated area in a macula grid pattern."

## Endpoint Management is mathematically precise

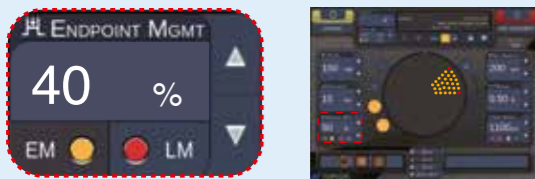
The Arrhenius Integral coupled with extensive data on retinal laser-tissue interactions defines the algorithms for Endpoint Management. By use of this formula, heat induced changes in the retina are controlled as Endpoint Management simultaneously modulates the laser power and duration, providing linear control over a non-linear process.

## Landmark™ patterns

The exclusive Landmark feature is a useful tool for tracking the sub-visible areas which have been treated, assisting with the treatment process and taking the guess work out of successive treatments.

## Easy operation

The yellow dots displayed on the user interface treatment pattern display indicate the laser spots that will be delivered using the energy level set by Endpoint Management. While Endpoint Management is active, the red dots indicate the laser spots that will be delivered at the titration energy level ("100% level") and will provide the "Landmark" reference points outlining the treated area.



Endpoint Management automatically adjusts power and duration to the appropriate level with a simple energy percentage setting.



\*Depending on the parameters of Endpoint Management.

# Precise treatment for IOP Reduction



## PSLT (Pattern Scanning Laser Trabeculoplasty™)

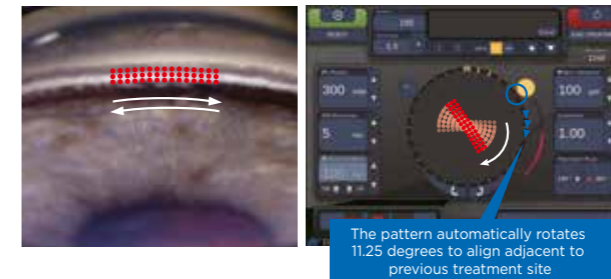
Pattern Scanning Laser Trabeculoplasty (PSLT<sup>1</sup>) is an advanced tissue-sparing laser treatment for reducing intraocular pressure in open angle glaucoma. PSLT provides a rapid, precise, and minimally traumatic computer-guided treatment that applies a sequence of patterns onto the trabecular meshwork. Automated rotation of consecutive patterns ensures that treatment steps are precisely placed without overlap or excessive gaps.

The advantages are clear:

- Computer guided treatment
- Non-destructive procedure
- Clinical studies show an IOP reduction of 24% in 6 months<sup>2</sup>
- Ability to retreat if necessary



1 PSLT is an optional software and not available in all countries, please check with your distributor for availability in your country. Not available for sale in the US.  
2 Patterned Laser Trabeculoplasty. M. Turati, et.al, Ophthalmic Surgery Lasers and Imaging, 41:538-545 (2010).



## Easy operation

Our exclusive procedure provides computer guided placement of the treatment patterns ensuring full coverage of the trabecular meshwork and eliminating the chance of overlap unlike other SLT procedures.

*"Physicians should consider PSLT as a good option to reduce IOP..."*

- Miho Nozaki, MD, PhD  
Nagoya City University



Sophisticated technology,  
elegantly designed



In order to help you and your patients, we never stop improving. When you understand the science behind our advancements, you'll understand why PASCAL is really a synthesis of innovations, all working together to further the field of ophthalmology.

### PASCAL family line-up

The PASCAL family of ophthalmic lasers includes premiere dual-port pattern scanning retinal lasers providing fast and effective treatment using our clinically-proven PASCAL Technology.



SL-D7 Green  
Yellow



SL-D4 Green  
Yellow



SL-D4 Twinstar



#### PASCAL Synthesis

- Available in 577/532 nm wavelengths (yellow/green)
- Integrates seamlessly with Topcon SL-D4, SL-D7 and Haag-Streit™ 900 BM/BQ slit lamps

#### PASCAL TwinStar<sup>3</sup>

- Includes both 577 nm + 638 nm wavelengths (yellow+red) in a single system
- Integrates seamlessly with Topcon SL-D4 slit lamp
- Red wavelength is useful in treating deeper structures in the subretinal neovascular membrane close to the choroidal vessels<sup>4</sup>

#### PASCAL LIO<sup>5</sup>

- Allows physicians to offer laser photocoagulation treatments to patients unable to sit at a slit lamp
- Provides increased access to the far periphery of the retina
- Small and lightweight headset battery offers up to 2 hours of use without recharging

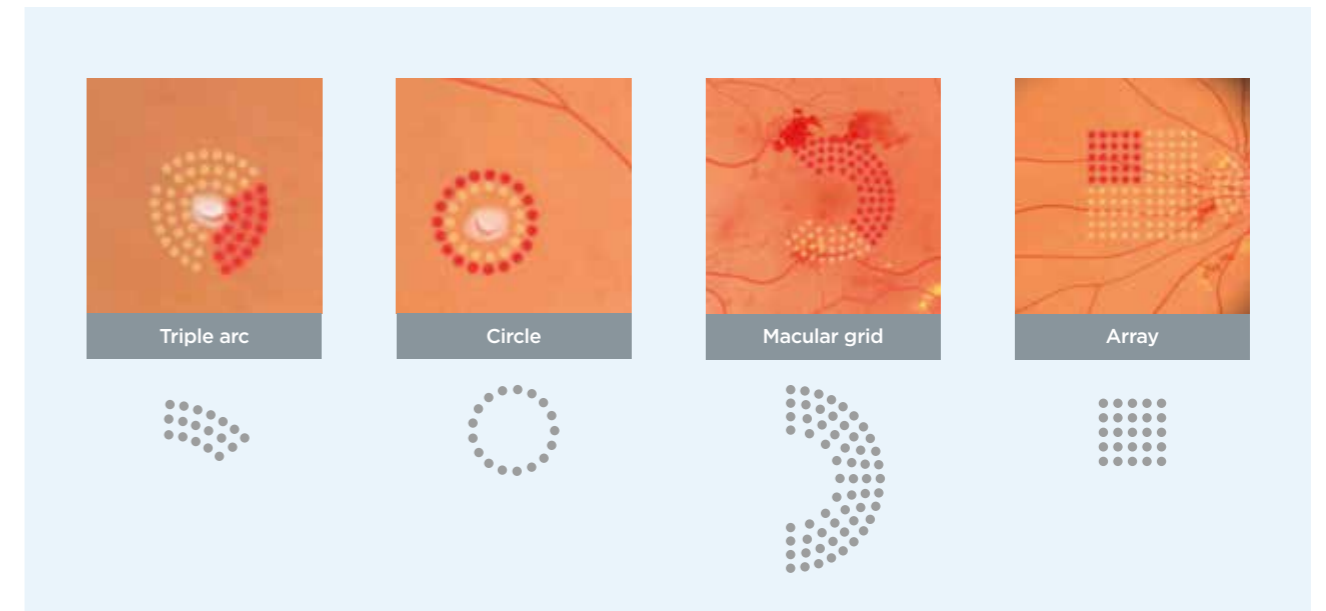
Sophisticated technology,  
elegantly designed

### More patterns. More treatment options.

PASCAL offers a vast selection of patterns designed to meet all your patients needs.

### A pattern for every need

Extensive pattern palette provides many variations to suit nearly every clinical need.



### Intuitive user interface

Touch screen allows for easy selection of a wide variety of pattern variations. Auto Advance feature delivers sequential patterns without taking eyes away from oculars.



<sup>3</sup> Not available in all countries, please check with your distributor for availability in your country.  
Not available for sale in the US.

<sup>4</sup> Surgical Techniques in Ophthalmology: Retina and Vitreous Surgery by By Ashok Garg, Jorge L. Alio Jaypee Brothers Publishers, Sep 1, 2010 (page 331).

<sup>5</sup> Not available in all countries, please check with your distributor for availability in your country.

## Specifications

## Synthesis (Y7/G7/Y4/G4)

## Synthesis TwinStar

<b>Laser</b>	Available in 577nm or 532nm Optically pumped semiconductor (OPSL)	577nm , 638nm <sup>*1</sup>
<b>Patterns</b>	Single spot, array, triple arc <sup>*2</sup> , triple ring, arc, line, circle, macular grid (PSLT <sup>*3</sup> )	
<b>Power</b>	0 - 2000mW	577nm: 0 - 2000mW 638nm: 0 - 600mW <sup>**</sup>
<b>Power control</b>	3-D Controller and touch screen user interface	
<b>Treatment</b>	Pulse durations 5 to 1000ms <sup>*4</sup>	
<b>Aim beam</b>	635nm diode	670nm diode
<b>Aim beam power</b>	Adjustable to < 1mW	
<b>Delivered spot size</b>	50, 100, 200, 400µm	577nm: 50, 100, 200, 400µm 638nm: 60, 200µm
<b>User interface</b>	3-D Controller and touch screen control panel display (26.5 cm; 10.4 in)	
<b>Slit lamp compatibility</b>	Haag-Streit 900 BM / BQ, Topcon SL-PA02/03	Topcon SL-PA03
<b>Laser console dimensions</b>	Height: 23 cm (9 in) Length: 31 cm (12 in) Width: 38 cm (15 in) Weight: 15 kg (35 lbs)	
<b>Input power requirement</b>	100 - 240 VAC; 50/60Hz 200VA	
<b>Cooling</b>	TEC / Air cooled	

\*1: 577nm is for single, pattern scan, PSLT and Endpoint Management 638nm is only for single spot

\*2: Triple arc is only for angle treatment by PSLT

\*3: PSLT is optional software

\*4: Pulse Durations 5ms is only for Triple arc

\* PASCAL is a registered trademark and Synthesis and Endpoint Management are trademarks of Topcon Medical Laser Systems.

\* Not available for sale in the United States.

\* Not available in all countries, please check with your distributor for availability in your country

\* Subject to change in design and/or specifications without advanced notice.

**IMPORTANT** In order to obtain the best results with this instrument, please be sure to review all user instructions prior to operation.



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