

REXONEYE



QMR **CLINICAL** **EVIDENCE**

The Science Behind Rexion-Eye®

CLINICAL AND SCIENTIFIC RESEARCH SUMMARY





The Science Behind Rexon-Eye®

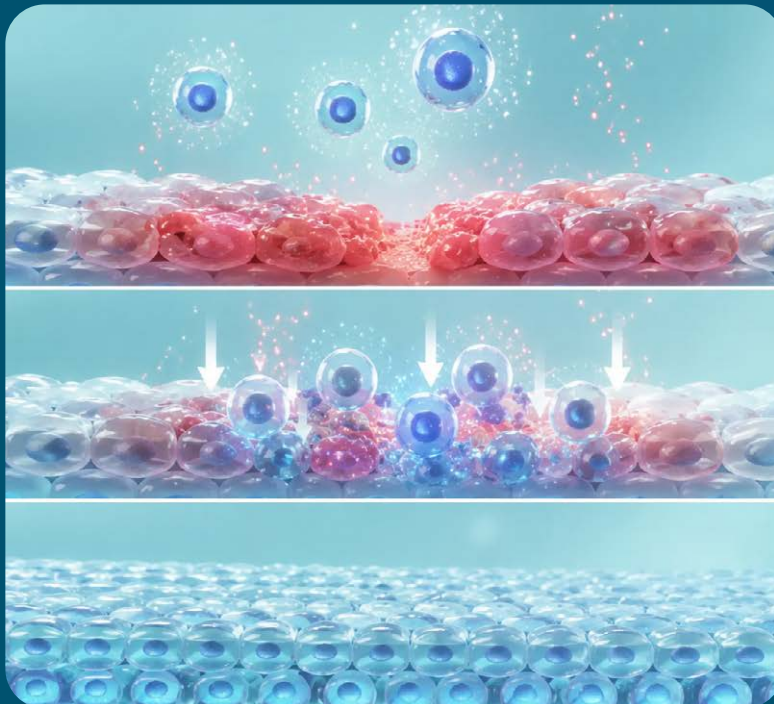
QMR® technology has been investigated across different areas of ocular surface health, with clinical and preclinical research exploring its effects on symptoms, tissue function and biological processes.

This Clinical Evidence Summary brings together the key findings in a clear visual format — highlighting the data that matter most in clinical practice.



QMR® TECHNOLOGY

The principle of operation of Rexion-Eye® is based on patented Quantum Molecular Resonance (QMR®) Technology, which delivers a low-intensity alternating electrical signal containing a specific spectrum of high frequencies ranging from 4 to 64 MHz. Unlike thermal-based technologies, QMR® does not rely on heat generation. Instead, it stimulates the body's natural regenerative processes while promoting an anti-inflammatory response.⁰⁹

**1**

Anti-inflammatory cytokine release by shifting macrophage activity

2

Activation of mesenchymal stem cells (MSCs) to regenerate damaged tissue

3

Restoration of the tear film and ocular surface

THE ANTI-INFLAMMATORY EFFECT

Chronic inflammation is one of the main drivers of the vicious cycle of Dry Eye Disease, leading to tear film instability and ocular surface damage. Rexion-Eye® helps interrupt this cycle by promoting the shift of macrophages from the pro-inflammatory M1 phenotype to the anti-inflammatory M2 phenotype, reducing inflammatory cytokines and supporting ocular surface homeostasis.⁰⁹

NATURAL REGENERATIVE EFFECT

QMR® Technology emits packets of energy called quanta, capable of modulating ion concentrations within the intracellular and extracellular environment, inducing changes in the transmembrane potential of target cells. These biological signals activate metabolic pathways that stimulate mesenchymal stromal cells (MSCs), promoting tissue regeneration rather than simple tissue repair. The regenerated tissue restores the original structure and physiological function of the ocular surface.²

BIOLOGICAL SAFETY

QMR® Technology is proven to be biologically safe. Rigorous studies on chromosomes, apoptosis, and proteins have affirmed its biological safety, assuring the absence of cellular damage in patients.*

*Sella et al., PloS ONE, 2018

01

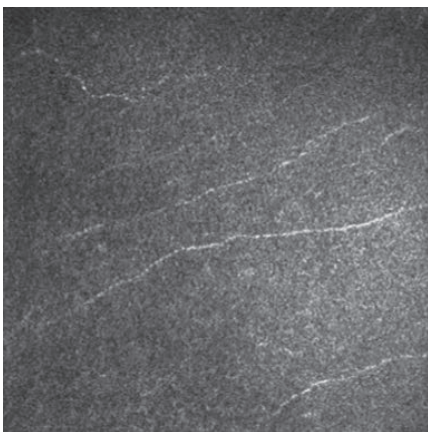
CORNEAL NERVES

Reduced neuropathic corneal pain and measurable changes in corneal nerve parameters

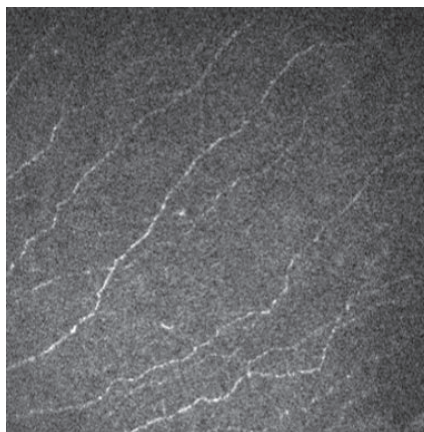
Preliminary clinical data in patients with neuropathic corneal pain showed reduced pain together with significant improvements in key corneal nerve metrics following QMR® treatment.

Sample and protocol

19 patients with neuropathic corneal pain
8 weekly treatments (30 min, intensity 4–5/10)



Pre-treatment



Post-treatment

Significant improvements in key corneal nerve metrics

Corneal nerve metrics

- Corneal Nerve Fiber Density: 7.54 ± 4.86 to 10.23 ± 5.48 ($p=0.046$)
- Corneal Nerve Fiber Length: 5.63 ± 2.34 to 6.81 ± 3.14 ($p=0.029$)
- Corneal Nerve Branch Density: 10.81 ± 8.38 to 15.49 ± 12.27 ($p=0.037$)

Patient feedback

>60% reported an overall improvement in their eye condition
80% rated the treatment as pleasant

STUDY REFERENCE

Efficacy of Quantum Molecular Resonance in Neuropathic Corneal Pain and Corneal Nerve Regeneration
Yu-Chi Liu, MD, MCI, PhD — Associate Professor

02

MEIBOMIAN GLAND DYSFUNCTION

Randomized controlled evidence of improved meibum quality and clinical signs

A randomized, double-masked, sham-controlled trial in patients with meibomian gland dysfunction demonstrated significant improvements in meibum quality and multiple ocular surface parameters following QMR® treatment.

Sample and protocol

80 patients with meibomian gland dysfunction (MGD)

Randomized QMR vs sham-QMR

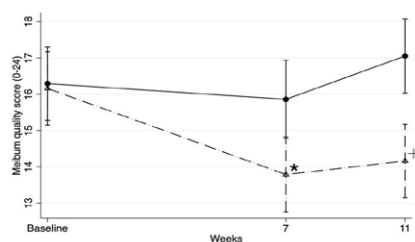
4 treatments over 3 weeks | 20 min/session

Follow-up: baseline, week 7 and week 11

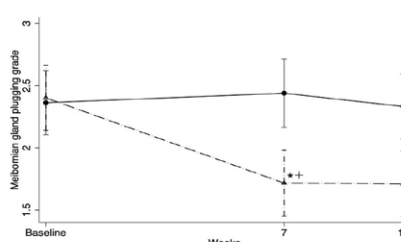
SIGNIFICANT IMPROVEMENTS VS SHAM

MEIBUM QUALITY

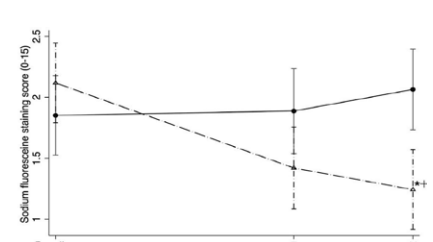
Significant improvement at week 11 $p = 0.008$



Telangiectatic vessel area
 $p = 0.008$



Meibomian gland plugging
 $p = 0.017$



Fluorescein staining
 $p = 0.036$

STUDY REFERENCE

Randomized, double-masked, sham-controlled trial of efficacy and safety of quantum molecular resonance for treating meibomian gland dysfunction

L. Uthaithammarat, N. Kasetsuwan, U. Reinprayoon, Y. Chongpison, W. Quanchareonsap, P. Dissaneevate

03

CLINICAL CASES

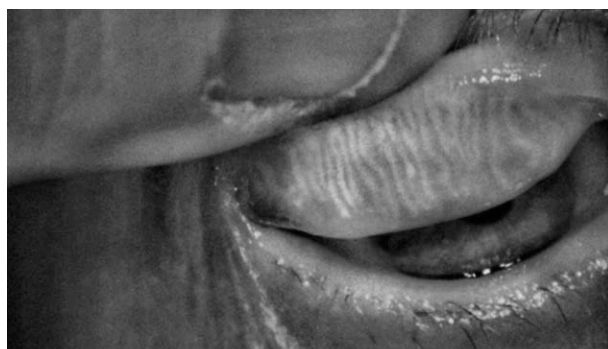
Meibomian gland morphology before and after QMR® treatment

Representative clinical imaging showing changes in meibomian gland morphology before and after QMR® treatment.

JAVIER BAEZ, OPTOMETRIST - NORWAY



Pre-treatment



Post-treatment

DR. LUCA VIGO, OPHTHALMOLOGIST - ITALY



Pre-treatment



Post-treatment

04

DRY EYE DISEASE

Dry eye improvements observed at 18-month follow-up

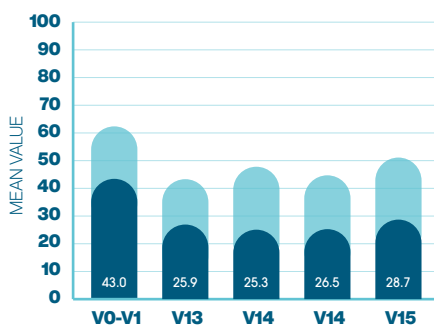
Clinical data showed improvements in subjective symptoms and objective ocular surface parameters following QMR® treatment.

Sample and protocol

27 patients with dry eye disease
18 evaporative | 9 hyposecretive
12 treatment sessions over 2 months | 22 min/session

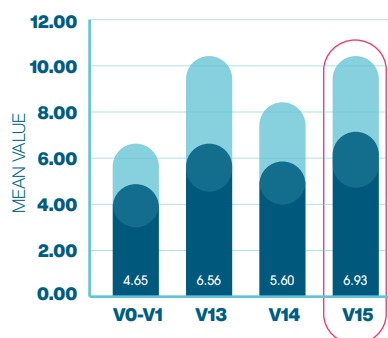
Objective ocular surface improvements were still observed at 18-month follow-up.

OSDI



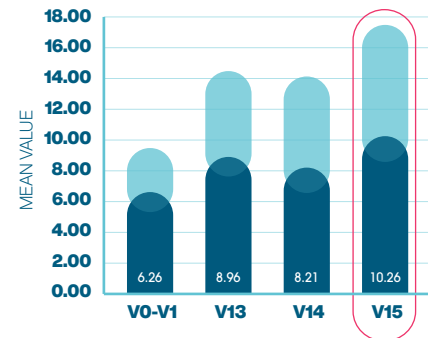
Baseline
43.0 to 28.7 at 18 months

TBUT



Baseline
4.65s to 6.93s at 18 months

SCHIRMER



Baseline
6.26mm to 10.26 mm at 18 months

QMR® treatment was associated with improvements in dry eye symptoms and objective ocular surface parameters. Published results demonstrated maintenance of several effects up to 12 months, while additional follow-up data showed sustained improvements in OSDI, TBUT and Schirmer test values at 18 months.

STUDY REFERENCE

Transcutaneous Periorbital Electrical Stimulation in the Treatment of Dry Eye

Emilio Pedrotti et al. — British Journal of Ophthalmology, 2017

05

DRY EYE DISEASE

Randomized controlled evidence: improvements in dry eye symptoms and clinical signs

A double-masked, randomized, placebo-controlled trial showed significant improvements in dry eye symptoms, meibomian gland dysfunction and corneal staining following QMR® treatment.

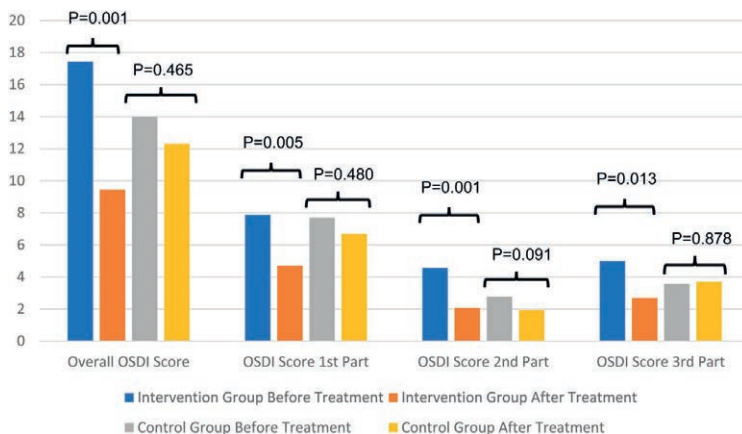
Sample and protocol

40 patients with Dry Eye Disease

20 QMR® | 20 placebo

4 weekly treatments

Significant improvement in dry eye symptoms



MGD SCORE

1.57 to 0.8 | p = 0.006

CORNEAL STAINING

2.25 to 1.1 | p = 0.045

CLINICAL TAKEAWAY

In this randomized, double-masked, placebo-controlled trial, QMR® treatment significantly improved dry eye symptoms, MGD score and corneal staining, with no treatment-related adverse events reported.

STUDY REFERENCE

Quantum Molecular Resonance Effects on Patients With Dry Eye Disease: A Randomized Controlled Trial

Asaf Shemer, MD, Aya Altarescu, MD, Lee Nusbaum, MD, Maya Vardi, MD, Biana Dubinsky-Pertsov, MD, MPH, Idan Hecht, MD, Lior Or, MD, Adi Einan-Lifshitz, MD, Eran Pras, MD

06

SEVERE CORNEAL INJURY

QMR® significantly reduced corneal perforation in an experimental alkali burn model

In a preclinical model of severe corneal inflammation induced by alkali burn, QMR® treatment significantly reduced the incidence of corneal perforation compared with sham treatment.

Sample and protocol

40 mice with severe alkali-induced corneal injury

20 QMR® | 20 sham-treated controls

2 treatments/week for 3 weeks | 20 min/session

4-week observation period

Significant difference in corneal perforation incidence between QMR®-treated and sham-treated animals.

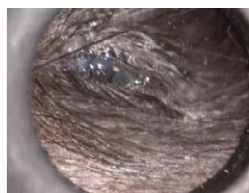
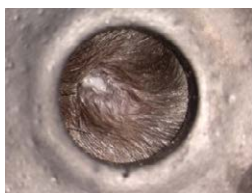
Alkali burn treated

Day 28
Non perforated



Alkali burn sham treatment

Day 28
Perforated



SCIENTIFIC TAKEAWAY

In this preclinical model, QMR® treatment significantly reduced the incidence of corneal perforation following severe alkali-induced corneal injury, supporting further investigation of QMR® in severe corneal inflammation.

STUDY REFERENCE

Innovative radiofrequency electrotherapy significantly reduces cornea perforation in an alkali burn murine model

Alfredo Ruggeri, Timur Dyrdin, Marco Barbariga, Paolo Rama, Giulio Ferrari

Investigative Ophthalmology & Visual Science, 2018; 59:4350 — ARVO Annual Meeting Abstract

07

CLINICAL CASES

Post-FemtoLASIK patients treated with Rexion-Eye®

Clinical observations and long-term follow-up by Dr. Giovanni Roberto Tedesco — Italy

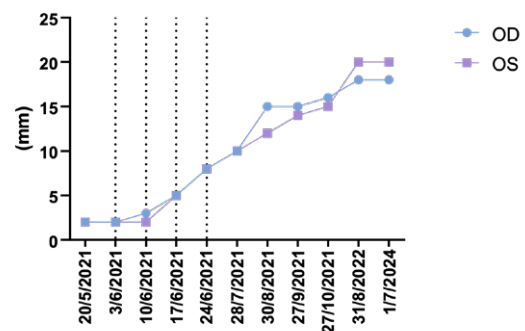
41-YEAR-OLD WOMAN

Long-term improvement in tear secretion

~2 mm to 18–20 mm

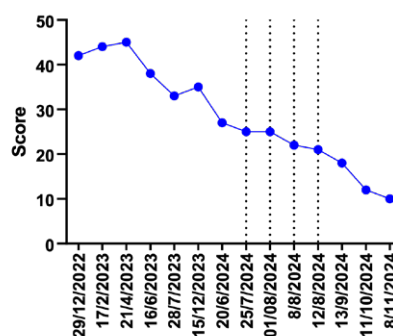
Progressive bilateral increase in tear secretion, maintained at long-term follow-up.

SCHIRMER



33-YEAR-OLD MAN

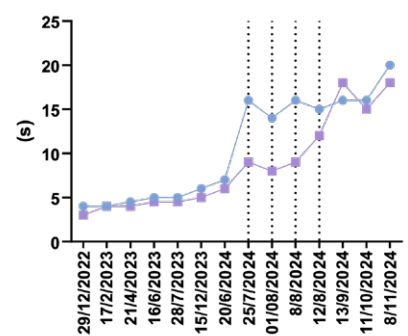
OSDI



~42 to 10

Late-phase stabilization at lower scores suggests durable symptomatic relief consistent with improved tear film function.

BREAK-UP TIME



~4 sec to 18–20 sec

It demonstrates a clear upward inflection during the central phase, followed by further prolongation in the final visits, indicating improved tear film stability.

CLINICAL TAKEAWAY

Long-term clinical observations showed improvements in both subjective symptoms and objective tear film parameters following Rexion-Eye® treatment.

08

TISSUE REGENERATION

QMR® in hard-to-heal wounds: clinical and histological evidence of tissue regeneration.

Clinical and histological observations in chronic hard-to-heal wounds showed wound bed reactivation, increased granulation tissue and wound contraction following QMR® treatment.

Sample and protocol:

11 patients with chronic hard-to-heal wounds

1-2 QMR® applications/week

Average: 10 treatment sessions

Visible progression of wound repair (Patient, 75 years old)



WOUND HEALING & CONTRACTION

Clinical improvement and size reduction observed in several cases

GRANULATION TISSUE

Wound bed reactivation and increased granulation tissue

PAIN

3 patients reported **60-80% pain reduction**

2 patients reported **complete pain relief**

QMR® treatment was associated with wound bed reactivation, increased granulation tissue and wound contraction in chronic hard-to-heal wounds, supported by clinical and histological evidence of tissue regeneration.

STUDY REFERENCE

Marco Fraccalvieri, Marco Salomone, Claudia Di Santo, Erind Ruka, Umberto Morozzo & Stefano Bruschi
International Wound Journal, 2017

09 - IN VITRO STUDY

ANTI-INFLAMMATORY MECHANISM

QMR® reduces inflammatory signaling and promotes M1-to-M2 macrophage polarization

In an in vitro model of inflammation, QMR® significantly modulated key inflammatory pathways and promoted macrophage polarization toward the anti-inflammatory M2 phenotype.

KEY FINDINGS

INFLAMMATORY SIGNALING

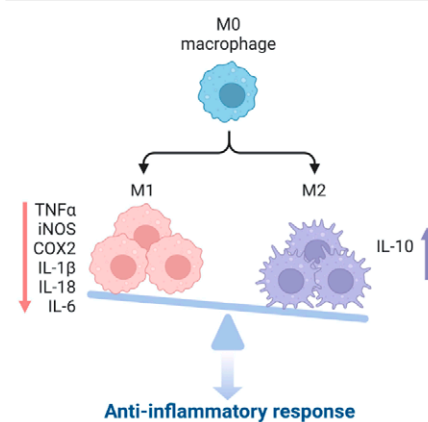
Significant reductions in COX-2, iNOS and NF-κB activity following QMR® exposure.

NLRP3 INFLAMMASOME

QMR® reduced **NLRP3** and **activated caspase-1**, together with decreased **IL-1β** and **IL-18** expression and secretion.

NITROSATIVE STRESS

Significant reduction in **peroxynitrite**, with tyrosine nitration restored to levels similar to sham-exposed controls after 4 days.



M1 → M2 MACROPHAGE POLARIZATION

QMR® promoted a shift from the pro-inflammatory M1 phenotype toward the anti-inflammatory M2 phenotype, with increased CD163 and IL-10 and reduced TNF-α.

SCIENTIFIC TAKEAWAY

- M1 → M2 macrophage polarization
- Increased production of anti-inflammatory cytokines (e.g., IL-10)
- Reduced production of pro-inflammatory cytokines (e.g., IL-1β)
- Rebalancing of the inflammatory response
- QMR® demonstrated an anti-inflammatory effect in vitro

STUDY REFERENCE

Paolucci T. et al. Quantum Molecular Resonance Inhibits NLRP3 Inflammasome/Nitrosative Stress and Promotes M1 to M2 Macrophage Polarization. *Antioxidants*, 2023; 12:1358.

10 - IN VITRO STUDY

TISSUE REGENERATION

QMR® modulates biological pathways involved in tissue regeneration

QMR® was investigated in human bone marrow-derived mesenchymal stromal cells (MSCs), key cells involved in tissue repair and regenerative processes.

Study model

Human mesenchymal stromal cells
10 min/day x 4 consecutive days
QMR® vs sham-exposed controls

KEY FINDINGS

>95% CELL VIABILITY

QMR® maintained cell viability, phenotype, proliferation and differentiation capacity.

ECM REMODELING ▪ ANGIOGENESIS ▪ TISSUE DEVELOPMENT ▪ GENE EXPRESSION MODULATION

QMR® significantly modulated genes involved in extracellular matrix remodeling, angiogenesis and cellular/tissue development.

SCIENTIFIC TAKEAWAY

The findings suggest a potential involvement of QMR® in angiogenesis and tissue regeneration, probably through extracellular matrix remodeling.

STUDY REFERENCE

In-vitro analysis of Quantum Molecular Resonance effects on human mesenchymal stromal cells
Sella S. et al. — PLOS ONE, 2018

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and clinical outcomes with the Rexon-Eye® medical device.

Rev. 01/2026 Subject to technical changes as part of product development, as well as errors and omissions

