

ARTICLES TO HELP
YOU THROUGH:

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FROM THE
PRESIDENT'S
DESK

The world is finally coming around after the surreal aftermath of the pandemic. Let us hope that COVID is finally bidding adieu to our world and we never get to see this mayhem in our lives. It has been a roller coaster ride for almost everyone. Enormous tragedies, economic losses, failed resources and what not... It has been a nightmare which should never ever happen again.

Like the Phoenix emerging from the ashes, let us emerge from this holocaust. Optometry India has finally found its foothold on the 28th of March 2021. The onerous act was finally passed and has given a legal crown to Optometry India. Now the onus is on us. We need to live up to the expectations and take Optometry India to its Zenith.

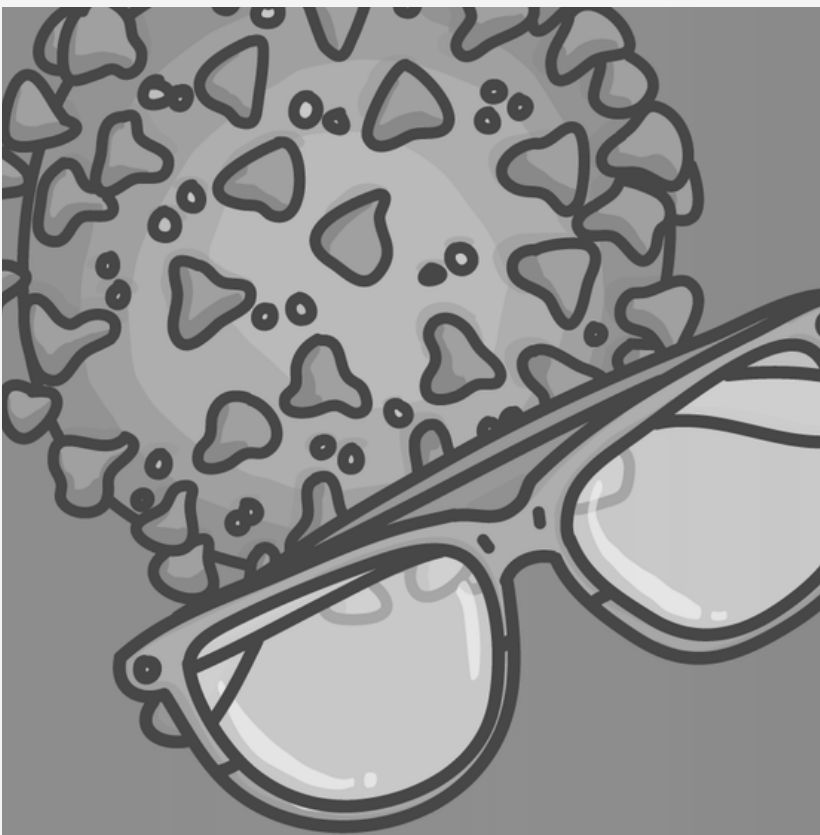
World Optometry did not reach the summit of eye care without efforts. The only way they did it was with unending perseverance. Education was the key. We need to follow that mantra in its totality. If Optometry India has to shine, it can be achieved only through education. That too continuous education. No matter what our educational credentials be, we need to update and upgrade our competencies till the time we practice Optometry.

ASCO India has planned out various programs for optometric education. We would also like to know from the students, educators and practitioners the ways in which we can support their knowledge and skills development. Please help us help Optometry India.


Until the next time we meet, let me leave you with the words of the great Rabindranath Tagore... Let us all live this dream...

Where the mind is without fear
and the head is held high
Where knowledge is free
Where the world has not been
broken up into fragments by narrow
domestic walls; Where words come
out from the depths of truth;
Where tireless striving
stretches its arms towards
perfection; Where the clear stream
of reason
has not lost its way into the
dreary desert sand of dead habit;
Where the mind is led forward
by thee into ever widening
thought and action-
into that heaven of freedom,
my father,
let my country awake.

Rabindranath Tagore



Like the Phoenix
emerging from the
ashes, let us emerge
from this holocaust.



FELLOW OF ASSOCIATION OF
SCHOOLS & COLLEGES OF OPTOMETRY

Application opens now..

Association of Schools and Colleges of Optometry - ASCO, India announces its 2020 unique Fellowship program that offers a blended learning approach in three specialty subjects – Contact lens, Vision Therapy and Low Vision Care.


Facilitate. Educate. Upgrade.

Sallient features of the 1 year fellowship programme:

- Candidates get to choose their mentor in the chosen speciality from the list of mentors
- Two personal contact programs with the mentor
- Hands on training and didactic lectures during two contact programs
- Continuous evaluation of the candidate by the mentor
- Exclusive access to the ASCO web portal with study materials on various speciality subjects of optometry from across the globe
- Fellowship conferred upon successful completion of assignment, written exam and viva

Earn 10 OCI credit points on completion of the fellowship

AN INITIATIVE OF



Association of Schools and Colleges of Optometry

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This year ASCO-India conducted virtual fellowship exam in April, 2021. Ms. Helly Shah and Ms. Devanshi Dalal from Nagar school of Optometry, Ahmedabad participated for Low vision care and Ms. Atri Sen from Canada participated for Contact lens. They were thoroughly examined in two phases (written and Viva).

It gives immense pleasure to announce that all three candidates have successfully cleared their fellowship exam. ASCO congratulates all three candidates being FASCO in their chosen specialties.

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ASCO CONGRATULATES ALL THREE CANDIDATES BEING FASCO IN THEIR CHOSEN SPECIALTIES.

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FASCO

Facilitate. Educate. Upgrade.

Fellowship of Association of Schools and Colleges of Optometry (FASCO) in India is an initiative by ASCO to encourage and inculcate continuous learning among Optometrist in India and abroad. The fellowship is offered in three specialties Contact lens, Low Vision care and Vision therapy.



CORNEAL COLLAGEN CROSS-LINKING WITH RIBOFLAVIN (CXL/ C3R)

Jeetesh Gurnani (D. Optom, B. Optom)

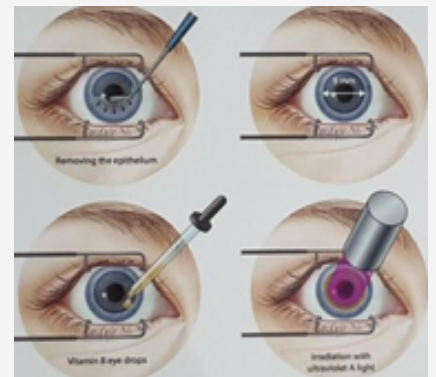
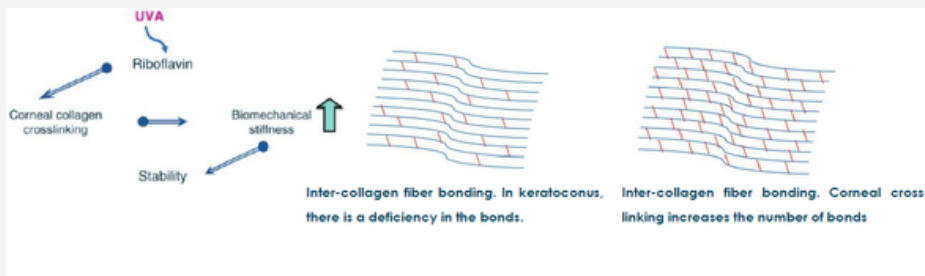
Riboflavin/ultraviolet A (UVA) – induced collagen cross-linking of the cornea (CXL) is a novel approach that aims at increasing the mechanical and biochemical stability of the stromal tissue. Its goal is to slow down or arrest KC progression to delay or avoid recourse to keratoplasty.

The purpose of this treatment is to create additional chemical bonds inside the corneal stroma by means of photo polymerization in the anterior two thirds of the stroma, while minimizing exposure to the surroundings.

The aim of this procedure is to increase corneal stiffness and achieve corneal stability

How does C3R work in Keratoconus?

Riboflavin or vitamin B2 is an easily absorbed micronutrient. CXL involves soaking the cornea with riboflavin solution typically for 20 to 30 minutes. This is followed by exposure of ultra violet (UV-A) light of 370 nm. Riboflavin molecules absorb energy delivered by UV-A light and reach an excited state. In its excited state the riboflavin generates free radicals or singlet oxygen moieties. These molecules can induce covalent bond formation thus cross-linking collagen fibres.



Epithelium	Riboflavin Conc.	Riboflavin Impregnation	UV-A fluence (mW/cm ²)	Irradiation time (min)	Total Energy (J/cm ²)
Off	0.1% Riboflavin with 20% dextran (Dresden Protocol)	Every 2 min for 30 min Every 5 min during fluence	3	30	5.4
Off	0.1% Riboflavin with 20% dextran (ACXL)	Every 2 min for 30 min Every 5 min during fluence	30	3	5.4
Off	0.1% Riboflavin with 20% dextran (ACXL)	Every 2 min for 30 min Every 5 min during fluence	18	5	5.44
Off	0.1% Riboflavin with 20% dextran (ACXL)	Every 2 min for 30 min Every 5 min during fluence	9	10	5.4
Off	0.5% Riboflavin, 0.9% NaCl (Hypo osmolar solution for pachymetry <400 µm)	Every 3 min for 30 min Every 20 sec for 5 min	3 – 18	Depending on the UV-A fluence	5.4
On	0.25% Riboflavin, HPMC, BAC, EDTA, NaCl (Transepithelial CXL)	Every 3 min in for 30 min	45	2.40	7.2

ACXL: Accelerated CXL

The corneal epithelium is debrided approximately 9 mm in diameter. The ectatic corneais irradiated with UV-A light following 0.1% riboflavin (Vitamin B2) eye drop instillation.

The C3R warrants removal of epithelium for better penetration of riboflavin and adequate effect of CxL.

The aim of epithelial debridement should ideally be removing epithelium in such a way so as to produce a painless and natural recovery, while leaving the corneal stroma untouched and Bowman's layer intact. This simple pre-operative step affects the clinical outcomes hence forms a crucial step in CxL.

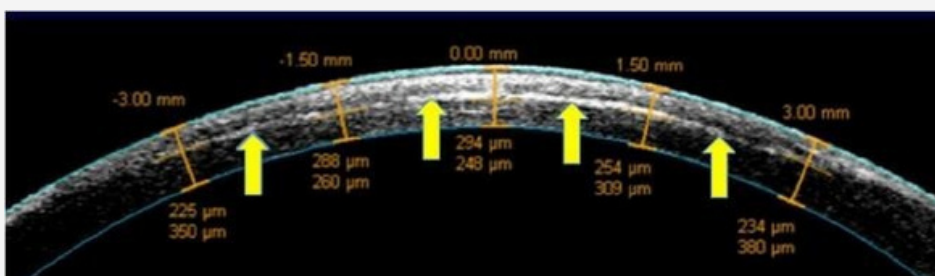
To avoid complications associated with epithelial removal, CxL can be performed by keeping the epithelium intact (trans - epithelial CxL (TE - CxL)). Modification in the riboflavin solution is made for TE - CxL. This helps in breaking the epithelial barrier by adding Benzalkonium chloride (BAC) and ethylene diamine tetra acetic acid (EDTA). However, it has been reported that the absorption coefficient achieved is only 37% that of epithelium off absorption.

To enhance the trans - epithelial absorption, iontophoresis has been implicated. Riboflavin being a negatively charged and water-soluble molecule makes it a good drug for diffusion through the intact epithelium, using an electric current.

CxL using iontophoresis has shown good clinical results but not compared to that of Dresden protocol.

To appreciate the outcome of CxL clinically, Doors et al described the formation of demarcation line on optical coherence tomography (OCT). This line appears as early as 2 weeks and is representative of the interface between the treated and untreated cornea.

Histologically, this area shows maximum zone of keratocyte apoptosis. In addition, in vivo study using confocal microscopy is coherent with histological and clinical findings that reveal keratocyte loss which persists up to 36 months and stromal oedema. Moreover, a nerve loss of the superficial plexus was also observed whereby the nerve start to regenerate by 1 month.



CxL should be avoided in pachymetry less than 400 μm due to a potential risk of toxicity to the endothelium. Use of hypo-osmolar riboflavin solution increases the corneal thickness. Clinically, it has been demonstrated that the corneal thickness increases from 337 μm preoperatively to 452 μm intra-operatively. However, the efficacy of CxL with hypoosmolar solution seems to be reduced when compared to conventional (Dresden) protocol.

Does C3R work in all keratoconus patients?

The answer to this question, depends upon the corneal surgeon and the protocol he/ she implicates. C3R being a foremost field of interest for the corneal surgeons, the modern protocols are studied on very regular basis, being Dresden protocol be the traditional and the most successful one yet.

So, theoretically, C3R does have some contradictions. So, we can simply say that C3R does not work in all keratoconus patients virtually.

This demarcation line is due to the difference between the (hyper-reflective) cross-linked tissue and the residual posterior less-crossed-linked tissue

Let's focus on those contraindications, but some can be overcome by the modern protocols of the procedure being developed. Corneal thickness is one of them which can be overcome by using hypo osmolar riboflavin solution methodology.

Before that, let's see the conditions that makes C3R suitable for KC patients:

Upon decision, the following questions mount:

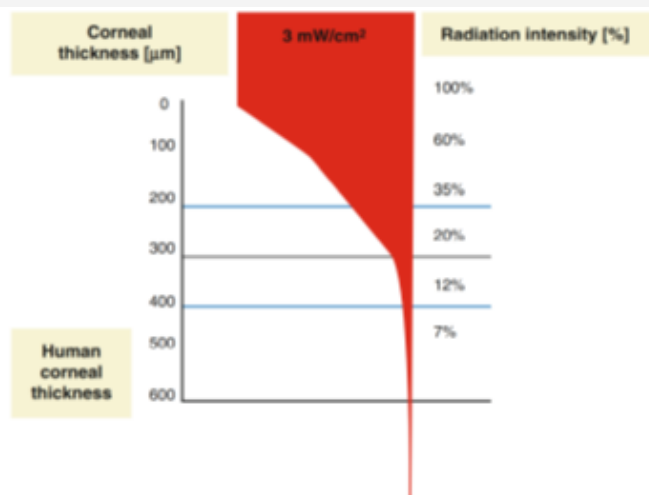
- Is the cornea suitable for CxL? i.e., clear cornea and corneal thickness at the thinnest location is $> 400 \mu\text{m}$.
- Are there any risk factors that might lead to unpleasant healing responses?
- What does the patient expect from the procedure (visual expectation)?
- Is the aim of CxL to stop the progression or to prepare the cornea for PRK or for both?

Contraindications:

The answers to the above questions compose part of the contraindications for CxL. Contraindications include:

- Corneal thickness $< 400 \mu\text{m}$ at thinnest location because of danger of damaging the endothelium
- K-max $> 60 \text{ D}$.
- High visual expectations.
- Corneal epithelial healing disorders.
- Previous herpes keratitis.
- Corneal melting disorders (rheumatoid).
- Pregnancy.
- Continuous eye rubbing habits especially when associated with the following systemic conditions: Leber congenital amaurosis, Down syndrome, atopic disease, contact lens wear, floppy eyelid syndrome, and nervous habitual eye rubbing.
- Corneal scarring.

Fig. 3.27 Safety margin of corneal cross-linking. When UV light penetrates a saturated stroma with riboflavin, it will be absorbed and a small safe amount will reach the endothelium



Expected Changes After CxL

- Biochemical bonding of collagen fibers lead to changes in the corneal curvature and thickness and shrinking of collagen fibers displace the cone towards the center of the cornea. These changes lead to a temporary increase in K-readings (by 2.0–2.5 D), an increase of minus spherical component of the refractive error by 2.0–2.5 D
- Corneal dehydration induced by the intensive exposure to UV light during the treatment leads to a temporary reduction of central corneal thickness by 30–50 μm .

Complications of CxL are rarely encountered. They include:

- Herpetic keratitis with iritis
- Induction of diffuse lamellar keratitis after CxL in a patient with post LASIK ectasia
- Loss in BSCVA of 2 or more Snellen lines
- Failures to stop the progression or failures to achieve the demarcation line
- Haze
- Corneal melting
- Microbial keratitis with Acanthamoeba and Pseudomonas (very rare)

Typical Final Clinical Outcomes:

- Reduction of K-max by 1.0–2.0 D
- Stability that is statistically proven over 48 months
- 1–2-line gain in BSCVA
- Low-to-moderate haze up to 6 months post-surgery

LIGHT THE CIGARETTE - BLACKOUT THE SIGHT

Optom. Kinnari Kalaria, Nagar School of Optometry, Gujarat University

Globally, 2.2 billion people are visually impaired due to many reasons. Smoking is one of the major risk factor for various ocular diseases including glaucoma, age related macular degeneration, cataract, etc. which are leading causes of vision impairment. India has 12% of the world's smokers and it has been estimated that close to 9,00,000 people die every year due to smoking. This article focuses on ocular and systemic conditions which affect the sight.

TYPES OF SMOKING

There are two types of smoking: Active and Passive. Active smoking is defined as a puff of smoke that is directly inhaled or breathed whereas in passive smoking, non smokers are exposed to smoke which is blown out by an active smoker. Passive smoking has similar affect to that of active smoking. There are various ways of smoking like Pipe smoking, hookahs/ water pipe, cigarette, bidi's - However the most common is cigarette smoking.



MECHANISM OF ACTION

Smoking attacks our body by increasing the level of oxidants and decreasing the level of antioxidants. Heavy exposure to smoking leads to biological and chemical changes in the lungs and then in different organs.

SYSTEMIC PROBLEMS

Smoking can cause cancer of various organs such as lungs, bladder, kidney, throat, mouth, esophagus, stomach, cervix, ovaries. Smoking significantly reduces sperms motility and sperm count as compared to non smokers. Also, smokers are at high risk of erectile dysfunction. A pregnant smoker is at high risk of infant's death due to sudden infant death syndrome (SIDS).

OCULAR PROBLEMS

- **CATARACT:** Smoking is major risk factor for developing cataracts. Although considered to be an age related disease, heavy smokers are at higher risk of developing nuclear and cortical cataracts.
- **RETINAL COMPLICATIONS**
 1. Age related macular degenerations (ARMD):- Smokers have 2-3 fold high risk of developing age related macular disease compared to non smokers. However, quitting smoking decreases the progression of ARMD.
 2. Diabetic retinopathy:- Smoking affects proper utilization of insulin leading to increase in blood glucose level resulting in worsening of diabetic mellitus. Long standing diabetes leads to diabetic retinopathy.

Smoking is one of the major risk factor for various ocular diseases including glaucoma, age related macular degeneration, cataract, etc

3. Retinal vein and artery occlusion:- Smokers are at higher risk of hypoxia, leading to retinal artery and vein occlusion.

- DRY EYE: Smoking can cause tear film impairment, itching of eye, redness, blurred vision & discomfort.
- TOBACCO(TOXIC) AMBLYOPIA: It can lead to loss of vision (both eyes), Showing symmetrical scotoma & acquired disturbance of colour vision.
- GLAUCOMA: Smoking leads to narrowing of blood vessels which can affect perfusion of the optic nerve. Primary open angle glaucoma (POAG) is the most common type among smokers.
- OPTIC NEURITIS: Smokers with optic neuritis have high risk of Red-green colour defect than non smokers & Transmit loss of vision is common.
- THYROID EYE DISEASE: Smokers are at high risk of developing graves ophthalmopathy.
- UVEITIS: Smokers have high risk of uveitis localized to vitreous & peripheral retina or whole uveal tract with accumulation of fluid in macular region.

In addition to ocular diseases, smoking also affects various visual functions including visual acuity, contrast sensitivity, colour vision & visual field changes and thereby could affect quality of life in these individuals.



Detailed examination of visual functions in smokers is essential to rule out early ocular and visual changes.

MANAGEMENT PLAN FOR SMOKING REDUCTION

Rehabilitation centers provide counseling to the individuals, prescription medicine such as varenicline is used for smoking cessation. Nicotine replacement therapy in the form of nicotine patch application on skin decreases the addition of smoking.

One can also visit <https://smokefree.gov/>, <https://quitnowapp.com/en> for detailed information on smoking reduction.

CONCLUSION

Smoking in addition to being a social problem is also associated with various systemic as well as ocular disorders. Reduction or stoppage of smoking can help in the prevention of systemic and ocular diseases. Appropriate management plan for smoking reduction is important.

India has 12% of the world's smokers and it has been estimated that close to 9,00,000 people die every year due to smoking.

CATARACT AND LOW VISION

Optom. Helly Shah, Nagar school of Optometry,
Gujarat University

Cataract is the major cause of blindness worldwide and cataract surgery is the most frequently performed ophthalmic surgical intervention. More than 66 countries have established National Blindness Control Programs or committees, where cataract surgery is the major activity. Cataract is an age-related disease and there are currently no effective preventive measures.

Ongoing services are therefore required, that are able to deal with existing (prevalent) as well as new cases (incident). The numbers of cataract cases are increasing rapidly because of population growth, increasing longevity and the growing desire of the patients to seek surgery in the early stages of visual disability.

Who is at risk?

Approximately 90% of visually impaired people live in developing countries. About 65% of all people who are visually impaired are aged 50 years and older and this age group comprises about 20% of world's population. With an increasing elderly population, more people will be at risk of visual impairment due to chronic eye disease and ageing processes as per the ICD - 10. Childhood cataract is one of the most important causes of blindness and severe visual impairment in children and is responsible for 5-20% of paediatric blindness worldwide. It is estimated that 200 000 children worldwide are blind due to cataract, and that 20 000-40 000 children are born each year with congenital cataract. Cataract blindness in children presents an enormous problem to developing countries in terms of human morbidity, economic loss, and social burden. According to the latest assessment as per WHO, cataract is responsible for 51% of world blindness. Although cataract can be removed, in many countries barriers still exist that prevent patient to assess the surgery.

Management:

Surgical treatment and post surgically, if visual acuity is impaired, low vision aids are the option of management. Low vision centres are scarce in rural areas; so at least minimal management for low vision should be known to optometrist in PHC. Prescribing glasses for distance, spectacle or handheld magnifiers for near can enhance residual vision of patients having low vision due to cataract.

Low vision management:

For Children

A poor management of low vision in children with congenital cataract adds to economic, social and psychological problems for both family and community as well. The management include refraction, prescription of low vision devices – optical and non optical, low vision training, treatment of amblyopia and visual stimulation. A telescope could be prescribed for board work and long distance task for and high plus spectacle devices for reading task. Unlike other low vision children, these children require an addition for near vision tasks due to loss of accommodation.

These children also need good contrast, proper illumination for writing and reading activities and counselling sessions with parents for educational and vocational needs. The comprehensive and timely low vision care of children with paediatric cataract and associated decreased vision could minimize long term permanent visual disability.

STRATEGIES TO PROTECT YOURSELF AGAINST COVID-19 IN YOUR PRACTICE

- Administer a questionnaire to understand the patient's COVID exposure, travel history, etc.
- Screen your patients for temperature and respiratory distress symptoms.
- Use appropriate PPE – face masks, eye wear/face shields, gloves, etc.
- Train administrative personnel working in the reception of patients on hand hygiene, social distancing, use of facemask, for them and incoming patients.
- Maintain air circulation
- Use distant waiting chairs



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TAKING ALL PRECAUTIONS IN PROTECTING OUR PATIENTS AND OUR TEAM

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- Remove the majority of bioburden, and disinfect equipment and environmental surfaces.
- On the way back home, follow all precautions and on return, follow the removal of shoes, change of clothes, having a wash and disinfect your mobile, wristwatch etc.

Association of Schools and Colleges of Optometry

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