WHAT IS CORNEAL CROSS-LINKING?

• Also known as CXL, it is a minimally-invasive treatment that strengthens stromal tissue.
• CXL is used to stabilize the stroma in many degenerative corneal diseases including keratoconus and pellucid marginal degeneration.

HOW DOES IT WORK?

• The cornea is strengthened by application of riboflavin (vitamin B2) followed by treatment with UVA light.
• Numerous studies have shown that treatment can increase the rigidity of human corneas 300% or more.
• Biomechanical rigidity and biochemical resistance of the cornea is increased through:
  1. Instantaneous formation of covalent bonds (crosslinks) and inhibition of collagenase.
  2. Long-term stabilizing effect by synthesis of new collagen with different structure and resistance.

PURPOSE

• To halt progressive corneal ectasia.
• Prevent disease progression through corneal stabilization.
  o Early disease – prevent necessity for rigid contact lens wear.
  o Moderate disease with rigid lens wear – prevent corneal transplantation.

PATIENT SELECTION

• In general, 15 years or older with the ability to cooperate during treatment.
• Progressive corneal ectasia.
• Increase in spherical and/or cylindrical component of refraction.
• Decrease in best corrected visual acuity.
• Topography showing alteration in corneal shape and disease progression.
• Note that significant corneal scarring and/or the ability for RGPs to no longer provide reasonable vision are indications the patient is beyond the utility of CXL.

EVALUATION FOR TREATMENT

• A referral form is available in the For Doctors section of our website.
• We request findings that support progressive corneal ectasia.
• This includes baseline and recent topography.
• K reading and/or manifest refraction if topography is not available.
• Recent BCVA with RGP lenses.
• Before our pre-op evaluation, soft lenses must be left out at least 7 days and RGPs at least 2 weeks. This can be done one eye at a time.

CONTRAINDICATIONS

• Pachymetry less than 400 microns, with some exceptions.
• Prior herpetic corneal infection.
• Current infection.
• History of poor epithelial wound healing.
• Severe ocular surface disease.
• Autoimmune disorders.
• Significant corneal scarring.
• RGPs no longer provide reasonable vision.
RECOVERY

- Similar to PRK
- Topical NSAID and prescriptive oral pain medication prescribed to improve comfort

DISCHARGE INSTRUCTIONS

- Prednisolone acetate 1% - qid x 1 week, bid x 2 weeks, qd x 2 weeks
- Moxifloxacin – q2h x 1 day, qid until re-epithelialized
- Acuvail – 1gt q5m for 15 minutes followed by q2h as needed for pain up to 24 hours following procedure
- Hydrocodone – 5/325mg – or – 7.5/325mg, dispense 14 tablets, q4-6h as needed for pain, no more than 5 tablets per day
- Frequent use of preservative free artificial tears
- Patients are educated to avoid exposure to sunlight for a minimum of 24 hours
- If riboflavin is still evident during the 1 day post-op slit lamp exam (yellow tinged corneal tissue), UV protection should be continued
- Patients are instructed to be out of their contact lenses for 2 weeks post-operatively

POST-OPERATIVE CARE

- Until post-operative expectations are established, these exams will be done at PCLI:
  - 1 day
    - VA, slit lamp evaluation
  - 3-5 days
    - VA, slit lamp evaluation, BCL removal
  - 1 month
    - VA, AR, IOP, slit lamp evaluation, topography
  - 3 months
    - VA, AR, IOP, slit lamp evaluation, topography
  - 12 months
    - VA, AR, MR, IOP, slit lamp evaluation, topography
      - Additional treatment may be considered if continued progression is evident on topography. Studies show previous CXL does not reduce effect of follow-up procedures.

HEALING

- Maximum keratometry and visual acuity is typically worsened at 1 month followed by improvement and stabilization after 6 months
- There is initial epithelium thinning, stromal edema and keratocyte apoptosis on confocal microscopy that explains the initial worsening at 4-6 weeks
- Improvement after 3 months is demonstrated by epithelial thickening, decreased edema and collagen compaction

INCREASED RISK OF COMPLICATIONS

- Patients >35 years old
- Pre-op CDVA better than 20/25
- Pre-op maximum K reading greater than 58 diopters
- Vogt striae associated with risk for permanent stromal haze

POTENTIAL COMPLICATIONS

- Delayed re-epithelialization
- Corneal haze
- Inflammation
- Infection
- Increased IOP from steroid response
- Endothelial issues
- Treatment failure