The Continuum of Care for Keratoconus

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Course Description:
With the more sophisticated and earlier diagnosis of keratoconus, we need to be prepared to treat our patients early and throughout their journey. We are in it for the long run; considerations for the progressive disease require an understanding of all the treatment options that best serve our patients as their condition necessitates more advanced and personalized care.

Learning Objectives:
1. Understand the equipment needed for diagnosing and monitoring keratoconus
2. Gain insight into how genetic testing can be utilized within the keratoconic population
3. Differentiate between the different keratoconus stages
4. Appreciate the role corneal crosslinking plays in keratoconus disease management & when to make the referral
5. Determine which contact lenses are appropriate for each stage of the disease
6. Be conscious of the complexity of scleral shape and how it impacts scleral fitting

Outline:
I. The diagnosis of keratoconus (10 min)
    a. Prevalence
    b. Etiology
        i. Associate systemic conditions
        ii. Eye rubbing
        iii. Inflammatory component
        iv. Genetics
            1. Genetic testing
    c. Detection
        i. Necessary equipment
            1. Topographer vs Tomographer
            2. Pachymeter
            3. Slit lamp
                a. Clinical signs
            4. Retinoscopy

            a. Retinoscopy study
        ii. Special equipment
            1. Anterior-segment OCT
                a. Global pachymetry
                b. Epithelial thickness mapping
            2. Corneal hysterometer for corneal biomechanics
            3. Aberrometry
    d. Treatment Options
        i. Corneal collagen cross-linking
        ii. Glasses
        iii. Contact lenses
        iv. Corneal inlays
        v. Topography guided ablation
        vi. Cornea transplant
    e. When to monitor vs when to refer (5 min)
        i. Depends on age/risk of progression, genetic testing
        ii. Corneal collagen cross-linking
            1. Who is it approved for?

II. Keratoconus staging and vision correction at each stage

    a. Sub-clinicial / Form Fruste (2 min)
        i. Glasses
        ii. Off-the-shelf soft contact lenses
        iii. Custom soft contact lenses
        iv. Corneal gas permeable
        v. Hybrid contact lenses – regular cornea designs
    b. Mild (5 min)
        i. Custom soft contact lenses
        ii. Corneal gas permeable
        iii. Hybrid contact lenses – irregular cornea designs
            1. 1st generation vs 2nd generation designs
            2. Diagnostic vs empirical fitting
        iv. Advantages/disadvantages of custom soft vs corneal GPs vs hybrids
    c. Moderate (5 min)
        i. Hybrid lenses
        ii. Scleral lenses
        iii. Advantages/disadvantages of hybrid vs scleral lenses
            1. Proper patient selection
            2. Choosing the correct profile: Prolate vs oblate design
    d. Advanced
        i. Scleral lenses
            1. Complexity of scleral shape (8 min)

a. Sclera is flatter nasally & steeper temporally
b. The shape of the corneo-scleral junction is linear
c. Amount of toricity and asymmetry increases further away from the limbus
d. The cornea is oval and has an elliptical shape
e. Irregular corneas will have more irregular scleras as well
    i. Greater ectasia decentration = more asymmetric scleral shape

2. Diagnostic fitting (5 min)
    a. Where to start?
    b. Tips for perfecting the fit
        i. Take note of the HVID/VVID
        ii. Optimize limbal clearance
        iii. Align with the sclera
            1. What to do with sclera obstructions (pterygiums, pingueculae, tubes/blebs)
3. Instrument based fitting (8 min)
    a. Profilometry guided
    b. Profilometry designed free-from sclerals
        i. Advantages/disadvantages
        ii. "How-to" guide
4. Impression based fitting (2 min)
    a. Determining when it is the most valuable

ii. Surgical intervention (2 min)
1. When to consider
2. Declining rates of PK due to both CXL & CL advancements

III. Conclusions