Keratoconus: Diagnose and Manage Like A Pro

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No financial disclosures

How many people have keratoconus?

150,000 to 180,000

What's the worst thing you can do with keratoconus?

Miss the diagnosis

For keratoconus, what is the most common incorrect diagnosis?

Amblyopia

Types of Amblyopia

- Refractive
- Strabismic
- Form Deprivation

R/O Amblyopia: Need at least one of these things

- A tropia or phoria
- Assymetric refractive error
- Extreme bilateral refractive
- Some obstruction along line of sight

Things we can do to confirm our diagnosis of keratoconus

Refraction

- Large changes in cylinder
- Shifts in axis
- BCVA not 20/20

Retinoscopy findings for keratoconus

Scissors motion

Slit Lamp Findings

- Vogt's Striae
- Fleisher's ring
- Corneal thinning
- Prominent corneal nerves
- Munson's sign

Keratometry findings for keratoconus

Distorted mires

Oval mires

Non superimposable central rings

Pachmetry findings for keratoconus

You want thinnest point of cornea

Do every year on keratoconus patients

Quick GP VA Check

- Put in a drop of anesthetic
- Apply GP roughly equivalent to BC
- Do VA and OR

Corneal Topography

- Measures the curvature and shape of the cornea and displays color-coded maps

Once we make the diagnosis what is the next worst thing to do?

The Worst Thing

- Send him to an ophthalmologist
  - OMDs don't know the first thing on CL options
  - So what are they going to do?
    - Refer to OD for GP fit
    - Recommend surgery

2 main surgical options

- PKP
- Corneal cross linking

Reasons why patients with keratoconus get sent for surgery

Risk of perforation

- How often does the cornea perforate?
- Almost never

Scarring of cornea

- Mostly due to CL abuse and/or improperly fit lens
- As scarring progresses, CL refit can often stop the process. Patients only need surgery if you wait too long to refit them

Progression of Kconus

- Most of it happens in teenage years
- A few women progress when they are pregnant
- Progression can be as short as 2-3 year or as long as 10 years

GP intolerance

What I Say…

- The percentage of patients who are truly GP intolerant is WAY over-rated
- I find 1-2 patients a year at the most who are GP intolerant
- The vast majority of them have not been properly fit or prepared for the process

Ways to avoid GP intolerance

- Use large diameter lens
- Be liberal with punctal plugs, artificial tears, and/or allergy drops
- Build up wear time slowly

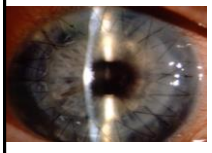
Ways to avoid GP intolerance

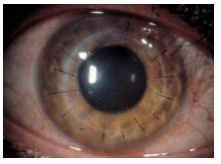
- Make sure patient is properly motivated
- 1. Wait for vision to be bad enough to motivate the patient to work through the discomfort
- 2. Discuss surgery
- 3. Make sure your fees are high enough

PKP is second most common transplant done in U.S.

46,000 procedures a year

Keratoconus s/p PKP





Post Op

- Eyedrops for months, years, and sometimes forever
- Fluctuating, hazy vision for months
- 2/3 of patients will need a GP to restore vision

After the PKP

- Average VA in immediate post op is around 20/200
- By 6 months mean BCVA is 20/60
- By 1 year BCVA around 20/30

What is the overall success rate of PKP?

But…

Definition of Success: Clear graft at 90 days

What is the 1 year survival rate for a cornea after transplantation?

90%

What is the 10 year survival rate for a cornea after transplantation?

60 to 70%

For these reasons…

- My recommendation is always to exhaust all options before sending a patient for PKP

Corneal Cross Linking

Contraindications

- Prior herpetic infections
- Corneal scarring or opacification
- H/O poor wound healing
- Autoimmune disease
- Corneal thinning less than 400 nm

Results

UCVA

- No change: 51%
- Improve: 31%
- Decline: 18%

BCVA

- No change: 47%
- Improve: 45%
- Decline: 8%

Kmax

- No change: 39%
- Decrease: 51%
- Increase: 10%

Patient Expectations

- Discomfort for several days
- VA return to baseline 2-6 months
- Costs $3000 to $4000

Complications

- **Delayed corneal reepithelization**
- **Infection**
- **Corneal endothelium cell damage – in thin corneas**
- **Keratouveitis**
- **Severe corneal haze**

Newest variations… epi on

- Much safer and faster recovery for patients
- Will ODs be able to perform?
- Why do the procedure at all – just use Riboflavin drops

The Bad But Not Worst

- Send him to a fellow optometrists
  - OD will take good care of your patient
  - But who makes the money and who's practice gets built?

The Best

- Do it all by yourself
  - Lots of resources
  - Not as bad as you think

Theoretical Options

- Spherical GP
- Hybrid Lens
- Piggyback fit – GP fit over SCL
- Speciality GP fit
- Scleral Lenses

My Order of Options

- Eyeglasses
- Soft contact lenses
- Specialty GP fit

The easy way

- Get patient's chart and call in K's, topo, MR to lab and they will send the first lens

Next Step

- When lens comes in, apply the lens after instilling topical anesthetic
- After 20 min, check VA and grossly check fit.
- Even if not perfect, send patient home

Next Step

- After 2-3 weeks, when patient comes back check VA, do take pix of SLE, email to lab
- Do NOT worry about fluorescein patterns or whether the fit looks good --- this is no longer your job
- They will send second lens to you, if needed

Then…

- Step 5: Repeat this process until done
- With 2 or 3 lenses, you will successfully fit 90% of your patients

Advantages/Disadvantages

- Advantage:
  - You kept the fitting process in-house
  - You make the money on the patient

Advantages/Disadvantages

- Disadvantage:
  - You still did not learn about how easy it is to fit a keratoconus patient and needed a consultant to help you

Your investment


Last thing you need… Motivation

Its all about the money

- CL Initial Fit: Anywhere from $1000 to $1500
- CL materials: anywhere from $500 to $800

Its all about the money

- Billing codes – 92072
  - Initial CL fitting of patient with keratoconus

Its all about the money

- Average keratoconus patient worth over $1200 for a new fit/diagnosis
- $400 to $600 for returning annual patients

Do the Math

ODs at least 12 patients with keratoconus a year

New patients worth $1,200 each (6)
Returning patients worth $600 each (6)

Therefore annual revenue: $10,800 from just the fitting – doesn't include exam, topography, etc

Do the Math

- If you practice 30 years that is over $300,000
- What's in your wallet? Or more accurately, is this $300,000 in your wallet or someone else's?

Your ideal goal in GP fit…

- 3 point touch:
- Minimal bearing (touch) at the corneal apex and an area between the periphery of the lens and the intermediate zone of the cornea

My Fool Proof Method for Fitting Keratoconus Patients

- Find the steepest point of the cornea
- Find the flattest point of the cornea
- Your lens will be somewhere in between

Here we go…

- Select Base Curve – Flatter of the Two K readings from Topography or keratometer
- Evaluate Fluorescein Pattern – should be too flat. Steepen until you achieve a good 3 point touch

Next Step

- When lens comes in, apply the lens after instilling topical anesthetic
- After 20 min, check VA and grossly check fit.
- Even if not perfect, send patient home

Next Step

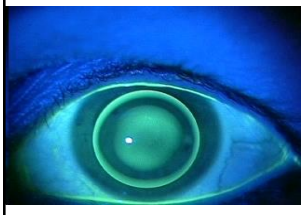
- After 2-3 weeks, when patient comes back check VA, do OR, and evaluate fluorescein patterns
- In most cases, you will only need to make minor modifications to BC
- Order second lens if needed

Then…

- Step 5: Repeat this process until done
- With 2 or 3 lenses, you will successfully fit over 90% of your patients

CLEK: Most fit too flat

7.10 / 8.7 Standard



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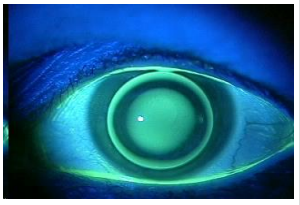

Remember…

- It's one of our high ticket items
- It's one of the few things we can do which is life changing for our patients