The contact lens miracles

Keratoconus

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Introduction

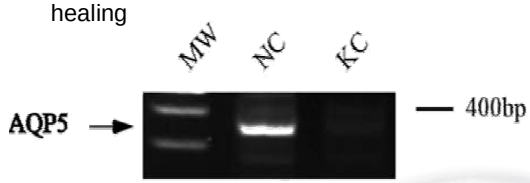
- Keratoconus is a chronic, non-inflammatory, degeneration of the cornea
- 94% diagnosed between 12 and 39 years
- Prevalence 54.5 - 600 / 100´000
- No gender or sex dependence

Etiology: Genetics

- Probably hereditary cornea disorder
  - Quite popular in deep valleys or islands
- Bowman Membrane probably with defects
- 9 genes associated with KC
  - 21, 20q12, 20p11-q11, 17, 16p, 15q, 13, 5q14.3-q21.1, 3p14-q13, 2p24

Etiology: Genetics

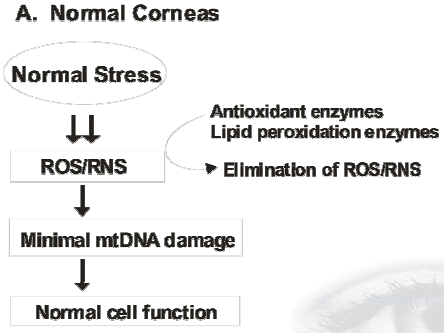
- Missing Gene: Aquaporin 5 (AQP5)
  - Water transport gene, plays a role in wound healing



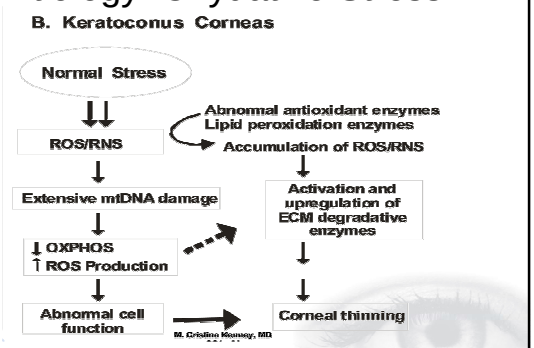
Etiology: Oxydative Stress

- Unlikely one single gene defect
  - (9 genes associated with KC)
- Multiple genes involved which are related to oxydative stress pathway
- Different KC patients may have different factors of the pathway affected

Etiology: Oxydative Stress



Etiology: Oxydative Stress



Etiology: Environment

- Eye rubbing habitus
- Atopy/Allergies
- Poorly fitted contact lenses
- UV exposure

Detecting Keratoconus

Pachymetry Topography Biomicroscope

Detecting Keratoconus

- Patient history
- Refraction
- Retinoscopy
- Ocular inspection with Biomicroscope of the anterior segment
- Mires (Keratometer)
- Videokeratography
- Pachymetry

Amsler Grade 1

- Mires <3° distortion
- Retinoscopy produces scissor–type reflect
- Astigmatism obliquus
- often called “form fruste”

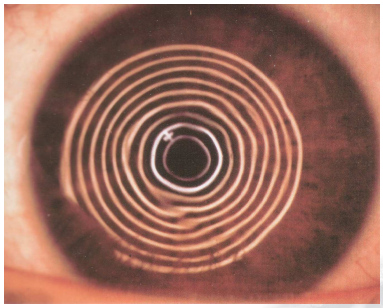
Amsler Grade 2

- Mires 4°- 9° distortion
- Decreased vision with spectacles
- Apical thinning
- Fine fibrillary lines at the subepithelial and anterior stromal levels.

Amsler Grade 3

- Distortion of Placido-Rings
- Impossible to correct vision properly for spectacles
- Apical thinning

Amsler Grade 3



Amsler Grade 3

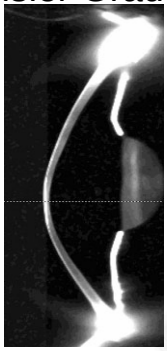
- Vertically oriented stress or Vogt lines at posterior cornea
- Vertical descement striae
- Stromal nerve fibers will appear more prominent

Amsler Grade 3

Amsler Grade 4

- Corneal central radius <5mm
- Apex displacement toward 270°
- Corneal ectasia, Apex pulsation possible
- Monocular diplopia

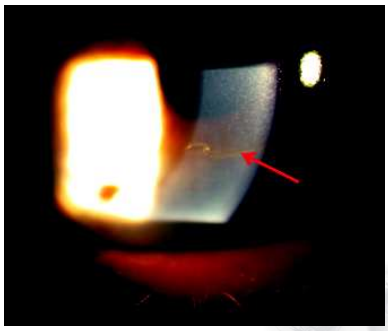
Amsler Grade 4



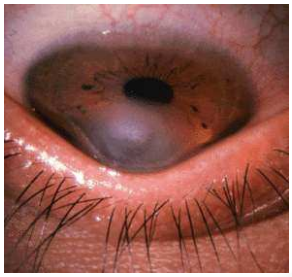
Amsler Grade 4

- Brownish-orangish ferrous (Protein Ferritin) ring at the base of the cone (Fleischer ring)
- Cracked descement membrane
- Scarred corneal lamellae may appear at Bowman's and anterior stromal levels

Amsler Grade 4

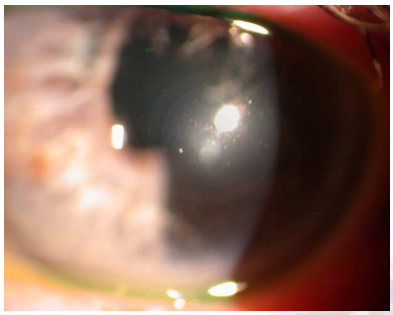


Amsler Grade 4

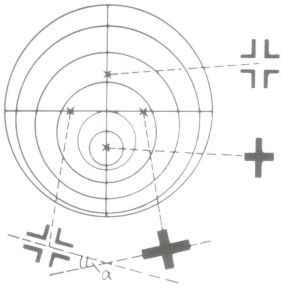


Munson Sign

Hydrops



Mires (Javal Keratometer)



Mires (Javal Keratometer)

- Distortion of 3° or more
- Steeper Radius in 270°, by looking 5° upwards
- Let the patient observe the upper edge of the Objective of the Keratometer

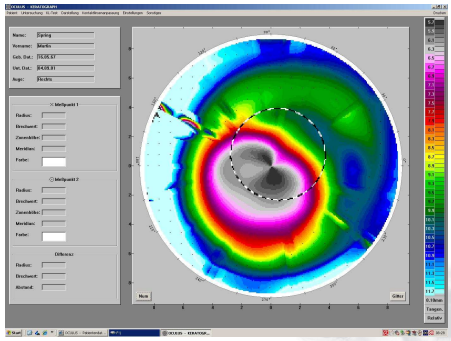
Mires (Amsler-Muckenhirn)

Grade	In-clination of mires	Radii	VA with glasses	VA CL (RGP)	Corneal transpa-rency	Pachy-metry	Eccen-tricity
1	0°- 3°	7,50	0.8 – 1.0	1.0	normal	500 micron	< 0,8
2	4°- 9°	6,50-7,50	0.3 – 0.8	0.8 – 1.0	normal	300 - 500	0,8 – 1,2
3	> 9°	5,80-6,50	0.15 – 0.3	0.5 – 0.8	Slight central dulling	200 - 300	1,2 – 1,5
4	Difficult to measure	<5,80	< 0.15	< 0.5	Moderate central dulling	<200 micron	> 1,5

Videokeratography

- Quick and precisely information about the status of keratoconus
- Gives your patient an imagination
- Important information for the fitting procedures of contact lenses

Videokeratography



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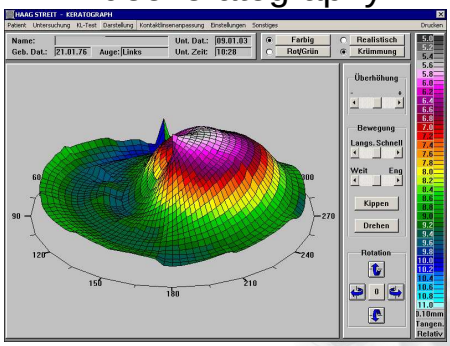
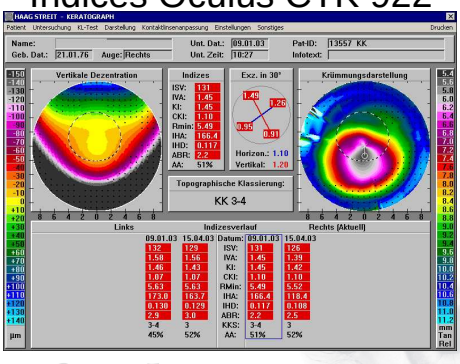


Indices Oculus CTK 922

- Dr. Bürki, Thun, Switzerland
- New state of the art in communication with ophthalmologists
- Every involved person speaks the same medicine “language” and it is possible to quantify with the same dates and interpretation!

Indices Oculus CTK 922



Indices Oculus CTK 922

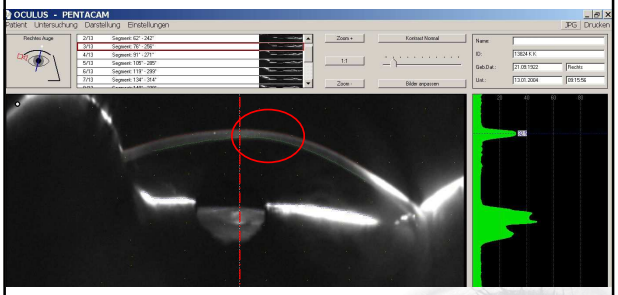
Please note:

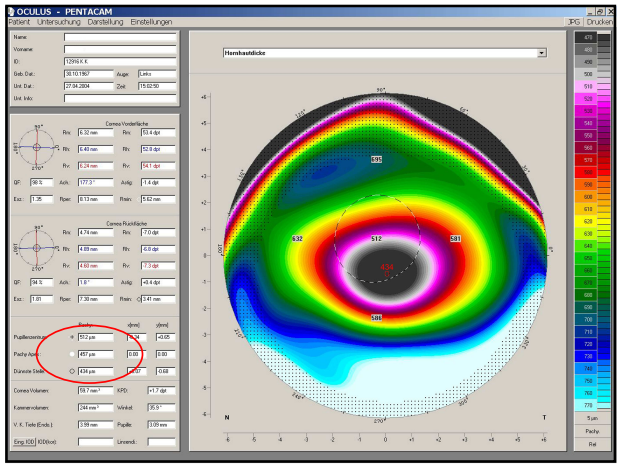
- This assessment by the Keratographer software is entirely based on topography and is not to be regarded as a basis for a clinical diagnosis!!

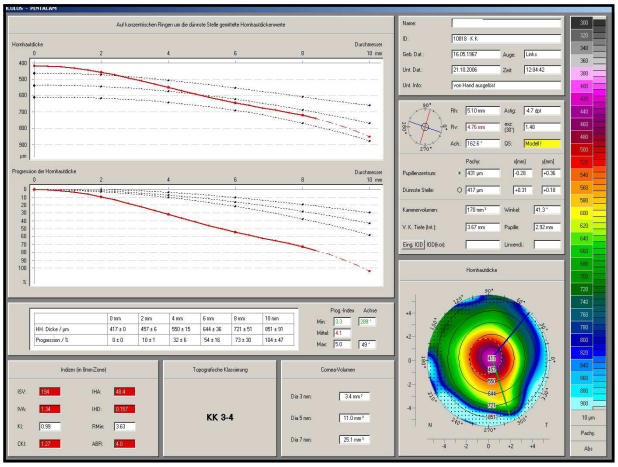
Pachymetry (Pentacam)

- Rotating Scheinpflug Camera with 25’000 measurements
- Features:
  - Chamber angle, volume and size
  - Topography of the front and back surfaces
  - Corneal thickness over the entire cornea

Pachymetry (Pentacam)







Amsler – Muckenhirn Grading

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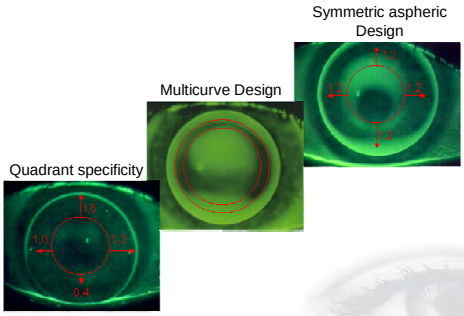
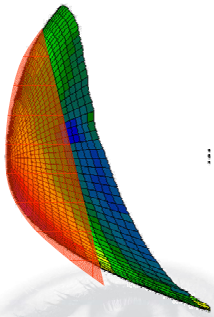
Contact lens fitting procedures

Contact lens fitting procedures



Rotation symmetric Design

- Rotation symmetric design
- Pay attention to the edge lift in 270°



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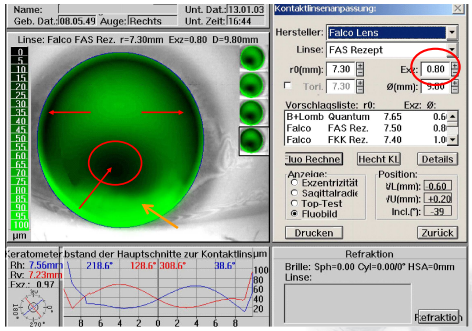
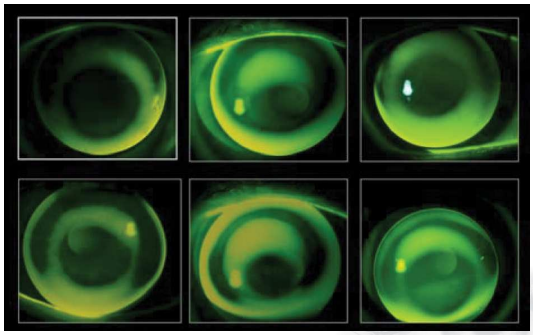


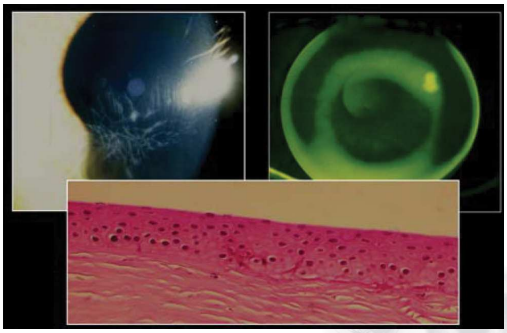
Flat fitting and Apical Touch



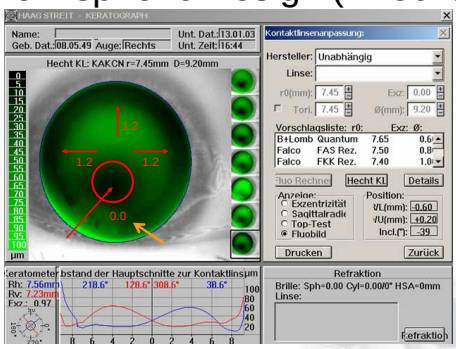
Incidence of scarring

- CLEK Study 1994 - 2002 (1'209 PX)
  - 32% of flat fitted Px by eight years vs. 14% steep fitted
- Korb et al, 1982 (7 Px)
  - 57% flat vs. 0% steep after 12 month
- Maguen et al, 1983
  - 25% flat by three years had "sign. staining"

Flat fitting and Apical Touch

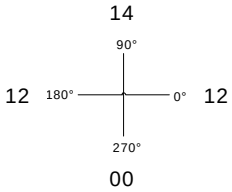


Hemispheric Design (Knecht)



Quadrant-specific FKQ Design

- Falco, Switzerland
  1. Generation since 1991
  2. Generation since 2001
- **F**alco **K**eratoconus **Q**uadrant-specific
- 12 12 14 00 are the eccentricitys in each quadrant



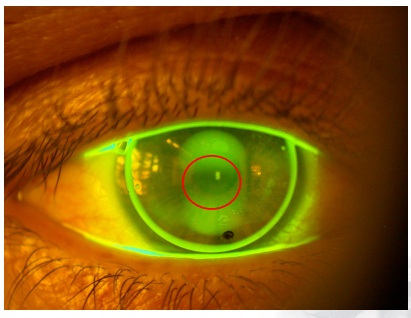
Quadrant-specificity Design

- Fit the lens in every quadrant as good as possible to the origin cornea curvature
- Fitting over the periphery, not taking the center curvature as a reference!
- All parameters can be manipulated individually

Quadrant-specificity Design

- The lens has inferior a black colored engraved point which must be inserted in 270°
- Design includes a hollow in the back curve center to relieve the apex
  - Makes the fluorescein pattern looks like slidely steep fitted

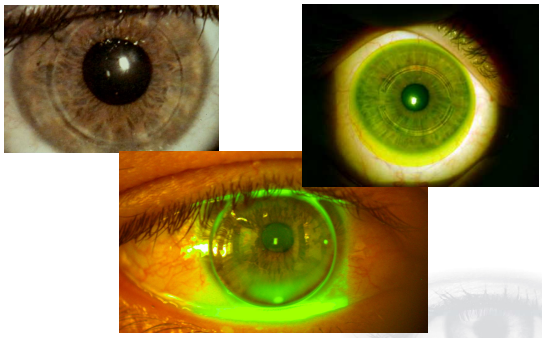
First apical clearance



Material

- High DK (100) Materials
  - Boston XO / HDS 100 / Contamac Extra
- Hyper DK (>100) Materials
  - Menicon Z / Contamac Extreme
- Frequently replacement because of the distortion of the contact lenses

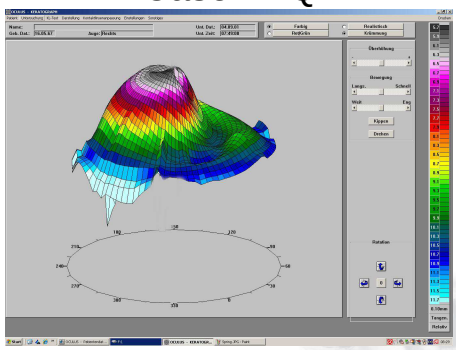
Diameter



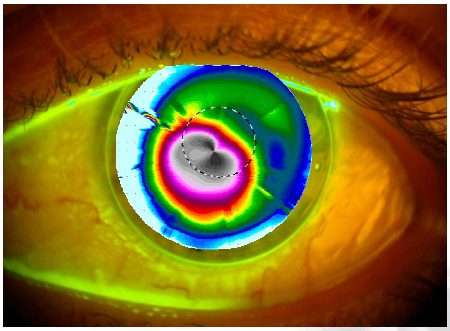
Diameter

- Try to fit as small as possible. But never touch the apex!
- As the contact lens gets bigger, as freaky the design will be
- On the other hand, bigger lenses will transport lens pressure into periphery

Case FKQ



Case FKQ



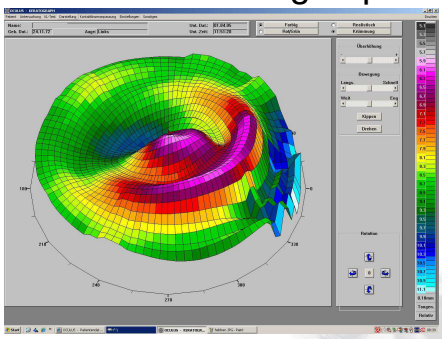
Scleral Design

- Lots of different types and shapes are on the market available
  - Rotation Symmetric Designs with “normal” central radius
  - Peripheral-Toric Design: only Toric shape over scleral area
  - Keratoconus Specific Design with a very steep center, additionally with a hollow

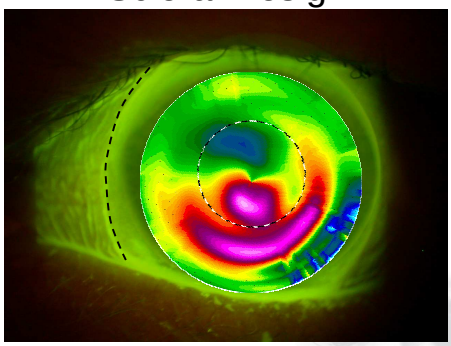
Scleral Design

- Diameter:
  - Mini or Semiscleral 12.00mm to 16.00mm
  - Scleral 16.00mm to 25.00mm
- No Topographer data's available
  - Fitted by interpreting fluorescein pattern
- Adhering, but no sticking allowed

Case Ferrara-Ring Implant



Scleral Design



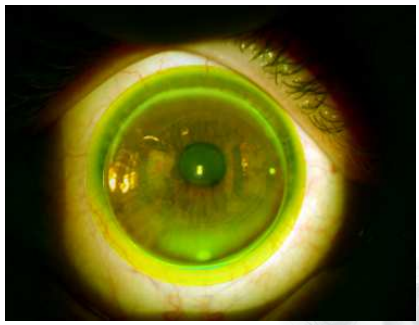
Piggyback Indication

- Last opportunity, when everything else failed before
- Massive 3+9 o'clock staining
- Very sensitive Patient, or extremely exposed to dust

Piggyback fitting

- Fit the GP like there's no soft contact lens beneath
- Don't tolerate any Neovascularization
- Siliconhydrogel
  - Night+Day, Purevision, Oasys, Biofinity
- High minus power can support centration

Piggyback



Piggyback care regimen

- Do not allow GP solution to come in contact with Hydrogel Material
  - Remove and clean GP with adequate Cleaner, rinse and store in MPS for Hydrogels
  - Remove Hydrogel, clean, rinse and store in MPS
- ANDRASKO: important information about staining (www.staininggrid.com)

freedom to see

Enjoy Boston!

www.kontaktlinsenstudio.ch

freedom to see