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studio bärtschi

## The contact lens miracles

### Continuous wear

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### Indication for continuous wear

- Pediatric / Geriatric Patients



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### Indication for continuous wear

- Bandage contact lens after surgery or injury
- Therapeutic use in cornea disorders
  - EBMD (Map-dot-fingerprint dystrophy) and recurrent Erosio
  - Lagophthalmus
  - Open eyes during sleeping

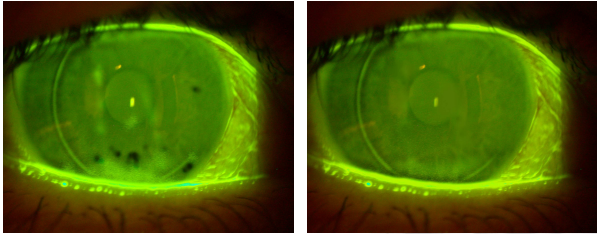
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### Indication for continuous wear

- Open eyes during sleeping

Pre Tx


Post Tx



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### Indication for continuous wear

- Convenience
  - Outback and Adventure
  - Dating "hoppers"
  - Lazy people – like me



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### Product Overview

|                  | Purevision                    | Night&Day    | Oasys        | Biofinity   | GP             |
|------------------|-------------------------------|--------------|--------------|-------------|----------------|
| DK/t             | 110                           | 175          | 154          | 160         | 100-163        |
| H <sub>2</sub> O | 36%                           | 24%          | 40%          | 48%         | <2%            |
| Radius           | 8.60                          | 8.40 / 8.60  | 8.40         | 8.60        | Individual     |
| Ø                | 14.00                         | 13.80        | 14.00        | 14.00       | Individual     |
| Diopter          | +6.0 / -12.0                  | +6.0 / -10.0 | +6.0 / -12.0 | plan / -6.0 | Individual     |
| Cylinder         | -0.75 / -1.25 / -1.75 / -2.25 | *****        | *****        | *****       | No restriction |
| CW up to         | 30 days                       | 30 days      | 7 days       | 30 days     | 30 Tage        |
| Replace          | 1 month                       | 1 month      | 1 week       | 1 month     | 1 Jahr         |
| Modulus          | 1.50                          | 1.52         | 0.72         | ???         | *****          |
| Lubricity        | 17                            | 47           | 3            | ???         | *****          |

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## Fitting Procedure

- Initial Consultation
  - Information and Anamnesis
  - Refraction, Biomicroscopy, Topographie, Fundus, Pachimetry if available, etc.
  - Insert first pair of contact lenses for 1h trial
  - First check of lens fit and Vacc
  - Handling instruction

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## Fitting Procedure

- First week, after first night
  - Px comes with lenses inserted, after first night as soon as possible
  - Ask about awakening (dryness, blurred vision)
  - Biomicroscopy and then Rx
  - If everything unaffected, start CW

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## Fitting Procedure

- Second week CW
  - Dito first week
  - Analysis of deposition on lens surface
  - eventually switch system or product
- First month CW
  - Dito second week, but let Px come in afternoon
  - Critical for CLPC
  - Additionally Pachimetry if available

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## After Care

- Follow-up every 6 month, no selling without control
- Hand-out or Guideline about complications and “what to do” in such cases
- Hotline for emergency

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## Incidence of Complications

Table 3 Annual incidence and relative risk of non-severe and severe keratitis in contact lens wear

| Wearing modality | Lens type                 | Annual incidence*    |                      | Relative risk‡       |                    |
|------------------|---------------------------|----------------------|----------------------|----------------------|--------------------|
|                  |                           | Non-severe keratitis | Severe keratitis     | Non-severe keratitis | Severe keratitis   |
| Daily wear       | Rigid                     | 5.7 (2.2 to 14.7)†   | 2.9 (0.8 to 10.4)    | 0.4 (0.2 to 1.1)     | 0.5 (0.1 to 1.9)   |
|                  | Hydrogel daily disposable | 9.1 (5.5 to 15.1)    | 4.9 (2.5 to 9.6)     | 0.7 (0.4 to 1.2)     | 0.8 (0.3 to 1.8)   |
|                  | Hydrogel                  | 14.1 (10.4 to 19.0)  | 6.4 (4.1 to 9.9)     | 1.0                  | 1.0                |
|                  | Silicone hydrogel         | 55.9 (9.9 to 309.7)  | 0.0 (0.0 to 210.1)   | 4.0 (0.6 to 28.7)    | §                  |
| Extended wear    | Rigid                     | 0.0 (0.0 to 1758.8)  | 0.0 (0.0 to 1758.8)  | §                    | §                  |
|                  | Hydrogel                  | 48.2 (13.2 to 174.0) | 96.4 (37.5 to 245.2) | 3.4 (0.8 to 14.1)    | 15.2 (5.2 to 44.4) |
|                  | Silicone hydrogel         | 98.8 (60.0 to 162.5) | 19.8 (6.7 to 58.0)   | 7.0 (3.9 to 12.7)    | 3.1 (0.9 to 10.5)  |

\*Number of cases per 10,000 wearers per year.

†95% confidence limits.

‡Calculated independently for non-severe and severe keratitis, taking “daily wear hydrogel” as the referent in each case.

§Indeterminable because of an annual incidence of zero.

P B Morgan, N Efron et al  
Br. J. Ophthalmol. 2005; 89:430-436

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## General Complications

- First 3 - 4 days
  - Burning or Foreign body sensation
  - Contrast sensitivity decreased
  - Immediately after awaking
    - Dryness
    - Mucin deposits at “Plica Semilunaris” area
    - “Crusty” lid margins

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## Complications Mucin Balls

- Incidence increases with nights wearing contacts continuous
  - Common in materials with high modulus



## Complications CLARE

- Contact lens induced acute red eye
  - Incidence 1 – 3.8%

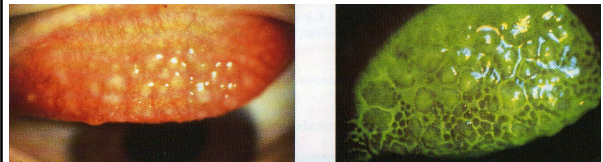


## Complications CLARE

- Non-ulcerative sterile keratitis associated with colonization of gram-negative bacteria
  - awakening with unilateral pain, photophobia, tearing and a red eye
  - Visual acuity is unaffected
  - Sub-epithelial infiltrates in the mid-periphery of the cornea near the limbus, focally or diffusely
  - Limbal injection circumferentially, but no anterior chamber reaction or lid edema

## Complications CLPC

- Contact lens induced papillary conjunctivitis
  - Incidence 2-7% dependent on DW or CW

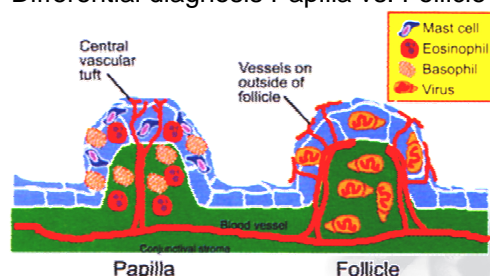


## Complications CLPC

- Conjunctiva findings
  - Conjunctiva hyperemia & bright red/orange colour of papilla
  - Hexagonal shape change to more rounded form
  - Central vascular tuft, sometimes with staining
  - Can display infiltrates at apex, sometimes scarring (cream/white colour)
  - Mucus can be present in severe cases

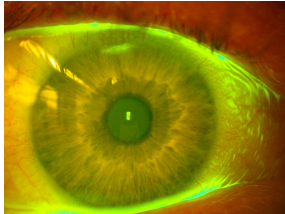
## Complications CLPC

- Differential diagnosis Papilla vs. Follicle



## Complications SEAL

- Superior Epithelial Arcuate Lesion
  - Incidence up to 4.5%
  - most seen in Purevision Toric

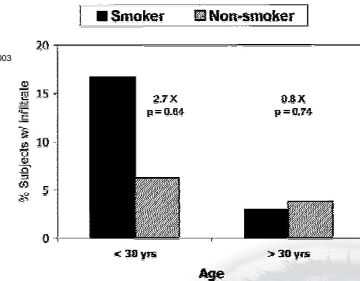


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## Risk factors for infiltrative event

- Smoking

John J McNally et al  
Eye & Contact lens 29: 153-156, 2003



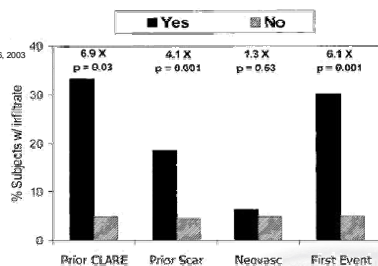
**FIG. 2.** The impact of smoking across all age groups on risk of infiltrative events with continuous wear.

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## Risk factors for infiltrative event

- Others

John J McNally et al  
Eye & Contact lens 29: 153-156, 2003



**FIG. 3.** The impact of ocular health history on risk of infiltrative events with continuous wear.

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## Complications IK

- Infiltrative Keratitis
  - Incidence 5% - 10%



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## Complications IK

- Infiltrates
  - Mild diffuse or small focal infiltrates
  - Infiltrates are often near the limbus, but can be present anywhere in the cornea. There also may be mild corneal punctate staining
- Causes
  - Mechanical trauma
  - Gram-positive bacterial exotoxins
  - Minor foreign body trapped under the lens

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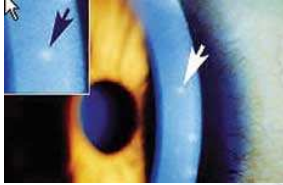
## Complications IK

- Symptoms
  - tearing, photophobia, foreign-body sensation, injection of the bulbar conjunctiva and limbus
  - Occur later in the day and may vary widely, from severe to non-existent

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## Complications AIK

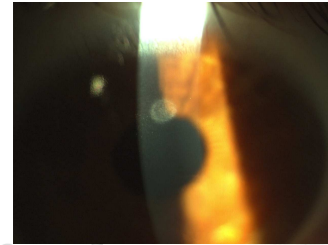
- Asymptomatic Infiltrative Keratitis
  - Incidence 1% - 8%



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## Complications CLPU

- Contact lens induced peripheral ulcer
  - Incidence 3.3% - 5.4%



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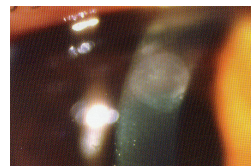
## CLPU Definition

- “CLPU is an inflammatory reaction of the cornea that is characterized in its active stage by focal excavation of the epithelium, infiltration, and necrosis of the anterior stroma. However, Bowman’s layer is intact”

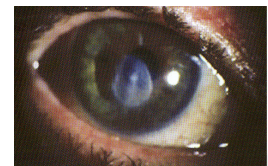
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## Complications MK

- Microbial Keratitis
  - Incidence 0.2% - 12.7%



Acanthamoeba



Pseudomonas

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## MK Definition

- “MK is an infection of the cornea by microbes that is characterized by excavation of the corneal epithelium, Bowman’s layer, and stroma with infiltration and necrosis of the tissue”

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## Risk factors for MK

3188 Morgan et al.

JOFS, September 2005, Vol. 46, No. 9

TABLE 3. Some Previously Reported Non-Lens-Related Risk Factors for Microbial Keratitis in Contact Lens Wear

| Factor   | Relative Risk           | Referent                            | Controls           | Reference |
|--|-------------------------|-------------------------------------|--------------------|-----------|
| Nonprofessional workers                        | $\times 3.3$            | Professional workers                | For extended wear  | 4         |
| Living in Boston, MA                           | $\times 4.6$            | Living in New Hampshire             | For extended wear  | 8         |
| Living in southern UK                          | $\times 0.3$            | Living in northern UK               | For AK             | 15        |
| Young age (12-19 years)                        | $\times 2.2$            | Old age ( $>40$ years)              | For extended wear  | 8         |
| Male gender                                    | $\times 2.0$            | Female gender                       | For daily wear     | 8         |
| Hard domestic water                            | $\times 2.2$            | Soft domestic water                 | For daily wear     | 4         |
| Traveling abroad                               | $\times 2.9$            | Not traveling abroad                | For AK             | 15        |
| Swimming                                       | Magnitude not specified | Not swimming                        | For AK             | 15        |
| Lack of disinfection                           | $>59.9$                 | Using disinfection                  | For AK             | 16        |
| Chlorine-based disinfection, used optimally    | $\times 14.6$           | Using other chemical systems        | For AK             | 16        |
| Chlorine-based disinfection, used suboptimally | $\times 41.1$           | Using other chemical systems        | For AK             | 16        |
| Smoking  | $\times 2.7$            | Not smoking                         | Population control | 7         |
|  | $\times 4.2$            | Not smoking                         | Hospital control   | 2         |
|  | $\times 3.5$            | Not smoking                         |                    |           |
| Noncompliance with cleaning procedures         | $\times 6.8$            | Compliance with cleaning procedures |                    | 2         |

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## Differential Dx: CLPU vs MK

- Differentiation among infiltrative events is often confusing

Can subtypes of Contact Lens associated corneal infiltrative events be Clinically Differentiated?  
N. Elron, P.B. Morgan  
Cornea 2006;25:540-544

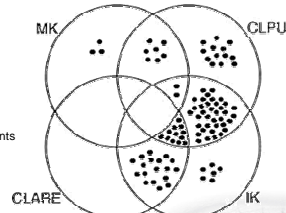


FIGURE 1. Venn diagram showing how the 111 CIEs are classified. Each dot represents a single CIE. Thirteen CIEs are not shown because they did not fit in to any category.

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## Differential Dx: CLPU vs MK

- Symptoms
  - Patients are generally more symptomatic with MK than CLPU. However, mild discomfort or pain, redness, epiphora, and photophobia are not unusual with CLPU. Severe pain and discharge (mucus or mucopurulent) should raise suspicion of MK

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## Differential Dx: CLPU vs MK

- Signs
  - Lid Edema
    - Unusual in CLPU and points to an infectious origin. Rarely, mild to moderate lid edema may be seen in severe forms of CLPU
  - Injection
    - In CLPU, bulbar and ciliary congestion are mild and localized to the quadrant where the focal infiltrate is located, whereas it is generalized and intense in MK

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## Differential Dx: CLPU vs MK

- Focal Infiltrate
  - Size
    - A focal infiltrate larger than 1.0 to 1.5 mm should be considered infectious.
  - Progressive increases in size are unlikely in CLPU
  - In both MK and CLPU, the focal infiltrate is surrounded by diffuse cellular infiltrate in the anterior stroma. In MK, the diffuse infiltrate may be more generalized, whereas in CLPU, it is localized to the involved quadrant

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## Differential Dx: CLPU vs MK

- Focal Infiltrate
  - Shape
    - CLPU is almost always round or may be oval
    - Any irregularity in the shape of the infiltrate, particularly amoeboid projections, is highly suggestive of MK
  - Density
    - Generally, a CLPU is translucent to opaque in appearance, whereas the lesion is always opaque in MK

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## Differential Dx: CLPU vs MK

- Focal Infiltrate
  - Epithelial Status
    - Full-thickness epithelial defect with stromal glow may be seen in both CLPU and MK. In some stages, CLPU may have no epithelial defect or a few punctate erosions overlying the infiltrate
    - However, the absence of epithelial defect does not exclude MK, although such instances are rare

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## Differential Dx: CLPU vs MK

- Focal Infiltrate
  - Surrounding Cornea
    - Mild edema or folds are seen in the cornea surrounding the focal infiltrate in MK but are not seen in CLPU
  - Location
    - CLPU shows predilection for the peripheral cornea, whereas MK can be central, paracentral, or peripheral

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## Differential Dx: CLPU vs MK

- Anterior Chamber
  - Is almost always present in MK. Hypopyon is never seen in CLPU, although it is occasionally seen in the earliest stages of MK
- Clinical Course of CLPU
  - Mostly regress and resolve spontaneously on discontinuation of CL wear
    - A CLPU usually takes approximately 3 to 4 days to resolve

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## Differential Dx: CLPU vs MK

- Clinical Course in MK
  - Discontinuation of CL wear may result in mild relief from symptoms, but the condition never resolves unless appropriately treated
  - Worsening of symptoms despite CL removal is a strong indicator of MK
  - Heals more gradually over 2 to 3 weeks
    - In both conditions, healing leaves a scar, which is usually circular and faint in CLPU

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## CCLRU Grading Scale

| CORNEAL INFILTRATIVE CONDITIONS IN CONTACT LENS PRACTICE |  |  |   |                                       |
|--|--|--|---|---------------------------------------|
| Classification:  | SERIOUS<br>(symptomatic)   | SIGNIFICANT<br>(commonly symptomatic)  | NON-SIGNIFICANT<br>(asymptomatic)   |                                       |
| Description:   | Adverse reaction<br>• of sufficient clinical concern to warrant permanently discontinuing lens wear<br>• that produces or has the potential to produce significant visual impairment | Adverse reaction of sufficient clinical concern to warrant temporarily discontinuing lens wear   | Adverse event which may not warrant discontinuation of the patient in lens wear | An observation of no clinical concern |
| Conditions:  | • Microbial Keratitis  | • Contact Lens Induced Acute Red Eye<br>• Contact Lens Induced Peripheral Ulcer<br>• Infiltrative Keratitis<br>• Viral Keratoconjunctivitis<br>• Superior Epithelial Aruate Lesion | • Asymptomatic Infiltrative Keratitis   | • Asymptomatic Infiltrates            |

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## Grading: Non-Significant

| Non-Significant   |  |                               |  |
|---|--|-------------------------------|--|
|   | Asymptomatic Infiltrative Keratitis (A1) | Asymptomatic Infiltrates (A2) |  |
| <b>Key to symptoms and signs</b>  |  |                               |  |
| <b>Classification</b>   |  |                               |  |
| <b>Severity Rating (See also, Keratitis, Conjunctivitis &amp; Keratoconjunctivitis) (See 1000 Eyes)</b> |  |                               |  |
| <b>Symptoms</b>   |  |                               |  |
| <b>Signs</b>  |  |                               |  |
| <b>Diagnosis</b>  |  |                               |  |
| <b>Causes &amp; Management</b>  |  |                               |  |

## Grading: Significant

| Significant   |  |  |                             |
|---|--|--|-----------------------------|
|   | Contact Lens Induced Peripheral Ulcer (CLPU) | Contact Lens Induced Acute Red Eye (CLARE) | Infiltrative Keratitis (IK) |
| <b>Key to symptoms and signs</b>  |  |  |                             |
| <b>Classification</b>   |  |  |                             |
| <b>Severity Rating (See also, Keratitis, Conjunctivitis &amp; Keratoconjunctivitis) (See 1000 Eyes)</b> |  |  |                             |
| <b>Symptoms</b>   |  |  |                             |
| <b>Signs</b>  |  |  |                             |
| <b>Diagnosis</b>  |  |  |                             |
| <b>Causes &amp; Management</b>  |  |  |                             |

## Grading: Serious

| Key to symptoms and signs |                  |
|---------------------------|------------------|
| None                      | Minor            |
| Significant               | Significant      |
| None/Significant          | None/Significant |

| Definition  |          |
|---|----------|
| Severity Rating (See signs, symptoms, treatment, & outcome) |          |
| Annual Incidence (Per 1000 Eyes)                            |          |
| Grade   | Severity |
| 1   | 2        |
| 3   | 4        |

| Signs |     |
|-------|-----|
| 1     | 2   |
| 3     | 4   |
| 5     | 6   |
| 7     | 8   |
| 9     | 10  |
| 11    | 12  |
| 13    | 14  |
| 15    | 16  |
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| 83    | 84  |
| 85    | 86  |
| 87    | 88  |
| 89    | 90  |
| 91    | 92  |
| 93    | 94  |
| 95    | 96  |
| 97    | 98  |
| 99    | 100 |

## Important Information for Px

- Never CW if patient feel sick, has cold or fever
- After taking a dip, always rub & rinse and disinfect the lenses over night
- First night after a long flight always sleep without lenses

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# Enjoy Boston!

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