WHAT YOU NEED TO KNOW

Slit Lamp Viewing:
1. With fluorescein, cobalt filter and yellow barrier filter. Optical section to assess depth
2. Medium/high magnification (16 - 25x)
3. Direct illumination

Grading:
- Staining of ulcer
- Active ulcer
- Central ulcer scar
- Large central ulcer
- Ulcer caused by Pseudomonas
- Ulcer caused by Acanthamoeba

Area of corneal staining overlaying stromal opacity 0: No 1: Yes. Record location (S/I/N/T), size and shape

Incidence:
- RGP DW 0.03%, hydrogel DW 0.05%, hydrogel EW 0.96%, SiH EW 0.2% (Morgan et al, 2005)
- RGP DW 0.01%, hydrogel DW 0.02%, SiH DW 0.12%, hydrogel EW 0.20%, SiH EW 0.25% (Stapleton et al, 2008)

Aetiology:
Infection of compromised cornea (epithelial break, hypoxia) from invasion of bacteria (especially pseudomonas spp. - principally aeruginosa), virus, fungus or amoaebe with excavation of corneal epithelium, Bowman’s layer and stroma with infiltration and necrosis of tissue

Risk factors:
EW, hypoxia, poor compliance and hygiene, swimming/showering in lenses, tap water, not storing case dry, male, smoking, trauma, poor general and ocular health (diabetes, respiratory disease), warm climates, socio-economic class, longer wearing periods, delay seeking treatment, high ametropia (>5D), younger age (15-25 years), lens case contamination, environmental influences

Symptoms:
- Severe pain with rapid onset, photophobia, epiphora, severe redness, reduced vision (depends on location), discharge, lid puffiness
- No improvement after lens removal, pain usually increases

Signs:
- Full thickness epithelial defect with underlying infiltrate, Bowman's layer and stroma affected
- Generally central, large (>1mm), unilateral, irregular appearance
- Severe hyperaemia
- Anterior chamber activity (flare, hypopyon)
- Discharge and lid oedema
WHAT YOU NEED TO RECOMMEND TO YOUR PATIENTS

Recommendations:
- Immediate discontinuation of lens wear — lenses and case not to be reused
- Ocular emergency — urgent referral for ophthalmological investigation; corneal scrape, close monitoring and medical treatment
- Intensive round the clock treatment, with possible hospital admission (antimicrobial, cycloplegic, analgesic, topical steroids only when infection under control)
- No patching
- Advise about risk factors — improve hygiene, care regimen and avoid tap water
- Case replacement and hygiene (including rubbing & tissue wiping)
- Refit with DD, advise against overnight wear

Prognosis:
- Variable — often resolves with scar and vascularisation; depends on causative organism
- Improved with rapid intervention
- 14% lose 2 lines or more best corrected VA; depends on scar location and severity of infection
- Vision loss is less likely to occur in DD than in reusable soft CL users

Differential Diagnosis:
Contact Lens Peripheral Ulcer (CLPU), dense corneal staining (epithelial plug), corneal abrasion

NOTE: Microbial keratitis is also known as infected corneal ulcer, corneal abscess, suppurative keratitis, infectious keratitis, ulcerative keratitis

HOW TO FIND OUT MORE
- Click here for a general refresher on slit lamp techniques
- Click here to watch our educational video on slit lamp examination using optical section
How to manage patients with MK (Microbial Keratitis)

PATIENT CASE STUDY

Patient JC is a 20-year-old male student who has worn monthly replacement hydrogel lenses for the past three years.

He attends for an emergency appointment late afternoon wearing his lenses and complaining of a very painful, watery red eye since this morning. He is suffering from intense photophobia making examination difficult.

JC reports he has been wearing his lenses regularly overnight.

Quiz:

1. What slit-lamp techniques might you use to examine this patient’s cornea?
   A. Fluorescein and cobalt blue filter
   B. Direct illumination and medium/high magnification
   C. Optical section
   D. All of these

2. Which of the following features of suspected microbial keratitis would you record?
   A. Shape and size of ulcer
   B. Location
   C. Underlying stromal opacity
   D. All of these

3. What is the most likely risk factor associated with MK in this patient?
   A. Poor lens fit
   B. Overnight wear
   C. Delay seeking treatment
   D. Trauma

4. Which of the following management options would you be most likely to choose?
   A. Advise to leave lenses out for a week then resume
   B. Refit with silicone hydrogel lens and continue wear
   C. Refer urgently for ophthalmological investigation
   D. Patch the eye and see again in two days’ time

Correct answers:
1. D. All of these techniques have a role in assessing microbial keratitis and in differential diagnosis.
2. D. All of these features, ideally supported by ocular photography, should be recorded.
3. B. Overnight wear is the most obvious risk factor involved although the aetiology may be multi-factorial.
4. C. Refer urgently as an ocular emergency for corneal scrape, close monitoring and medical treatment.
Bacterial keratitis


Bacterial/Fungal: [CLICK HERE TO ACCESS]

Chalmers RL, Hickson-Curran SB, Keay L et al. Rates of adverse events with hydrogel and silicone hydrogel daily disposable lenses in a large postmarket surveillance registry: the TEMPO Registry. *Invest Ophthalmol Vis Sci* 2015;56:1 654-63. [CLICK HERE TO ACCESS]

Stapleton F, Keay L, Edwards K et al. The epidemiology of microbial keratitis with silicone hydrogel contact lenses. *Eye Contact Lens* 2013;39:1 79-85. [CLICK HERE TO ACCESS]


Stapleton F and Carnt N. Contact lens-related microbial keratitis: how have epidemiology and genetics helped us with pathogenesis and prophylaxis. *Eye* 2012;26 2:185-93. [CLICK HERE TO ACCESS]


Fleiszig SM and Evans DJ. Pathogenesis of contact lens associated microbial keratitis. *Optom Vis Sci* 2010; 87:4 225-32. [CLICK HERE TO ACCESS]


FURTHER READING/REFERENCES

[CLICK HERE TO ACCESS]

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**Fungal keratitis**

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**Acanthamoeba keratitis**

Clinical Management Guidelines. Microbial Keratitis. College of Optometrists. *Acanthamoeba: CLICK HERE TO ACCESS*

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