

# Corneal Abrasion: Adult & Pediatric

Ears, Eyes, Nose, Throat and Mouth

Clinical Decision Tools for RNs with Additional Authorized Practice [RN(AAP)s]

Effective Date: May 4, 2022

## Background

A corneal abrasion is the result of superficial or deep loss of the top layer of the corneal epithelium (Stephenson, Bruce, Verville, Giebel, Miller, & Duff, 2019). It is classified as traumatic, foreign-body related, contact lens-related, or spontaneous (Reinoso, Dunphy, & Porter, 2019).

Spontaneous corneal abrasion is due to recurrent corneal erosion attributed to previous abrading injuries (even years prior), epithelial basement membrane dystrophy (EBMD), corneal dystrophies, corneal degeneration, or prior ocular surgery for refractive errors, cataracts, or corneal transplantation (Miller, Hasan, Simmons, & Stewart, 2019).

## Immediate Consultation Requirements

The RN(AAP) should seek immediate consultation from a physician/NP when any of the following circumstances exist:

- dendritic pattern to lesion, which may suggest herpes;
- Seidel's test (leaking of aqueous humor);
- hyphema (a collection of blood between the cornea and the iris);
- chemical injury;
- hypopyon (layering of white blood cells in the anterior chamber);
- corneal infiltration, white spot, opacity, or ulceration;
- penetrating injury;
- foreign body;
- high velocity injury;
- pain not relieved by topical anaesthetic;
- rust rings;
- distorted pupil;
- change to visual acuity;
- suspected damage to retina;

## ENT | Corneal Abrasion - Adult & Pediatric

- herpetic lesions on face particularly nose;
- purulent discharge;
- abrasion involving more than 25% of the corneal surface;
- abrasion involving the visual axis (overlying the pupil);
- abrasion that is more than 4 millimetres across; and/or
- abrasion precipitated by contact lens use (Dynamed, 2018; Interprofessional Advisory Group [IPAG], personal communication, October 20, 2019).

## Predisposing and Risk Factors

Predisposing and risk factors for corneal abrasion include:

- dry eyes,
- participating in work or recreational activities without proper eye protection,
- contact lens use, and
- inability to blink eye (Dynamed 2018; Miller et al., 2019; Reinoso, et al., 2019).

## Health History and Physical Exam

### Subjective Findings

Patients with corneal abrasion may present with:

- history of direct trauma to the eye,
- foreign body sensation,
- sudden unilateral eye pain (sharp or worse with blinking),
- photophobia,
- conjunctivitis or red eye,
- moderate to profuse tearing,
- mild blurred vision (due to tearing),
- ocular drainage,
- contact lens use,
- headache, and
- history of work or recreational activities without proper eye protection (Dynamed 2018; Miller et al., 2019; Reinoso, et al., 2019).

### Objective Findings

The signs and symptoms of corneal abrasion may include:

- presence of tears,
- no infiltrate,
- ocular inflammation (e.g., red eye),
- hazy cornea if significant edema,
- conjunctival injection usually more pronounced at limbus,
- miosis due to ciliary spasm,

- presence of foreign bodies,
- rust residue left by metallic foreign bodies, or
- uptake of fluorescein on cornea during diagnostic testing (Dynamed 2018; Miller et al., 2019; Reinoso, et al., 2019; Stephenson, Bruce, Verville, Giebel, Miller, & Duff, 2019).

## Differential Diagnosis

The following should be considered as part of the differential diagnosis:

- conjunctivitis,
- foreign body,
- corneal infection,
- anterior uveitis,
- angle closure glaucoma,
- corneal ulceration,
- herpes zoster, or
- keratitis (Dynamed 2018; Miller et al., 2019; Reinoso, et al., 2019).

## Making the Diagnosis

The diagnosis is based on history and physical findings and is confirmed by visualization of the cornea under cobalt blue filter after application of fluorescein which shows stain uptake (Stephenson et al., 2019).

## Investigations and Diagnostic Tests

Penetrating injuries must be referred to physician/NP. Investigations and diagnostic tests for nonpenetrating injuries include:

- assessment of visual acuity; and
- instillation of 1 to 2 drops of tetracaine 0.5% eye solution (topical anesthetic) followed by instillation of 1 to 2 drops of fluorescein stain. The RN(AAP) should then perform the eye exam using the ophthalmoscope cobalt blue filter. Fluorescein stain will appear green under cobalt blue filter. Any stain uptake or staining indicates abrasion. A branching pattern (dendritic) of staining may indicate either a healing abrasion or Herpes simplex infection whereas a vertical abrasion suggests a foreign body (Stephenson et al., 2019).

## Management and Interventions

### Goals of Treatment

The primary goals of immediate treatment are to manage pain, prevent corneal ulceration, and prevent secondary bacterial infection (Dynamed 2018; Miller et al., 2019; Reinoso, et al., 2019).

## Non-Pharmacological Interventions

The RN(AAP) should recommend, as appropriate, the following non-pharmacological options:

- avoid contact lens use until after the abrasion is healed,
- recommend artificial tear preparations prn for comfort, and
- application of warm compresses to the affected eye (e.g., tea bag) (Dynamed, 2018; Stephenson et al., 2019).

## Pharmacological Interventions

The pharmacological interventions recommended for the treatment of corneal abrasion are in accordance with the *RxFiles: Drug Comparison Charts* (RxFiles Academic Detailing Program, 2021) and *Corneal Abrasion: Emergency Management* (Dynamed, 2018).

### Topical Antibiotics

Antibiotic ointment or drops are prescribed until the abrasion heals which usually takes less than one week.

	Drug	Dose	Route	Frequency	Duration
<b>Pediatric (≥ 1 month of age) and Adult</b>					
	Erythromycin 0.5% eye ointment	apply thin application to eyelid margin with a cotton-tipped applicator	topical	q.i.d.	5-7 days
<b>Pediatric (≥ 1 month of age) and Adult</b>					
	Polymyxin B plus trimethoprim eye drops	1-2 drops	topical	q3-4h while awake	5-7 days
<b>Pediatric (≥ 2 years of age) and Adult</b>					
	Sulfacetamide 10% eye solution (Blephamide)	1-2 drops	topical	q2-3h initially and then q4-6h as condition improves	5-7 days

The following antibiotics will effectively treat pseudomonas bacteria and therefore are indicated for individuals who wear contact lenses where there is a higher risk of infection from this pathogen.

**ENT | Corneal Abrasion - Adult & Pediatric**

	Drug	Dose	Route	Frequency	Duration
<b>Pediatric (≥ 2 years of age) and Adult</b>					
	Ciprofloxacin 0.3% ointment	0.5-inch ribbon	topical	q.i.d.	5-7 days
OR	Ciprofloxacin 0.3% solution	1 drop	topical	q.i.d.	5-7 days
OR	Ofloxacin 0.3% solution	1 drop	topical	q.i.d.	5-7 days

**Analgesics**

	Drug	Dose	Route	Frequency	Duration
<b>Pediatric</b>					
	Acetaminophen	10-15 mg/kg/dose (maximum daily dose of 75 mg/kg/day)	p.o.	q4-6h prn	5-7 days
AND/ OR	Ibuprofen	5-10 mg/kg/dose (maximum daily dose of 40 mg/kg/day)	p.o.	q6-8h prn	5-7 days
<b>Adult</b>					
	Acetaminophen	500-1000 mg/dose (maximum daily dose of 4 g/day)	p.o.	q4-6h prn	5-7 days
AND/ OR	Ibuprofen	400-600 mg/dose (maximum daily dose of 3200 mg/day)	p.o.	q6-8h prn	5-7 days

**Client and Caregiver Education**

The RN(AAP) provides client and caregiver education as follows:

- Counsel about the appropriate use of medications (dose, frequency, application, etc.).
- Advise that daily follow-up with a health care provider is important to ensure proper healing.
- Advise to return to clinic immediately if pain increases or vision decreases.
- Encourage the use of protective eyewear.
- Advise to not patch the affected eye.

- Advise to refrain from using nightly lubricant eye ointment while taking antibiotic eye ointment or drops.
- Avoid rubbing the eyes.
- Advise that most abrasions heal within 24-72 hours.
- Advise that topical anesthetic eye drops are for examination purposes only and should not be used to manage pain (Dynamed, 2018; Stephenson et al., 2019).

## Monitoring and Follow-Up

The RN(AAP) should stress the importance of daily follow-up by a health care provider (e.g., RN(AAP), NP, physician) to assess healing. If the client is still symptomatic the eye should be re-examined with fluorescein. The uptake of fluorescein dye should be less than the previous day if the abrasion is resolving. If the abrasion has not decreased in size or is larger the client should be referred to a physician/NP.

## Complications

The following complications may be associated with corneal abrasion:

- corneal ulceration;
- secondary bacterial infection;
- corneal scarring;
- uveitis (iritis);
- recurrent corneal erosion - repeated, spontaneous disruption of corneal epithelium; and/or
- vision loss (Dynamed, 2018; Miller et al., 2019; Stephenson et al., 2019).

## Referral

Refer to a physician/NP if the client presentation is consistent with the *Immediate Consultation Requirements* section and if symptoms worsen or persist after 48 to 72 hours. (IPAG, personal communication, October 20, 2019).

## References

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