

DEFINITION

Corneal abrasion is a defect in the corneal surface epithelium due to scraping or rubbing of the corneal epithelium.

IMMEDIATE CONSULTATION REQUIRED IN THE FOLLOWING SITUATIONS

- Dendritic pattern of lesion
- Seidel's sign (leaking of aqueous humor)
- Hyphema
- Chemical injury
- Hypopyon
- Corneal infiltration, white spot, opacity, or ulceration
- Penetrating injury
- Embedded foreign body
- A foreign body that cannot be removed
- No improvement after initial treatment
- Large abrasion involving more than 25% of cornea
- Any signs of any complications
- High velocity injury
- Pain which is not relieved by topical anaesthetic
- Rust rings
- Distorted pupil
- Suspected damage to retina
- Herpetic lesions on face particularly nose
- Drop in vision or more than one or two lines on the Snellen's chart
- Purulent discharge

CAUSES

- Usually trauma
- Foreign body in the eye
- Airbag deployment in motor vehicle accident
- Conditions that impair corneal blink or sensation
- Certain sports such as lacrosse, hockey, etc.

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PREDISPOSING AND RISK FACTORS

- Dry eyes
- Riding an All-Terrain Vehicle (ATV), snowmobile, or Utility Task Vehicle (UTV) without eye protection, and participating in outdoor motorized activities without proper eye protection
- Contact lens use
- Younger, active individuals
- Inability to blink eye

HISTORY

- Direct trauma to the eye followed by pain, photophobia, and foreign body sensation
- Sudden unilateral eye pain (sharp or worse with blinking)
- Moderate to profuse tearing
- Mild blurred vision (due to tearing) may be present
- Enquire about use of contact lenses
- Red eye
- Blepharospasm
- Headache
- History of mining, woodwork, metal work, landscaping
- Participation in sports activity

PHYSICAL FINDINGS

- Vital signs normal
- Eye exam should include:
 - Eye lids
 - Lacrimal sac
 - Pupil size and reaction to light
 - Extraocular movement
 - Visual fields
 - Corneal involvement
 - Pattern and location of hyperemia
 - Preauricular lymph node involvement
 - Upper eyelid eversion should be performed to rule out subtarsal foreign body

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- Visual acuity is usually normal unless either of:
 - Abrasion involves visual axis
 - Significant corneal edema present

Typical findings include:

- No discharge other than tears
- No infiltrate
- Ocular inflammation ("red eye") may be present
- Cornea may appear hazy if significant edema
- Conjunctival injection typically present, most pronounced at limbus
- Ciliary spasm may cause miosis
- Presence of foreign bodies
- Foreign body
- Rust residue left by metallic foreign bodies
- Pupils react briskly to light

DIFFERENTIAL DIAGNOSIS

- Conjunctivitis
- Foreign body
- Corneal infection
- Anterior uveitis
- Angle closure glaucoma
- Corneal ulceration
- Keratitis

COMPLICATIONS

- Corneal ulceration
- Secondary bacterial infection
- Corneal scarring if abrasion recurs
- Uveitis (iritis)
- Recurrent corneal erosion - repeated, spontaneous disruption of corneal epithelium
- Vision loss

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INVESTIGATIONS AND DIAGNOSTIC TESTS

- Measure visual acuity first: measure visual acuity with correction or through pin hole as appropriate.
- Do not instill any eye drops or fluorescein for penetrating injuries.
- Instill tetracaine 0.5% eye solution (topical anesthetic) first if needed, for testing purposes only.
- Fluorescein should be used only after visual acuity is measured.
- Apply 1-2 drops of fluorescein stain to determine extent of damage.
 - Perform exam under cobalt blue filter after the fluorescein stain is applied.
 - Fluorescein stain will appear green under cobalt blue filter.
 - Any stain uptake or staining indicates abrasion.
 - Branching pattern (dendritic) of staining may indicate either healing abrasion or Herpes simplex infection.
 - Vertical abrasion suggests a foreign body.

MAKING THE DIAGNOSIS

- Suspect corneal abrasion if eye pain, foreign body sensation, photophobia, red eye, or recent ocular trauma.
- Confirm diagnosis by visualization of cornea under cobalt blue filter after application of fluorescein which shows stain uptake.
- Fluorescein uptake is seen green with regular light but enhanced with cobalt blue light.

MANAGEMENT AND INTERVENTIONS

Goals of Treatment

- Prevent secondary bacterial infection
- Prevent development of corneal ulceration

Appropriate Consultation

Consult a physician/RN(NP) if:

- pain is not relieved by analgesic.
- there is a large abrasion where the size is more than 1/4 of the corneal surface, or a round abrasion that is more than 8 mm across.
- abrasion does not respond to therapy after 48 hours.

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- a residual rust ring is evident.
- contact lens induced corneal abrasion.

Non-Pharmacological Interventions

- Discontinue use of contact lenses until after abrasion is healed and treatment is complete.

Pharmacological Interventions

- If the corneal abrasion is a result of contact lens injury, consult a physician/RN(NP) for specific management.
- Instill topical anesthetic eye drops initially for examination only. Do not repeat use after the initial exam.
- Tetracaine 0.5% eye solution (Pontocaine) 2 drops stat dose only.
- Complaints of irritation and foreign body sensation should resolve in 1-2 minutes.
- Instill a generous amount of antibiotic eye ointment in the lower conjunctival sac:
 - Erythromycin or bacitracin or chloramphenicol eye ointment 1.25 cm ribbon qid for 5-7 days
 - Or
 - Polymyxin B plus trimethoprim (Polytrim) eye solution 1 drop q3-4h initially up to maximum 6 doses per day, then decrease frequency as condition improves for 7 days
 - Or
 - Sulfacetamide 10% eye solution 1-2 drops q2-3h initially and decreasing the dosing interval as condition responds for 7 days

Consider topical or oral analgesic

- Oral analgesic for Adult:
 - Ibuprofen (Motrin) 400-600 mg orally q8h prn (maximum dose 3.2 g/day)
 - Or
 - Acetaminophen (Tylenol) 500-1000 mg orally q4h prn (maximum dose 4 g/day)
- Oral analgesic for Children:
 - Acetaminophen 15 mg/kg/dose orally q4-6h prn (maximum dose 75 mg/kg/day)

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Or

- Ibuprofen 10 mg/kg/dose orally q8h prn (maximum dose 40 mg/kg/day)

Client and Caregiver Education

- Advise client/caregiver that a daily follow-up is important to ensure proper healing.
- Counsel client/caregiver about appropriate use of medications (type, dose, frequency, side effects, compliance, etc.).
- Instruct client/caregiver to return to clinic immediately if pain increases or vision decreases before 24 hour follow-up.
- Suggest that client wear protective glasses while working to help prevent similar incidents in future.
- Do not patch the eye.
- Avoid nightly lubricant eye ointment in addition to antibiotic treatment.
- Avoid rubbing the eyes.
- Most abrasions heal within 24-72 hours.

Monitoring and Follow-Up

- It is imperative to follow-up at 24 hours to assess healing. Most corneal abrasions will resolve within 24-72 hours.
- If no symptoms or signs, client can be sent home with advice on preventing corneal abrasions.
- If client is still symptomatic but improving, the eye should be re-treated as above with antibiotic ointment or drops and re-examined daily with fluorescein. The uptake of dye should be less than on the previous day.
- Re-examine daily until the abrasion has healed completely.
- Tetanus prophylaxis is not indicated in non-penetrating corneal abrasions.

Referral

Is indicated if:

- symptoms worsen (such as pain or visual acuity reduction) or persist after 48-72 hours.
- symptoms do not improve within hours of contact lens removal.
- deep eye injury.

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- a large abrasion when the size is more than 1/4 of the corneal surface or a round abrasion that is more than 8 mm across.
- foreign body cannot be removed.
- defect over visual axis.
- corneal abrasion which shows no improvement daily.
- development of corneal infiltrate or ulcer.
- suspected recurrent corneal erosion.
- any concern regarding complication of contact lens use.

DOCUMENTATION

- As per employer policy

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