BrienHoldenVisionInstitute

EYE INJURIES

THINK

A mother brings her child to you because he has hurt his eye with a stick. What should you do?

WHAT YOU WILL LEARN

When you have worked through this unit you should be able to:

- Explain the common types of eye injuries
- Find out how bad the injury is
- Know when to refer.

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EYE INJURIES

Eye injuries may:

- Be painful
- Be serious
- Affect vision
- Cause blindness
- Need treatment or immediate referral.

There are many kinds of eye injuries, including:

- Foreign bodies
- Penetrating injuries
- Lid lacerations
- Blunt trauma
- Chemical burns
- Flash burns.

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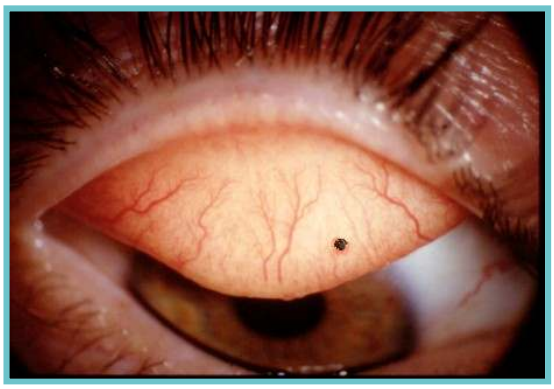
FOREIGN BODIES ON THE SURFACE OF THE EYE

WHAT IS IT?	• Any material such as an eyelash, dust, sand, stone or metal pieces that gets into the eye is called a foreign body • When a foreign body enters the eye, it can either stay on the surface of the eye or eyelid (a superficial foreign body), or it can get into the eyeball (a penetrating foreign body) • Superficial foreign bodies can rest gently on the top of the eyeball or get stuck under the lids • If the foreign body is on the cornea it will usually be quite painful • If it is on the conjunctiva, it will be less painful.
CAUSES	• Foreign bodies on the surface of the eye are usually sand, stone, paint or a piece of metal that gets stuck on the cornea or under the eyelid • Foreign bodies are often blown into the eye (for example when are outside on a windy day) • Superficial foreign bodies (i.e. those that have not penetrated or entered the eyeball) are usually not serious.
WHAT DO I ASK?	• Does it hurt when you blink? • What were you doing when you first felt the pain? • Has your vision changed? • Where do you feel the pain?
SYMPTOMS	• Discomfort or pain, which may be worse when blinking or with eye movements • The person might report something flying into the eye.
SIGNS	• Swollen eyelids • Watery eye • Redness • A white scratch or black spot which will stain with fluorescein • Vision should not change • There should be no blood or pus discharge • Light sensitivity (photophobia) if the foreign body affects the cornea.
WHAT DOES IT LOOK LIKE?	 ***Figure 19-1: Foreign body on the cornea [photo courtesy of the Brien Holden Vision Institute]***  ***Figure 19-2: Foreign body on upper eyelid conjunctiva [photo courtesy of the Brien Holden Vision Institute]***

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WHAT SHOULD I DO?	• Measure visual acuity
	• Examine the eye with a slit lamp or a torch
	• Check the cornea, conjunctiva and under the eyelids for:
	  ○ Foreign bodies
	  ○ Pus and blood
	• Check the cornea with fluorescein if you can (this will also make it easier to find a foreign body in the eye).
	
	FOREIGN BODIES UNDER THE LID:
	• **Foreign bodies will often get stuck under the upper eyelid**
	• **They can cause a scratchy feeling as it rubs on the cornea during a blink**
	• **You will need to evert the upper lid to see the foreign body**
	• **You can easily wipe away the foreign body with a cotton bud or try to wash it out.**

TREATMENT PLAN	• You should only remove the foreign body if:
	  ○ The object is NOT stuck on the eye
	  ○ It is at least 4 mm from the pupil
	• How to remove a foreign body from the eye:
	  ○ Try to rinse it out gently with clean water
	  ○ Squirt with a syringe (no needle) filled with clean water or saline – but be careful not to lodge the foreign body deeper into the eye!
	  ○ Gently wipe off with the corner of a clean cloth
	• If you are not able to remove the foreign body this way, you need to refer the person to somebody who is trained in the surgical removal of foreign bodies from the eye
	• Immediately refer the person to an ophthalmologist or medical practitioner if:
	  ○ The foreign body is a piece of chemical
	  ○ There is pus or blood
	  ○ The foreign body has become embedded in the cornea, conjunctiva or sclera
	  ○ The foreign body has penetrated the eyeball
	  ○ You are not able to remove the foreign body
	  ○ There is staining with fluorescein after you take the foreign body out
	  ○ The person is in pain.

WHAT SHOULD I *NOT* DO?	• Do *NOT* let the person rub their eye • Do *NOT* give the person local anaesthetic drops to take home and use • Do *NOT* apply an eye pad or bandage • Do *NOT* touch the eye if the foreign body has penetrated the eyeball – this requires immediate referral to an ophthalmologist.

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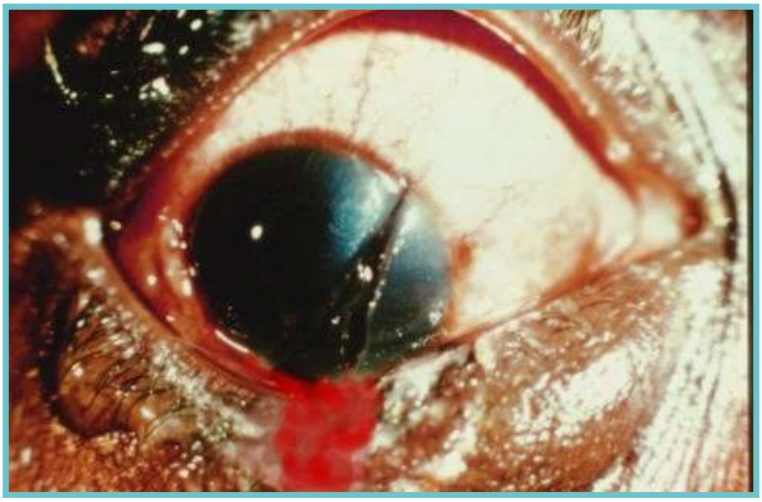
FOREIGN BODIES INSIDE THE EYE (PENETRATING INJURY

WHAT IS IT?	• A penetrating eye injury occurs when a foreign body penetrates the eyeball • Penetrating injuries may occur with or without the foreign body remaining in the eye • Foreign bodies like metallic chips or glass fragments can easily penetrate the eyeball and can cause a lot of damage in the eye • Penetrating injuries of the eye can be very serious, and can lead to blindness if not detected and treated early. • Even with appropriate treatment, penetrating injuries can cause permanent damage to the eye, including loss of vision.
CAUSES	• A penetrating injury is caused when a foreign body penetrates the eye – usually by an object which travels very fast, or which is very sharp • This can happen for example when welding or grinding metal.
WHAT DO I ASK?	• What were you doing when it happened? • When did this happen? • Do you know what type of foreign body hit your eye (e.g. metal / sand / glass)? • How is your vision? • Are you in pain?
SYMPTOMS	• Person might report something hitting them in the eye • There may be pain or discomfort • Opposite to what we might expect, penetrating injuries are often less painful than superficial foreign bodies on the eye – even though they are much more serious • Vision may be reduced, but not always.
WHAT MIGHT IT LOOK LIKE?	 *Figure 19-3: Penetrating eye injury [photo courtesy of the WHO]* • **Not all penetrating eye injuries will look this dramatic or be this easy to see!** • **Often, a penetrating injury can only be seen upon careful examination of the eye.**

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	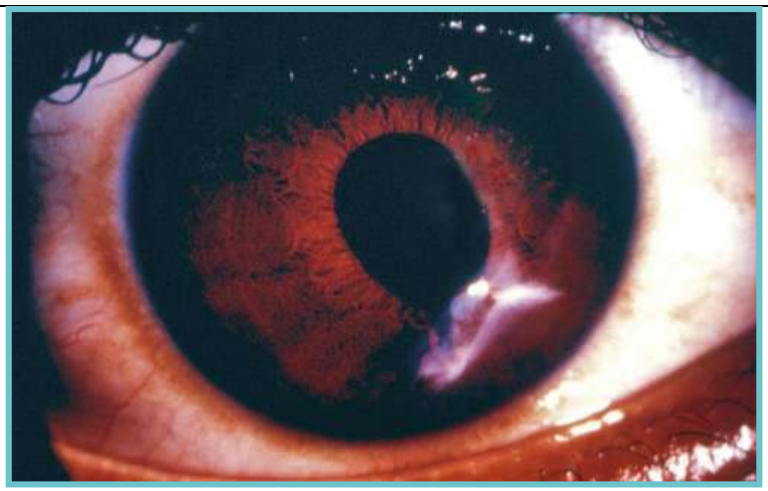 ***Figure 19-4: A penetrating eye injury that is harder to see. Note that there is a cut on the cornea and the pupil is not round. [photo courtesy of Karin Lecuona, Dept. of Ophthalmology, University of Cape Town and the International Centre for Eye Health]***

SIGNS	• Red eye
	• Vision may be reduced (but not always)
	• You may see:
	  ○ swollen or cut eyelids
	  ○ a cut on the cornea
	  ○ a red and/or watery conjunctiva
	  ○ something leaking out of the cut
	• Check for:
	  ○ pupils that might not be round
	  ○ pus and blood in the eye
	  ○ a cut on the eye
	  ○ a foreign body in the eye.

WHAT SHOULD I DO?	• Measure vision • Carefully examine the eye with a slit lamp or a torch • Check the pupils • Try to keep the person calm.

TREATMENT PLAN	• Anybody who has a penetrating eye injury needs to be referred to an ophthalmologist IMMEDIATELY – to prevent infection and to reduce further damage to the eye
	• Place a secure but loosely fitting eye shield over the eye (not a pressure patch!)
	  ○ Make sure the shield does not press on the eye
	  ○ Have the person lie down while you arrange for a doctor or trained eye care professional to see them
	• Advise the use of protective eyeglasses or safety goggles when welding, using a grinder or sander, or when conducting other activities that could cause foreign bodies to enter the eye.

WHAT SHOULD I *NOT* DO?	• Do *NOT* touch the person's eye • Do *NOT* let the person touch or rub their eye • Do *NOT* apply an eye patch • Do *NOT* try to remove or cut off any foreign body that might still be stuck in the eye • Do *NOT* allow the person to eat or drink anything – they might need to be given general anaesthesia and surgery to repair the eye.

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LID LACERATIONS

WHAT IS IT?	• A lid laceration is when the eyelid gets cut due to trauma • The cut can be in either the upper or lower lid, or in both • The eyelid might need stitches (sutures) if the cut is deep • There is a great risk of infection of the lacerated eyelid • A lacerated eyelid can lose its ability to cover the eye adequately, which may lead to problems like dry eye and corneal infection.
CAUSES	• Cuts to the eyelid are usually caused by a sharp object, such as a rock or a piece of glass • It can also be caused by a bump to the head, car accidents or bite wounds.
WHAT DO I ASK?	• How did this happen? • When did this happen? • What were you doing when this happened? • Has your vision changed? • Does your eye hurt?
SYMPTOMS	• Person might report something hitting them in the eye • Pain.
WHAT MIGHT IT LOOK LIKE?	 ***Figure 19-5: Laceration of the lower lid [photo courtesy of the WHO]***
SIGNS	• There will be a cut in the eyelid (upper or lower lid, or both) • There may be bleeding and bruising • The eyelids and area around the eyes may be swollen.
WHAT SHOULD I DO?	• Measure visual acuity (if the person can keep their eye open) • Check for other injuries to the eye (e.g. cornea) if possible – but be careful not to touch the eyelid • Refer the person to an ophthalmologist or medical practitioner, and make sure they can be seen immediately.
TREATMENT PLAN	• Immediately refer to an ophthalmologist or medical practitioner!

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BLUNT TRAUMA TO THE EYE

WHAT IS IT?	• Blunt trauma to the eye occurs when the eye is struck with a blunt (not sharp) solid object, like a fist or a tennis ball • Blunt trauma damages the eye because it causes depression and indentation of the eyeball • It can damage the eye and/or the bones around the eye (orbit) • The person may be in pain and complain of poor vision.
CAUSES	• Can be caused by a finger, a fist, a ball, or any solid object which hits the eye.
WHAT DO I ASK?	• When did this happen? • What hit your eye? • How is your vision? • Are you seeing double? • Do you have any pain around the eye, face or inside your mouth? • Are there any areas of your face that you cannot feel? • Have you seen any flashing lights and/or floaters? • Can you move your eye to look in all directions?
SYMPTOMS	• Person might report something hit them on the eye or in the face • They may have double vision (especially if there was damage to the orbit) • May have pain around the eye, and in their face and mouth • May have numbness in the face and mouth (parts of the face and mouth that they cannot feel) • Might see flashing lights or floaters (especially if there is damage at the back of the eye) • Loss of vision or poor vision.
SIGNS	Depending on the type of blunt trauma, you may see some or all of these signs: • Swollen eyelids • Bruising of the eyelids • Subconjunctival haemorrhage • Blood in the anterior chamber (hyphema) • Dilated or semi-dilated pupil • The crystalline lens may be damaged and cloudy, and it may even be displaced • Inability to move the eye in different directions • The injured eye may be sunken inside the orbit, and may not be looking straight ahead – which could indicate a broken bone around the eye (*this is called a blow-out fracture*).
WHAT SHOULD I DO?	• Measure visual acuity • Check the pupils • Check the eye movements • Closely examine the cornea, conjunctiva, iris, lens and anterior chamber with a torch or slit lamp • Examine the retina and vitreous with an ophthalmoscope if possible.

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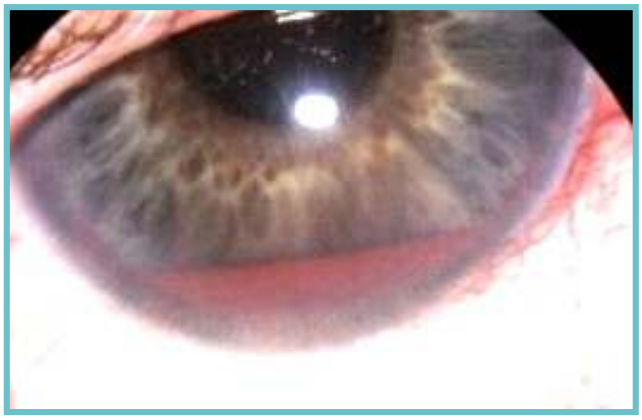
WHAT MIGHT IT LOOK LIKE?	 ***Figure 19-6: Bruised eyelids (black eye) and bleeding of the conjunctiva (subconjunctival haemorrhage) due to blunt trauma.*** ***[photo courtesy of John Sandford-Smith and the International Centre for Eye Health]***  ***Figure 19-7: Blood between iris and the cornea (hyphaema)*** ***[photo courtesy of the WHO]***

TREATMENT PLAN	• A person with blunt trauma to the eye needs to immediate referral to an ophthalmologist or medical practitioner if:
	  ○ Vision is worse than normal
	  ○ The person sees flashes and floaters
	  ○ The person experiences double vision or numbness inside the mouth
	  ○ The injured eye appears sunken into the socket
	  ○ The pupil is not round or does not react to light
	  ○ There is a sub-conjunctival haemorrhage and you cannot see the white of the eye (sclera) all the way around the bleeding
	  ○ There is bleeding inside the eye
	• If a person has bleeding inside the eye, but for some reason they cannot get to a doctor immediately:
	  ○ Pad both their eyes (but only if you are sure there is only blunt trauma and no laceration of penetrating injury)
	  ○ The person needs to take strict bed rest for 5 days, and they should not bend down or forward
	  ○ They can use ice packs to help reduce the pain and swelling
	  ○ They should avoid using aspirin as this can make the bleeding worse
	  ○ If the blood has not cleared after 5 days, they HAVE TO see a medical practitioner.

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FLASHES AND FLOATERS:

- **Blunt trauma to the eye can cause a retinal detachment (the retina separates from the back of the eye)**
- **A retinal detachment can occur up to 6 months after an injury**
- **Anybody who has had a blunt injury needs to be educated on the symptoms of a retinal detachment**
- **The symptoms of retinal detachment include:**
  - **Seeing flashes of light**
  - **Seeing floaters or black spots**
  - **Feeling like there are cob-webs or something blocking their vision**
  - **Vision may be reduced or lost**
- **People should be immediately referred to an eye care professional if they have any of these symptoms – especially if they have a history of trauma to the eye**
- **A retinal detachment is very serious – it can cause blindness if not treated immediately.**

LONG-TERM EFFECTS OF TRAUMA TO THE EYE:

- **The effects of blunt trauma to the eye are sometimes only noticed months or years after the trauma occurred**
- **These effects can include cataract, retinal detachment and glaucoma – all of which can cause loss of vision**
- **Continued follow-up and close monitoring is necessary following any eye injury.**

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CHEMICAL BURNS

WHAT IS IT & WHAT CAUSES IT?	• When a chemical gets splashed into the eye or onto the eyelid, it can cause a chemical burn • Chemical burns can happen with things that people use every day at work or home, such as: ○ Ammonia (in household cleaning products) – this causes very serious burns ○ Chlorine (found in household cleaner and pool cleaners) ○ Lye (found in drain cleaners) – this causes very serious burns ○ Bleach (commonly used for laundry and as a disinfectant) ○ Acetic acid (found in nail polish remover) ○ Hydrochloric acid (found in car batteries) • All chemical burns should be taken seriously • It can cause permanent damage to the eye and lead to blindness • This is an eye EMERGENCY!
CHEMICAL BURNS SHOULD BE RINSED IMMEDIATELY ON PRESENTATION Start rinsing the eye before asking about symptoms and looking for signs The longer the chemical is in the eye, the more damage it will cause You should rinse the eye for at least 20 minutes with sterile saline or clean water.	
WHAT DO I ASK?	• What happened? What were you doing when you got a splash in the eye? • Do you know what type of product or substance went into your eye? • When did this happen? • Have you put any drops into the eye since the accident? • How is your vision? • Do you have any pain in or around the eye? • Are you sensitive to light? **REMEMBER:** **When you realise the person has a chemical in the eye, you should rinse the eye before asking any other questions!**

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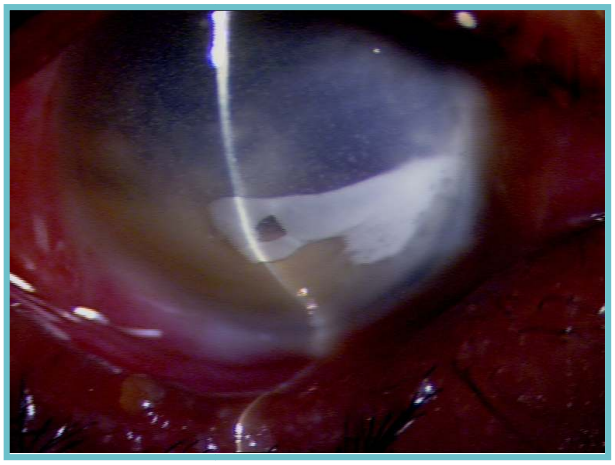
SYMPTOMS	Early symptoms could include: • Pain or irritation • Redness • Tearing • Sensitivity to light • Can struggle to keep the eye open • Blurry vision • Swelling of the eyelids. **NOTE:** **You should rinse the eye for at least 20 minutes before asking about symptoms!** • Very serious burns can cause a total loss of vision • If the chemical burn penetrates the eye, it can damage the inside of the eye and the lens • Chemical burns can also cause cataracts and glaucoma.
WHAT COULD IT LOOK LIKE?	 ***Figure 19-8: Mild chemical burn with a clear cornea [photo courtesy of the WHO]***  ***Figure 19-9: Severe chemical burn with a cloudy cornea [photo courtesy of the WHO]***

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WHAT SHOULD I DO?	**Step 1: Rinse the eye** • The first and MOST important thing to do is to wash the chemical from the eye as soon as you can • Use saline or boiled water (that has cooled down) if you can, but use tap water if you have nothing else available *Note: Do not boil water and wait for it to cool down – you need to start rinsing the eye IMMEDIATELY!* • Keep rinsing the eye thoroughly for at least 20 minutes ○ Hold the person's head under a tap (do not have the tap on too hard), under a shower head or a running stream of sterile saline solution ○ You can also put the person's head in a bowl of clean water ○ Ask the person to open their eyelids as wide as possible ○ Wash under the eyelids as well ○ If possible, get the person to an ophthalmologist or a doctor while you keep rinsing their eye ○ If there is no doctor available, you will have to examine the eye after 20 minutes of rinsing. **Step 2: Carefully examine the eye** • Check visual acuity • Examine the eyelids, conjunctiva and cornea with a torch or slit lamp • Look for redness anywhere in the eye • If you can, also examine the cornea with fluorescein and cobalt blue light • Examine the skin around the eyes. *Note: You should only examine the eye after at least 20 minutes of thorough rinsing!*
SIGNS	• Vision may be reduced or there could be a complete loss of vision • Redness • Swelling of the eyelids or the skin around the eyes • Tearing • Eye kept shut, difficult to open • There might be corneal staining with fluorescein.
TREATMENT PLAN	• Ideally, all persons with a chemical burn of the eye should be seen by an ophthalmologist or medical practitioner as soon as possible – once the eye has been rinsed for at least 20 minutes • If that is not possible, you should at least refer any person with corneal staining • Any person with a chemical burn, who has eye pain, should also be referred.

CHEMICAL BURNS OF THE EYE:

- **The most important thing to remember is that you MUST start rinsing the eye as soon as possible**
- **This is the one time when you DO NOT take a comprehensive case history, measure vision or examine the eye before treating the person**
- **Use boiled water (cooled down) or sterile saline solution if available; otherwise use any clean water you can get**
- **You must continue to rinse the eye for at least 20 minutes.**

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FLASH BURNS

WHAT IS IT?	• A flash burn is damage to the eye caused by exposure to ultraviolet radiation • It is like sunburn to the surface of the eye.
CAUSES	• Flash burns are caused by prolonged exposure to ultraviolet (UV) light • Can be caused by: ○ Welder's arc (sometimes called "arc eyes") – when someone welds without wearing the proper eye protection ○ Direct sunlight ○ Looking at a solar eclipse ○ Sun reflecting off the water or snow ○ Sun lamps or tanning beds ○ Photographer's flood lamps.
WHAT DO I ASK?	• What were you doing when the pain started? • How long ago did it happen? • Were you wearing any eye protection? • How is your vision? • How do your eyes feel? • Are they sensitive to light? • Has this ever happened to you before?
SYMPTOMS	• Symptoms usually begin hours after exposure to UV light • The person may report that they were welding or spent a lot of time in the sun • Pain • Sensitivity to light • Excessive tearing • Poor vision • Irritation or foreign body sensation in the eye • Both eyes are usually involved.
WHAT COULD IT LOOK LIKE?	 ***Figure 19-10: This man has corneal flash burns from welding without eye protection***
SIGNS	• Red, painful eyes • Excessive tearing • Vision is reduced • Cornea will stain with fluorescein • Both eyes are usually affected.

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WHAT SHOULD I DO?	• Measure visual acuity in each eye • Take a close look at the cornea of each eye with a torch or a slit lamp • Examine the cornea of each eye with fluorescein and cobalt blue light.
TREATMENT PLAN	• If you are sure that the problem is definitely caused by flash burn only: ○ Wash out both eyes with clean water or saline ○ Tell the person that the pain and discomfort should start improving in a few hours ○ A clean, cold cloth over the eyes could help relieve some of their discomfort ○ If there is no improvement in one day, the person needs to see an ophthalmologist or medical practitioner ○ Advise the person to wear safety goggles when they weld, or appropriate sunglasses when they are outside ○ Explain to them that this could be serious next time as the eyes are prone to infection after a flash burn • If you are not sure that the problem is definitely a flash burn, or if it is not better after one day, you need to refer the person to an ophthalmologist or medical practitioner.

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CORNEAL SCARRING

WHAT IS IT?	• Scarring of the cornea • Can cause a change in refractive error • If the scarring is located over the pupil, it could cause visual impairment or even blindness.
CAUSES	• Corneal scarring is usually the result of a corneal injury or infection • Can be caused by: ○ Deep corneal abrasion ○ Infection of the cornea ○ Corneal ulcer ○ Corneal laceration ○ Chemical burn ○ Trachoma.
WHAT DO I ASK?	• Have you had any eye injuries or infections in the past? • Are you aware that there is a scar on your eye? How long have you had this? • Are you having problems with your vision? • Do your eyes hurt?
SYMPTOMS	• The person may report past history of an eye injury or infection • Vision will be reduced • The degree of vision loss will depend on how dense the scar is, and how much of the pupil is covered by the scar.
WHAT COULD IT LOOK LIKE?	 ***Figure 19-11: Corneal Scar over the pupil – note how the conjunctiva is white, not red and there is a white mark on the cornea.*** ***[photo courtesy of the International Centre for Eye Health]***
SIGNS	• Reduced vision • A white mark on the cornea • The rest of the eye should not be red or swollen.
WHAT SHOULD I DO?	• Measure visual acuity • Take a close look at the cornea and conjunctiva to make sure there is no new eye infection or injury • If the eye is red or there is any discharge, there is probably active infection and the person needs to be referred to an ophthalmologist or medical practitioner immediately.

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TREATMENT PLAN	• If you are sure that it is a scar and not an infection, and if vision is not affected too much, there is no need to refer the person for further treatment • If the scar was caused by a disease (like trachoma), make sure that the disease has been treated and the condition is resolved • If the scar was caused by an injury (like grinding), advise the person to wear eye protection next time • If a corneal scar is dense enough to severely affect vision, the person needs to be referred to an ophthalmologist as they may require a corneal transplant • Since corneal scarring can cause permanent vision loss, it is best to try and prevent them from occurring by trying to prevent eye injuries and infections.

CORNEAL SCARS:

- **A scar caused by injury or disease will not get bigger unless the disease is active or the eye gets injured again**
- **If the eye is red, or if there is any discharge, the white mark on the cornea might be an infection and not a scar**
- **If you are not sure refer to an eye care professional or a medical practitioner.**

PREVENTING EYE INJURIES:

- **Wear safety spectacles at work or at home whenever there is a risk of eye injury**
- **Keep sharp objects away from children**
- **Don't let children play with sticks**
- **Open bottles away from face**
- **Keep chemicals in a safe place**
- **Have clean water ready to wash eyes in places where chemicals are used**
- **Teach people about washing their eyes in case of a chemical splash in the eye.**

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SUMMARY – EYE INJURIES

FOREIGN BODIES ON THE SURFACE OF THE EYE

- Any material that gets into the eye is called a foreign body
- Look for the foreign body, including under the eyelids
- Only remove the foreign body if it is not stuck on the eye, and is not within 4mm of the pupil.

FOREIGN BODIES INSIDE THE EYE (PENETRATING INJURY)

- May occur with or without a foreign body remaining in the eye
- Do NOT touch the eye if you think a foreign body has penetrated it
- Do NOT apply an eye patch
- Protect the eye with a loosely fitting shield
- Arrange to have the person taken to hospital immediately.

LID LACERATIONS

- Cut to the eyelid due to trauma
- Check for other injuries
- Gently clean eye
- Do NOT try and stitch the eyelid
- Immediately refer to an ophthalmologist or medical practitioner!

BLUNT TRAUMA

- Trauma to the eye caused by a blunt object
- Should be referred to an ophthalmologist or medical practitioner if:
  - vision is worse than normal
  - the person has double vision
  - the person sees flashes and floaters
  - the person has a numb feeling inside their mouth
  - there is bleeding inside the eye
  - the pupils is not round or reactive
  - one eye is sunken in
  - there is a sub-conjunctival haemorrhage and you cannot see all the way around the bleeding
- Tell the person not to use aspirin, as this can make any bleeding worse.

CHEMICAL BURNS

- This is an eye EMERGENCY!
- The eye needs to be rinsed or washed out immediately – before you measure vision or ask about symptoms
- Wash the eye for at least 20 minutes, and don't forget to rinse under the eyelids
- Refer to an ophthalmologist as soon as possible, especially if the cornea stains with fluorescein or if the pain persists after eye washing.

FLASH BURNS

- Usually from welding without eye protection, or too much sun exposure
- Typically affecting both eyes
- Reassure the person that the discomfort will start improving in a few hours
- Refer to an ophthalmologist or medical practitioner if it is not better on the next day
- Advise the patient to wear adequate eye protection next time.

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CORNEAL SCARS

- Usually from injury or disease
- Look for white patch on cornea
- Conjunctiva should be white
- Refer if there is active infection or if vision is reduced.

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TEST YOURSELF QUESTIONS

1. **A mechanic has had battery acid splashed in the eye. What is the first and most important thing you should do?**

_____
_____
_____

2. **A person comes to you after getting into a fist fight, and he got hit in the face. His one eyelid is swollen, but vision is normal and the eye looks normal. What should you tell him?**

_____
_____
_____

3. **The same person comes back a month later, complaining of seeing flashing lights and floating objects in his vision. What should you do and what do you think is the cause of these symptoms?**

_____
_____
_____

4. **What should you *NOT* do if a person has a penetrating eye injury?**

_____
_____
_____

5. **What should you advise someone with flash burn of the cornea?**

_____
_____
_____

6. **What are some common causes of a corneal scarring?**

_____
_____
_____

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