

# Disorders of the eye

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# WHY EYE INJURIES AT WORK IS IMPORTANT?

- More than 2,000 people injure their eyes at work each day.
- 10-20 % will cause temporary or permanent vision loss.
- The right eye protection could have lessened the severity or prevented 90% of eye injury accidents.
- The financial cost of eye injuries is more than \$300 million per year in lost production time, medical expenses, and workers compensation.


# WORK PLACE INJURIES

- Eye injuries represent 11% of all injuries in the construction industry today.
- 80% of injuries occur because glasses were not being worn at the time of the accident.

# ALLERGIC CONJUNCTIVITIS:

- all occupations & long list of workplace Allergens
- systemic allergic manifestations (Asthma & Dermatologic disorders)
- The role of work-related factors is the first question to be considered.

# ALLERGIC CONJUNCTIVITIS:

- changes in the quality of the tear layer overlying the cornea and conjunctiva  symptoms
- Mucus protects the cornea becomes thick and uneven.
- Small areas of the cornea remain unprotected and dry quickly.
- Nerve endings located in the superficial layers of the cornea are stretched and cause a foreign body sensation.

# *CLINICAL FEATURES OF ALLERGIC CONJUNCTIVITIS*

- The clinical picture is often complicated by post infection allergic reactions.
- Are not specific
- mucous discharge, dryness, itching, burning, foreign body sensation, tearing, pain and blur vision.
- pathognomonic of an allergic reaction:  
Thin threads of mucus in the lower fornix

# ALLERGIC CONJUNCTIVITIS:



**Fig. 5.5** Acute allergic reaction of the conjunctiva with swelling and redness. The eye is usually very itchy.



# THE KEY IN DETERMINATION OF ETIOLOGY :

- ❑ case history (type and duration of symptoms during working days and weekends ).
- ❑ Environmental factors should be noted:
  - Ventilation
  - sources of irritating and allergic exposures
  - carpeting, cleaning agents, smoking, various chemicals used in the workplace (including those used by adjacent workers).



# TREATMENT OF ALLERGIC CONJUNCTIVITIS

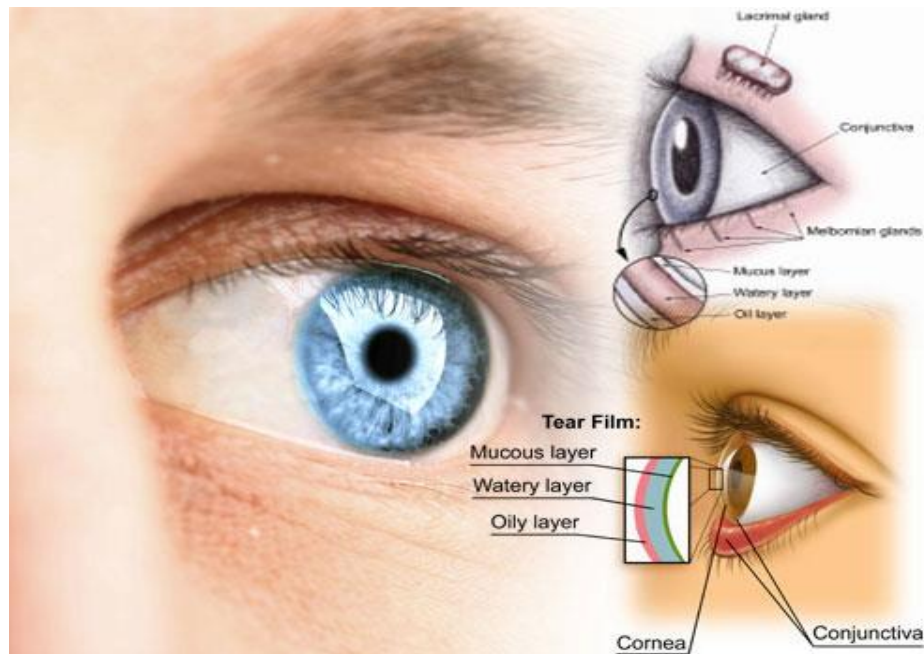
- Often a single specific allergen or irritant cannot be identified
- Reduction or prevention to the allergen or irritant is preferred, but often not possible
- Treatment is often symptomatically:
  - cool compresses
  - artificial tears
  - avoidance of any preservatives in the medications used, (benzalconium chloride)

- Topical mast-cell stabilizers and antihistamines
- Systemic antihistamines
- topical steroids (increased intraocular pressure, herpetic or fungal keratitis, and of cataract formation )
- If the employee is entitled to compensation because of work-related disease, the diagnosis needs to be confirmed using exposure in well controlled laboratory conditions.



# DRY EYE SYNDROME

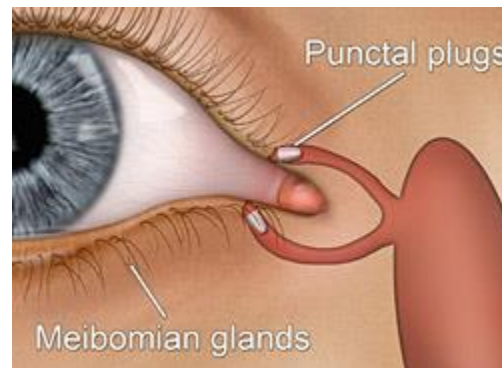
- is common.
- the symptoms are often worsened by low humidity at the workplace.
- similar to allergic conjunctivitis and generally worsen as the day goes on and with near vision tasks.





## Treatment :

- ❑ artificial tears is helpful.
- ❑ Use of a humidifier
- ❑ Punctal plugs may be indicated if symptoms persist.



# IRRITATION OF THE CORNEA

- Chemicals
- high or low temperature
- dust and other irritant exposures



- irritating agents may worsen an underlying allergic condition.
- Chemical irritation may lead to accumulation of fluid under the corneal epithelium, as is the case after exposure to triethylamine. Resultant minute subepithelial corneal vesicles, which can be seen only on microscopic examination, can cause blurred, hazy vision.
- Exposure to amines may cause corneal opacities

# ULTRAVIOLET (UV) LIGHT-INDUCED KERATOCONJUNCTIVITIS

- common problem

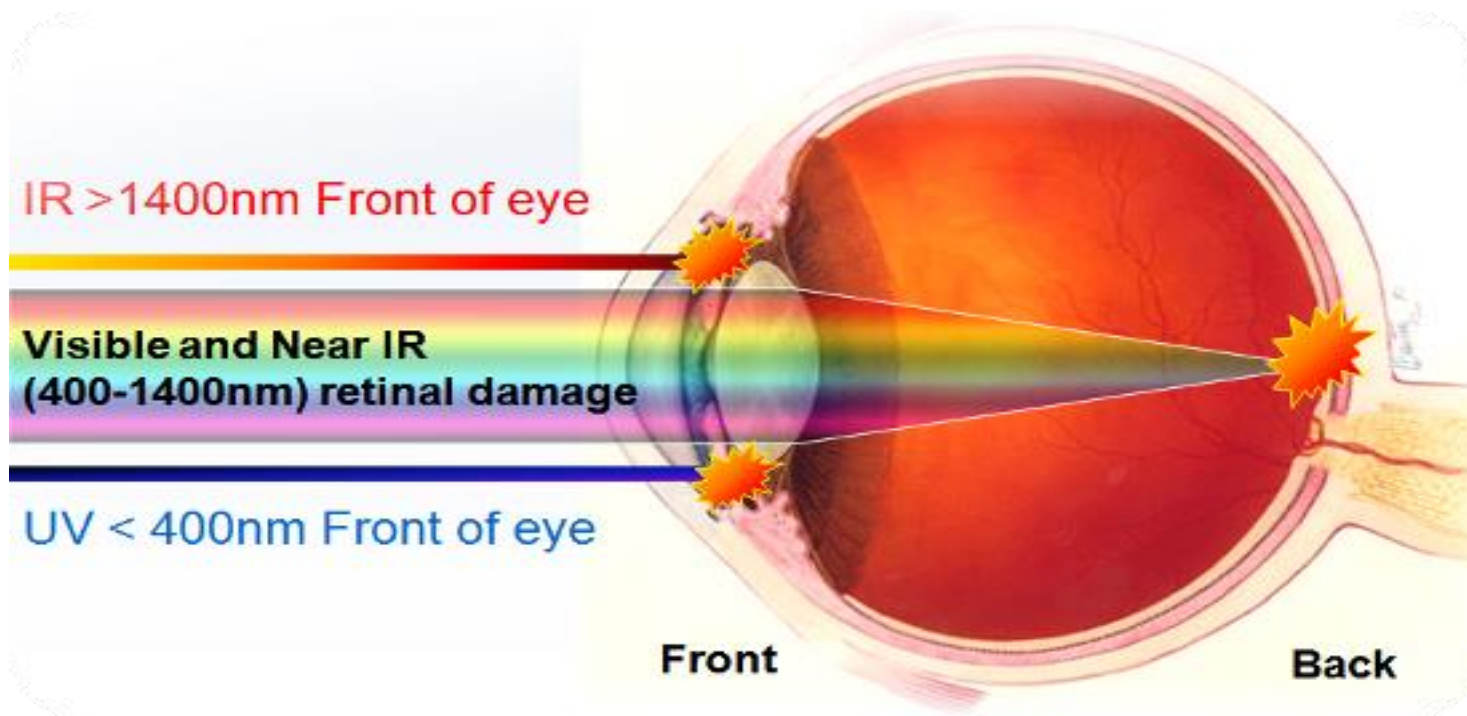




- Regular plastic lens materials absorb UV light. Glass lenses vary in their transmission of UV light and should have UV coating when needed.



- UV light is absorbed in the cornea and the lens, with only minimal amounts reaching the retina in normal eyes.



- **The symptoms** appear within hours after UV exposure (slight irritation to severe sloughing).
  
- **Treatment:**
  - sterile ointment, tight bandaging and pain medication.
  - Subacute damage : occur from lower levels of exposure to UV light. Symptoms include dryness or foreign-body sensation in the late night and early morning hours.
  - Chronic exposure may lead to thickening of the conjunctiva and changes in the corneal surface.

# DISORDERS OF THE LENS



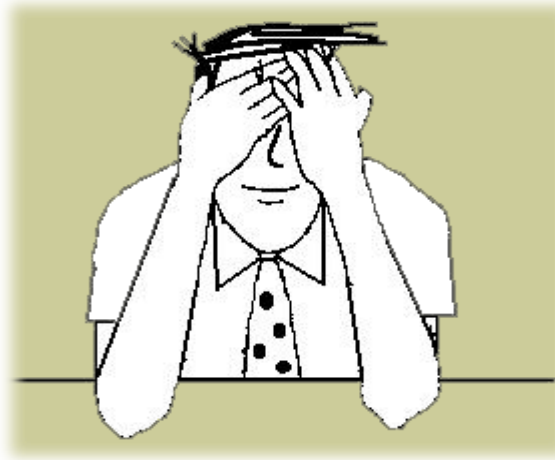
- **UV-B:** Some epidemiologic studies: the correlation between UV light and cortical and posterior subcapsular cataracts.
- the role of work-related radiation in cataracts is usually hard to prove.
- **organic nitrate :** Exposure to organic nitrate explosives has been reported to be associated with cataract formation.
- **infrared radiation :** glass and metal workers

# DISORDERS OF THE RETINA AND OPTIC PATHWAYS

## ○ Chemicals :

- solvents have been reported to cause altered color vision, most commonly in the blue–yellow axis:
- styrene, toluene, perchloroethylene, n-hexane, carbon disulfide and solvent mixtures.
- Carbon disulfide can cause changes in the retinal capillary.

# EYE STRAIN AND VISUAL ERGONOMICS



- Many occupations , office based, using computers instead of manual labor.
- visual ergonomics have become important, in planning the working conditions of employees.

# SYMPTOMS OF EYE STRAIN :

- sore eyes
- headaches
- Fatigue
- associated with intensive close work (reading and use of video display terminals).

# ENVIRONMENTAL AND ERGONOMIC FACTORS

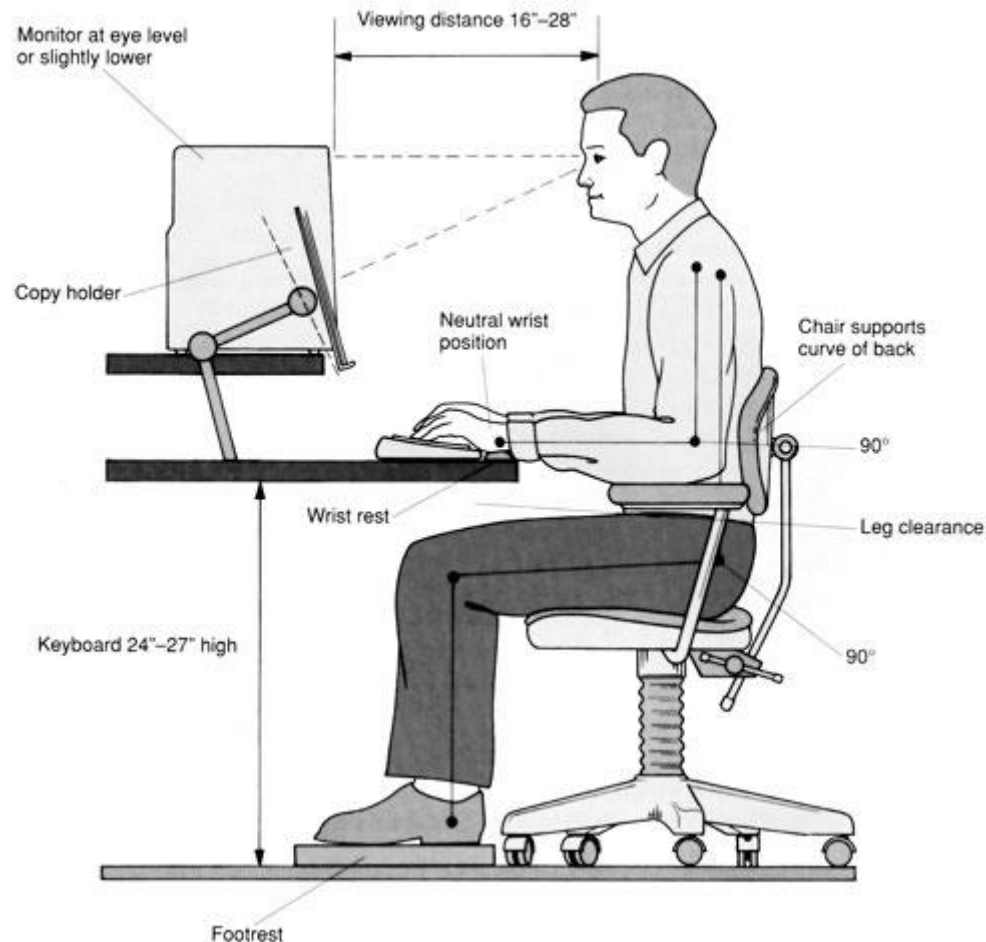
- Poor contrast
- small text
- too high direction of gaze (blinking decreases and dry spots , neck muscle tension )
- Poor placement of a video display terminal may cause glare



## Correction

- Illumination should be adjustable.
- Shared workstations need to be adjustable

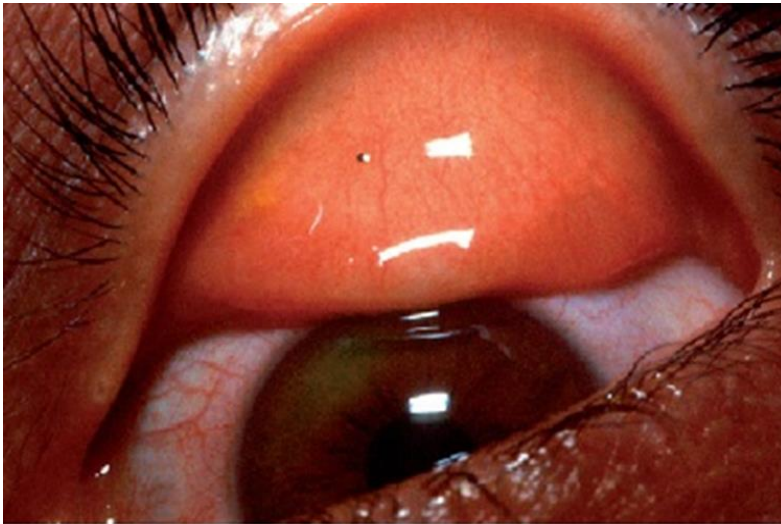
- All visual target areas should be placed lower the visual field, so that the head posture is comfortable and nodding is avoided .



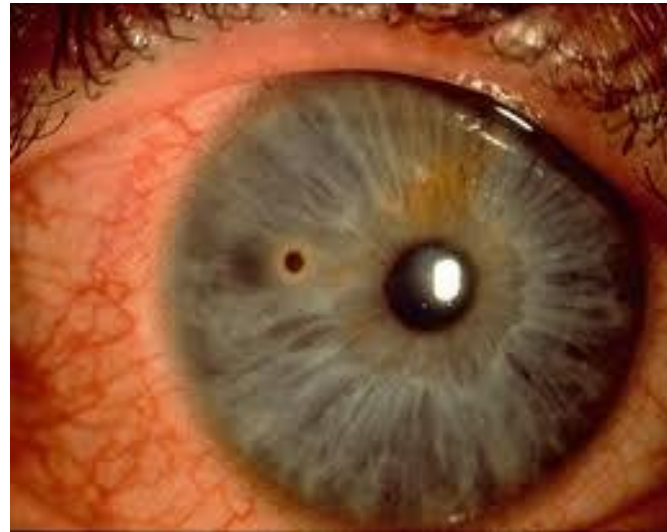


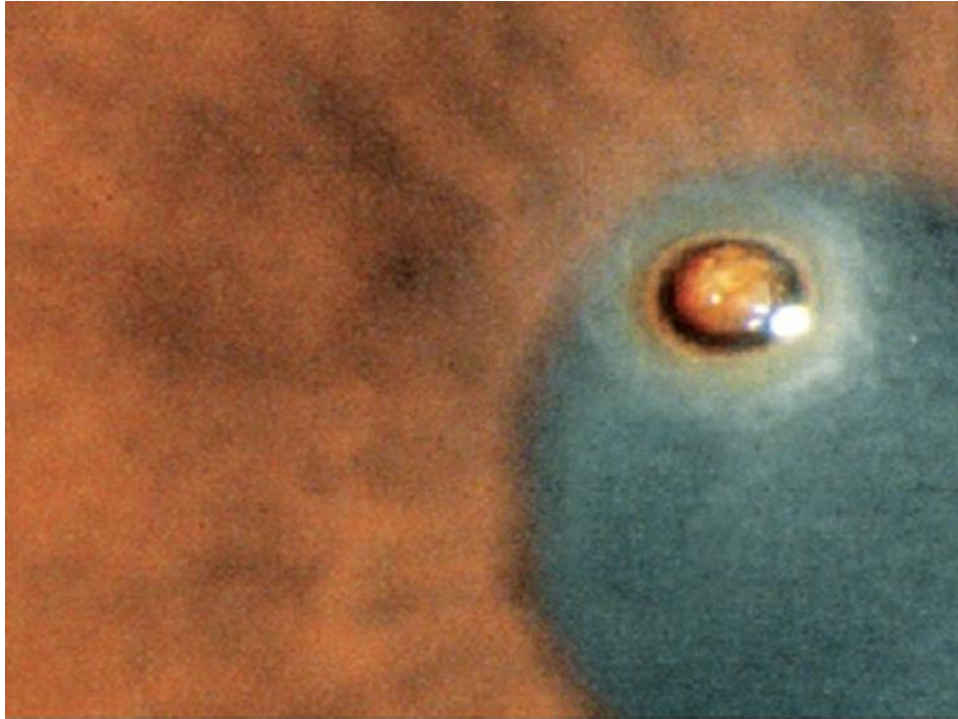
## SUPERFICIAL FOREIGN BODIES

- the most commonly work-related eye injuries.
- foreign body may cause corneal or conjunctival abrasion or become embedded in the cornea or conjunctiva.



5.2: Subtarsal foreign body with associated  
corneal uptake





Corneal FB with rust ring.

- Fluorescein stains the damaged epithelium and helps to locate the foreign body.
- After it is removed, antibiotic ointment is applied.
- Corneal abrasions usually heal within 48 hours but it is wise to use ointment nightly for a week.



## COMPLICATIONS OF CORNEAL ABRASIONS :

- **Infection:** should be suspected if a discharge develops  
immediate referral to an ophthalmologist.
- **Recurrent erosion:** a common complication and occurs when the basement membrane that underlies the superficial epithelium of the cornea is disrupted. This prevents firm adherence of the corneal epithelium to the basement membrane and the corneal epithelium then breaks down after minor trauma, such as rubbing of the eye. Therefore it is wise to cover the eye with a patch for the first few nights.

# PENETRATING OCULAR FOREIGN BODIES

- the eye should be covered with a sterile patch. when the patient is sent to the emergency clinic No medications are used.



# CHEMICAL INJURIES



- may occur in laboratory, agricultural, or industrial settings and represent a significant threat to vision.
- Numerous chemicals can cause serious ocular injury, especially strong acids and bases.

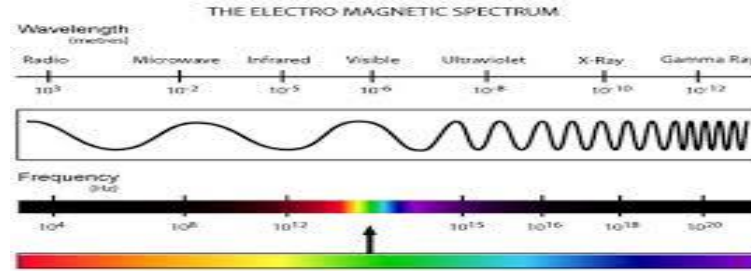
- Immediate irrigation is essential to minimize permanent vision loss.
- bottles with irrigation fluid must be near all workstations where dangerous chemicals are used and the workers must be trained .
- Irrigation is continued while transporting the patient to an emergency room for further treatment.



- Alkali burns tend to be more caustic and thus more damaging than acid injuries.
- However, both have the potential to cause severe vision loss.
- Protective eyewear should always be worn when handling corrosive or caustic fluids and gases, preferably behind a protecting window or screen.



# ELECTROMAGNETIC RADIATION



- Visible, ultraviolet, infrared, microwave, and laser energy have all been implicated in work-related eye injuries.
- **Visible and ultraviolet** : pterygium and macular degeneration.
- **Infrared** : in glass and metal workers has been associated with cataract formation.
- **Microwaves** : cataract formation.



# PREVENTION

- Prevention is the most important
- According to the Bureau of Labor statistics, 60% of workers who suffer eye injuries did not wear eye protection at the time of the injury; 40% of those who wore protection wore the wrong kind of protection.
- the most important single intervention to decrease the eye injury.

- Comprehensive workplace strategies to prevent eye injuries :
  - workplace modifications
  - use of appropriate personal protective equipment
  - worker education
  - appropriate trained personnel