3.04 Functions and disorders of the eye

3.04 Understand the functions and disorders of the sensory system
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Essential Questions

• What are the functions of the sensory system?
• What are some disorders of the sensory system?
• How are sensory system disorders treated?
• How do you relate the body’s communication to the sensory system?
Understanding the functions of the eye

Sight

3.04 Understand the functions and disorders of the sensory system
Understanding the functions of the eye

**External eye**
- **Orbit** - The cavity that houses the eye

- **Eyelids and eyelashes**
  Women blink twice as often as men. Why do we blink? To prevent particles from entering the eye.

- **Conjunctiva**
  Protects the exposed eye surface

- **Lacrimal apparatus**
  Produces and stores tears

- **Extrinsic muscles**
  Muscles responsible for moving the eye

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3.04 Understand the functions and disorders of the sensory system
Understanding the functions of the eye

External eye

- Extrinsic muscles - Move the eye within the orbital socket and are attached to the outside of the sclera

Which extrinsic muscle allows you to look upward?

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Understanding the functions of the eye

Internal eye

- **Cornea** - allows passage of light rays.
- **Iris** - controls the size of the pupil when light passes into the eye.
- **Pupil** - Allows light to pass into the eye.

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Understanding the functions of the eye

Internal eye

- **Ciliary body** - muscles that alter the shape of the lens which allows focusing
- **Lens** - Thins and thickens to allow light to focus on the retinal surface
- **Aqueous humor** - bathes the iris, pupil and lens with fluid

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**Internal eye**

- **Sclera**: maintains the shape of the eye; bends outside light rays to focus on the retina
- **Choroid**: Contains blood vessels and pigment that prevent internal reflection of light rays
- **Retina**: contains nerve endings that receive and interpret the rays of light for vision

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Internal eye

- **Vitreous humor** - maintains eye shape; refracts light rays
Understanding the functions of the eye

Macula: The yellow disc in the back of the eye

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Process of Seeing

- Trace the field of vision. Images in the light > cornea > pupil > lens > light rays are bent or refracted > retina > rods and cones pick up the stimulus > optic nerve > optic tracts > occipital lobe of the brain to interpretation.

Why can’t you see in the dark?

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**Vision**

1. Close your left eye and focus your right eye on the cross.
2. Move the page slowly away from your eye and then slowly toward your eye.

What happens as you move your paper away from and toward to your eye?

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Rods and cones of the retina

What are the functions of the rods and cones?

3.04 Understand the functions and disorders of the sensory system
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VISION ACTIVITY

Do you see what I see?
Disorders of the eye

Astigmatism  Glaucoma  Presbyopia
Detached retina  Diabetic retinopathy
Color blindness  Hyperopia
Cataract  Conjunctivitis
Myopia

Have you heard of these conditions? What do you know about them?

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Disorders of the eye

Cataract

Describe this lens.

The lens gradually becomes cloudy. It occurs frequently in people over 70. Vision becomes blurred, pupil becomes milky white.
Disorders of the eye

Cataract

How is a cataract treated?
Surgical removal of the lens and lens implant.

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Disorders of the eye

Color blindness

- Do you see the number?
- What is color blindness?
  Disorder of the retina that causes an inability to distinguish between red and green colors.
- What causes it? It is inherited due to genes on the X chromosome

Ishihara chart

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Disorders of the eye

Conjunctivitis

- What is conjunctivitis? Inflammation of the membrane that lines the eye
- What are the symptoms? Red swollen eyes
- What causes it? Viruses or bacteria
- How is it treated? Eye washes or eye irrigations to cleans the conjunctiva

How is conjunctivitis spread? How can it be prevented?

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Detached retina

What is it? When the retina becomes detached from the choroid layer.

What is the relevance to health? This can happen as a result of a traumatic accident. However, with aging, it may happen as the vitreous fluid contracts and pulls on the retina causing it to tear.
Disorders of the eye

Detached retina

Compare this process to the previous picture.
Disorders of the eye

Diabetic retinopathy

- **Cause:** Changes in the blood vessels in the retina. Blood vessels may swell and leak or abnormal blood vessels may grow on the retina.
- **What are the symptoms?** None in the early stages, but as it advances, people can see red spots if bleeding occurs.
- **Prognosis:** Blindness if untreated.

**How can diabetic retinopathy be prevented?**
Disorders of the eye

Glaucoma

- **Description:** Overproduction of aqueous humor or obstruction of its outflow causing excessive pressure and results in destruction and atrophy of the optic nerve.

- **Symptoms:** gradual aching feeling, loss of peripheral vision and a halo around light.

- **How is it diagnosed?**
  Tonometry, ophthalmoscope to visualize the optic nerve.

- **How is it treated?**
  Medicated eye drops that increase the outflow of aqueous fluid.

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Disorders of the eye

Macular degeneration

- What is macular degeneration? Occurs with aging. It is a reduction or loss of central vision.
- Two types
  - Atrophic (Dry)
  - Exudative (Wet)
- Symptoms: Dimming or distortion of vision especially when reading
- What is the treatment? None for dry type; laser treatment for wet type.

3.04 Understand the functions and disorders of the sensory system
Presbyopia: The lens loses its elasticity making it difficult to focus on close objects.
- Usually occurs after age 40
- Correction with glasses

An irregular curvature of the cornea or lens which causes blurred vision and eyestrain
- Special prescription glasses help this condition

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Hyperopia (farsightedness): Objects must be moved farther away from the eye to be seen clearly.
  • Convex lenses help correct this situation

Myopia (nearsightedness): Objects must be moved closer to the eye to be seen clearly.
  • Concave lenses correct this situation

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Testing vision

- How do we test visual acuity?

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The End

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