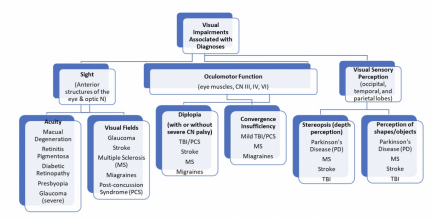
Visual impairment w/ diagnoses



Brain Injury Related Visual Dysfunctions/ Other

Traumatic Brain Injury (TBI)	an injury that affects how the brain works.	Motor Vehicle Accident Athletes (football, boxing, skateboarding, etc.), Gunshot wounds, Domestic Violence, Falls
Acquired Brain Injury (ABI)	brain damage caused by events after birth, rather than as part of a genetic or congenital disorder	CVA or Stroke Aneurysm Anoxia – oxygen deprived Brain tumor/brain tumor resection or removal located in occipital lobe, parietal lobe, cerebellum, or Optic Tract Cranial Nerves III, IV, and IV palsies
Optic Neuritis	Optic neuritis can affect your vision and cause pain. When the nerve fibers become inflamed, the optic nerve can also start to swell. This swelling typically affects one eye, but can affect both at the same time. Optic neurit-is can affect both adults and children.	Multiple Sclerosis

Brain Injury Related Visual Dysfunctions/ Other (cont)

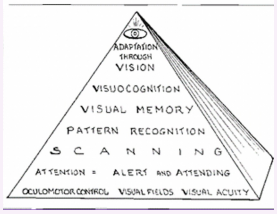
Migraines	A migraine that involves visual disturbance is called an ocular migraine. Ocular migraines can develop with or without the accomp-anying pain of a classic migraine. During an ocular migraine, or migraine with aura, you may see flashing or shimmering lights, zigzagging lines, or stars	Kaleid-oscope vision
Vitamin Defici-encies	Disturbed or blurred vision can also occur as a result of a Vitamin B12 deficiency. This happens when the defic-iency causes damage to the optic nerve that leads to your eyes. The nervous signal that travels from the eye to the brain is disturbed due to this damage, leading to impaired vision	

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Brain Injury Related Visual Dysfunctions/ Other (cont)

Medications	Medications used for depression, Parkinson's disease, seizures, ulcers, asthma, arrhythmia, and hemorrhoids can cause this type of glaucoma; Many cancer treatments, including chemotherapy, radiation, steroids and immunotherapies, are known to cause eye-related side effects such as dryness, tearing, cataracts, sensitivity to light, infection or altered vision. It's even possible for eye color to change.	Cancer Treatment

Hierarchy of Visual Perceptual Processing



Oculomotor System

Gaze systems that redirect the eyes to each new target	Voluntary or "targeting" movement:	Smooth pursuits/tracking
	Involuntary oculomotor movements:	Vestibular-ocular reflex (VOR)

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Attention= Alert + Attending

Alertness & Arousal	Ability to maintain awake state	Reticular Activating System (RAS)
Attending	Frontal eye fields	Gaze stabilization center (sustained gaze or fixation on target or object)

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The Brain's Visual Processing Modes

Focal Mode (vetral stream)	**What is it?**, object recognition, exclusively visual and impacted by changes in acuity, involvess attention
Ambient Mode (dorsal stream)	**Where it is?**, works in concert with vestibular, somato-sensory, and auditory, sense to subserve spatial orient-ation, posture, and gaze stability,; reflexive in nature

Vestibular-oculomotor reflex (VOR)

Close relationship between oculomotor function and vestibular function to **maintain gaze stability during whole-body movement and head movement**

Normal VOR has a disconjugate 1:1 ratio of tracking object to head movement – implying the **head and eye movement are opposite but equal**

VOR must be suppressed during combined eye-head movement for the **image to be maintained on the fovea**

VOR cancellation or suppression test is essentially a **higher demand on smooth pursuit function**

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Scanning

integration of vestibular and oculomotor fucntion

integrates movement directed from frontal eye fields (gaze stabil-ization center), primary visual cortex, and visual association areas to navigate the environment and avoid obstacles

Some may have difficulty with

Reading – poor reading comprehension

Sports or recreational activities – increased risk of secondary injuries

Balance – inability to quickly locate items (decreased reaction time) and respond to environmental barriers

Depth perception (stereopsis) – miss steps climbing stairs, unable to reach for items efficiently due to over or undershooting target

Binocular Coordination require effective...

smooth pursuits/-tracking	ability to binocularly follow a moving target smoothly and coordinately	Dysfunction: poor binocular fusion (blurry vision), diplopia (double vision), visual fatigue
saccades	quick, simultaneous movement of both eyes between two or more phases of fixation in the same direction	Dysfunction: Over or unders-hooting target, visual fatigue, delayed visual speed or processing due to inefficiency with localizing/ targeting key information
conver-gence	ability to fixate on an object **coming towards** you	Dysfunction: Exotropia, **convergence insufficiency**, Diplopia with nearsighted tasks
divergence	ability to fixate on an object **going away** you	Dysfunction: Esotropia, Divergence insufficiency, Diplopia with farsighted tasks

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Binocular Coordination require effective... (cont)

stereopsis/spatial localization	Judgement of space and distance (**stereopsis** (depth perception)	Can be affected by: changes in acuity,**contrast sensitivity**, poor integration of focal and ambient visual processing systems, divergence and/or convergence insufficiencies **(binocular vision dysfunctions)**
focal and ambient visual processing-physiological diplopia	**Brain's ability to receive, interpret, and act upon visual stimuli**; focal mode: what is it?; Ambient mode: Where is it?	

Actions of the eye (dont need to really memorize(

Lateral rectus	ABD	CN 6 (Abducens N)	contralateral
Medial rectus	ADD	CN 3 (Oculomotor N)	contralateral
Superior rectus	Elevation	CN3	contralateral
Inferior rectus	Depression	CN3	contralateral
Inferior Oblique	Elevation and ER	CN 3	contralateral
Superior Oblique	Depression and IR	CN 4	ipsilateral

Eye Movement Synergy

Binocular coordination is a result of synergistic movement of the contralateral eye
Example: Look to the left without moving your head
Antagonistic and synergistic movements occur in monocular coordination

Eye Alignment

Phoria	Natural position of the eye; **fusion** and depth perception **is intact**	Esophoria: tendency to aim in front; Exophoria: behind the point of focus	Symptoms: eye misaligment, poor oculomotor control, impaired visual processing;	**Changes in phoria** symptoms are subtle: difficulty concentrating, frontalor temportal headaches, sleepiness after reading, stinging of eyes after reading
Strabismus or Tropia	Visble turn of one eyes: Esotropia-one eye turns in; Exotropia-one eye turns out; Hypertropia; One eye turns up relative to other eye	Diplopia: long-term effects result in central vision suppression (peripheral vision remains intact)	**fusion (binocular vision) and depth perception (stereopsis are not present	inability to judge distances, under/over reaching objects, double vision (diplopia), head tilt or turning, difficulty reading, appear spaced out, avoid near activities, become confused or disoriented

Visual Perception

Form Constancy (b vs d)	the visual skill that allows us to distinguish one object from another similar object. Being able to tell the difference between the letter “b” and “d” or “3” and “8”. Though the forms are similar in shape, they are very different in meaning. The ability to see and distinguish these differences is form constancy.

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Visual Perception (cont)

Visual discrimination	each of the above six skills require some degree of visual discrimination. Visual Discrimination is the ability to identify detail, seeing items likes and differences in shape, color, position and orientation.
Visual closure	the visual skill that allows us to detect, differentiate, select, draw conclusions and understand information when we are only given certain pieces of information, rather than the entire account, story or explanation.
Figure Ground	the visual skill that allows us to distinguish, segregate, isolate or find an object or stimuli in varying environments. This can include faces, figures, objects, landscapes, and letters or numbers. Properly processing our visual figure ground helps to organize the information we see in our environment.
Spatial Relations	the visual skill that allows us to process the visual environment around us and the location of objects in respect to ourselves.
Visual Memory	the visual skill that allows us to record, store and retrieve information. It allows us to learn and later recall what is learned.
Visual Sequential Memory	similar to visual memory in that it allows us to store and retrieve information when necessary or useful. However sequential memory helps us remember and recognize people, places we have been, and series of events, equations, and procedures

Visual Cognition

Understanding the interaction of **visual construct and cognition...	Object structure (i.e. weight, size, position, color, etc)
	Executive function (memory and attention)
	Attention and awareness

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