FALLS AND

BRAIN INJURIES

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Presented by:

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Facts

- Traumatic brain injuries (TBIs) are more common among adults older than 65. People in this age group are more prone to losing their balance, falling and hitting their heads.
- Among all age groups, falls can cause serious injury and are the second leading cause of TBI related deaths.
- A study from 2008-2017 found a 17% increase in fall related TBI deaths, with notable increase in rural counties and adults over the age of 74.

Facts Cont.

- Falls are the leading cause of TBI in children and older adults, with the greatest incidence in 83-90 years old. Falls are also the second leading cause of death related to accidental or unintentional injury worldwide.
- In the United States, as many as one in four adults over age 65 suffers from a fall each year.
- Fall related TBI deaths for males is 2x that of females.
- There were 17,408 fall related TBI deaths in 2017. Those over 74 years old were 8x higher than 55-74 years old.

Risk Factors For Falls

- **Age:** The most susceptible groups for falls, including the highest risk of serious head injury, are adults 65 years and older. Older adults who hit their head due to a fall are more likely to have a brain injury due to age related changes in brain structure and circulation as well as medications like blood thinners.
- **History of Falls:** Statistically, half of older adults who fall will fall again within the next 12 months.
- **Fear of Falling:** Fear of falling leads to reduced activity (i.e., walking, exercising, gardening, etc.). Eliminating these activities can cause a reduction in strength and balance.
- **Preoccupation/Dual Tasking**

Risk Factors Cont.

- **Muscle Changes/Generalized Weakness:** Decreased strength; altered tone and flexibility.
- **Altered Balance:** Impaired balance results in gradual withdrawal from more complex activities.
- **Polypharmacy:** 4 or more prescribed medications significantly increases the risk of falls. Also NEW medications
- **Visual Deficits or Visuo-Spatial Disturbances**
- **Vestibular Disorder:** e.g., Benign paroxysmal positional vertigo (BPPV). Feeling like you are spinning.
- **Cognitive Deficits:** Slow processing; impaired executive functions; attention deficits; inability to dual task/multitask. 2 out of 3 individuals with dementia or cognitive impairment are statistically likely to fall each year.

Risk Factors Cont.

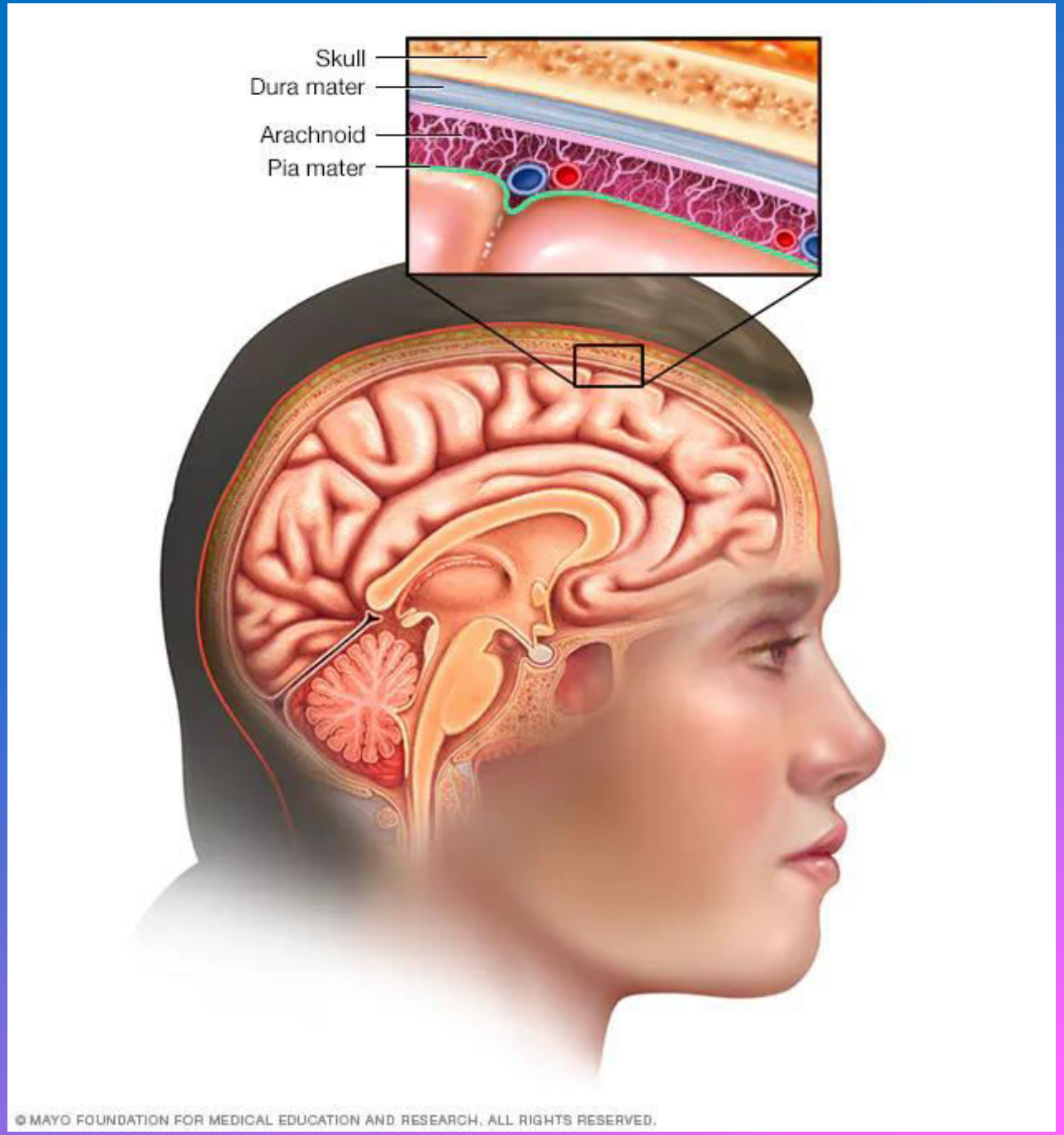
- **Low Mood and Related Medication**
- **Incontinence**
- **Chronic Condition:** e.g., Traumatic Brain Injury, Stroke, Multiple Sclerosis, Dementia, Parkinson's Disease
- **Short Term Factors:** e.g., medication side effects, alcohol intake
- **Activity Related:** e.g., walking, stairs, climbing, hiking
- **Environmental Factors:** e.g., poor lighting, poor kitchen organization, carpets and rugs, pets, clothing and footwear

Risk Factors Cont.

- **Walking slowly and/or taking short steps**.
- **Poor Posture / Kyphosis** (An increased front-to-back curve of the spine leading to forward rounding of the upper back)
  - Changes your center of gravity, which then impacts your field of vision and also impacts blood flow, lung capacity and oxygen exchange)
- **Prior brain injury**

Brain Anatomy

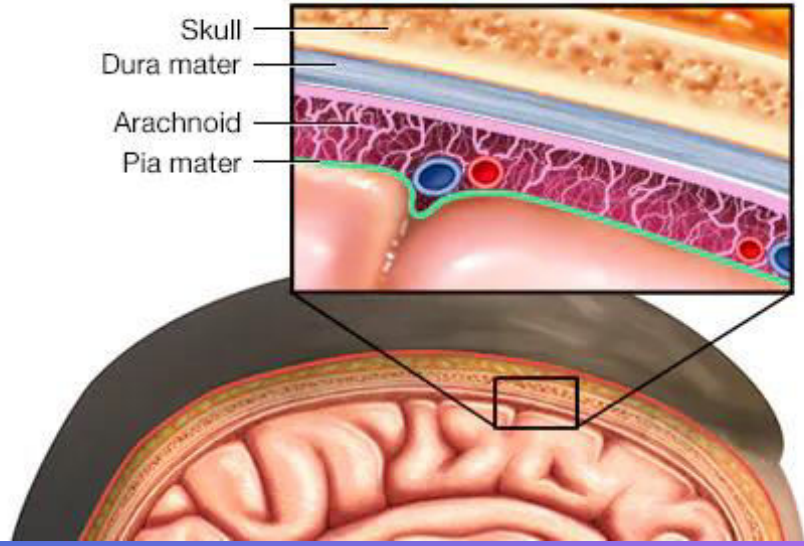
- The brain has three membrane layers (meninges) between the bony skull and brain tissue. The three membranes are the dura mater, arachnoid, and pia mater. The purpose of the meninges is to cover and protect your brain. Bleeding can occur anywhere between these three membranes.

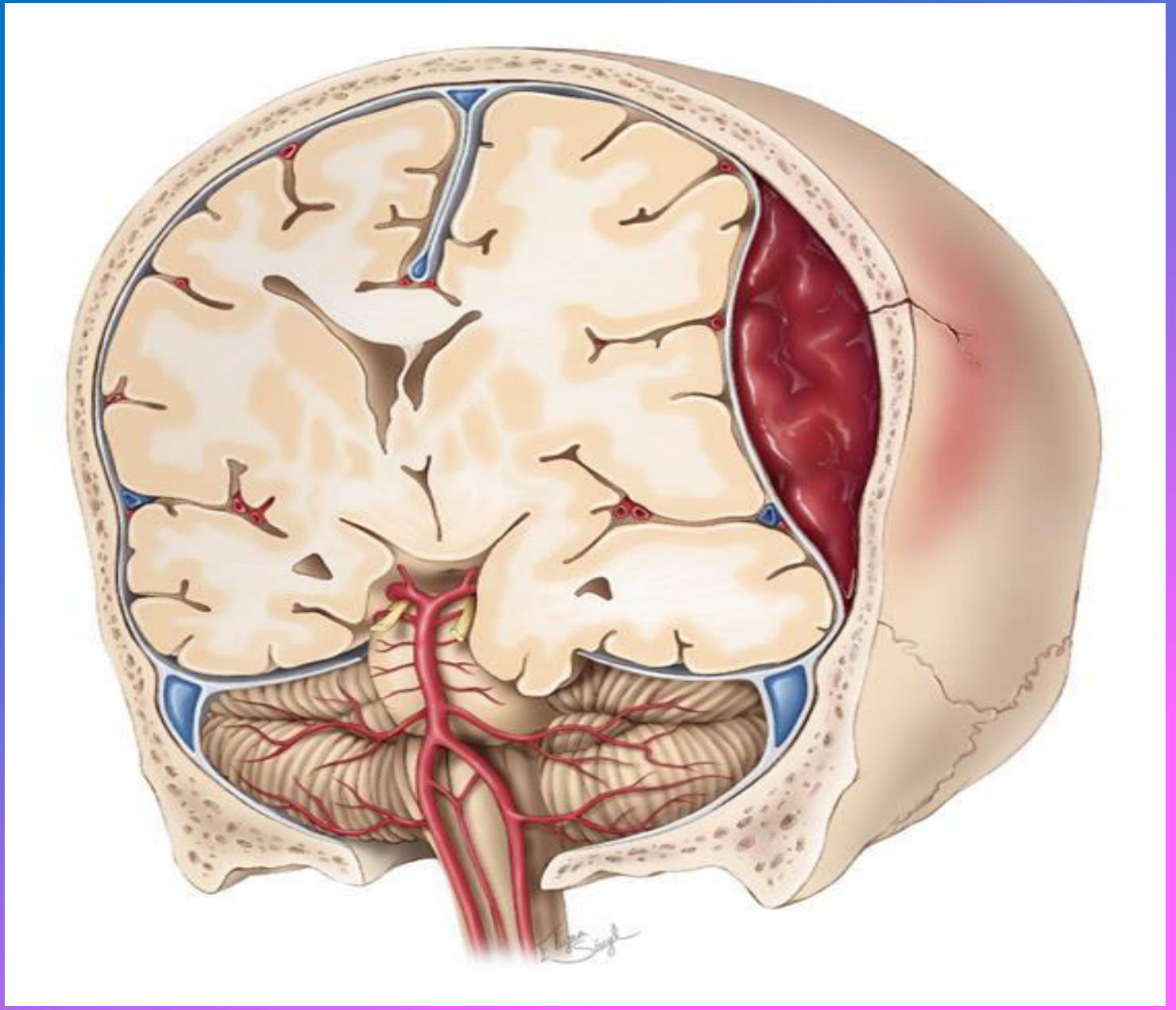


Most Common Brain Injuries with Falls

- EPIDURAL HEMATOMA (EDH)
  - Epidural hematomas occur ***between the skull bone and the outermost membrane layer***, the dura mater.
  - It will not cross suture lines of the skull and will have an elliptical appearance.
  - Associated with a "lucid interval," which means that a patient can be conscious and appear "normal" right after an injury, but as the blood accumulates the headache will worsen, and mental status will decline as the intracranial pressure rises.

EPIDURAL HEMATOMA

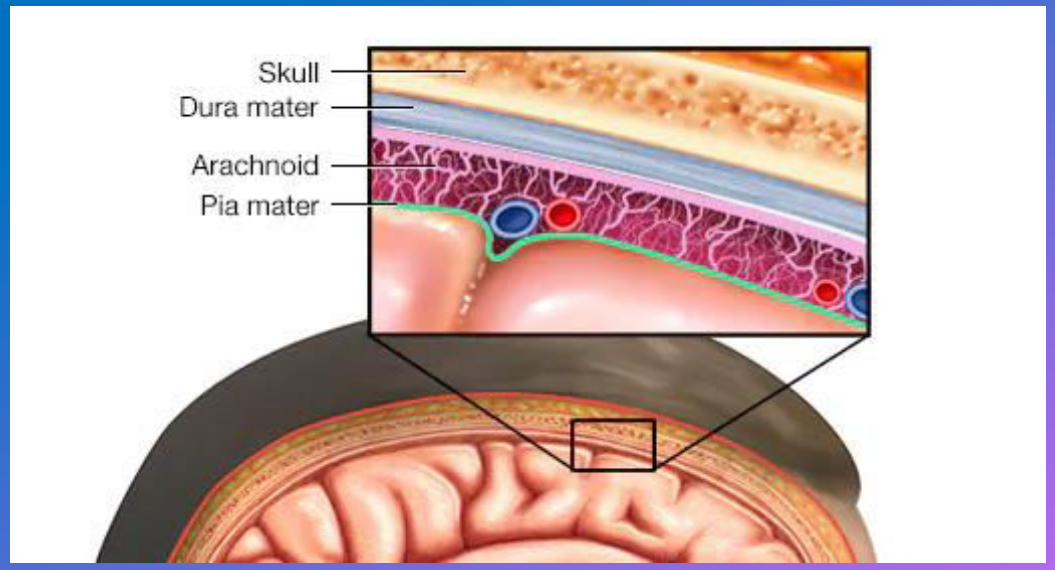


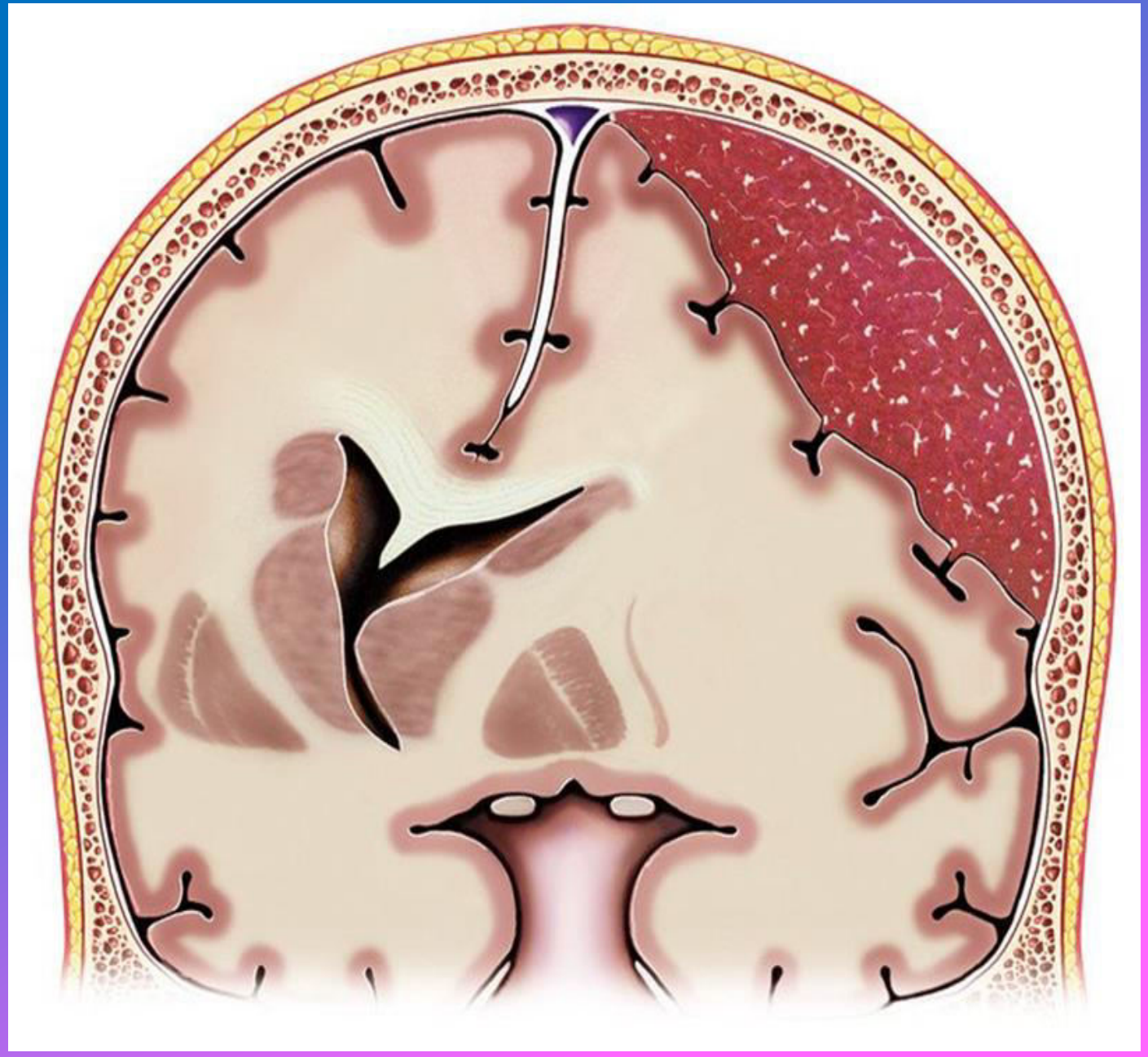


Most Common Brain Injuries with Falls

- SUBDURAL HEMATOMA (SDH)
  - This occurs when a blood vessel in the space ***between the skull and the brain*** (the subdural space) is damaged.
  - This bleed happens between the dura mater and the arachnoid membrane.
  - This can cross suture lines since bleeding is below the dura, thus giving the "crescent shape" appearance on head CT.
  - Can result in mass effect leading to herniation if left untreated.
  - Occur more frequently in elderly patients due to reduced brain volume.

SUBDURAL HEMATOMA





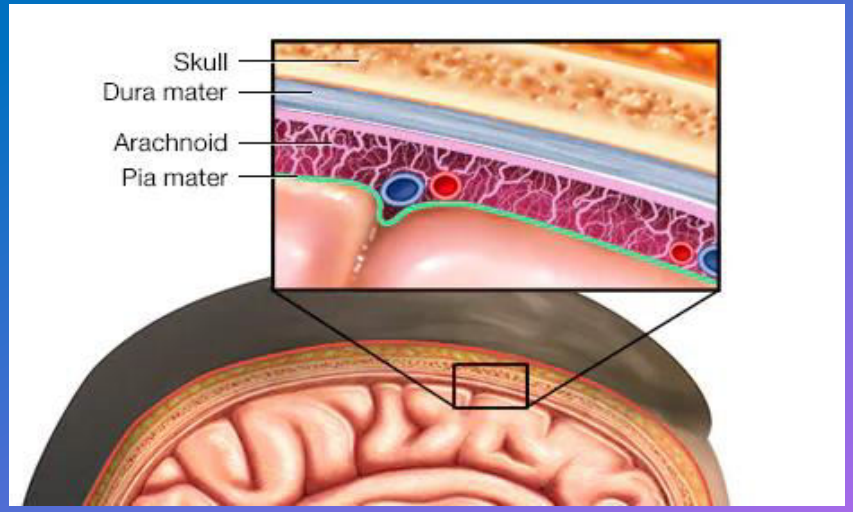
Hematomas

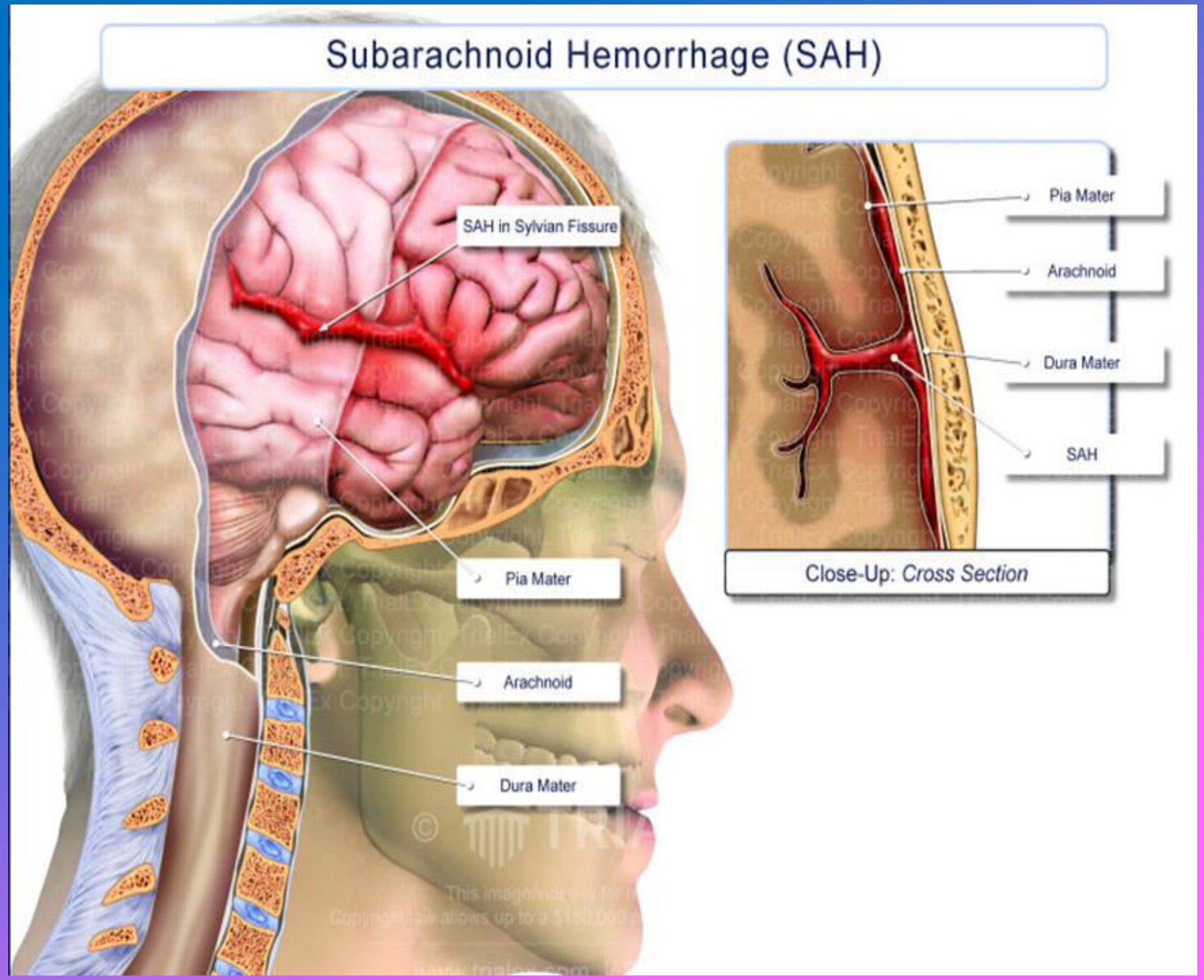
- Epidural and subdural hematomas differ only in where the bleed originates. Epidural hematomas generally start from the middle meningeal artery, while subdural hematomas usually start from the veins that carry blood away from the surface of the brain. So very similar, but slightly different.

Other Possible Brain Injuries

- SUBARACHNOID HEMORRHAGE (SAH)
  - This bleed happens ***between the arachnoid membrane and the pia mater.***
  - A subarachnoid hemorrhage means that there is bleeding in the space that ***surrounds*** the brain. Most often, it occurs when a weak area in a blood vessel (aneurysm) on the surface of the brain bursts and leaks. The blood then builds up around the brain and inside the skull increasing pressure on the brain. This can cause brain cell damage, life-long complications, and disabilities.
  - Most often occurs with hemorrhagic strokes.

SUBARACHNOID HEMORRHAGE (SAH)

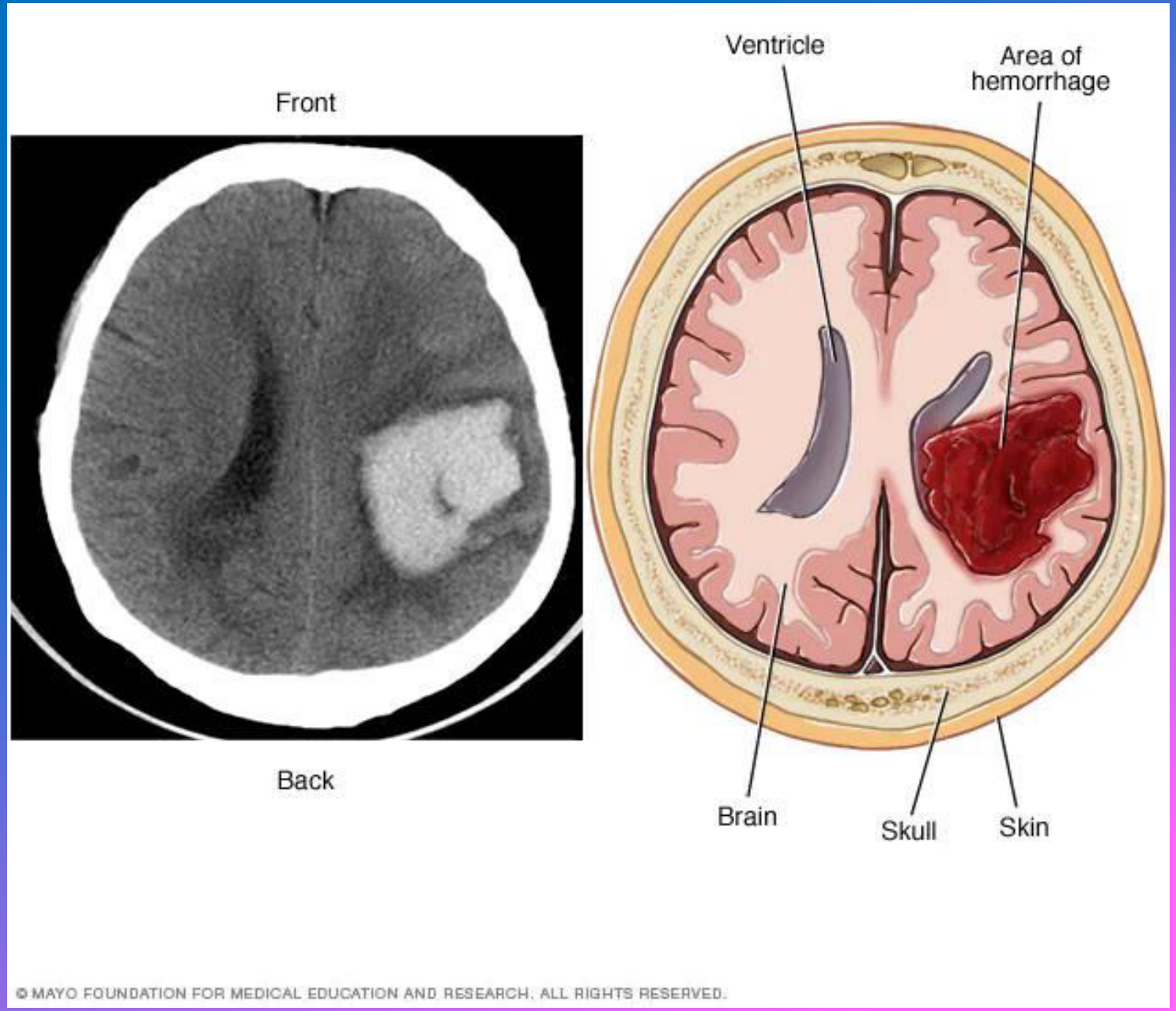




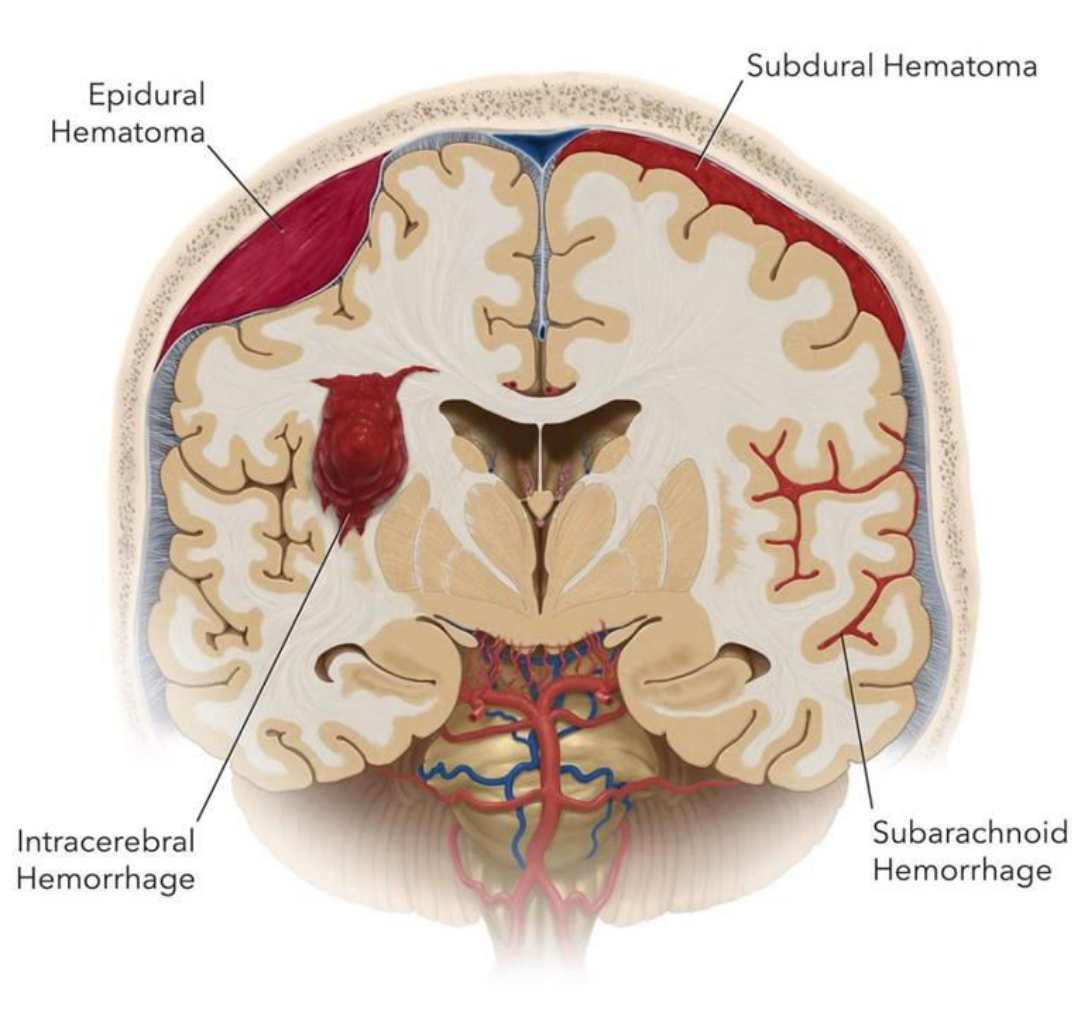
Other Possible Brain Injuries

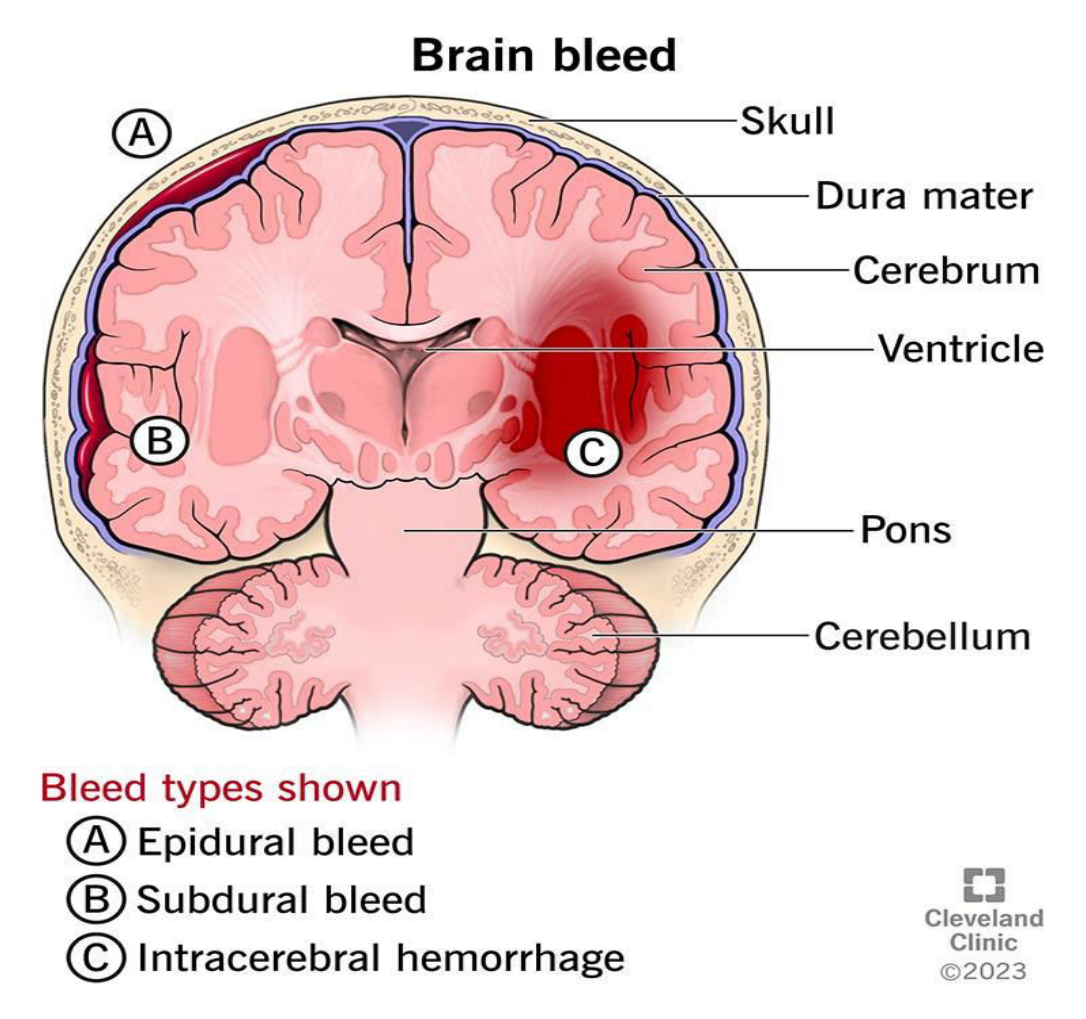
- INTRACRANIAL HEMORRHAGE (ICH)
  - A brain bleed (intracranial hemorrhage) is a type of stroke that causes bleeding in your head.
  - Your brain can't store oxygen, so it relies on a series of blood vessels to supply its oxygen and nutrients. When a brain bleed occurs, a blood vessel leaks blood or bursts. Blood collects or pools within your skull and brain. This causes pressure against your brain, which prevents oxygen and nutrients from reaching your brain tissues and cells.
  - Brain bleeds are common after falls or traumatic injuries. They're also common in adults with unmanaged high blood pressure.

INTRACRANIAL HEMORRHAGE

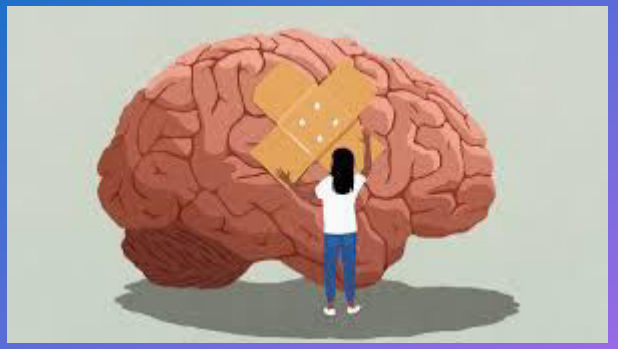


A look at all 4 brain injuries





Signs and Symptoms



- Balance or Walking problems
- Confusion
- Dizziness
- Headache (severe)
- Sleepiness/Drowsiness
- Passing Out
- Seizures
- Speech Problems
- Vision Problems
- Weakness/numbness that may come and go
- One pupil enlarged
- Nausea and/or vomiting

Concussions

- A concussion is a mild Traumatic Brain Injury (mTBI)
- Nothing will show on a CT/MRI
- May have the similar symptoms
- Light and noise sensitivity
- Headaches
- Poor concentration
- Even though seemingly less “severe,” a concussion can have a devasting life impact

What To Do……

- Call 9-1-1
- Go to the hospital
- Get a CT scan and/or MRI

What To Do……

- Depending on size and/or location of injury, you may need surgery .

What To Do……

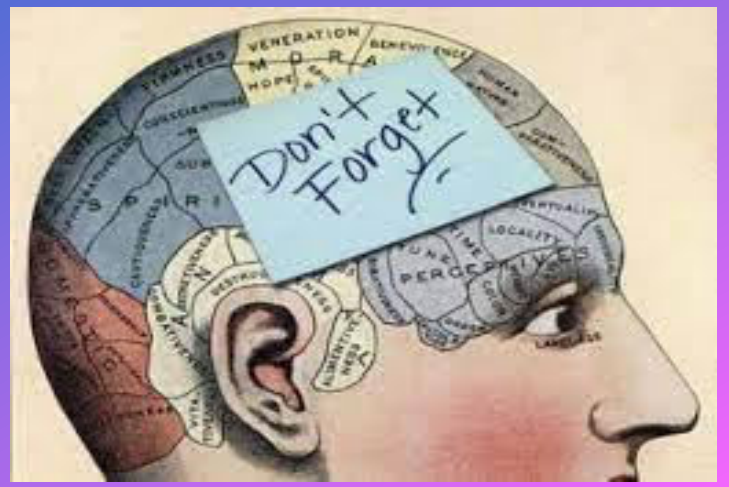
- After medical management… REHAB, REHAB, **REHAB!**
- This means
  - Physical Therapy
  - Occupational Therapy
  - Speech Therapy

Therapies

- Physical Therapy (PT):
  - Strengthening (legs/trunk)
  - Walking
  - Balance
- Occupational Therapy (OT):
  - Strengthening (arms/trunk)
  - ADLs – Activities of Daily Living (bathing, dressing, grooming, etc.)
  - IADLs – Instrumental Activities of Daily Living (cooking, laundry, finances, etc.)
- Speech Therapy (ST):
  - Swallowing
  - Speaking
  - Understanding
  - THINKING

Therapies

- Interestingly, of the therapies, it is **Speech Therapy** that usually works the most / the longest with brain injuries.



Preventing Falls

- Stay physically active – Exercising and moving regularly strengthens your muscles and helps to keep your body parts flexible, which will minimize the risk of both falling and being injured by a fall.
- Get your sight and hearing regularly checked – Vision and hearing are essential in knowing what is going on around you. Any vision or hearing loss can greatly increase your risk of falling.

Preventing Falls Cont.

- Review the side effects of the medications that you take with your doctor – Some medications can cause dizziness, drowsiness, and other symptoms that increase your likelihood of falling. Speak with your doctor.
- Check your vitamin D levels – A recent study found that a daily dose of vitamin D can reduce the risk of falls in older adults by 19%.
- Wear appropriate footwear – Wearing shoes that are uncomfortable, don't fit correctly, or that are not suitable for your environment, greatly increase your chances of falling.

Preventing Falls at Home

- Avoid uneven surfaces – Be aware of any areas in your home where there is uneven flooring. If possible, replace flooring altogether. Keep your walkways clear of rugs, clutter and wires.
- Install bars or railings – Adding supports to areas in your home where falls are common, such as stairs and bathtubs, can reduce the risk of falling and sustaining a brain injury.
- Ensure you have adequate lighting – A simple way to prevent falls in your home is to have ample lighting. Make sure you have easily accessible light switches and bright light in all the rooms in your house.

Preventing Falls at Home Cont.

- Avoid using ladders and stepstools – Ladders and stepstools present opportunities for injury. If you are at a high risk of falling, adapt a task/chore to avoid using these items. Alternatively, ask a friend or relative help you, or hire an expert.
- Making small adjustments in your daily life and taking the proper precautions can prevent you from falling and sustaining a brain injury.

For More Information……

- BIAA's Falls and Traumatic Brain Injury Brochure
- CDC Falls Facts and Prevention Tips
- CDC STEADI Tools and Education Materials
- National Council on Aging National Falls Prevention Resource Center
- National Council on Aging Falls Prevention Awareness Day

Questions?

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Thank you!