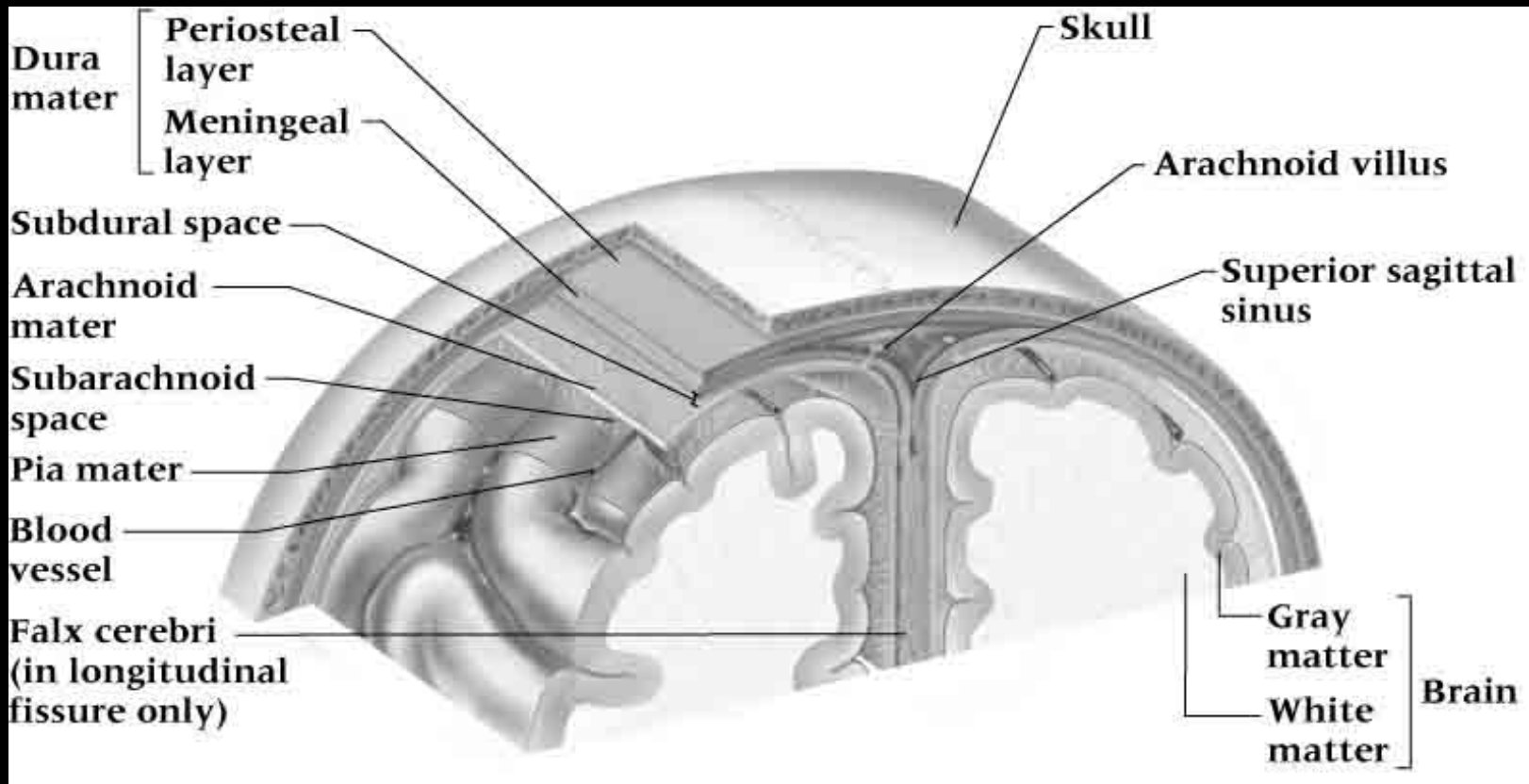


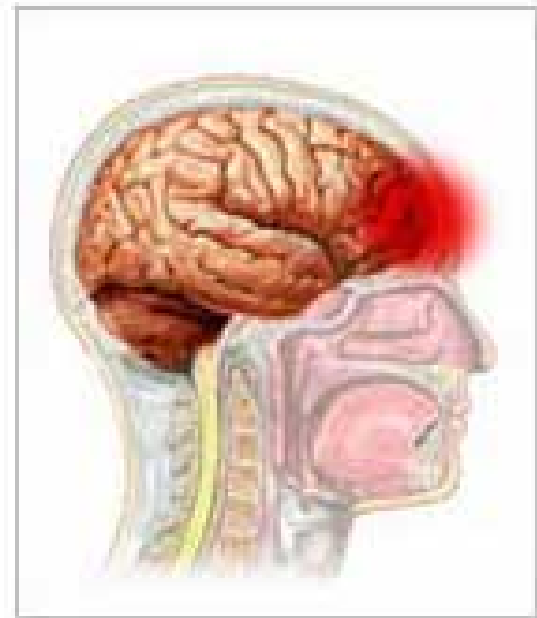
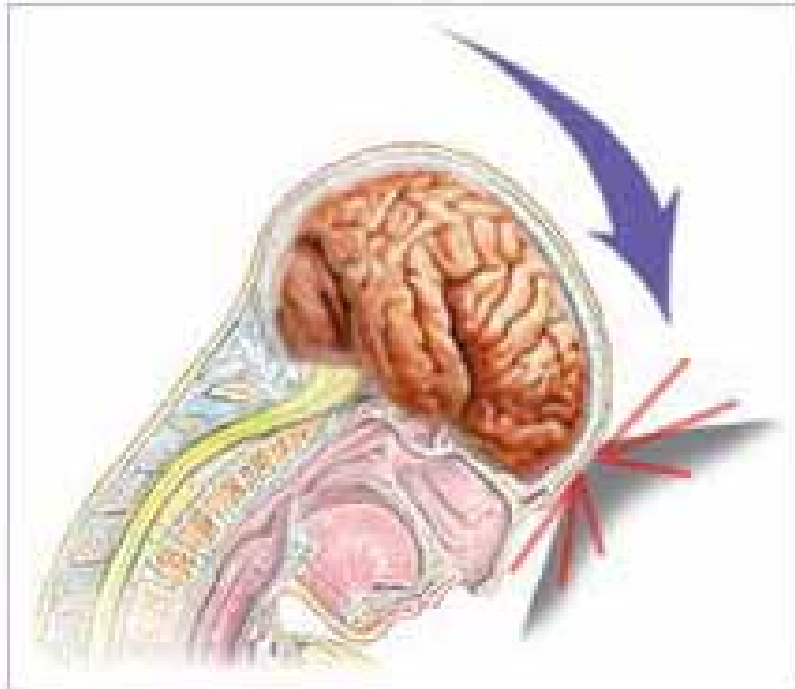
The Head & C-Spine



Traumatic Brain Injury

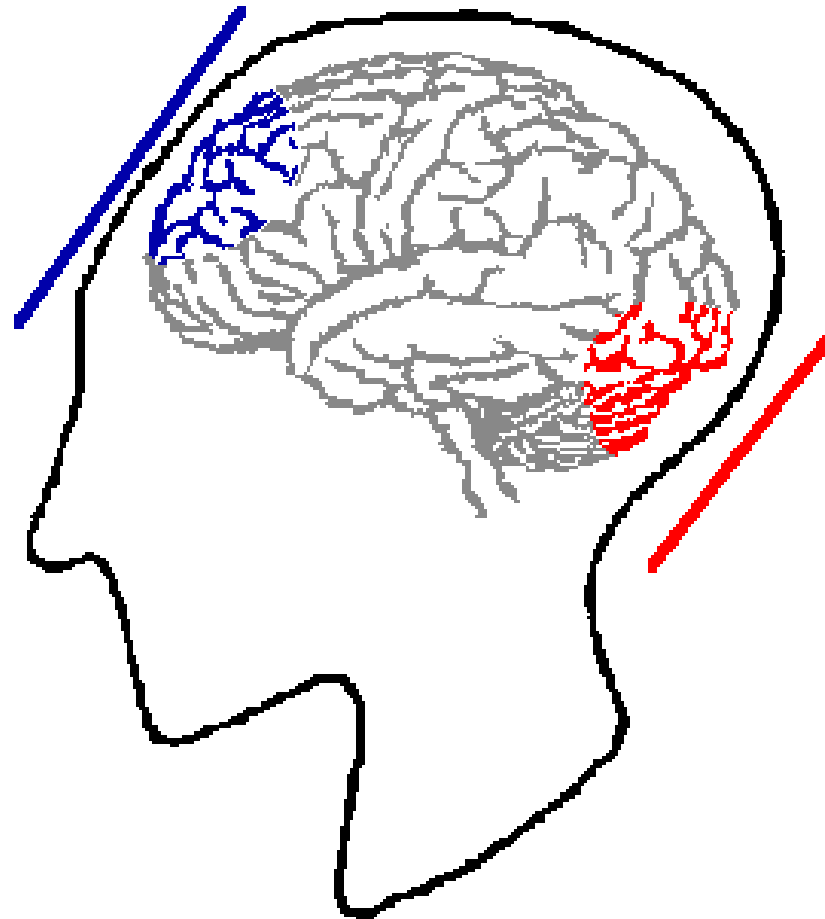




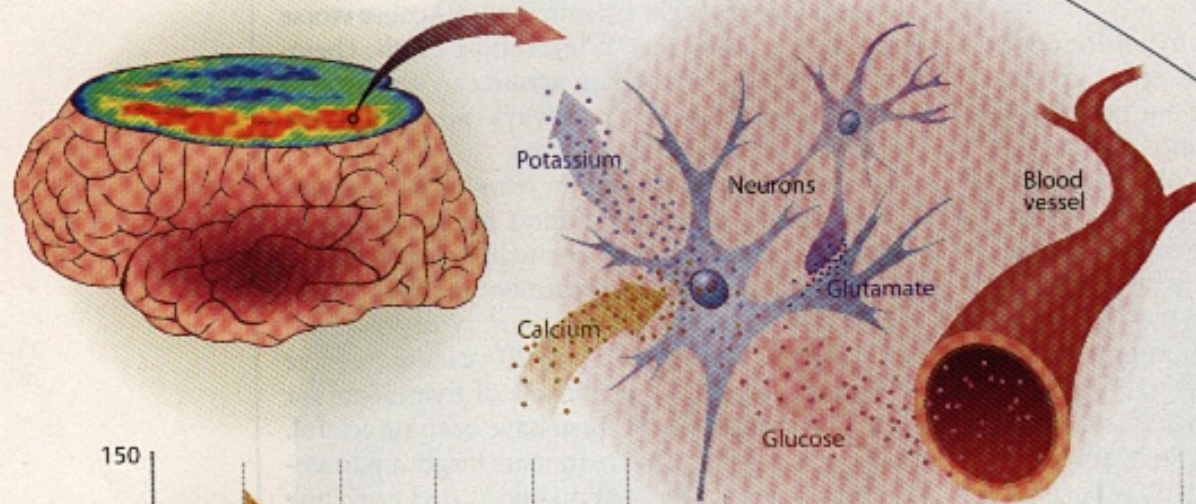


The **coup** injury is caused when the head is stopped suddenly and the brain rushes forward. It not only gets injured by hitting in the side of the skull but is also damaged as it rubs against all the inner ridges.

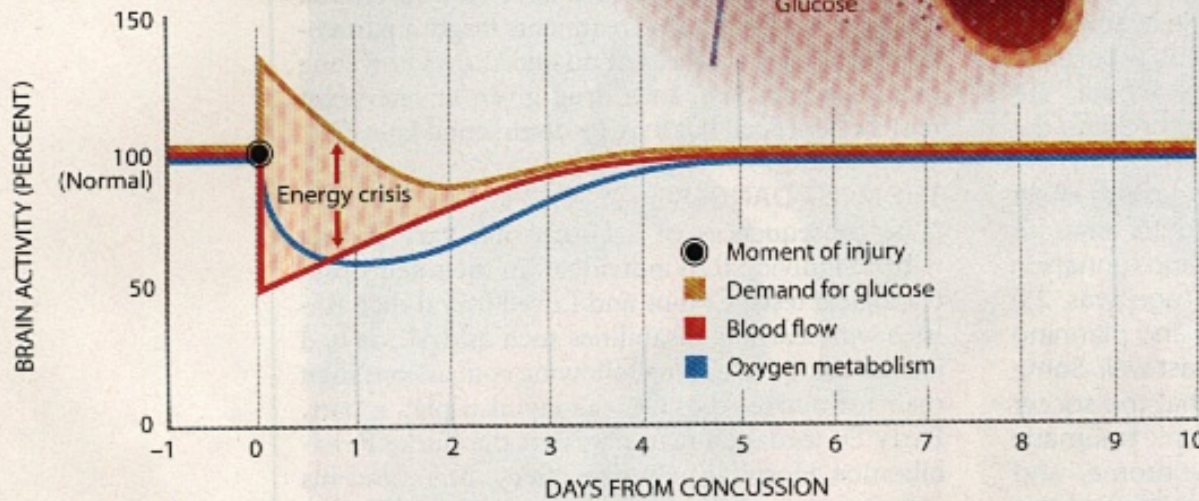
The **contrecoup** injury is caused when the brain bounces off the primary surface and impacts against the opposing side of the skull. Again, additional injury occurs as the brain again rubs against all the inner ridges.



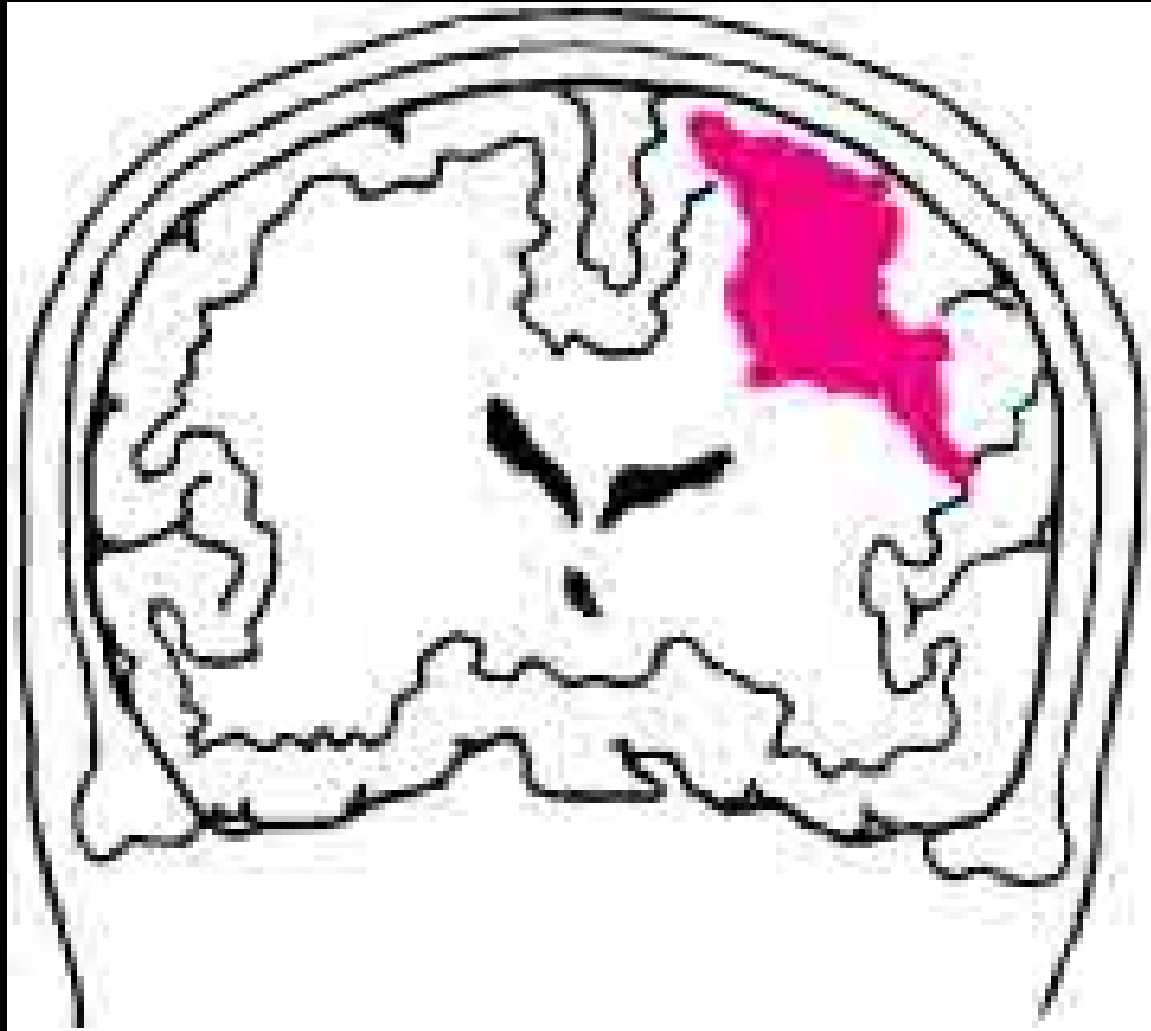
Anatomy of a Concussion

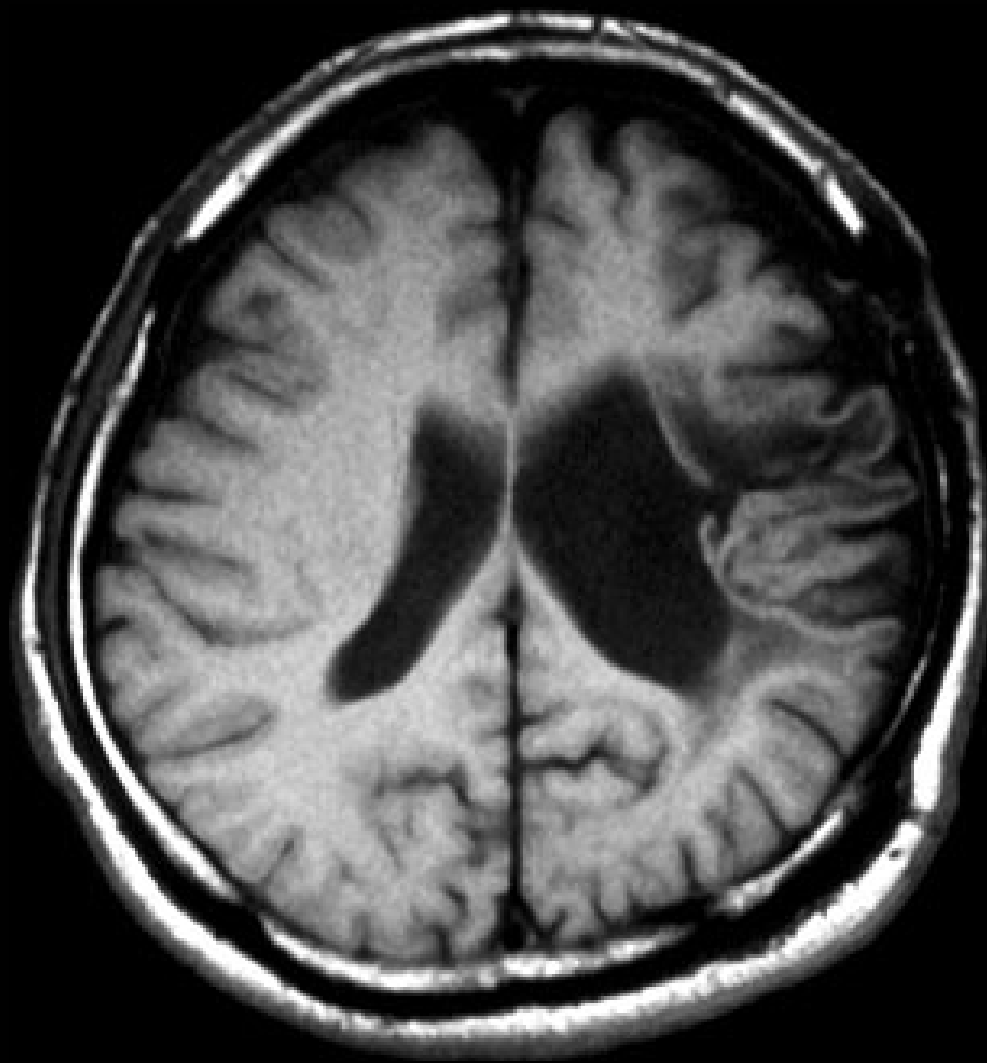


A blow to the brain sets off a flood of neurotransmitters such as glutamate. This prompts neurons to fire incessantly, causing an influx of calcium into the neurons and a release of potassium. To keep firing, the neurons demand extra energy, but the excess calcium reduces oxygen metabolism and thus the cells' ability to generate it. Meanwhile the wash of potassium constricts blood vessels, limiting the supply of new glucose fuel. The high energy demand, restricted blood flow and oxygen debt create an energy crisis that exhausts the neurons, leading to the mental confusion and failed memory of concussion. The brain may take days to restore the chemical balance that constitutes full recovery.

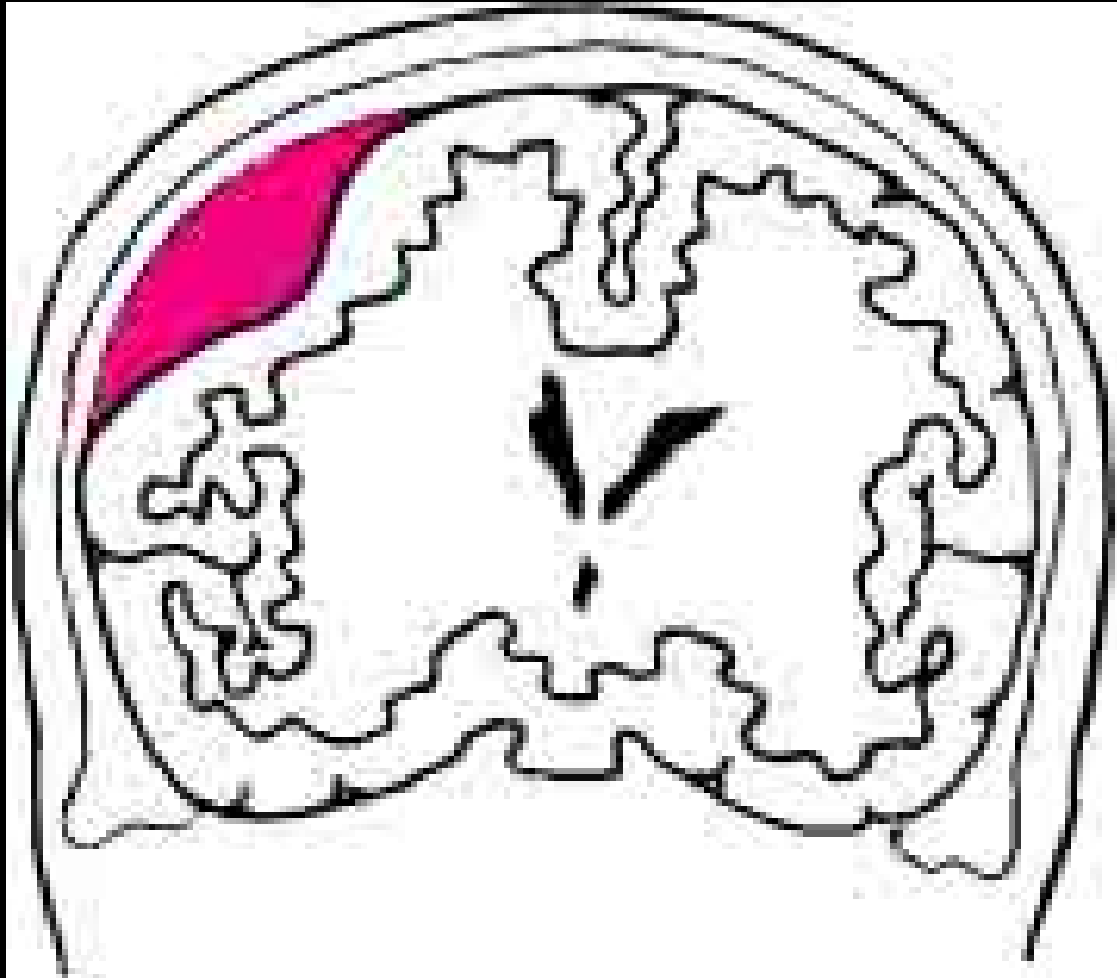


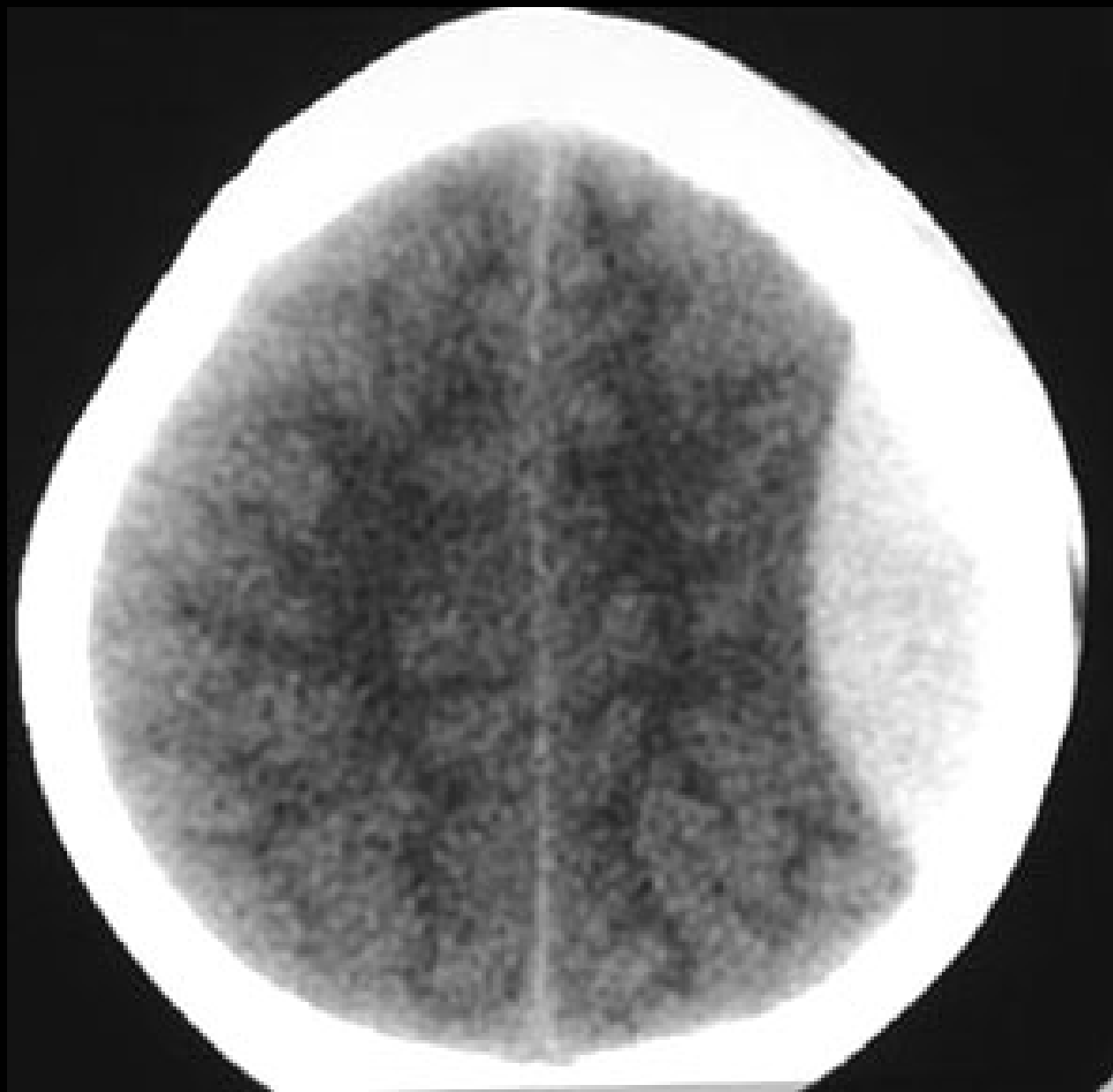
Intracerebral Hematoma (Bleeding)



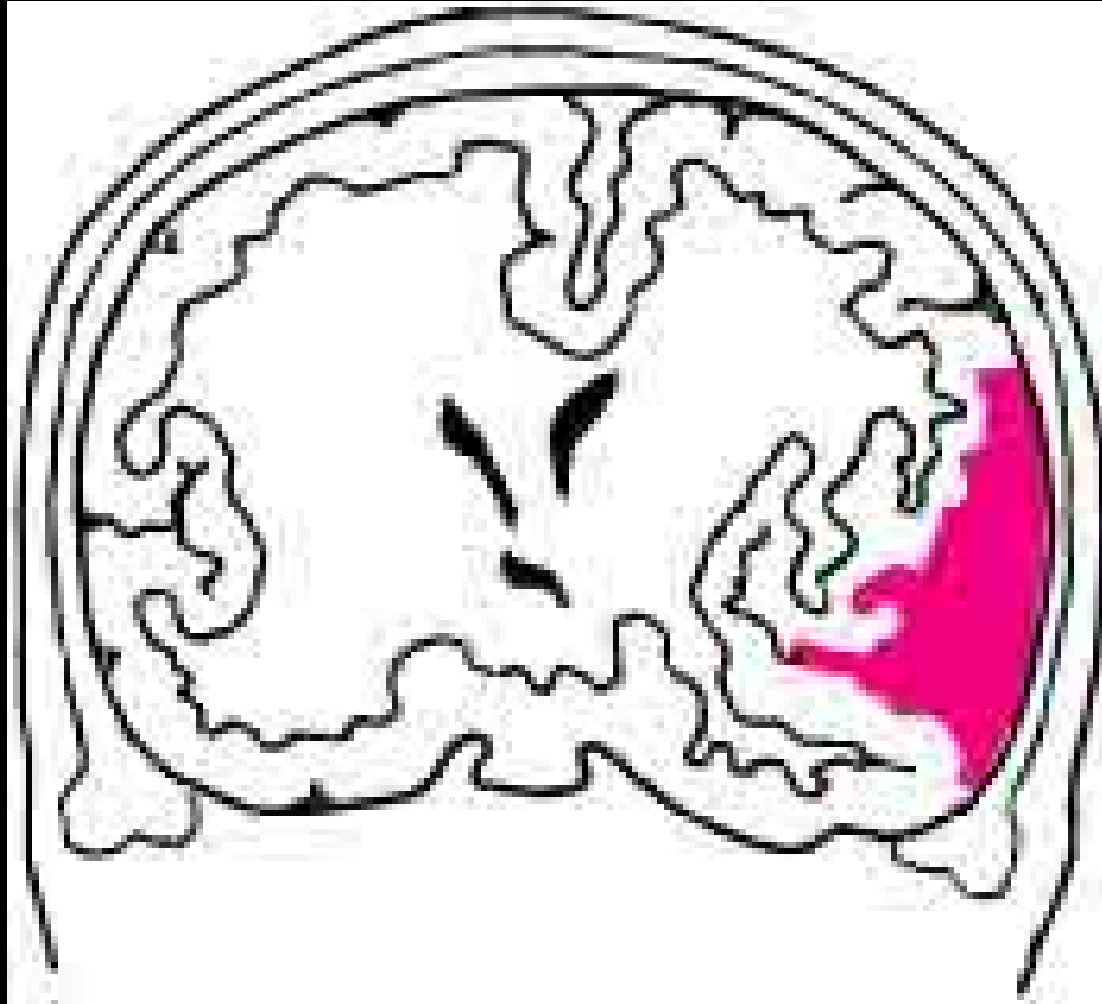


Epidural Hematoma (Bleeding)



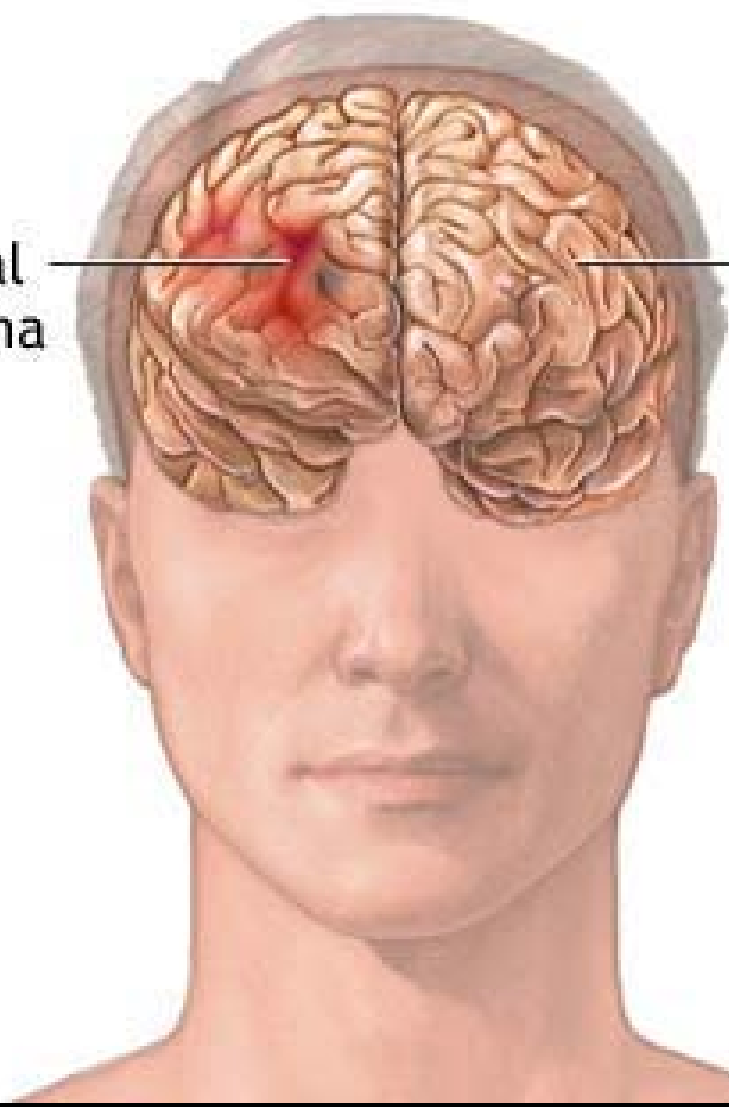


Subdural Hematoma (Bleeding)

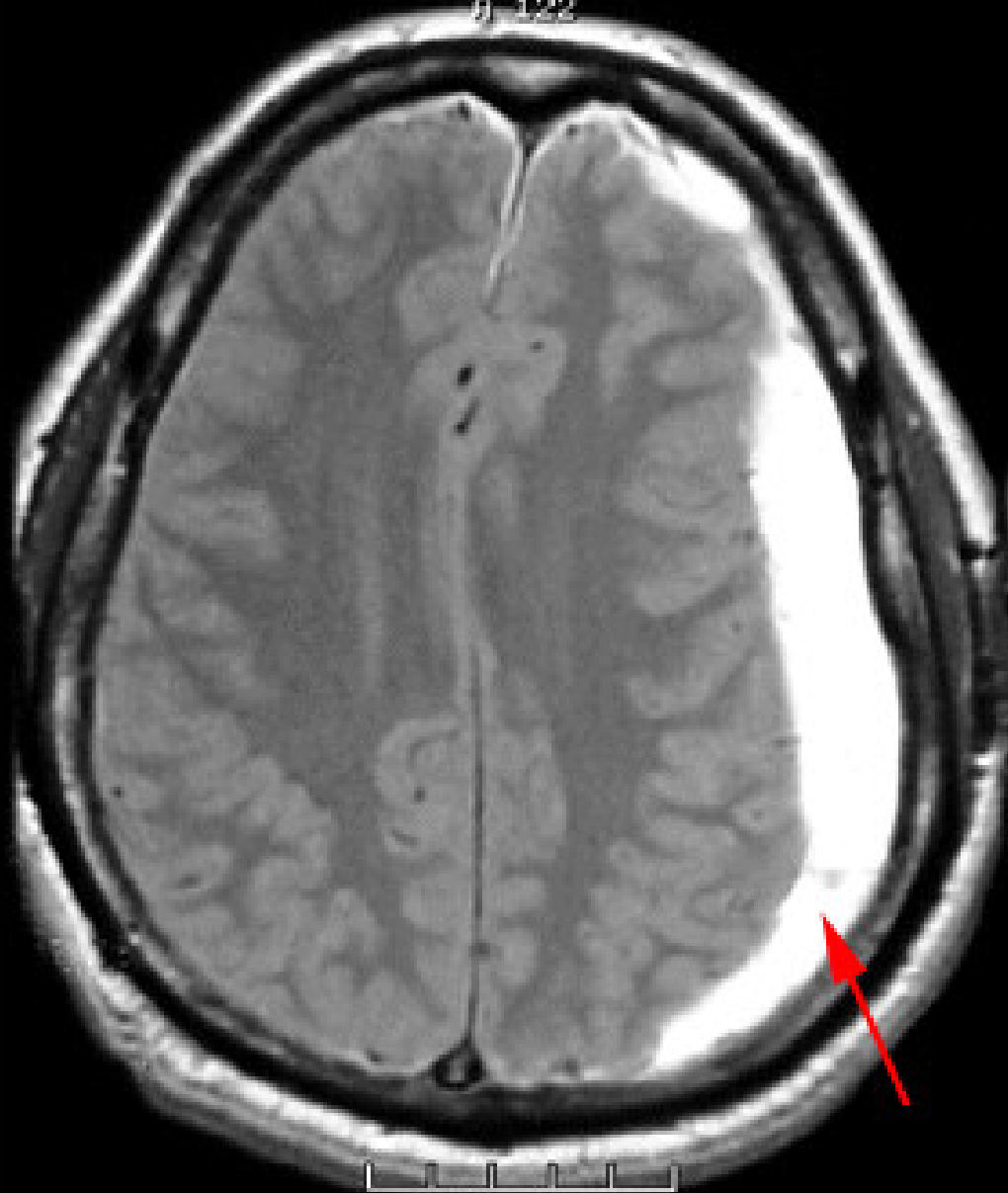


Subdural
hematoma

Brain

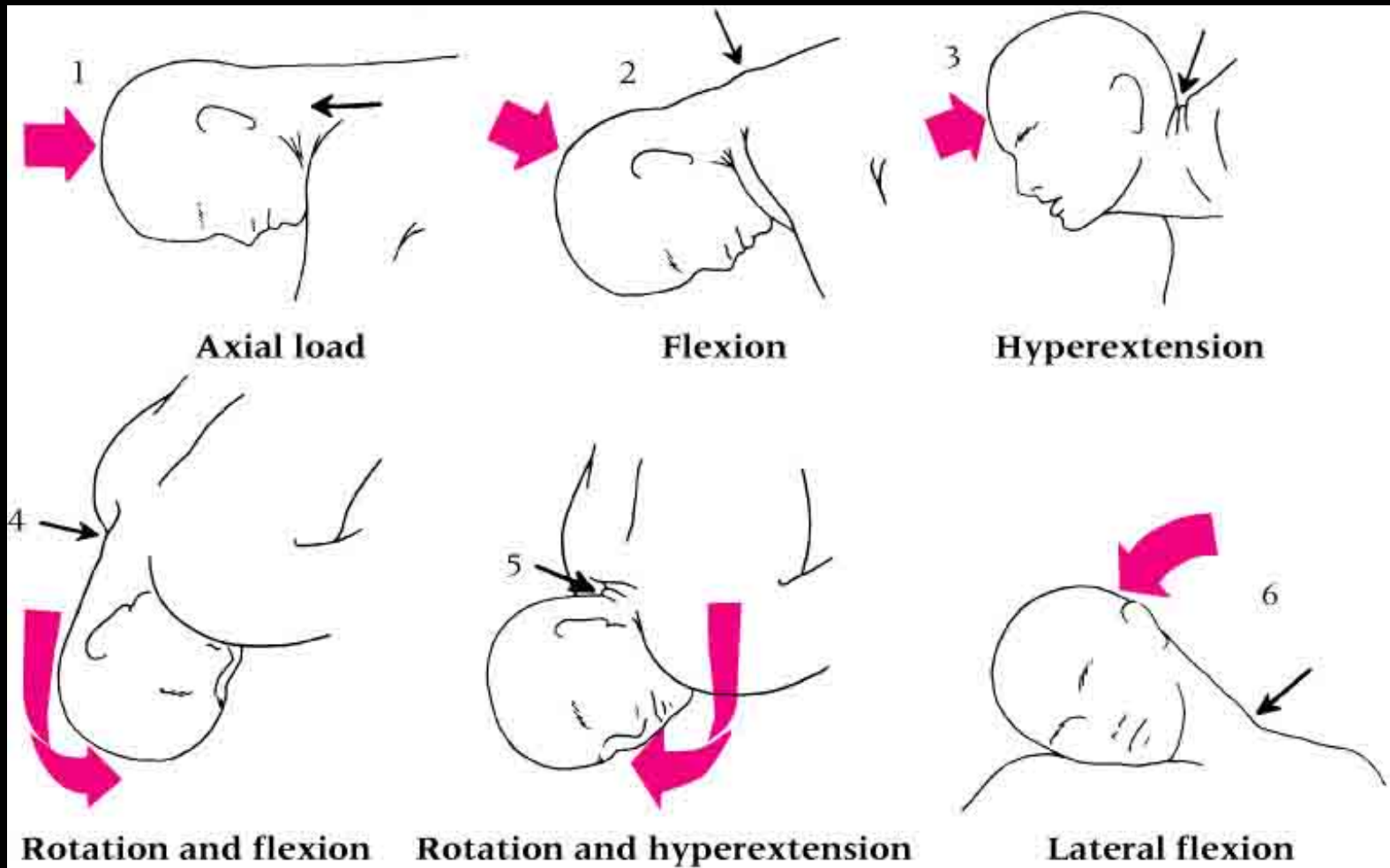


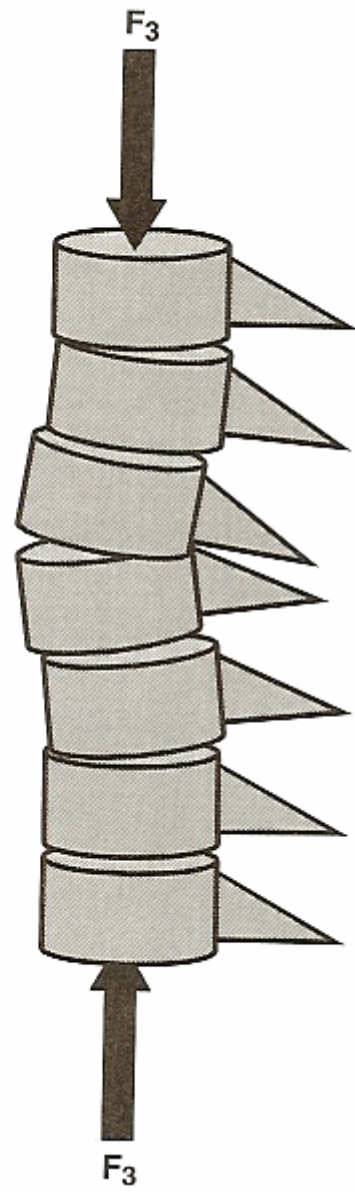
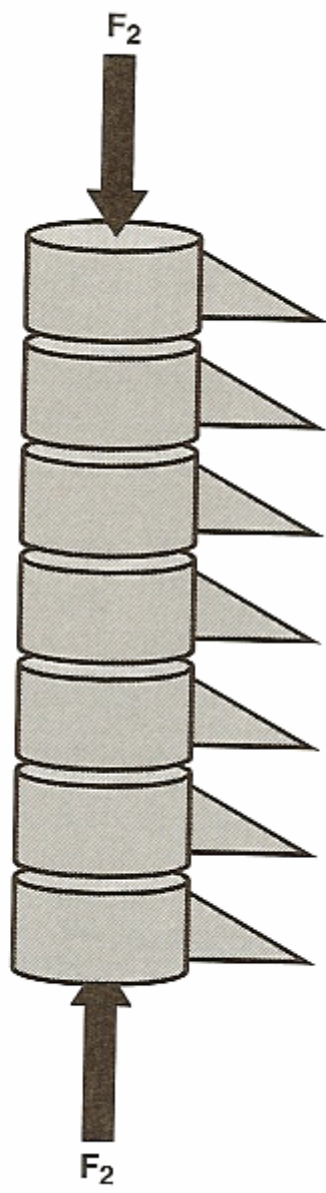
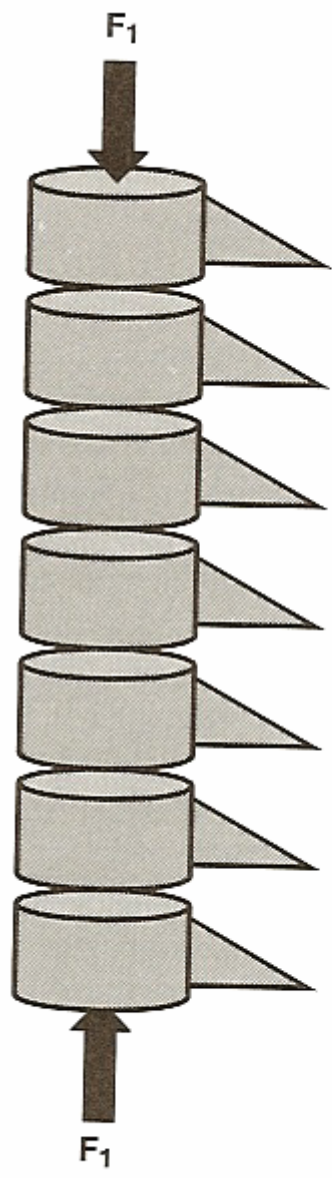
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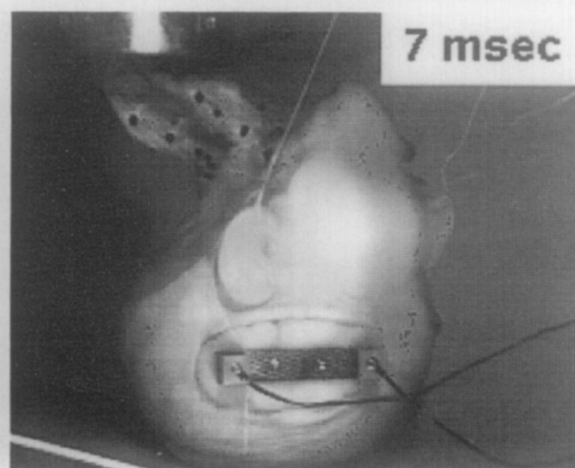
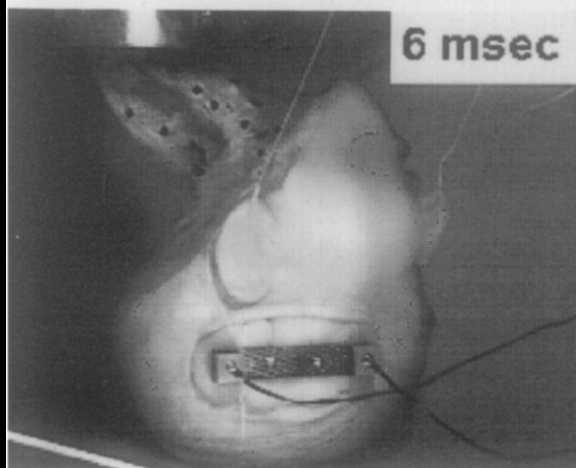
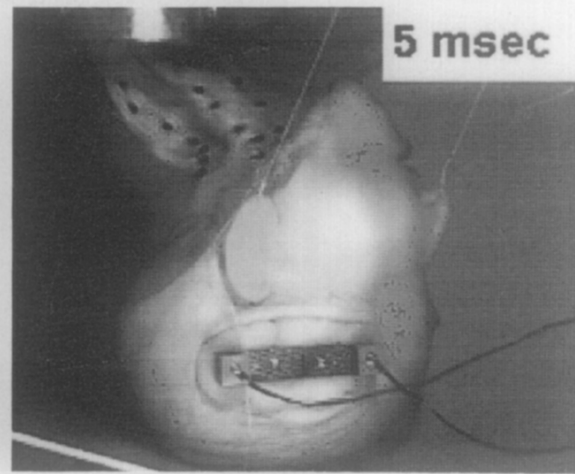
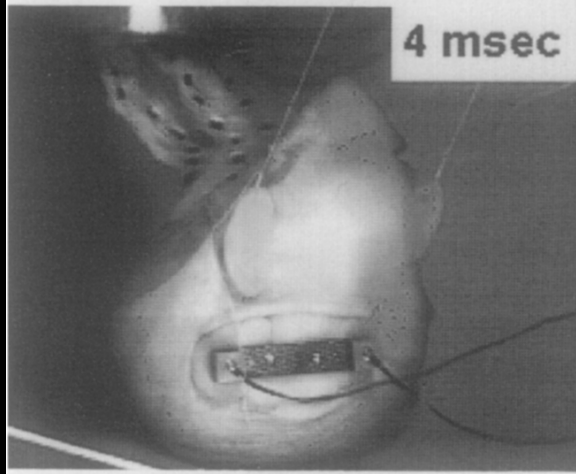
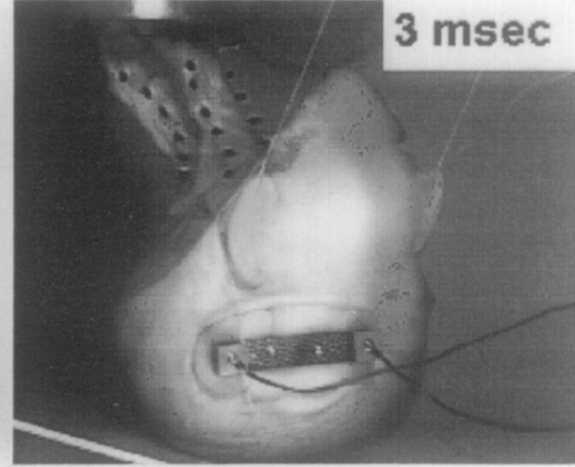
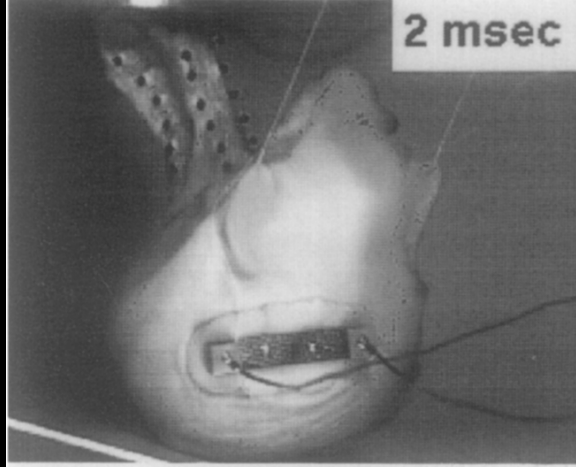


C-SPINE INJURIES

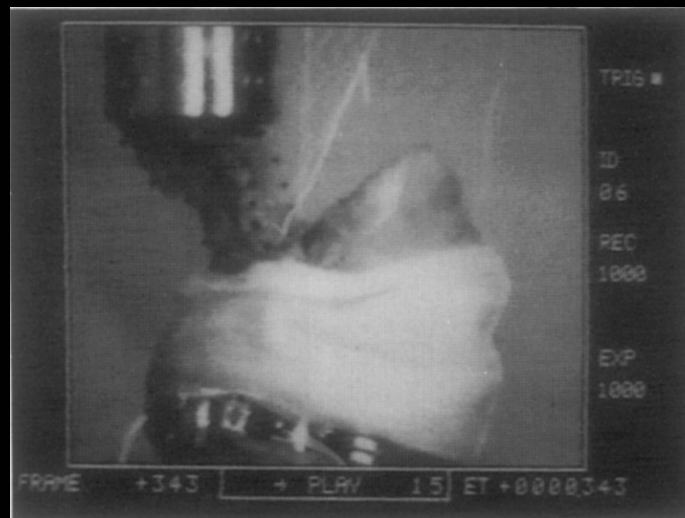
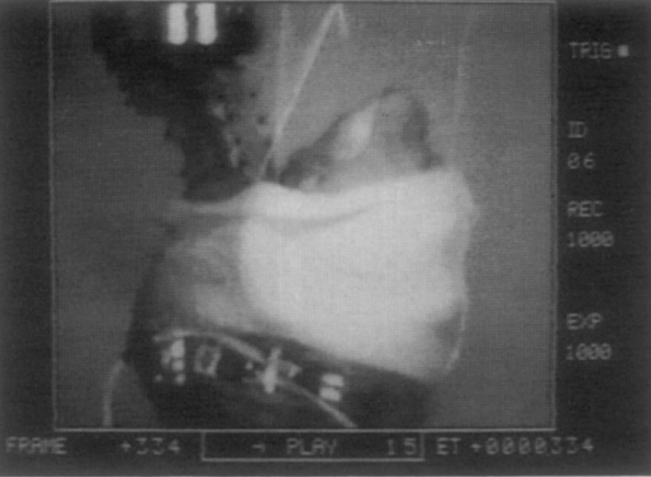
Cervical Fractures







Nightingale et al, 1996



Nightingale et al, 1996

The backbone consists of:

7 neck bones (cervical vertebrae)

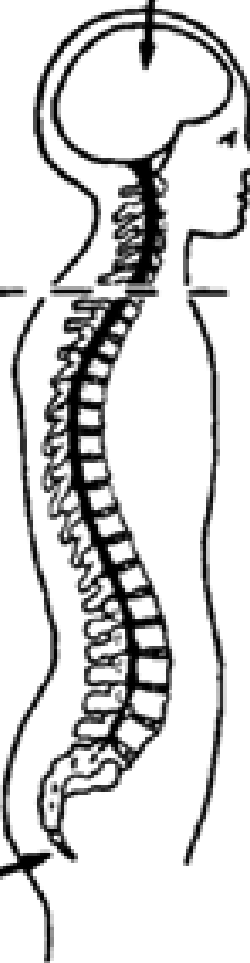
12 upper back bones (thoracic vertebrae)

5 lower back bones (lumbar vertebrae)

5 joined hip or sacral vertebrae

tailbones

brain



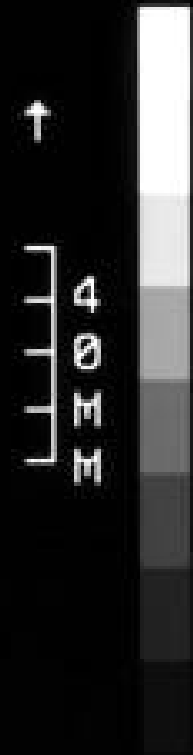
Spinal cord injury of the neck causes **QUADRIPLEGIA.**



Spinal cord injury of the back causes **PARAPLEGIA.**

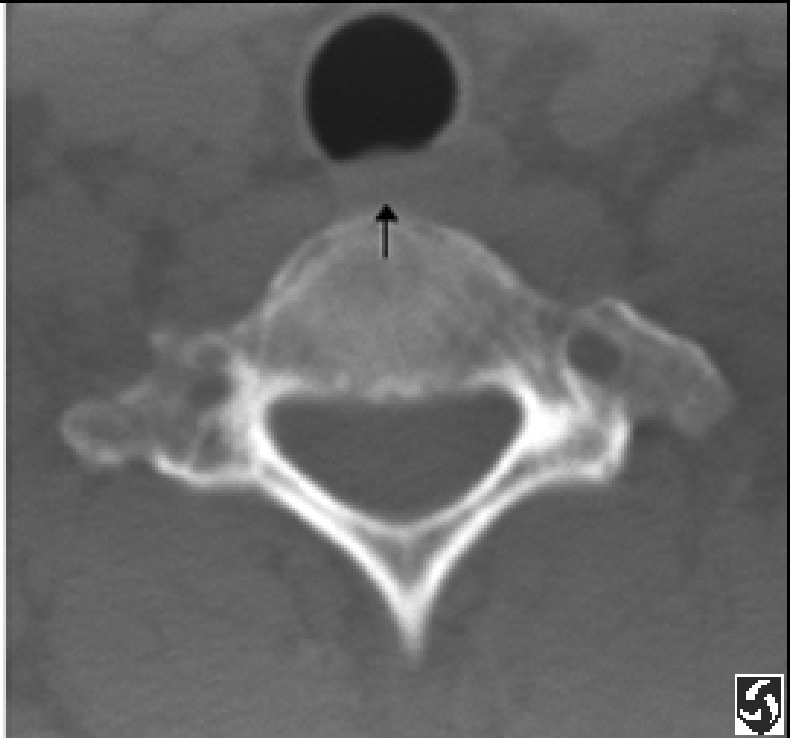
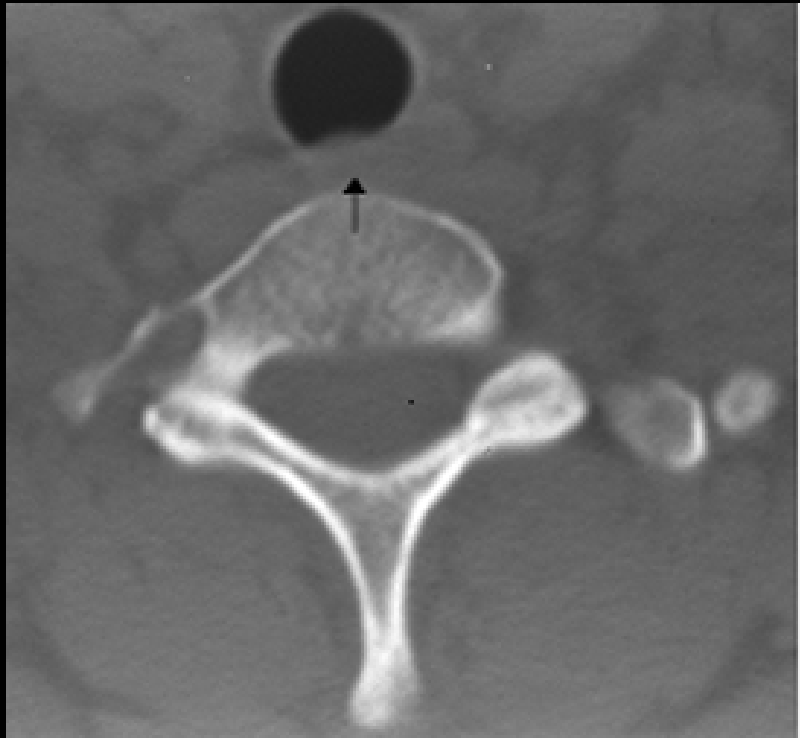


12:15



P W 1931
L 968

GYROSCAN T5-11





**Cervical
(C5-C6)
Fracture
Dislocation**

OBLIQUUS CAPITUS
SUPERIOR

RECTUS CAPITIS
POSTERIOR MINOR

RECTUS CAPITIS
POSTERIOR MAJOR

RECTUSCAPITIS
LATERALIS

LONGUS
CAPITIS

RECTUS CAPITIS
ATERIOR

TRAPEZIUS

SEMISPINALIS
CAPITIS

LONGISSIMUS
CAPITIS

SPINALIS
CAPITIS

STERNOCLEIDO-
MASTOID



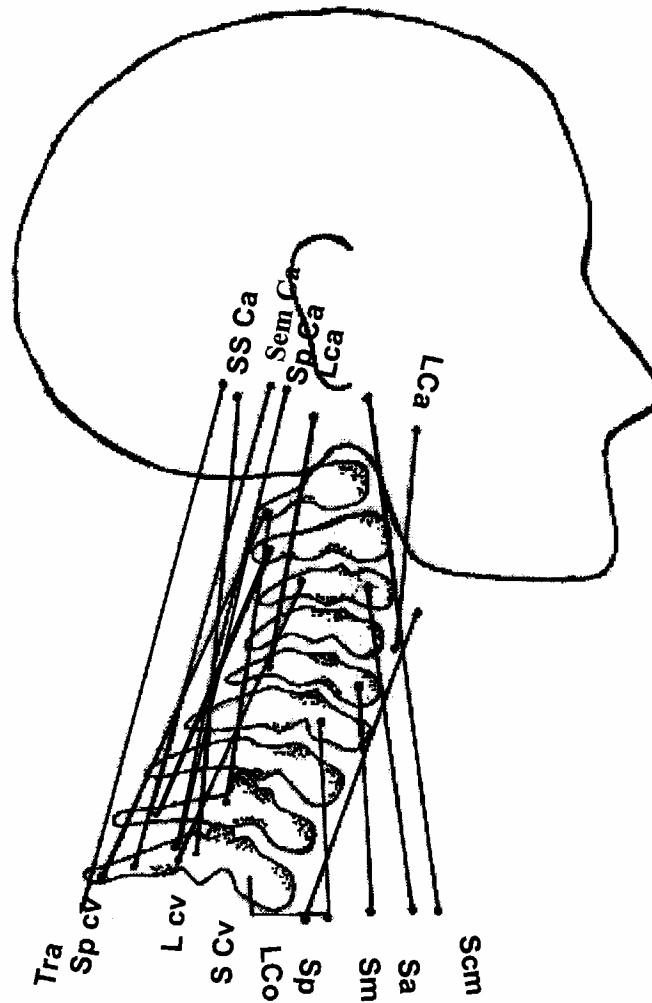


FIGURE 4.13 Sagittal projection of the line of action for cervical musculature. Sternocleidomastoid (Scm), longus capitis (Lca), longus colli (Lco), scalenus anterior (Sa), scalenus medius (Sm), scalenus posterior (Sp), trapezius (Tra), splenius capitis (Sca), splenius cervicis (Sp cv), spinalis capitis (Spi ca), spinalis cervicis (Spi ce), semispinalis capitis (Sem ca), semispinalis cervicis (Sem ce), longissimus capitis (Lca), longissimus cervicis (L cv).