

The Glasgow Coma Scales

The Glasgow Coma Scale (GCS) is the most widely used scoring system used in quantifying the level of consciousness following traumatic brain injury. It is used because it is simple, has a relatively high degree of reliability and correlates well with outcomes following severe brain injury. One of the components of the scale is the “verbal response,” which cannot be assessed when children are very young. A modified version of the scale — the Pediatric Glasgow Coma Scale (PGCS) — was created for children too young to talk.

According to a study published in 2005, using the PGCS for children under 2 years of age compared favorably to using the standard GCS for older kids. It was especially accurate for babies and toddlers who needed acute intervention. The authors of this study (James F. Homes MD, MPH and colleagues from the University of California Davis School of Medicine) investigated the accuracy of the pediatric scale by studying children with TBIs from infancy through 18 years. The children were divided into two groups: (1) those 2 years and younger, and (2) those older than 2.

The authors assigned the PGCS score to the younger group and the standard GCS to the older kids. The GCS is based on a 15-point scale for estimating and categorizing the outcomes of brain injury on the basis of overall social capability or dependence on others. Patients with scores of 3 to 8 are considered to have a severe brain injury. Following is a breakdown of the scale.

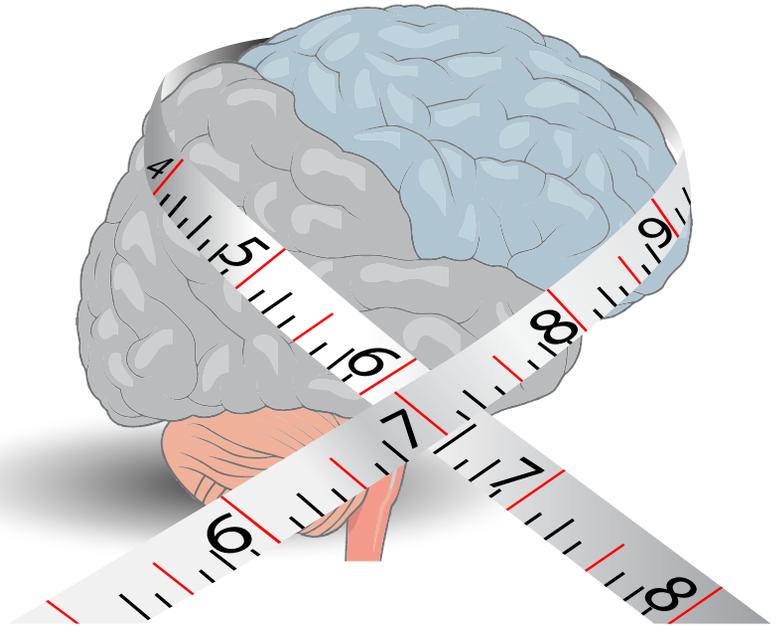
The GCS defined

When applying the GCS, the final score is determined by adding the values of E + V + M (eye opening score + verbal response score + motor response score.) This number helps medical practitioners categorize the possible levels for survival, with a lower number indicating a more severe injury and a poorer prognosis. Following is a breakdown of the scoring:

- mild brain injury — a score of 13 to 15
- moderate brain injury — a score of 9 to 12 (this usually suggests that there was a loss of consciousness greater than 30 minutes.)
- severe brain injury is a score of 3 to 8

Eight is considered a critical score with 90 percent of patients in a coma at this level or below. A coma is defined as:

- (1) not opening eyes,



- (2) not obeying commands, and
- (3) not uttering understandable words.

Motor Response Definitions

When an individual scores below four points on motor response, the scale identifies a decorticate or decerebrate posture/response. Following are descriptions of those terms.

Decorticate posture is an abnormal posturing that involves rigidity, flexion of the arms, clenched fists and extended legs. The arms are bent inward toward the body with the wrists and fingers bent and held on the chest. This type of posturing implies severe damage to the brain with immediate need for medical attention.

Decorticate posture indicates damage to the corticospinal tract, the pathway between the brain and spinal cord. Although a serious sign, it is usually more favorable than decerebrate posture.

What causes decorticate posture? An intracranial hemorrhage (bleeding in the brain), brain abscess, head injury, increased intracranial pressure, a primary or secondary brain tumor, and/or stroke.

Decerebrate posture is an abnormal body posture that involves rigid extension of the arms and legs, downward pointing of the toes and backward arching of the head. A severe injury to the brainstem is the usual cause of this condition.

What causes decerebrate posture? A stroke, intracranial hemorrhage, primary or secondary brain tumor, encephalopathy or hepatic encephalopathy, head injury, increased intracranial pressure, and/or a brain stem tumor.

The Glasgow Coma Scale *continued*

Decerebrate posture can occur on one or both sides of the body or in just the arms. It may alternate with decorticate posture, or a person can have decorticate posture on one side and decerebrate posture on the other. ❖

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The Glasgow Coma Scale (pediatric & adult)

Eye Opening Response

Adults, children over 2 years

Under 2 years

Spontaneous — opens with blinking at baseline	4 points	Eye opening spontaneously
Opens to verbal command, speech or shout	3 points	Eye opening to speech
Opens to pain	2 points	Eye opening to pain
None	1 point	No eye opening

Verbal Response

Adults, children over 2 years

Under 2 years

Oriented and converses	5 points	Infant coos or babbles (normal activity)
Confused, but able to answer questions	4 points	Infant is irritable and continually cries
Inappropriate responses, words are discernible	3 points	Infant cries to pain
Incomprehensible speech / sounds	2 points	Infant moans to pain
None	1 point	No verbal response

Motor Response

Adults, children over 2 years

Under 2 years

Obeys commands for movement	6 points	Infant moves spontaneously or purposefully
Purposeful movement to painful stimulus	5 points	Infant withdraws from touch
Withdraws from pain	4 points	Infant withdraws from pain
Abnormal (spastic) flexion, decorticate posture	3 points	Abnormal flexion to pain for an infant (decorticate response)
Extensor (rigid) response, decerebrate posture	2 points	Extension to pain (decerebrate response)
None	1 point	No motor response