

Growth hormone deficiency

- It has been demonstrated that once other hormone deficiencies are addressed, normal growth response to provocative testing may be restored.²
- For patients with isolated pituitary growth hormone deficiency, provocative testing should be delayed for 12 months following the traumatic brain injury to verify that the growth hormone deficiency is persistent.²

Following a traumatic brain injury:

- patients should be prospectively and retrospectively screened for deficits;¹
- gonadal and growth hormone replacement therapy should be initiated if deficiencies have been demonstrated.¹

Key rehabilitation endpoints to support hormone replacement are:³

- Motor communication
- Sensation
- Emotion
- Cognition
 - Attention
 - Memory
- Visual spatial processing
- Reasoning

Identifying Patients^{with} Growth Hormone Deficiency (GHD)



following Traumatic Brain Injury (TBI)

1. Elger, E., Mead, B., Rowland, G., et al. Consensus guidelines on screening for hypopituitarism following traumatic brain injury. *Neurology* 2005;199:711-724.
2. Beck, S.R., Mead, B., and Utter, R.L. Pituitary dysfunction after Traumatic Brain Injury. In: Miller, M.J., ed. *Essentials: Brain Injury Rehabilitation, Research, and Case Management*. Third Edition. CRC, 2010.
3. Popovic, V., Aronowski, G., Combsweber, F., and Elger, E. Hypopituitarism following traumatic brain injury. In: Jayaraman, J.L., Christensen, L.S., eds. *Brain Trauma: Pathophysiology and Rehabilitation*. Boca Raton, FL: Taylor & Francis, 2005, vol. 33, pp. 33-44.

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Overall, alterations of the hypothalamic–pituitary axis occurred in:

- ▶ 33–50% of the patients studied;
- ▶ patients with severe GHD reported in 15–20% of adult patients.

- Ghigo et al., 2005¹

Growth hormone deficiency is often seen in patients with TBI because:¹

- ▶ the growth hormone-secreting somatotrope cells are located in the pituitary gland;
- ▶ these cells receive their blood supply from the portal vessels running between the hypothalamus and pituitary gland;
- ▶ TBI poses a significant risk for hypothalamic and pituitary injury.

Pituitary hormone deficiencies could result in sub-optimal rehabilitation for patients with TBI-induced hypopituitarism.

- Ghigo et al., 2005¹

Growth hormone deficiency should be screened in all patients with:

- ▶ moderate- to-severe* traumatic brain injury (TBI);
- ▶ clinical signs or symptoms associated with hypopituitarism.

* Moderate TBI = 9–12 points on the Glasgow Coma Scale (GCS).
Severe TBI = <8 points on the GCS.¹

Life complaints in patients with head injury and adult-onset GHD¹

Complaints	Moderate- to-severe TBI	Adult-onset GHD
Memory impairment	Yes	Yes
Concentration impairment	Yes	Yes
Decreased IQ	Yes	Yes
Impaired judgement, problem-solving	Yes	No
Poor organizational skills	Yes	No
Decreased quality of life	Yes	Yes
Fatigue	Yes	Yes
Anxiety	Yes	Yes
Depression	Yes	Yes
Social isolation	Yes	Yes
Deterioration of sex life	Yes	Yes
Increased unemployment	Yes	Yes

- Adapted from Ghigo et al., 2005¹

Patients should be referred to an endocrinologist if:

- ▶ results of their basal evaluations are unclear,
- ▶ these results indicate a need for further testing.

- Ghigo et al., 2005¹

- ▶ Glucagon is considered a good alternative to an insulin tolerance test (ITT) for investigation of growth hormone for those in whom ITT is generally contraindicated (e.g., patients who have central nervous system pathologies).¹
- ▶ Patients with three or more pituitary hormone deficiencies and an IGF-1 less than the reference range have a 97% chance of being growth hormone deficient.²

