

# Enteral nutrition in Traumatic Brain Injury

[Isotonic solutions](#) (such as Isocal® or Osmolyte®) should be used at full strength starting at 30 ml/ hr. Check [gastric residuals](#) q 4 hrs and hold feedings if residuals exceed  $\approx 125$  ml in an adult. Increase the rate by  $\approx 15$ –25 ml/hr every 12–24 hrs as tolerated until the desired rate is achieved <sup>1)</sup>.

Dilution is not recommended (may slow gastric emptying), but if it is desired, dilute with [normal saline](#) to reduce free water intake.

Cautions:

- [Nasogastric tube feeding](#) may interfere with absorption of [phenytoin](#);

- reduced [gastric emptying](#) may be seen following head-injury <sup>2)</sup> (NB: some may have temporarily elevated emptying) as well as in [pentobarbital coma](#); patients may need IV hyperalimentation until the enteric route is usable.

The technique of [hypocaloric feeding](#) <sup>3)</sup> (AKA “trophic feed,” “trickle feed,” among others) through an [enteral feeding](#) tube (e.g. Dobhoff tube) at a rate variously defined as at 10–20 ml/hr may be tolerated and may reduce mucosal atrophy while providing a portion of nutritional requirements. Others have described better tolerance of enteral feedings using jejunal administration <sup>4)</sup>

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In a review of the nutritional guidelines for the Management of [Severe Traumatic Brain Injury](#), Fourth Edition, the articles cited demonstrate early transpyloric enteral feeds within 24 to 48 h significantly decrease morbidity and mortality <sup>5) 6) 7) 8) 9) 10)</sup>.

While these articles provide clear evidence that early nutrition is critical to survival, the most recent cited reference is 2012 and the articles lack the detail of which specific macro/micronutrients may benefit the traumatized brain. This is not a critique of the authors creating the guidelines but rather an observation of the need for serious large multi-institutional nutritional studies on TBI. Recently, there have been several studies demonstrating the highly beneficial effects of [branched chain aminoacids](#) (BCAAs) in the patient suffering mild to severe brain injury <sup>11) 12) 13)</sup>.

<sup>1)</sup>

Clifton GL, Robertson CS, Contant CF, et al. Enteral Hyperalimentation in Head Injury. J Neurosurg. 1985; 62:186–193

<sup>2)</sup>

Ott L, Young B, Phillips R, et al. Altered Gastric Emptying in the Head-Injured Patient: Relationship to Feeding Intolerance. J Neurosurg. 1991; 74: 738–742

<sup>3)</sup>

Preiser JC, van Zanten AR, Berger MM, et al. Metabolic and nutritional support of critically ill patients: consensus and controversies. Crit Care. 2015; 19. DOI: 10.1186/s13054-015-0737-8

<sup>4)</sup>

Graham TW, Zadrozny DB, Harrington T. Benefits of Early Jejunal Hyperalimentation in the Head-Injured Patient. Neurosurgery. 1989; 25:729–735

<sup>5)</sup>

Carney N, Totten AM, O'Reilly C, et al. Guidelines for the management of severe traumatic brain injury, 4th Ed. Neurosurgery. 2017;80(1):6-15.

<sup>6)</sup>

Chourdakis M, Kraus MM, Tzellos T, et al. Effect of early compared with delayed enteral nutrition on endocrine function in patients with traumatic brain injury:an open- labeled randomized trial. J Parenter Enteral Nutr. 2012;36(1):108-116.

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Dhandapani S, Dhandapani M, Agarawal M, et al. The prognositc significance of the timing of total enteral feeding in traumatic brain injury. Surg Neurol Int. 2012;3:31-36.

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Acosta-Escribano J, Fernandez-Vivas M, Grau CT, et al. Gastric versus transpyloric feeding in severe traumatic brain injury: a prospective, randomized trial. Intensive Care Med. 2010;36(9):1532-1539.

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Lepelletier D, Roquilly A, Demeure DL, et al. Retrospective analysis of the risk factors and pathogens associated with early-onset ventilator-associated pneumonia in surgical- ICU head-trauma patients. J Neurosurg Anesthesiol. 2010;22(1):32-37.

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Hartl R, Gerber LM, Ni Q, Ghajar J. Effect of early nutrition on deaths due to severe traumatic brain injury. J Neurosurg. 2008;109(1):50-56

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Jeter CB, Hergenroeder GW, Ward NH, et al. Human mild traumatic brain injury decreases circulating branched-chain amino acids and their metabolite levels. J Neurotrauma. 2013;15(8):671-679.

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Elkind JA, Lim MM, Johnson BN, et al. Efficacy, dosage, and duration of action of branched chain amino acid therapy for traumatic brain injury. Front Neurol. 2015;30:66-73.

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Sharma B, Lawrence DW, Hutchison MG. Branched chain amino acids (BCAAs) and traumatic brain injury: a systematic review. J Head Trauma Rehabil. 2017. doi: 10.1097/HTR.0000000000000280.

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