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Detection of skull expansion with increased intracranial pressure.

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Abstract

A technique is described which uses standard strain-gauge technology to detect skull expansion associated with increased intracranial pressure.

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The neurosurgery literature has also provided some evidence of cranial bone mobility. Heifetz and Weiss (1981) applied skull tongs containing strain gauges to two comatose patients. In the first patient, intracranial pressure (ICP) was increased by applying intermittent jugular compression, while in the second patient, ICP was increased by injecting 7-12 cc of fluid into the ventricles of the brain. The results demonstrated that each time the ICP was increased between 15-20 mm Hg, there was a voltage change indicating movement of the skull tongs and therefore, an expansion of the cranial vault. Pitlyk et al. (1985), similarly placed Gardner-Wells tongs with strain gauges first on a dried cadaver skull, then on a fresh cadaver and six live dogs. ICP pressure was increased by manipulating a Swan-Ganz catheter or by saline infusion into the intraspinal subarachnoid space. The authors were not able to consistently increase the ICP in the cadaver skulls but were successful with the dog model. Changes in skull expansion were recorded with increases in ICP as small as 2 mm Hg. Magnitudes of skull expansion, however, were not documented.

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Cited by

1. Zahid Hussain Khan, Pooya Kalani. 2017. Intracranial Compliance, Traumatic Brain Injury and Management. Challenging Topics in Neuroanesthesia and Neurocritical Care, 3-25. [\[Crossref\]](#)

2. Christina N. Seimetz, Andrew R. Kemper, Stefan M. Duma. (2012) An investigation of cranial motion through a review of biomechanically based skull deformation literature. *International Journal of Osteopathic Medicine* **15**:4, 152-165. . Online publication date: 1-Dec-2012. [\[Crossref\]](#)
3. Anne Jäkel, Philip von Hauenschild. (2012) A systematic review to evaluate the clinical benefits of craniosacral therapy. *Complementary Therapies in Medicine*. . Online publication date: 1-Aug-2012. [\[Crossref\]](#)
4. Neil Curtis, Marc E. H. Jones, Junfen Shi, Paul O'Higgins, Susan E. Evans, Michael J. Fagan, Andrew A. Farke. (2011) Functional Relationship between Skull Form and Feeding Mechanics in Sphenodon, and Implications for Diapsid Skull Development. *PLoS ONE* **6**:12, e29804. . Online publication date: 28-Dec-2011. [\[Crossref\]](#)
5. David E. Williams, John E. Lynch, Vidhi Doshi, G. Dave Singh, Alan R. Hargens. (2011) Bruxism and Temporal Bone Hypermobility in Patients with Multiple Sclerosis. *CRANIO***29**:3, 178-186. . Online publication date: 1-Jul-2011. [\[Crossref\]](#)
6. 2011. Literaturverzeichnis. Faszien, 228-232. [\[Crossref\]](#)
7. J. Buchmann, U. Smolenski, U. Arens, G. Harke, R. Kayser. (2008) Kopf- und Gesichtsschmerzsyndrome. *Manuelle Medizin* **46**:2, 82-92. . Online publication date: 1-Apr-2008. [\[Crossref\]](#)
8. Patricia A. Downey, Timothy Barbano, Rupali Kapur-Wadhwa, James J. Sciote, Michael I. Siegel, Mark P. Mooney. (2006) Craniosacral Therapy: The Effects of Cranial Manipulation on Intracranial Pressure and Cranial Bone Movement. *Journal of Orthopaedic & Sports Physical Therapy* **36**:11, 845-853. . Online publication date: 1-Nov-2006. [\[Crossref\]](#)
9. Zareen Bashir, Jemma Miller, Jaleel Ahmad Miyan, Maureen Susan Thorniley. (2006) A near infrared spectroscopy study investigating oxygen utilisation in hydrocephalic rats. *Experimental Brain Research* **175**:1, 127-138. . Online publication date: 9-Oct-2006. [\[Crossref\]](#)
10. W. Heymann, C. Kohrs. (2006) Was ist der „kraniosakrale Rhythmus“?. *Manuelle Medizin***44**:3, 177-184. . Online publication date: 1-Jun-2006. [\[Crossref\]](#)
11. Toshiaki Ueno, M.D., Ph.D., Brandon R. Macias, B.A., William T. Yost, Ph.D., and Alan R. Hargens, Ph.D.. (2005) Noninvasive assessment of intracranial pressure waveforms by using pulsed phase lock loop technology. *Journal of Neurosurgery* **103**:2, 361-367. . Online publication date: 1-Aug-2005. [Abstract](#) | [Full Text](#) | [PDF \(428 KB\)](#)
12. Ian Piper. 2005. Intracranial pressure and elastance. *Head Injury* 2Ed, 93-112. [\[Crossref\]](#)
13. C GREEN, C MARTIN, K BASSETT, A KAZANJIAN. (1999) A systematic review of craniosacral therapy: Biological plausibility, assessment reliability and clinical effectiveness. *Complementary Therapies in Medicine* **7**:4, 201-207. . Online publication date: 1-Dec-1999. [\[Crossref\]](#)
14. S. Richard Heisey, Thomas Adams. (1993) Role of Cranial Bone Mobility in Cranial Compliance. *Neurosurgery* **33**:5, 869-877. . Online publication date: 1-Nov-1993. [\[Crossref\]](#)
15. S. Richard Heisey, Thomas Adams. (1993) Role of Cranial Bone Mobility in Cranial Compliance. *Neurosurgery* **33**:5, 869-877. . Online publication date: 1-Nov-1993. [\[Crossref\]](#)
16. Zvi Karni, Leslie P. Ivan, Jacob Bear. (1986) An Outline of Continuum Modeling of Brain Tissue Mechanics. *Journal of Child Neurology* **1**:2, 119-125. . Online publication date: 1-Apr-1986. [\[Crossref\]](#)

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