

(iNPH). **Methods:** Five sites of the Adult Hydrocephalus Clinical Research Network (AHCNRN) randomized 18 patients scheduled for ventriculoperitoneal shunting based on CSF-drainage response. Patients were randomized to a Codman® Certas® Plus valve with SiphonGuard at either setting 4 (Active, N=9) or setting 8/“virtual off” (Placebo, N=9). Patients and assessors were blinded to the shunt setting. Outcomes included 10-meter gait velocity, cognitive function, and bladder activity scores. The prespecified primary analysis compared changes in 4-month gait velocity in the Active versus Placebo groups. Placebo-set shunts were then blindly adjusted to the active setting and all patients underwent 8 and 12-month post-surgical assessment. **Results:** At 4-months, gait velocity increased by 0.28 ± 0.28 m/s in the Active Group and 0.04 ± 0.17 m/s in the Placebo Group ($p=0.071$). Overactive Bladder (OAB-q) scores significantly improved in the Active versus Placebo groups ($p=0.007$). At 8 months, Placebo gait velocity increased by 0.36 ± 0.27 m/s and was comparable to the Active Group (0.40 ± 0.20 m/s; $p=0.56$). **Conclusions:** This AHCNRN study shows a trend suggesting gait velocity improves more at an Active shunt setting than a Placebo shunt setting and demonstrates the feasibility of a placebo-controlled trial in iNPH.

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Novel 3D printing for complex cranial reconstruction in neurosurgery - A case series

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Background: Cranial reconstruction is a common consequence of neurosurgical disease and intervention following craniectomy, trauma, infection, congenital defects, or neoplasm. Most commonly, Computer Aided Design-Computer Aided Manufacturing (CAD-CAM) technology is utilized in cases where autologous bone cannot be used. These patient-specific implants provide excellent cosmesis, however individual costs range from \$800-15,000, making routine use challenging in the current Canadian health care environment. Here we present a novel method using desktop 3D printers to manufacture patient-specific molds for intraoperative reconstruction of various cranial defects. **Methods:** Our first patient presented following two separate traumas requiring decompressive craniectomy and subsequent posterior fossa decompression without interval cranioplasty. The second patient required reconstruction during resection of intraosseous meningioma. Both cases were performed using a titanium-mesh/poly-methyl-methacrylate (Ti-PMMA) construct draped over the mold. The third case, cranioplasty following decompressive craniectomy outside the country, was performed using a “two piece” mold and PMMA was casted into the mold and allowed to harden. **Results:** Patients reported satisfaction with cosmesis, without adverse outcomes. Cost per case was \$50-100, representing an estimated cost savings of \$685,000 per year in Canada. **Conclusions:** Given excellent outcomes in addition to cost effectiveness, this case series provides evidence for use of this alternate technique with similar patient outcomes.

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Transitioning from Pediatric to Adult care: a Qualitative Study of Patients with Hydrocephalus and their Caregivers

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Background: Hydrocephalus is a common pediatric neurosurgical condition that requires lifelong care into adulthood. Significant gaps in care are thought to exist for youth transitioning to adult care, but little is known about how patients and their caregivers feel about the process. This study examines the perceptions of adolescents, young adults and caregivers when transitioning from pediatric to adult care at a single Canadian center. **Methods:** 40 patient/caregivers (7 adolescents, 13 young adults and 20 parents) treated at BC Children’s Hospital participated in semi-structured interviews using the qualitative research methodologies of grounded theory. Interviews were transcribed verbatim and coded, with common themes identified. **Results:** Four overarching themes relating to the process of transitioning from pediatric to adult care were identified: (1) Inadequacy of communication between pediatric and adult care teams and patients/caregivers; (2) Uncertainty relating to the prospect of life as an adult with hydrocephalus; (3) Anxiety and fear regarding navigating a new health care environment; and (4) sadness at the loss relationships with the pediatric health care team. **Conclusions:** We identified a general dissatisfaction with the transitioning process for hydrocephalus. Common themes and concerns identified may form the basis of an improved transitioning model for youth with hydrocephalus as they become adults.

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Characterizing and comparing brain injury associated with traditional self-retracting brain retractors with novel tubular retractors

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Background: Tubular retractors are FDA approved and in the Neurosurgical marketplace, but adaptation has been hampered by lack of evidence showing superiority over traditional retractors when performing subcortical surgery. This study examines brain injury associated with traditional brain retractors versus tubular retractors. **Methods:** Nine porcine models underwent a simulated neurosurgical operation. Retractors were inserted for four hours after which the porcine model was euthanized. The en-bloc extracted porcine brain was fixed in 10% formalin, paraffin embedded, sectioned at 4 um and stained with hematoxylin and eosin (H&E) using standard laboratory protocols. Computer algorithms were generated to calculate areas of cerebral edema and hemorrhage adjacent to retractor surfaces. **Results:** Using a two-tailed t-test with a significance level of 0.05, traditional brain retractors were associated with statistically significant greater areas of cerebral edema when compared to tubular retractors