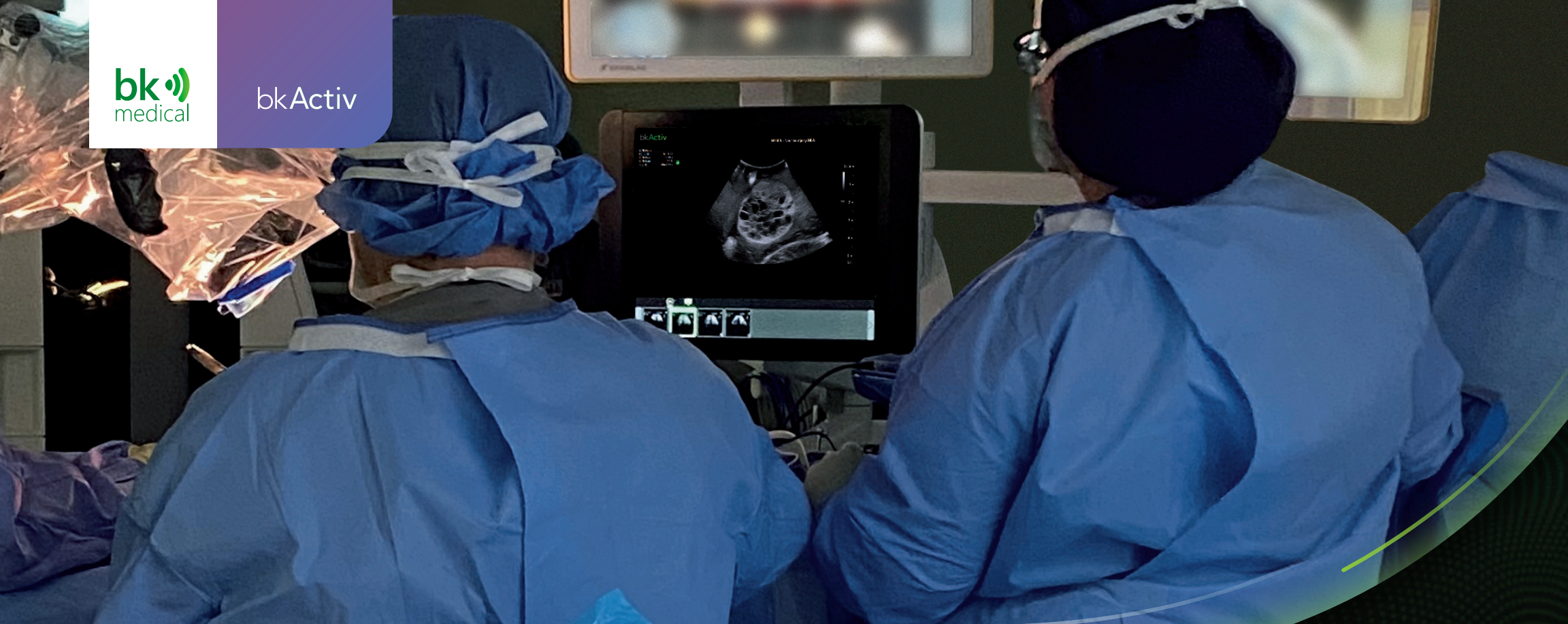




bkActiv



Reassurance for Decision-Making in Neurosurgery

Active Imaging for Neurosurgeons with Real-Time Intraoperative Ultrasound



Neuro-Oncology

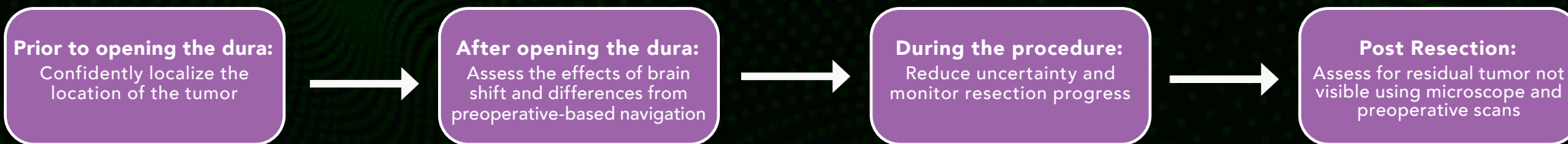
Confidence in Decision-Making

Use up-to-date information to visualize your target in real-time.

brain shift
up to
19 mm¹

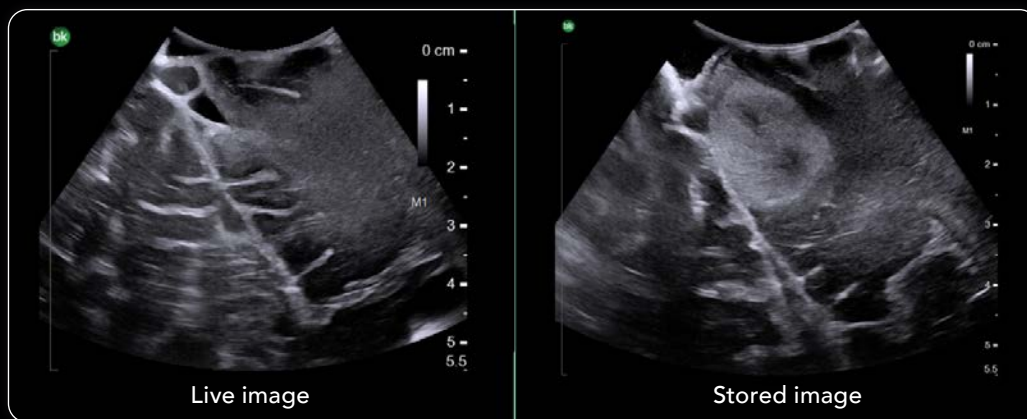


Feel reassured and achieve planned results with real-time intraoperative ultrasound (iUS) through all steps of your procedure



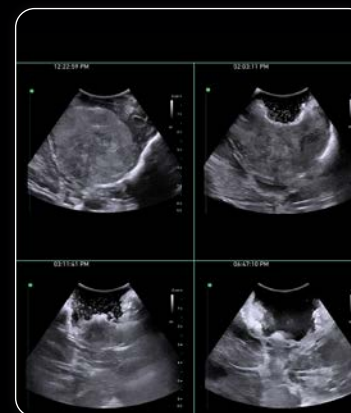
Support image interpretation during your procedure with three different compare features that enable you to compare live imaging with previously taken scans:

Dual Live Compare



Breast Cancer Brain Metastasis
Craniotomy (N13C5)

Stored Image Compare



Meningioma
Craniotomy (N13C5)

Picture-in-Picture



High Grade Glioma
Craniotomy (N13C5)



Skull Base

Visualize at Depth

With a complete portfolio for a variety of approaches, use intraoperative ultrasound (iUS) in skull base procedures to visualize deep structures in the brain.

Endoport

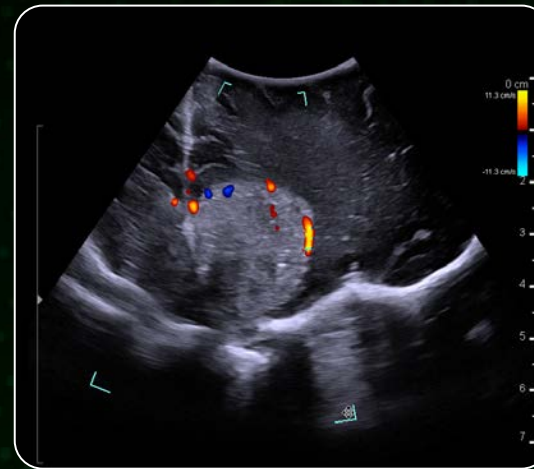
- Localize the lesion and assess trajectory before endoport insertion.
- Assess for lesion removal and residual lesion.



Hematoma evacuation guided through endoport
Burr Hole (N11C5s)

Cranial

- Use BK's Prism technology to visualize deeper anatomy and lesions at the base of the skull with more clarity.
- Access hard-to-reach areas for real-time visualization that may reduce image artifacts at the far borders of the resection cavity.



Color Doppler Falx Meningioma
Craniotomy (N13C5)



Meningioma
Craniotomy (N13C5)



Spine

Clear Details for Reassurance

Intraoperative ultrasound (iUS) helps you guide your spine procedures where every millimeter has a big impact.



Real-time active imaging for critical decision support



Unlike iCT, iUS does not involve ionizing radiation²



in 63% of cases in study, iUS changed the course of surgery³

Reduce number of laminectomies⁴

Rely on real-time active imaging to confirm adequate laminectomy prior to opening the dura.³

Reduce need for intraoperative fluoroscopy⁴

Visualize spinal cord, soft tissue, and bleeds with the soft tissue differentiation from intraoperative ultrasound.

Reduce incision dimension⁴

Confidently localize the lesion prior to making incision in the dura.

Confirm surgical end-points

Determine degree of decompression in spinal cord and assess for residual tumor.

Tethered Spinal Cord



Tethered Spinal Cord
Craniotomy (N13C5)

Spinal Tumor



Benign Spinal Cord Lesion
Craniotomy (N13C5)

Spinal Decompression



Lumbar Spinal Cord post Decompression
Craniotomy (N13C5)



Neurovascular

Reassurance for Critical Decisions

Intraoperative ultrasound (iUS) can provide the certainty you need for unplanned procedures.



Shorten operative time with iUS for AVMs⁵



63% reduction in hematoma volume with accurate catheter placement⁶

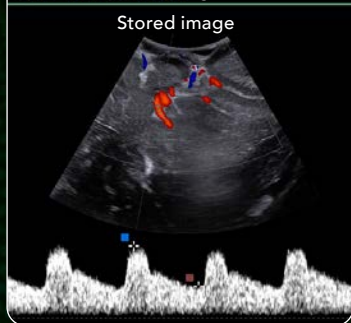
Aneurysms

Use iUS to:

- Evaluate blood flow post aneurysm clipping using color and pulse-wave Doppler.
- Visualize clipping of intracranial aneurysm in real-time without streaking image artifacts traditionally seen on CT.



Live image



Stored image

Aneurysm with color and pulse-wave Doppler. Dual Live Compare Craniotomy (N13C5)



Titanium clips after clipping of intracranial aneurysms. Craniotomy (N13C5)

Arteriovenous Malformations (AVMs)

Use iUS to:

- Locate AVM nidus and identify feeding arteries with color Doppler⁷
- Assess for resection of AVMs^{7,8}
- Identify associated hematoma⁸
- Visualize preoperative embolization (e.g. Onyx®)



Hematoma due to AVM with color Doppler Craniotomy (N13C5)

Intracerebral Hemorrhages (ICH)

Use iUS to:

- Localize the hematoma
- Confirm positioning of the catheter
- Assess effectiveness of clot removal



Live image



Stored image

Live and stored scan of clot removal procedure. Dual Live Compare Craniotomy (N13C5)



Pediatrics

Fewer Obstacles to Achieve Outcomes

Use intraoperative ultrasound (iUS) for pediatric procedures including tumor resections, spine procedures, and hematomas



Unlike iCT, intraoperative ultrasound does not involve ionizing radiation²

Spinal Procedures



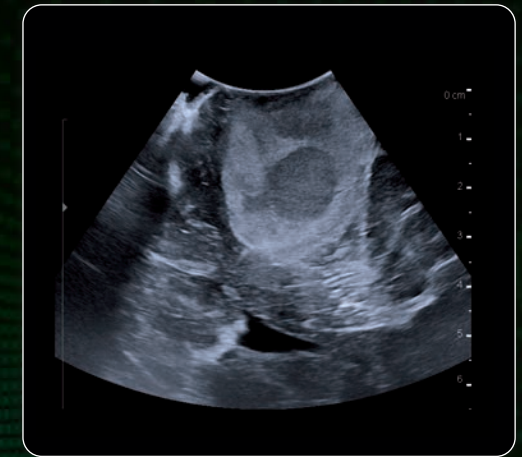
Lumbar Spine Dermoid Cyst, Pediatrics
Craniotomy (N13C5)

Hematomas/ICHs



Pediatric Hematoma
Craniotomy (N13C5)

Tumor Resections



Pediatric Temporal Lobe Brain Tumor
Craniotomy (N13C5)

bkActiv

On-Demand Videos

Increase surgeon and OR staff confidence and competency with instructional videos right on the system.



Neurosurgeon Control

Enhanced neurosurgeon control with Smart Button™ on neurosurgical, sterilizable transducers. The remote control allows you to control the image in the sterile field, from where you stand.

Simple and Customizable UI

See only what you need with an intuitively simple, Tru-Sense™ touch UI. Scale from Basic to Advanced and create customized user profiles tailored to specific user needs.



Adjustable Monitor

Turn the monitor to view images in portrait or landscape orientation. Mounted on an extendable, flexible arm, the screen faces you where you stand.

Enhanced Visualization

Improved algorithms that automatically allow uniform image resolution, greater details around lesion borders and at larger depths, and enhanced penetration, spatial resolution, and near field image quality.

N13C5

Craniotomy Transducer with wide field of view for full visibility



N11C5s

Burr Hole Transducer with deep penetration and small footprint



Active Imaging for Active Decision-Making

Intraoperative ultrasound provides real-time visual guidance for decision support and offers the following advantages over competing imaging products.



The only real-time intraoperative imaging that does not interrupt workflows like scanning with iCT and iMRI.⁹



Has demonstrated gross total resection for high-grade gliomas that is not statistically different from iMRI and 5-ALA.¹⁰



¹ Ohue, S., et al. "Evaluation of Intraoperative Brain Shift Using an Ultrasound-Linked Navigation System for Brain Tumor Surgery." *Neurol Med Chir (Tokyo)* 50, 291-300.2010.

² <https://www.fda.gov/radiation-emitting-products/medical-imaging/ultrasound-imaging>

³ Harel R and Knoller N. Intraoperative spine ultrasound: application and benefits.

⁴ Ganau, M., Syrmos, N., Martin, A. R., Jiang, F., & Fehlings, M. G. (2018). Intraoperative ultrasound in spine surgery: history, current applications, future developments. *Quantitative imaging in medicine and surgery*, 8(3), 261–267. doi:10.21037/qims.2018.04.02.

⁵ Griffith, S., Pozniak, M.A. et al. Intraoperative Sonography of Intracranial Arteriovenous Malformations. *Journal of Ultrasound in Medicine*, Vol 23, Issue 8, 1011-1139 (2004). doi.org/10.7863/jum.2004.23.8.1065

⁶ MISTIE III A phase III, randomized, open-label, 500-subject clinical trial of minimally invasive surgery plus rt-PA in the treatment of intracerebral hemorrhage. MTI-M3 Mechanisms of Tissue Injury in MISTIE III Rebleeding and inflammation: Predicting risk of excessive bleeding in minimally invasive surgery and inflammatory marker evaluation. National Institute of Health Research (NIHR, UK)N. (2015, April 14), Retrieved March 10, 2021, from https://clinicaltrials.gov/ProvidedDocs/46/NCT01827046/Prot_003.pdf

⁷ Dellaretti, M., Ronconi, D. E. Intraoperative Ultrasound Navigation With Doppler Function to Guide Arteriovenous Malformation Resection: 3-Dimensional Operative Video. *Operative Neurosurgery*, Vol 17, Issue 4, E162-E163 (2019). doi: 10.1093/ons/0000000000000000

⁸ Walkden, J.S., Zador, Z., et al. Use of intraoperative Doppler ultrasound with neuronavigation to guide arteriovenous malformation resection: a pediatric case series. *Journal of Neurosurgery* (2015). doi.org/10.3171/2014.10.PEDS14249

⁹ Coburger J, Nabavi A, König R, Rainer Wirtz C, Pala A. Contemporary use of intraoperative imaging in glioma surgery: A survey among EANS members. *Clinical Neurology and Neurosurgery* 163m 133-141 (2017).

¹⁰ Mahboob S and Eljamel M. Intraoperative image-guided surgery in neuro-oncology with specific focus on high-grade gliomas. *Future Oncology* 13 (26) (2017).



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