

# Chiari malformation: Minimally invasive bony decompression with duraplasty

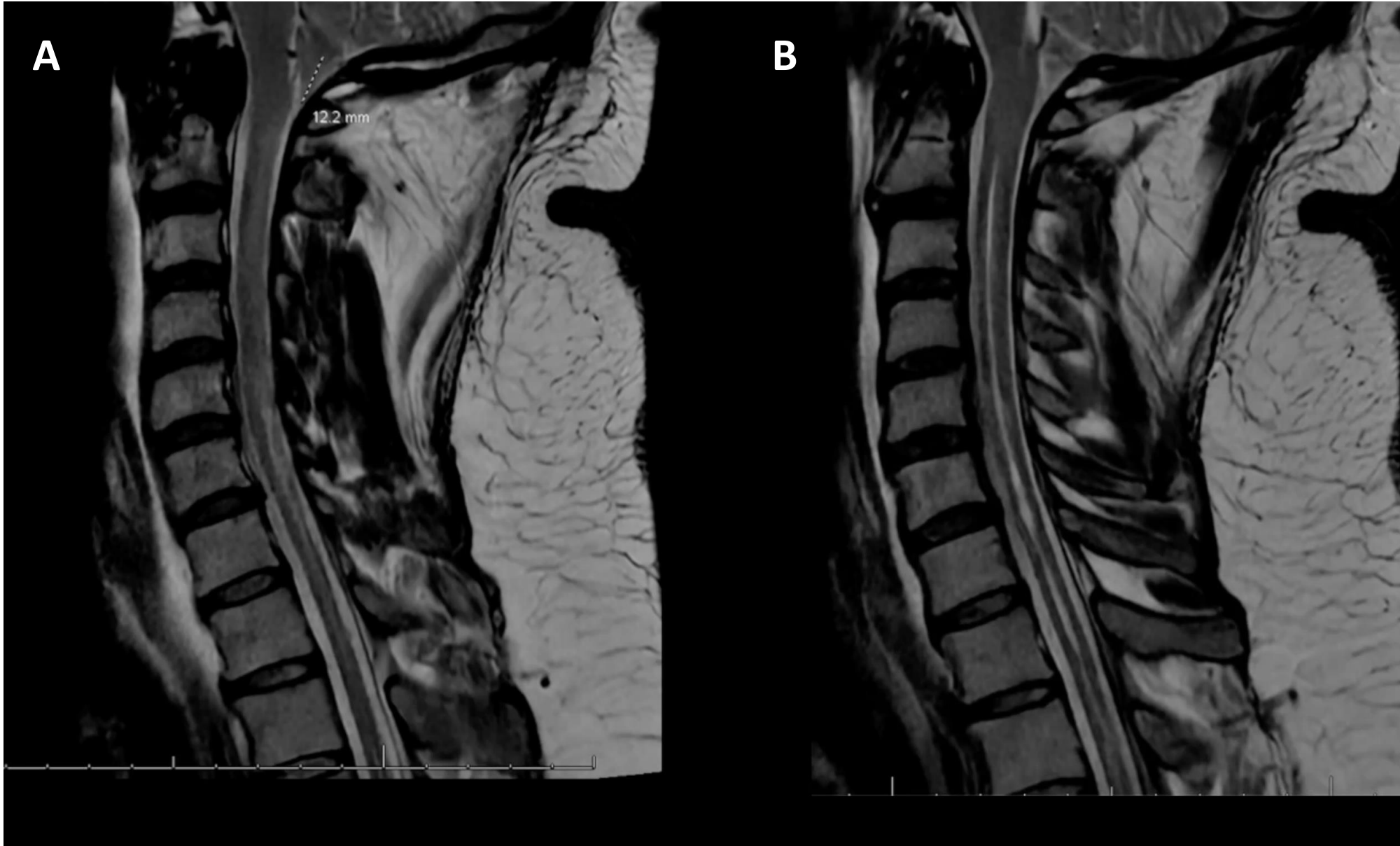
Preston D'Souza, MD<sup>1</sup> Matias L. Costa, MD<sup>1</sup> Miranda K. Hayworth, MD, PhD<sup>1</sup>  
Patrick J. Karas, MD<sup>1</sup>  
<sup>1</sup>The University of Texas Medical Branch

## Abstract

Chiari 1 malformation, a pathology characterized by caudal decent of cerebellar tonsils and subsequent outflow hindrances of cerebrospinal fluid, often requires neurosurgical intervention when conservative management fails<sup>2,3</sup>. This case highlights a minimally invasive approach utilizing a 3-blade retractor for effective decompression and duraplasty while minimizing post operative discomfort and maximizing outcomes.

## Case introduction

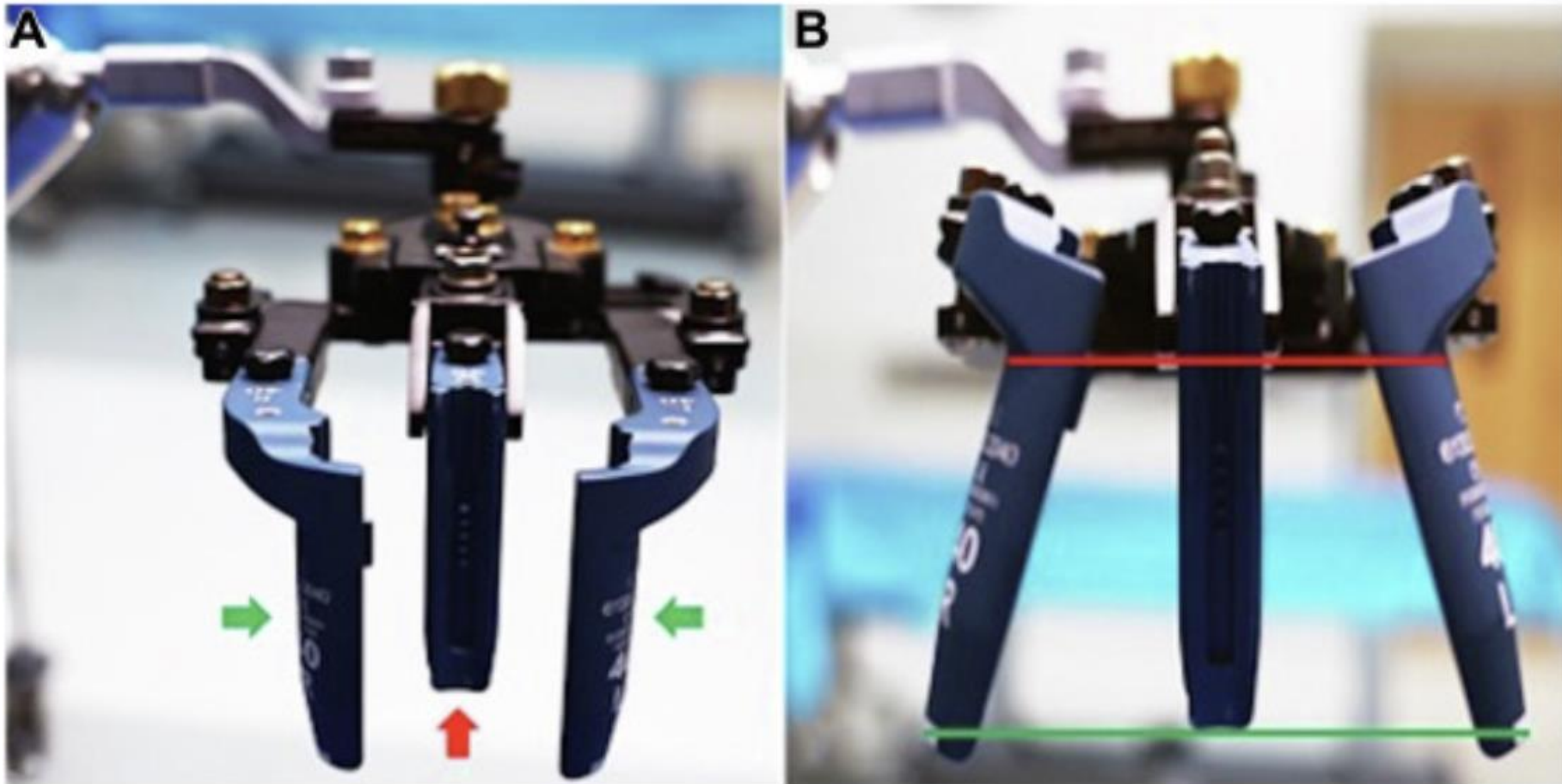
- 42-year-old male with past medical history PTSD/anxiety/chronic opioid use
- Worsening occipital headaches, neck pain, bilateral interscapular pain and upper extremity numbness
- Failure of symptom control with conservative management



**Figure 1 A/B:** Sagittal T2-weighted MRI cranio-cervical junction; 12mm cerebellar tonsillar herniation descent with syrinx from C2 to T4.

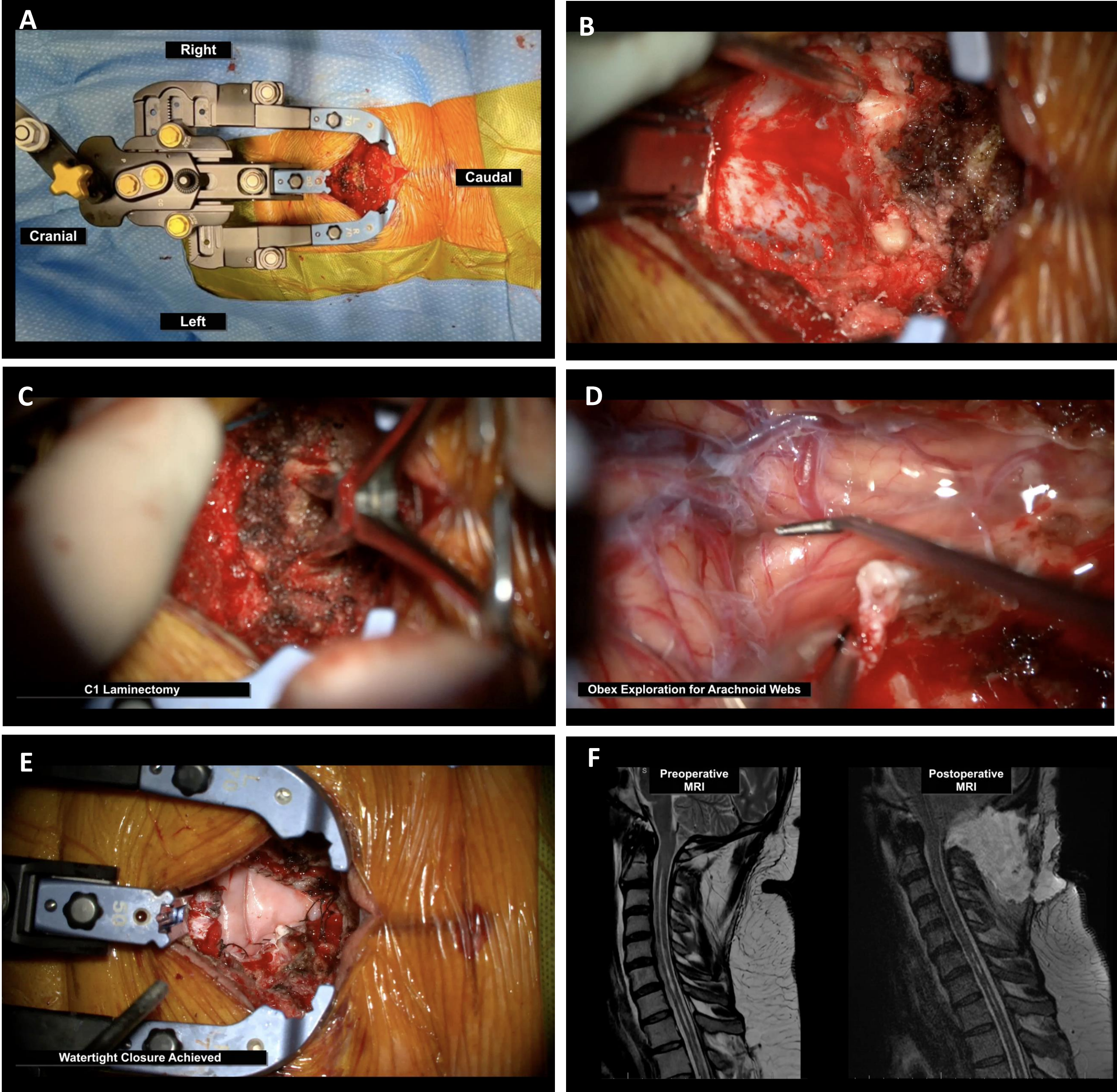
## Minimally invasive approach

- 3-blade retractor (Mars 3VL retractor, Globus Medical, Audubon, PA)<sup>1</sup>
- Lateral radiograph intraoperatively to identify optimal trajectory for retractors focusing on atlanto-occipital gap
- 3-4 cm incision marked over midline
- Application of retractor system after subperiosteal dissection of suboccipital bone and C1 lamina
- Utilization of both medio-lateral and cranio-caudal expansion within confines of incision

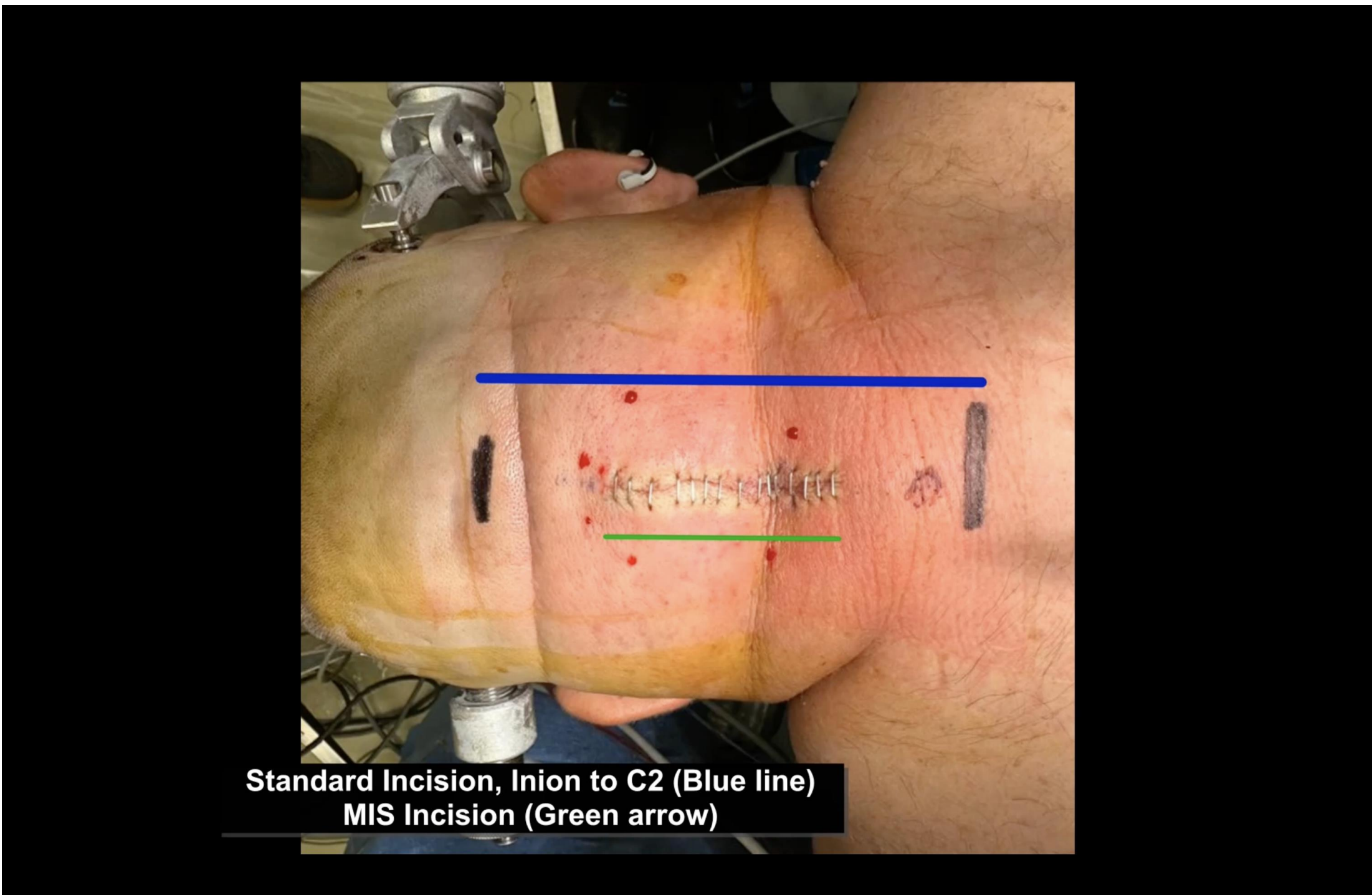


**Figure 2 A/B:** 3-blade retractor (Mars 3VL retractor, Globus Medical, Audubon, PA)<sup>1</sup>

## Operation



**Figure 3:** A: 3-blade retractor set-up following subperiosteal dissection suboccipital bone and C1 lamina; B: completion of suboccipital craniectomy 3cm x 3cm; C: completion of C1 laminectomy; D: opening of dura and exploration of obex with release of arachnoid tethering; E: water-tight duraplasty; F: Post operative sagittal T2-weighted MRI of cranio-cervical junction; resolution tonsillar herniation/syrinx



**Figure 4 :** MIS-approach incision 4cm (green line) compared to standard Chiari decompression incision that exposes inion to C1 lamina (blue line)

## Conclusions

- Expansile feature of 3-blade retractor allows adequate exposure of bony landmarks without excessive dissection of tissues
- With use of intraoperative microscope, the assistant can easily maneuver within the surgical field without hindering the surgeon
- In addition to foramen magnum decompression, C1 laminectomy, obex exploration, and duraplasty can be accomplished through this opening
- Less incision and dissection requirements may promote quicker post-operative recovery and wound healing

## References

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