

Submission ID #: 70945

Scriptwriter Name: Kathyayani Sridharan

Project Page Link: <https://review.jove.com/account/file-uploader?src=21638273>

Title: Uniportal Endoscopic Cervical Decompression for Myelopathic Spinal Stenosis

Authors and Affiliations:

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Author Questionnaire

1. Microscopy: Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **Yes, all done**

If **Yes**, can you record movies/images using your own microscope camera? **Yes**

Endoscopic Shots: 3.1.1, 3.1.2, 3.2.1, 3.2.2, 3.3.1, 3.3.2, 3.3.3, 3.4.1, 3.4.2, 3.4.3, 3.5.1

2. Software: Does the part of your protocol being filmed include step-by-step descriptions of software usage? **Yes, done**

3. Filming location: Will the filming need to take place in multiple locations? **No**

4. Testimonials (optional): Would you be open to filming two short testimonial statements **live during your JoVE shoot**? These will **not appear in your JoVE video** but may be used in JoVE's promotional materials. **No**

Current Protocol Length

Number of Steps: 08

Number of Shots: 26

Interviews

Videographer: Obtain headshots for all authors available at the filming location.

Authors: Please note that the questions will not appear on screen. Please answer in **stand-alone full sentence with sufficient context**

Note: The statements have been edited for clarity.

INTRODUCTION:

REQUIRED: Summarize your research focus and the main questions it aims to answer.

- 1.1. Hyeun-Sung KimYeon-Ha Hwang: Our research focuses on using uniportal endoscopic decompression to treat cervical myelopathy for minimal tissue damage.

1.1.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera.

~~Describe the research gap or limitation in existing methods and how this protocol addresses them.~~

- 1.2. Hyeun-Sung KimYeon-Ha Hwang: Unlike open laminectomy, this procedure preserves stability without screw fixation, minimizing muscle and soft tissue damage.

1.2.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera.

CONCLUSION:

~~What does this protocol allow researchers to study or measure?~~

- 1.3. Hyeun-Sung KimYeon-Ha Hwang: This procedure preserved stability and significantly reduced VAS neck pain and Nurick myelopathy grades from preoperative to final follow-up.

1.3.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera.

~~Describe the most important consideration or challenge when performing this protocol.~~

- 1.4. Hyeun-Sung KimYeon-Ha Hwang: The critical challenge is the narrow working corridor and the proximity of neural elements; hence, spinal cord manipulation should be minimized.

1.4.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera.

~~How can future studies build on this work? Describe the questions or research directions that can be investigated next.~~

- 1.5. **~~Hyeun-Sung KimYeon-Ha Hwang~~**: Future studies should include long-term follow-up and comparisons with conventional surgical techniques.

- 1.5.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera.

Videographer: Obtain headshots for all authors available at the filming location.

Ethics Title Card

This research has been approved by the Institutional Review Board (IRB) at Harrison Spinartus Hospital

Protocol

Videographer: Please always record an audio slate while filming each shot mentioned in the shotlist.

2. Endoscopic Docking

Demonstrator: Hyeun-Sung Kim

~~2.1. To begin, use wide safety straps to secure the anesthetized patient placed in the prone position on the radiolucent operating table [1]. Disinfect the posterior cervical skin with iodine and isopropyl alcohol [2] and drape the area to allow clear access for the endoscope and fluoroscopic guidance [3]. Mark the skin [4] under anteroposterior and lateral fluoroscopic guidance to target the junction of the interlaminar space lateral margin and the facet joint medial border, or the V (Vee) point [5].~~

~~2.1.1. WIDE: Talent securing the wide safety straps on the anaesthetized patient positioned on the operating table. *Videographer: Please obtain CU shot as well for this shot.*~~

~~2.1.2. Talent disinfecting the neck region with iodine and isopropyl alcohol.~~

~~2.1.3. Talent draping the area for clear endoscope and fluoroscopic entry points.~~

~~2.1.4. Talent marking the skin.~~

~~2.1.5. SCREEN: 70945_unannotated image for SCREEN-2.1.5.jpg.~~

~~*Video editor: please use the file named 70945_SCREEN_2.1.5.jpg as a reference to add the annotations for 2.1.5.*~~

~~2.2. Use a scalpel to make approximately 1 centimeter longitudinal skin incision at the marked V point [1]. For a single-level decompression, center the incision directly over the V point of the C5-C6 (see five see six) cervical disc segment or the target level [2] and achieve endoscopic access by cranio-caudal sliding of the working channel [3]. (Authors: We have omitted the two level and three level decompression points, based on your response. Please let us know if this changes during the demonstration so we can update the narration appropriately.)~~

~~2.2.1. Talent making a longitudinal skin incision at the marked V point.~~

~~2.2.2. SCREEN: Show the incision centered over the V point for single-level decompression.~~

~~2.2.3. Talent sliding the working channel in the cranial-caudal direction to achieve endoscopic access. (Authors: As specified, please provide a screen capture for this shot as well, in addition to the videographer filmed shot.)~~

~~2.3. After creating an incision for the endoscopic access, insert the obturator [1-TXT] and~~

working sleeve sequentially [2] and dock them onto the target bony landmark [3]. Reconfirm the final position of the working sleeve tip using anteroposterior and lateral fluoroscopy [4].

- 2.3.1. Talent inserting the obturator toward the target bony landmark. **TXT: Refer to the text protocol for patient preparation**
- 2.3.2. Talent inserting the working sleeve after inserting the obturator.
- 2.3.3. Talent docking both obturator and working sleeve onto the bony landmark.
- 2.3.4. LAB MEDIA: 70945_SCREEN_2.3.4..jpg.

3. Endoscopic Posterior Cervical Decompression

Author's NOTE:

Steps 3.1 – 3.4: During the filming of Steps 3.1 to 3.4, Videographer Kim captured additional wide shots of the surgeon performing the procedure as well as tight/close-up shots of the surgeon's hand movements. We kindly request that you insert these wide and close-up shots naturally throughout the Steps 3.1 to 3.4 sequence. Use split screen to show talent and scope footage

- 3.1. For bone drilling or laminectomy, use radiofrequency, or RF (*R-F*) ablation and blunt dissection to remove the muscle fibers covering the V point [1]. Continue dissection until the bony anatomy of the superior articular process, or SAP (*S-A-P*) and inferior articular process, or IAP (*I-A-P*) is clearly visualized [2].
 - 3.1.1. SCOPE: 70945_SCOPE_3.1.1..mp4.
 - 3.1.2. SCOPE: 70945_SCOPE_3.1.2..mp4.
- 3.2. Drill the medial-inferior portion of the IAP to expose the medial-superior SAP, extending 3 to 4 millimeters lateral to the initial V-point for an adequate lateral working margin [1]. Follow the exposed SAP medially to identify the cranial portion of the caudal lamina [2].
 - 3.2.1. SCOPE: 70945_SCOPE_3.2.1..mp4.
 - 3.2.2. SCOPE: 70945_SCOPE_3.2.21..mp4 00:10-00:20.
- 3.3. Drill the caudal lamina medially and caudally to expose the inferior edge of the ligamentum flavum and the midline raphe [1]. Drill the caudal portion of the cranial lamina to expose the superior edge of the ligamentum flavum [2]. Extend decompression toward the midline and contralateral side until the medial aspect of the contralateral SAP, or facet joint, is visualized [3]. Confirm bilateral lateral recess decompression [4].
 - 3.3.1. SCOPE: 70945_SCOPE_3.3.1..mp4.
 - 3.3.2. SCOPE: 70945_SCOPE_3.3.2..mp4.

- 3.3.3. SCOPE: 70945_SCOPE_3.3.3..mp4 00:08-00:20.
- 3.3.4. SCOPE: 70945_SCOPE_3.3.4..mp4
- 3.4. To remove the ligamentum flavum, carefully dissect its lateral margins [1]. Remove the ligamentum flavum en bloc to expose the dura mater and spinal cord [2].
 - 3.4.1. SCOPE: 70945_SCOPE_3.4.1..mp4.
 - 3.4.2. SCOPE: 70945_SCOPE_3.4.2..mp4.
- 3.5. Use radiofrequency coagulation and gelatin-thrombin based flowable hemostatic agent to achieve hemostasis [1]. After inserting a closed-suction drainage catheter through the working incision [2], use absorbable surgical sutures for subcutaneous closure [3] and topical skin adhesive for complete skin closure followed by standard postoperative management and care [4].
 - 3.5.1. SCOPE: 70945_SCOPE_3.5.1..mp4.
 - 3.5.2. Shot of inserted closed-suction drainage catheter.
 - 3.5.3. Talent suturing the subcutaneous layers of the skin.
 - 3.5.4. Talent applying topical adhesive for skin closure.

Results

4. Results

- 4.1. In 15 patients who underwent uniportal endoscopic cervical decompression, mean MRI canal stenosis improved from 37% to 5.2%, with no restenosis observed on serial follow-up [1]. From the preoperative baseline to final follow-up, the mean Visual Analog Scale, or VAS (V-A-S) scores decreased from 2.6 to 0.9 for neck pain [2], and significantly from 3.2 to 1.1 for arm pain [3].
 - 4.1.1. LAB MEDIA: Table 2. *Video Editor: Please emphasize the values in the column "Preoperative" and "12-month Postoperative" in the row labelled "Percent Canal Stenosis"*
 - 4.1.2. LAB MEDIA: Table 2. *Video Editor: Please emphasize the values in the column "Preoperative" and "12-month Postoperative" in the row labelled "VAS Neck"*
 - 4.1.3. LAB MEDIA: Table 2. *Video Editor: Please emphasize the values in the column "Preoperative" and "12-month Postoperative" in the row labelled "VAS Arm"*
 - 4.2. The mean Nurick myelopathy grade decreased significantly from 1.9 to 0.5 [1] and the Modified Japanese Orthopaedic Association, or mJOA (M-J-O-A) scores increased from 14 to 15.7, indicating improved neurological function from preoperative baseline to final follow-up [2].
 - 4.2.1. LAB MEDIA: Table 2. *Video Editor: Please emphasize the values in the column "Preoperative" and "12-month Postoperative" in the row labelled "Nurick myelopathy"*
 - 4.2.2. LAB MEDIA: Table 2. *Video Editor: Please emphasize the values in the column "Preoperative" and "12-month Postoperative" in the row labelled "mJOA"*
1. Anesthetized
Pronunciation link: <https://www.merriam-webster.com/dictionary/anesthetized>
IPA: /əˈnesθəˌtaɪzd/
Phonetic Spelling: uh·NES·thuh·tyzd
 2. Prone
Pronunciation link: <https://www.merriam-webster.com/dictionary/prone>
IPA: /proʊn/
Phonetic Spelling: prohn
 3. Radiolucent
Pronunciation link: <https://www.merriam-webster.com/dictionary/radiolucent>

IPA: /ˌreɪdiəʊˈluːsənt/

Phonetic Spelling: ray·dee·oh·LOO·suhnt

4. Cervical

Pronunciation link: <https://www.merriam-webster.com/dictionary/cervical>

IPA: /ˈsɜːvɪkəl/

Phonetic Spelling: SUR·vih·kuhl

5. Iodine

Pronunciation link: <https://www.merriam-webster.com/dictionary/iodine>

IPA: /ˈaɪəˌdaɪn/

Phonetic Spelling: EYE·uh·dyne

6. Isopropyl

Pronunciation link: <https://www.merriam-webster.com/dictionary/isopropyl>

IPA: /ˌaɪsoʊˈproʊpəl/

Phonetic Spelling: eye·soh·PROH·puhl

7. Endoscope

Pronunciation link: <https://www.merriam-webster.com/dictionary/endoscope>

IPA: /ˈendəˌskoʊp/

Phonetic Spelling: EN·duh·skohp

8. Fluoroscopic

Pronunciation link: <https://www.merriam-webster.com/dictionary/fluoroscopic>

IPA: /ˌflɒrəˈskaːpɪk/

Phonetic Spelling: floor·uh·SKAH·pik

9. Anteroposterior

Pronunciation link: <https://www.merriam-webster.com/medical/anteroposterior>

IPA: /ˌæntərəʊpəˈstɪriər/, /ˌæntərəʊpəʊˈstɪriər/

Phonetic Spelling: an·tuh·roh·pah·STEER·ee·ur, an·tuh·roh·poh·STEER·ee·ur

10. Interlaminar

Pronunciation link: <https://www.merriam-webster.com/dictionary/interlaminar>

IPA: /ˌɪntərˈlæmənər/

Phonetic Spelling: in·tur·LAM·uh·nur

11. Facet

Pronunciation link: <https://www.merriam-webster.com/dictionary/facet>

IPA: /ˈfæsət/

Phonetic Spelling: FASS·uht

12. Longitudinal

Pronunciation link: <https://www.merriam-webster.com/dictionary/longitudinal>

IPA: /ˌlɒːndʒəˈtuːdənəl/, /ˌlɒːndʒəˈtʃuːdənəl/

Phonetic Spelling: lon·juh·TOO·duh·nuhl, lon·juh·TYOO·duh·nuhl

13. Decompression

Pronunciation link: <https://www.merriam-webster.com/dictionary/decompression>

IPA: /ˌdiːkəmˈpreʃən/

Phonetic Spelling: dee·kuhm·PRESH·uhn

14. Cranio-caudal

Pronunciation link: No confirmed link found

- IPA: /ˌkreɪniəʊˈkɑːdəl/
Phonetic Spelling: cray·nee·oh·KAW·duhl
15. Obturator
Pronunciation link: <https://www.merriam-webster.com/dictionary/obturator>
IPA: /ˈɑːbtəˈreɪtər/
Phonetic Spelling: OB·tuh·ray·tur
16. Fluoroscopy
Pronunciation link: <https://www.merriam-webster.com/dictionary/fluoroscopy>
IPA: /flʊˈrɑːskəpi/
Phonetic Spelling: floor·AH·skuh·pee
17. Laminectomy
Pronunciation link: <https://www.merriam-webster.com/dictionary/laminectomy>
IPA: /ˌlæməˈnektəmi/
Phonetic Spelling: lam·uh·NEK·tuh·mee
18. Radiofrequency
Pronunciation link: <https://www.merriam-webster.com/dictionary/radiofrequency>
IPA: /ˌreɪdiəʊˈfriːkwənsi/
Phonetic Spelling: ray·dee·oh·FREE·kwuhn·see
19. Ablation
Pronunciation link: <https://www.merriam-webster.com/dictionary/ablation>
IPA: /əˈbleɪʃən/
Phonetic Spelling: uh·BLAY·shuhn
20. Articular
Pronunciation link: <https://www.merriam-webster.com/dictionary/articular>
IPA: /ɑːrˈtɪkjələr/
Phonetic Spelling: ar·TIK·yuh·lur
21. Lamina
Pronunciation link: <https://www.merriam-webster.com/dictionary/lamina>
IPA: /ˈlæməni/
Phonetic Spelling: LAM·uh·nuh
22. Ligamentum flavum
Pronunciation link: No confirmed link found
IPA: /lɪɡəˈmentəm ˈflɛvəm/
Phonetic Spelling: lig·uh·MEN·tuhm FLAY·vuhm
23. Raphe
Pronunciation link: <https://www.merriam-webster.com/dictionary/raphe>
IPA: /ˈreɪfi/
Phonetic Spelling: RAY·fee
24. Contralateral
Pronunciation link: <https://www.merriam-webster.com/dictionary/contralateral>
IPA: /ˌkɑːntɹəˈlætərəl/
Phonetic Spelling: kon·truh·LAT·uh·ruhl
25. Recess
Pronunciation link: <https://www.merriam-webster.com/dictionary/recess>

- IPA: /'riː.ses/, /rɪˈses/
Phonetic Spelling: REE·sess, rih·SESS
26. En bloc
Pronunciation link: <https://www.merriam-webster.com/dictionary/en%20bloc>
IPA: /ɑːnˈblɑːk/
Phonetic Spelling: ahn·BLAHK
27. Dura mater
Pronunciation link: <https://www.merriam-webster.com/dictionary/dura%20mater>
IPA: /'dʊərəˈmeɪtər/, /'djʊərəˈmeɪtər/
Phonetic Spelling: DUR·uh·MAY·tur, DYOOOR·uh·MAY·tur
28. Coagulation
Pronunciation link: <https://www.merriam-webster.com/dictionary/coagulation>
IPA: /koʊˌæɡjəˈleɪʃən/
Phonetic Spelling: koh·ag·yuh·LAY·shuhn
29. Gelatin
Pronunciation link: <https://www.merriam-webster.com/dictionary/gelatin>
IPA: /ˈdʒelətən/
Phonetic Spelling: JEL·uh·tuhn
30. Thrombin
Pronunciation link: <https://www.merriam-webster.com/dictionary/thrombin>
IPA: /'θrɑːmbɪn/
Phonetic Spelling: THROM·bin
31. Hemostatic
Pronunciation link: <https://www.merriam-webster.com/dictionary/hemostatic>
IPA: /ˌhiːməˈstætɪk/
Phonetic Spelling: hee·muh·STAT·ik
32. Hemostasis
Pronunciation link: <https://www.merriam-webster.com/dictionary/hemostasis>
IPA: /ˌhiːməˈsteɪsɪs/
Phonetic Spelling: hee·muh·STAY·suhs
33. Catheter
Pronunciation link: <https://www.merriam-webster.com/dictionary/catheter>
IPA: /'kæθətər/
Phonetic Spelling: KATH·uh·tur
34. Subcutaneous
Pronunciation link: <https://www.merriam-webster.com/dictionary/subcutaneous>
IPA: /ˌsʌbkjəˈteɪniəs/
Phonetic Spelling: sub·kyuh·TAY·nee·uhs
35. Postoperative
Pronunciation link: <https://www.merriam-webster.com/dictionary/postoperative>
IPA: /ˌpoʊstˈɑːpərətɪv/
Phonetic Spelling: post·OP·uh·ruh·tiv
36. Uniportal
Pronunciation link: No confirmed link found

IPA: /ˌjuːnɪˈpɔːrtəl/

Phonetic Spelling: yoo·nih·POR·tuhl

37. Stenosis

Pronunciation link: <https://www.merriam-webster.com/dictionary/stenosis>

IPA: /stəˈnoʊsɪs/

Phonetic Spelling: stuh·NOH·suhs

38. Restenosis

Pronunciation link: No confirmed link found

IPA: /ˌriːstəˈnoʊsɪs/

Phonetic Spelling: ree·stuh·NOH·suhs

39. Preoperative

Pronunciation link: <https://www.merriam-webster.com/dictionary/preoperative>

IPA: /ˌpriːˈɑːpərətɪv/

Phonetic Spelling: pree·OP·uh·ruh·tiv

40. Myelopathy

Pronunciation link: <https://www.merriam-webster.com/dictionary/myelopathy>

IPA: /ˌmaɪəˈlɑːpəθi/

Phonetic Spelling: my·uh·LAH·puh·thee

41. Orthopaedic

Pronunciation link: <https://www.merriam-webster.com/dictionary/orthopedic>

IPA: /ˌɔːrθəˈpiːdɪk/

Phonetic Spelling: or·thuh·PEE·dik

42. Neurological

Pronunciation link: <https://www.merriam-webster.com/dictionary/neurological>

IPA: /ˌnɒrəˈlɑːdʒɪkəl/, /ˌnjɒrəˈlɑːdʒɪkəl/

Phonetic Spelling: nur·uh·LAH·jih·kuhl, nyur·uh·LAH·jih·kuhl