



**THE PITTSBURGH COURSE:
COMPREHENSIVE ENDOSCOPIC ENDONASAL
SURGERY OF THE SKULL BASE**

Pittsburgh, Pennsylvania

~ November 3-6, 2024 ~



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*Sponsored by:
University of Pittsburgh School of Medicine
Department of Neurological Surgery
Department of Otolaryngology
Center for Continuing Education in the Health Sciences*

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GENERAL INFORMATION

Course Overview

This 4-day course is a presentation of minimally invasive techniques for endoscopic endonasal surgery of the ventral skull base. Experts on the subject will present the anatomical and technical aspects of this procedure along with the risks, benefits and outcomes.

The course features an interactive live surgery demonstration using indocyanine green fluorescence endoscopy, fresh anatomical specimen dissection, lectures and panel discussions, 3D anatomy lectures, and case presentations. Participants will have an opportunity to enhance their knowledge and skills regarding endoscopic surgery of the ventral skull base.

Learning Objectives

At the conclusion of this course, participants should be able to:

- Describe the anatomic relationships between the ventral skull base, paranasal sinuses and orbit.
- Understand the indications, benefits and risks associated with endoscopic endonasal skull base surgery.
- Utilize endoscopic techniques to approach tumors in the anterior, middle and cranial fossae.

Target Audience

This course is designed for skull base teams (neurosurgeons, otolaryngologists, head and neck surgeons) and senior level residents who wish to learn and practice the technical skills needed to perform comprehensive endoscopic endonasal surgery of the ventral skull base.

Location (unless otherwise noted)

Lecture Room: UPMC Eye & Ear Institute Building/Biomedical Science Tower
203 Lothrop Street, 1st Floor, Room S-120

Lab: University of Pittsburgh School of Medicine Anatomy Lab
Scaife Hall West Wing: 7th Floor, Room 7788
3550 Terrace Street

Continuing Medical Education Credit

In support of improving patient care, the University of Pittsburgh is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

The University of Pittsburgh designates this live activity for a maximum of 31.25 *AMA PRA Category 1 Credits*[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Other health care professionals will receive a certificate of attendance confirming the number of contact hours commensurate with the extent of participation in this activity.

To apply for CME credit:

The UPMC Center for Continuing Education in the Health Sciences (CCEHS) Continuing Education Learning Portal (<https://cce.upmc.com>) is used to claim and track your continuing education credits. Certificates will be available to download and stored for future reference.

If you are a new user, click [Register](#) (upper right corner) to create an account. **The email address you listed on your registration form should be the same email you use when creating your account.** If you choose a different email, please notify the UPMC Center for Continuing Education by emailing ccehs_support@upmc.edu or <https://cce.upmc.com/contact-us> to update your records. Once your account has been created, return to login, complete the course evaluation and claim credit on the [CCEHS Learning Portal](#), <https://cce.upmc.com>. The activity is accessible in your [Pending Activities](#). Please allow up to 2 days before accessing.

Questions or problems? Please contact the UPMC Center for Continuing Education by emailing ccehs_support@upmc.edu or <https://cce.upmc.com/contact-us>

Audio/Video Recording and Photography Policy

The use of audio/video recording or photographic devices is **NOT** permitted at any time in the lecture room, anatomy lab or hospital.

Wi-Fi Network

Complimentary Wi-Fi is available. To connect:

1. View available wireless networks.
2. Connect to “**upmc-guest**”
3. Open your Web Browser, begin surfing!

Disclaimer Statement

The information presented at this CME program represents the views and opinions of the individual presenters, and does not constitute the opinion or endorsement of, or promotion by, the UPMC Center for Continuing Education in the Health Sciences, UPMC / University of Pittsburgh Medical Center or Affiliates and University of Pittsburgh School of Medicine. Reasonable efforts have been taken intending for educational subject matter to be presented in a balanced, unbiased fashion and in compliance with regulatory requirements. However, each program attendee must always use his/her own personal and professional judgment when considering further application of this information, particularly as it may relate to patient diagnostic or treatment decisions including, without limitation, FDA-approved uses and any off-label uses.

ACKNOWLEDGEMENT OF SUPPORT

We gratefully acknowledge educational grant support for this course from the following companies:

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We gratefully acknowledge in kind support for this course from the following companies:

Apex Medical, Inc.	NICO Corporation
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Ivo Petoe, MD

*Fellow, Center for Cranial Base Surgery
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SUNDAY, NOVEMBER 3, 2024

- 7:15 AM **REGISTRATION & BREAKFAST**
- 7:30 AM **Let's Get Started: Classification and Training (including lab training)**
Carl Snyderman, MD, MBA
- 7:55 AM **Navigating the Nose and Sinuses: Getting to the Skull Base**
Garret Choby, MD
- 8:20 AM **If All Starts at the Sella: Endoscopic Pituitary Surgery**
Paul Gardner, MD
- 9:05 AM ***ALL Transfer from Lecture Room to Lab***
- 9:15 AM **Prosection for Lab Session 1 – Pituitary Surgery**
Erin McKean, MD, MBA and L. Madison Michael, II, MD
- 10:15 AM **Lab Session 1**

<p><u>Group A:</u></p> <p>Anatomical Dissection</p> <ul style="list-style-type: none"> • Intranasal Landmarks • Middle Turbinates • Septal Mucosal Flap • Sphenoidotomy • Sella • Posterior Ethmoidectomy • Suprasellar/Transplanum Approach • Reconstruction: Inlay Biodesign, Overlay with Nasoseptal Flap 	<p><u>Group B:</u></p> <p>Prosection for Lab Sessions 3&4: Sagittal Plane</p> <p><i>After Prosection, transfer from Lab to Lecture Room for:</i></p> <p>3D Surgical Anatomy Lectures Georgios Zenonos, MD</p> <ul style="list-style-type: none"> • Anterior Skull Base • Sinonasal, Sellar and Parasellar Regions
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- 12:45 PM ***GROUP A: Transfer from Lab to Lecture Room***
- 1:00 PM **LUNCH & LECTURE**
Tools for Success: Equipment, Instruments and Set-Up for Endonasal Surgery
Eric Wang, MD
- 1:30 PM **Plumbing Problems Big and Small: Reconstruction of Skull Base Defects**
Carl Snyderman, MD, MBA
- 2:05 PM **Up and Away: Transtuberculum and Transplanum Approaches**
Paul Gardner, MD

SUNDAY, NOVEMBER 3, 2024 (CONTINUED)

3:00 PM ***GROUP B: Transfer from Lecture Room to Lab*** (take belongings with you)

3:15 PM Lab Session 2

<p><i>Group A:</i></p> <p>3D Surgical Anatomy Lectures Georgios Zenonos, MD</p> <ul style="list-style-type: none"> • Anterior Skull Base • Sinonasal, Sellar and Parasellar Regions <p><i>After Lectures, transfer from Lecture Room</i> (take belongings with you) <i>to Lab for:</i></p> <p>Prosection for Lab Sessions 3&4: Sagittal Plane</p>	<p><i>Group B:</i></p> <p>Anatomical Dissection</p> <ul style="list-style-type: none"> • Intranasal Landmarks • Middle Turbinates • Septal Mucosal Flap • Sphenoidotomy • Sella • Posterior Ethmoidectomy • Suprasellar/Transplanum Approach • Reconstruction: Inlay Biodesign, Overlay with Nasoseptal Flap
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5:45 PM ADJOURNMENT

EVENING AT LEISURE (For complete information about events, shopping areas, or restaurants in or near Oakland, please feel free to visit the following websites (<http://www.pittsburghmagazine.com> or <http://www.visitpittsburgh.com/>) or feel free to ask us for recommendations!)

MONDAY, NOVEMBER 4, 2024

- 7:00 AM **BREAKFAST**
- 7:15 AM **The New Workhorses: Transclival, Transodontoid Approaches**
Paul Gardner, MD
- 8:00 AM **Case Presentations & Live Surgery**
Garret Choby, MD, Paul Gardner, MD, Carl Snyderman, MD, MBA, Eric Wang, MD, Georgios Zenonos, MD
Moderator
Erin McKean, MD, MBA and L. Madison Michael, II, MD
- 12:00 PM **LUNCH**
- 1:00 PM ***ALL Transfer from Lecture Room to Lab***
- 1:15 PM **Lab Session 3**

<p><u><i>Group A:</i></u> Prosection for Lab Sessions 5 & 6: Sagittal Plane <i>After Prosection, transfer from Lab to Lecture Room for:</i> Craniofacial Resection for Sinonasal Malignancy and Meningioma Eric Wang, MD Challenges and Considerations of Pediatric Endonasal Surgery Michael McDowell, MD</p>	<p><u><i>Group B:</i></u> Anatomical Dissection</p> <ul style="list-style-type: none"> • Anterior Ethmoidectomy • Medial Orbital Decompression • Optic Nerve Decompression • Ethmoid Artery Ligation • Frontal Sinusotomy (Draf 3 Procedure) • Craniofacial Resection
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- 3:00 PM ***GROUP B: Transfer from Lab to Lecture Room***
- 3:15 PM **PANEL DISCUSSION: Behind the Scenes – Perioperative Care**
Moderator: Garret Choby, MD
Panelists: All Faculty

MONDAY, NOVEMBER 4, 2024 (CONTINUED)

3:45 PM ***GROUP A: Transfer from Lecture Room to Lab*** (take belongings with you)

GROUP B:

Lecture – Craniofacial Resection for Sinonasal Malignancy and Meningioma

Eric Wang, MD

Lecture – Challenges and Considerations of Pediatric Endonasal Surgery

Michael McDowell, MD

4:00 PM Lab Session 4

<p><i>Group A:</i> Anatomical Dissection</p> <ul style="list-style-type: none"> • Anterior Ethmoidectomy • Medial Orbital Decompression • Optic Nerve Decompression • Ethmoid Artery Ligation • Frontal Sinusotomy (Draf 3 Procedure) • Craniofacial Resection 	<p><i>Group B:</i> <i>After Lecture, transfer from Lecture Room</i> (take belongings with you) <i>to Lab for:</i> Prosection for Lab Sessions 5 & 6: Sagittal Plane</p>
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5:45 PM AFTERNOON PROGRAM ADJOURNMENT

EVENING PROGRAM (*Registrants Only Please*)

LOCATION: Courtyard by Marriott
Schenley Ballrooms I-IV
100 Lytton Avenue
Pittsburgh (Oakland) PA 15213

6:30 PM Cocktail Reception

7:00 PM Dinner & Guest Faculty Lectures

7:30 PM Teaching Tips for Endoscopic Skull Base Surgery
Erin McKean, MD, MBA

8:00 PM Legacy and Cranial Base Surgery
L. Madison Michael, II, MD

8:45 PM ADJOURNMENT

TUESDAY, NOVEMBER 5, 2024

- 7:30 AM BREAKFAST
- 7:45 AM Transpterygoid Approach: Gateway to the Coronal Plane
Eric Wang, MD
- 8:15 AM ***GROUP A: Transfer from Lecture Room to Lab***
- GROUP B: 3D Surgical Anatomy Lecture – Posterior Skull Base
Georgios Zenonos, MD
- 8:30 AM Lab Session 5

<p><u>Group A:</u></p> <p>Anatomical Dissection</p> <ul style="list-style-type: none"> • Palatosphenoidal Artery and Vidian Nerve Identification • Pituitary Transposition • Transclival Approach (Extradural/Intradural) • Transodontoid Approach • Medial Transpetrous Approach • Cavernous Sinus Approaches 	<p><u>Group B:</u></p> <p><i>After Lecture, transfer from Lecture Room to Lab for:</i></p> <p>Prosection: Orbital Approaches S. Tonya Stefko, MD</p> <p>Prosection for Lab Sessions 7 & 8: Coronal Plane</p> <p>Equipment Demonstrations</p>
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- 12:00 PM ***ALL TRANSFER FROM LAB TO LECTURE ROOM***
- 12:15 PM Group Photo
- 12:25 PM LUNCH & LECTURE
Outside the Box: Coronal Plane Approaches
Paul Gardner, MD
- 1:10 PM GROUP A: 3D Surgical Anatomy Lecture – Posterior Skull Base
Georgios Zenonos, MD
- GROUP B: Transfer from Lecture Room to Lab*** (take belongings with you)

TUESDAY, NOVEMBER 5, 2024 (CONTINUED)

1:25 PM Lab Session 6

<p><i>Group A:</i> <i>After Lecture, transfer from Lecture Room</i> (take belongings with you) <i>to Lab for:</i> Prosection: Orbital Approaches S. Tonya Stefko, MD Prosection for Lab Sessions 7 & 8: Coronal Plane Equipment Demonstrations</p>	<p><i>Group B:</i> Anatomical Dissection</p> <ul style="list-style-type: none"> • Palatosphenoidal Artery and Vidian Nerve Identification • Pituitary Transposition • Transclival Approach (Extradural/Intradural) • Transodontoid Approach • Medial Transpetrous Approach • Cavernous Sinus Approaches
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4:55 PM ADJOURNMENT

6:10 PM Transportation Departs Courtyard by Marriott Hotel for Course Banquet

6:30 PM Course Banquet
(Registrants Only Please)

LOCATION: **Monterey Bay Fish Grotto**
Skyline Room
 1411 Grandview Avenue
 Mount Washington
<https://www.montereybayfishgrotto.com/>

9:30 PM Transportation Departs Course Banquet for Courtyard by Marriott Hotel

WEDNESDAY, NOVEMBER 6, 2024

8:00 AM BREAKFAST

8:15 AM PANEL DISCUSSION
 Putting it all Together: Case-Based Discussion and Q&A
 Moderator: Erin McKean, MD, MBA and L. Madison Michael, II, MD
 Panelists: All Faculty
**** Attendees are encouraged to bring cases for discussion ****

9:15 AM ***GROUP A: Transfer from Lecture Room to Lab***

GROUP B: 3D Surgical Anatomy Lecture – Cavernous Sinus and Middle Fossa
 Georgios Zenonos, MD

9:30 AM Lab Session 7

<p><i>Group A:</i></p> <p>Anatomical Dissection</p> <ul style="list-style-type: none"> • Antrostomy • Sphenopalatine Artery Ligation • Middle Cranial Fossa Approaches: Transpterygoid • Cavernous Sinus • Meckel's Cave • Infratemporal Skull Base 	<p><i>Group B:</i></p> <p><i>After Lecture, transfer from Lecture Room to Lab for:</i></p> <p>Prosection: Alternative Reconstructive Flaps: Pericranial Flap, Inferior Turbinate Wall Flap</p> <p>Equipment Demonstrations</p>
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11:30 AM ***ALL TRANSFER FROM LAB TO LECTURE ROOM***

11:45 AM LUNCH & LECTURE
 Code Red: Carotid Artery Injury
 Paul Gardner, MD

12:45 PM GROUP A: 3D Surgical Anatomy Lecture – Cavernous Sinus and Middle Fossa
 Georgios Zenonos, MD

GROUP B: Transfer from Lecture Room to Lab (take belongings with you)

WEDNESDAY, NOVEMBER 6, 2024 (CONTINUED)

1:00 PM Lab Session 8

<p><u>Group A:</u> <i>After Lecture, transfer from Lecture Room</i> (take belongings with you) <i>to Lab for:</i> Prosection: Alternative Reconstructive Flaps: Pericranial Flap, Inferior Turbinate Wall Flap Equipment Demonstrations</p>	<p><u>Group B:</u> Anatomical Dissection</p> <ul style="list-style-type: none"> • Antrostomy • Sphenopalatine Artery Ligation • Middle Cranial Fossa Approaches: Transpterygoid • Cavernous Sinus • Meckel's Cave • Infratemporal Skull Base
<p>3:00 PM Disaster Plan: ICA Injury Simulation Exercise Paul Gardner, MD</p>	

3:15 PM COURSE ADJOURNMENT

ANATOMICAL DISSECTION SCHEDULE

Sunday, November 3, 2024: Lab Sessions 1 & 2

1. **Intraoperative navigational device.** Familiarize yourself with the function of the image guidance system.
2. Identify the following **intranasal landmarks**: inferior turbinate, middle turbinate, superior turbinate, middle meatus, hiatus semilunaris, uncinate process, bulla ethmoidalis, sphenoid rostrum, sphenoid ostium, olfactory sulcus.
3. Resect the **middle turbinates**.
4. Elevate a **septal mucosal flap** on one side. It should be pedicled on the ipsilateral posterior nasal artery. Displace the flap into the nasopharynx during the other procedures.
5. **Endonasal approaches for pituitary surgery.** Transect the posterior nasal septum and expose the sphenoid rostrum. Remove rostrum and open sphenoid air cells. Enlarge the opening maximally in all directions. Resect the posterior edge of the nasal septum to enhance bilateral exposure. Identify sphenoid sinus landmarks: planum sphenoidale, optic canal, lateral optic-carotid recess, carotid canal, medial optic-carotid recess, sella, clival recess. Remove sphenoid septations and note relationship to carotid canal.
6. **Pituitary.** Open the sella to the margins of the cavernous sinus in all directions. Remove sphenoid rostrum inferiorly and note how it improves access to the sella.
7. **Posterior ethmoidectomy.** Skeletonize the posterior medial orbit and ethmoid roof by removing the posterior ethmoid air cells. Identify the increased visualization and exposure to the sphenoid planum.
8. **Suprasellar/transplanum approach.** Thin and remove the bone of the planum sphenoidale. Thin and remove the bone of the “tuberculum strut” bilaterally. Open the suprasellar dura and identify the optic chiasm, infundibulum, and ICA. Identify the superior hypophyseal artery.

ANATOMICAL DISSECTION SCHEDULE

Monday, November 4, 2024: Lab Sessions 3 & 4

1. **Anterior ethmoidectomy.** Open the bulla ethmoidalis and remove anterior ethmoid air cells in an anterior to posterior direction. Identify the lamina papyracea. Expose the nasofrontal recess and identify the anterior ethmoid artery. Repeat the ethmoidectomy on the opposite side.
2. **Medial orbital decompression.** Make an opening in the lamina papyracea and remove the medial orbital wall from the fovea ethmoidalis superiorly to the orbital floor and as far posteriorly as the anterior wall of the sphenoid sinus.
3. **Optic nerve decompression.** Decompress the orbital apex and follow the optic canal posteriorly. Use the drill to thin the bone over the optic nerve without exposing the carotid artery.
4. **Anterior and posterior ethmoid artery ligation.** Elevate the periorbita along the skull base and identify the anterior and posterior ethmoid arteries.
5. **Frontal sinusotomy (Draf procedure).** Perform a Draf Type 3 procedure. Resect the anterior nasal septum superiorly, anterior to the middle turbinates. Remove the floor of the frontal sinuses across the midline and anterior to the crista galli.
6. **Anterior craniofacial resection.** Resect the superior attachment of the nasal septum from the crista galli to the sphenoid. Resect attachments of middle turbinates. Thin and remove bone of anterior cranial base from ethmoid roof laterally and to planum sphenoidale posteriorly. Drill out crista galli. Incise dura bilaterally and then transect falx attachment anteriorly. Reflect dura posteriorly and identify olfactory bulbs. Elevate olfactory tracts and transect nerves posteriorly. Identify the interhemispheric fissures, frontopolar vessels, and anterior communicating artery.

ANATOMICAL DISSECTION SCHEDULE

Tuesday, November 5, 2024: Lab Sessions 5 & 6

1. **Palatosphenoidal artery and vidian nerve identification.** At the floor of the sphenoid sinus, identify the palatosphenoidal artery as it exits the pterygopalatine fossa and enters the nasopharynx. The vertical process of the palatine bone covering the palatosphenoidal artery should be removed. At this level, dissect laterally until you identify the vidian canal.
2. **Pituitary transposition.** Lift up the pituitary gland and drill out the posterior clinoids.
3. **Transclival approach (extradural).** Remove the bone of the clivus to expose the dura from the sella to the lower clivus.
4. **Transclival approach (intradural).** Open the dura to expose the vertebral and basilar arteries.
5. **Transodontoid approach.** Remove the soft tissues between the Eustachian tubes to the level of the soft palate. Remove cortical bone of the clivus from the sphenoid floor to the foramen magnum. Remove the lower edge of the clivus (foramen magnum). Expose the ring of C1 and remove the central portion. Drill out the dens down to the level of the body of C2.
6. **Reconstruction with mucosal flap.** Position mucosal flap in different areas of the skull base to see limits of reach and surface area of reconstruction.
7. **Medial petrous apex.** Drill the bone medial and deep to the ICA at the level of the clival recess. Open air cells of the petrous apex. Identify the course of the 6th cranial nerve.

ANATOMICAL DISSECTION SCHEDULE

Wednesday, November 6, 2024: Lab Sessions 7 & 8

1. Perform a middle meatal **antroostomy** on each side. Remove the uncinate process and enlarge the opening posteriorly and inferiorly. Make sure that you preserve the sphenopalatine arteries.
2. **Sphenopalatine artery ligation.** Expose the sphenopalatine and posterior nasal arteries and transect them.
3. **Transpterygoid approach.** Transect the sphenopalatine and posterior nasal arteries and open the pterygopalatine space. Elevate the soft tissue to expose the bone of the base of the pterygoids. Identify the vidian artery and nerve.
4. Exposure of **petrous ICA.** Drill the bone inferior and medial to the vidian artery and follow the vidian artery to the 2nd genu of the internal carotid artery.
5. **Middle cranial fossa approach (suprapetrous).** Identify V2 and drill the bone between V2 and the vidian artery to expose the petrous ICA. Open Meckel's cave lateral to the vertical segment of the ICA.
6. **Lateral cavernous sinus.** Dissect superior to Meckel's cave, lateral to the ICA. Identify the contents of the cavernous sinus.
7. **Infratemporal skull base.** Identify the medial and lateral pterygoid plates inferior to the base of the pterygoids. Follow the lateral pterygoid plate to foramen ovale and identify V3. Resect the medial portion of the Eustachian tube. Open the space between the pterygoid plates and dissect the medial and lateral pterygoid muscles. Follow the Eustachian tube along the skull base and identify the ICA where it enters the skull base.
8. **Infrapetrous approach.** Transect V3 and drill the bone along the inferior aspect of the petrous bone to expose the petrous ICA.
9. **[your name here] approach.** Discover a new approach to the cranial base and put your name on it.

DISCLOSURES

All individuals in a position to control the content of this education activity have disclosed all financial relationships with any companies whose primary business is producing, marketing, selling, re-selling, or distributing health care products used by or on patients. All the relevant financial relationships for the individuals listed below have been mitigated.

The following relevant financial relationships were disclosed:

Paul A. Gardner, MD

Mizuho	Consultant
Peter Lazic US, Inc.	Consultant
Renerva	Ownership Interest
SPIWay, LLC	Consultant
Stryker Instruments	Consultant
Sutter Medizintechnik GMBH	Consultant

Michael M. McDowell, MD

Astria Biosciences	Stockholder (privately held)
Dendritic Health AI	Ownership Interest
LICA-Tech	Consultant

Erin L. McKean, MD

Stryker	Consultant
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Carl H. Snyderman, MD, MBA

Respair, Inc.	Ownership Interest
SPIWay, LLC	Consultant

Georgios A. Zenonos, MD

Recursion Pharmaceuticals, Inc.	Grant/Research Support
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No other members of the planning committee, speakers, presenters, authors, content reviewers and/or anyone else in a position to control the content of this education activity have relevant financial relationships with any companies whose primary business is producing, marketing, selling, re-selling, or distributing health care products used by or on patients.

RECENT PUBLICATIONS

Peer-Reviewed (from 2020-present)

1. Rowan NR, Valappil B, Chen J, Wang EW, Gardner PA, Snyderman CH. Prospective characterization of postoperative nasal deformities in patients undergoing endoscopic endonasal skull-base surgery. *Int Forum Allergy Rhinol.* 2020 Feb;10:256-264.
2. Goldschmidt E, Schneck M, Gau DM, Carey L, Rasmussen J, Ferreyro B, Ajler P, Snyderman C, Wang E, Fernandez-Miranda J, Gardner PA. Effect of oxidized cellulose on human respiratory mucosa and submucosa and its implications for endoscopic skull-base approaches. *Int Forum Allergy Rhinol.* 2020 Mar;10(3):282-288.
3. McDowell MM, Zenonos G, Wang E, Snyderman C, Gardner P. Management of arterial injuries in endoscopic endonasal approaches. *Neurosurg Focus Video.* 2020 Apr;2(2):V4.
4. Goldschmidt E, Lavigne P, Snyderman C, Gardner PA. Endoscopic endonasal approach for clipping of a PICA aneurysm. *Neurosurg Focus Video.* 2020 Apr;2(2):V14.
5. Cardenas Ruiz-Valdepenas E, Kaen A, Gonzalez-Martinez E, Gardner PA, Wang, EW, Snyderman CH, Fernandez-Miranda JC. Endoscopic endonasal superomedial orbitectomy: how far is safe and possible? *Laryngoscope.* 2020 May;130:1151-1157.
6. Lavigne P, Vega MB, Ahmed OH, Gardner PA, Snyderman CH, Wang EW. Lateral nasal wall flap for endoscopic reconstruction of the skull base: anatomical study and clinical series. *Int Forum Allergy Rhinol.* 2020 May;10(5):673-678.
7. Kashiwazaki R, Turner MT, Geltzeiler M, Fernandez-Miranda JC, Gardner PA, Snyderman CH, Wang EW. The endoscopic endonasal approach for sinonasal and nasopharyngeal adenoid cystic carcinoma. *Laryngoscope.* 2020 Jun;130:1414-1421.
8. Wang WH, Lieber S, Lan MY, Wang EW, Fernandez-Miranda JC, Snyderman CH, Gardner PA. Nasopharyngeal muscle patch for the management of internal carotid artery injury in endoscopic endonasal surgery. *J Neurosurg.* 2020 Nov;133(5):1382-1387.
9. McDowell MM, Zwagerman NT, Wang EW, Snyderman CH, Tyler-Kabara EC, Gardner PA. Long-term outcomes in the treatment of pediatric skull base chordomas in the endoscopic endonasal era. *J Neurosurg Pediatr.* 2020 Nov 20;27(2):170-179.
10. Goldschmidt E, Chabot JD, Algattas H, Lieber S, Khattar N, Nakassa ACI, Angriman F, Snyderman CH, Wang EW, Fernandez-Miranda JC, Gardner PA. Seizure risk following open and expanded endoscopic endonasal approaches for intradural skull base tumors. *J Neurol Surg B Skull Base.* 2020 Dec;81(6):673-679.
11. Algattas H, Setty P, Goldschmidt E, Wang EW, Tyler-Kabara EC, Snyderman CH, Gardner PA. Endoscopic endonasal approach for craniopharyngiomas with intraventricular extension: case series, long-term outcomes and review. *World Neurosurg.* 2020 Dec;144:e447-e459.
12. Snyderman CH, Wang EW, Zenonos GA, Gardner PA. Reconstruction after endoscopic surgery for skull base malignancies. *J Neurooncol.* 2020 Dec;150(3):463-468.

13. Anania Y, Venteicher AS, Wang EW, Zenonos GA, Snyderman CH, Gardner PA. Facing a feared situation: endoscopic endonasal approach for petroclival lesions with internal carotid artery encasement: 2-dimensional operative video. *Oper Neurosurg (Hagerstown)*. 2020 Dec;19(6):E602-E603.
14. Forner D, Hueniken K, Yoannidis T, Witterick I, Monteiro E, Zadeh G, Gullane P, Snyderman C, Wang E, Gardner P, Valappil B, Fliss DM, Ringel B, Gil Z, Na'ara S, Ooi EH, Goldstein DP, Muhanna N, Gentili F, de Almeida JR. Psychometric testing of the Skull Base Inventory health-related quality of life questionnaire in a multi-institutional study of patients undergoing open and endoscopic surgery. *Qual Life Res*. 2021 Jan;30(1):293-301.
15. Snyderman CH, Gardner PA, Wang EW, Fernandez-Miranda JC, Valappil B. Experience with the endoscopic contralateral transmaxillary approach to the petroclival skull base. *Laryngoscope*. 2021 Feb;131(2):294-298.
16. Venteicher AS, McDowell MM, Goldschmidt E, Wang EW, Snyderman CH, Gardner PA. A preoperative risk classifier that predicts tumor progression in patients with cranial base chondrosarcomas. *J Neurosurg*. 2021 Feb;134(2):457-465.
17. Whelan RL, McDowell M, Chou C, Medsinge A, Lee J, Gardner PA, Snyderman CH, Stefko ST, Wang EW. Can ophthalmologic examination predict abducens nerve recovery after endoscopic skull base surgery? *Laryngoscope*. 2021 Mar;131(3):513-517.
18. Senthamarai Siddharthan YP, Bata A, Anetakis K, Crammond DJ, Balzer JR, Snyderman C, Gardner P, Thirumala PD. Role of intraoperative neurophysiologic monitoring in internal carotid artery injury during endoscopic endonasal skull base surgery. *World Neurosurg*. 2021 Apr;148:e43-e57.
19. Algattas HN, Wang EW, Zenonos GA, Snyderman CH, Gardner PA. Endoscopic endonasal surgery for anterior cranial fossa meningiomas. *J Neurosurg Sci*. 2021 Apr;65(2):118-132.
20. Chou CT, Valappil B, Mattos JL, Snyderman CH, Gardner PA, Fernandez-Miranda JC, Wang EW. The effect of nasoseptal flap elevation on post-operative olfaction and sinonasal quality of life: a prospective double-blinded randomized controlled trial. *Am J Rhinol Allergy*. 2021 May;35(3):353-360.
21. Wang EW, Gardner PA, Fraser S, Stefko ST, Fernandez-Miranda JC, Snyderman CH. Reduced tearing with stable quality of life after vidian neurectomy: a prospective controlled trial. *Laryngoscope*. 2021 Jul;131(7):1487-1491.
22. Patel CR, Snyderman CH, Fernandez-Miranda JC, Gardner PA, Wang EW. Mucosal grafting reduces recurrence after endonasal surgery of petrous apex cholesterol granulomas. *Laryngoscope*. 2021 Sept;131(9):E2513-E2517.
23. Setty P, Fernandez-Miranda JC, Wang EW, Snyderman CH, Gardner PA. Residual and recurrent disease following endoscopic endonasal approach as a reflection of anatomic limitation for the resection of midline anterior skull base meningiomas. *Oper Neurosurg (Hagerstown)*. 2021 Sep;21(4):207-216.
24. Velasquez N, Ahmed OH, Lavigne P, Goldschmidt E, Gardner PA, Snyderman CH, Wang EW. Utility of nasal access guides in endoscopic endonasal skull base surgery: assessment of use during cadaveric dissection and workflow analysis in surgery. *J Neurol Surg B Skull Base*. 2021 Oct;82(5):540-546.
25. Champagne PO, Zenonos GA, Wang EW, Snyderman CH, Gardner PA. The rhinopharyngeal flap for reconstruction of lower clival and craniovertebral junction defects. *J Neurosurg*. 2021 Nov;135(5):1319-1327.

26. Kassir ZM, Gardner PA, Wang EW, Zenonos GA, Snyderman CH. Identifying best practices for managing internal carotid artery injury during endoscopic endonasal surgery by consensus of expert opinion. *Am J Rhinol Allergy*. 2021 Nov;35(6):885-894.
27. McDowell MM, Chiang M, Abou-Al-Shaar H, Zenonos GA, Wang EW, Snyderman CH, Gardner PA. Applications of endoscopic endonasal surgery in early childhood: a case series. *Pediatr Neurosurg*. 2021 Nov;56(6):519-528.
28. Beswick DM, Hwang PH, Adappa ND, Le CH, Humphreys IM, Getz AE, Suh JD, Aasen DM, Abuzeid WM, Chang EH, Kaizer AM, Kingdom TT, Kohanski MA, Nabavizadeh SA, Nayak JV, Palmer JN, Patel ZM, Ramakrishnan VR, Snyderman CH, St. John MA, Wild J, Wang EW. Surgical approach is associated with complication rate in sinonasal malignancy: a multi-center study. *Int Forum Allergy Rhinol*. 2021 Dec;11(12):1617-1625.
29. Abdallah HM, Gersey ZC, Muthiah N, McDowell MM, Pearce T, Costacou T, Snyderman CH, Wang EW, Gardner PA, Zenonos GA. An integrated management paradigm for skull base chordoma based on clinical and molecular characteristics. *J Neurol Surg B Skull Base*. 2021 Dec;82(06):601-607.
30. Deng H, McDowell MM, Gersey ZC, Abou-Al-Shaar H, Snyderman CH, Zenonos GA, Lunsford LD, Gardner PA. Esthesioneuroblastoma with recurrent dural metastases: long-term multimodality treatment and considerations. *Surg Neurol Int*. 2021 Dec 8; www.surgicalneurologyint.com.
31. Jackson C, Kong DK, Gersey ZC, Wang EW, Zenonos G, Snyderman CH, Gardner PA. Contact endoscopy as a novel technique for intraoperative identification of normal pituitary gland and adenoma. *Neurosurg Focus Video*. 2022 Jan;6(1):V17.
32. Mangussi-Gomes J, Alves-Belo JT, Truong HQ, Nogueira GF, Wang EW, Fernandez-Miranda JC, Gardner PA, Snyderman CH. Anatomical limits of the endoscopic contralateral transmaxillary approach to the petrous apex and petroclival region. *J Neurol Surg B Skull Base*. 2022 Feb;83(01):44-52.
33. Sun X, Liu Q, Yu H, Wang H, Zhao W, Gu Y, Li H, Zhao K, Song X, Wang D, Fernandez-Miranda JC, Snyderman CH. Transinfratemporal fossa transposition of the temporalis muscle flap for skull base reconstruction after endoscopic expanded nasopharyngectomy: an anatomical study and clinical application. *J Neurol Surg B Skull Base*. 2022 Apr;83(02):159-166.
34. Melachuri S, Melachuri M, Seethala RR, Traylor K, Gardner PA, Snyderman CH. Giant cell lesions of the sinuses and skull base: a case series highlighting surgical management. *Int Forum Allergy Rhinol*. 2022 Jun;12(6):883-885.
35. Abou-Al-Shaar H, Mallela AN, Patel A, Shariff RK, Shin SS, Choi PA, Faraji AH, Fazeli PK, Costacou T, Wang EW, Fernandez-Miranda JC, Snyderman CH, Gardner PA, Zenonos GA. The role of endoscopic endonasal surgery in the management of prolactinomas based on their invasiveness into the cavernous sinus. *Pituitary*. 2022 Jun;25(3):508-519.
36. Eguiluz-Melendez A, Torres-Bayona S, Vega B, Hernandez-Hernandez V, Wang EW, Snyderman CH, Gardner PA. Keyhole endoscopic-assisted transcervical approach to the upper and middle retrostyloid parapharyngeal space: an anatomic feasibility study. *J Neurol Surg B Skull Base* 2022 Jun;83(suppl S2):e126-e134.
37. Mady LJ, Kaffenberger TM, Baddour K, Melder KL, Godse NR, Gardner PA, Snyderman CH, Solari M, Kubik M, Wang EW, Sridharan S. Anatomic considerations of microvascular free tissue transfer in endoscopic endonasal skull base surgery. *J Neurol Surg B Skull Base*. 2022 Jun;83(suppl S2):e143-e151.

38. Torres-Bayona S, Velasquez N, Nakassa A, Eguiluz-Melendez A, Hernandez V, Vega B, Borghei-Razavi H, Miranda-Acosta Y, Wang EW, Snyderman CH, Gardner PA. Risk factors and reconstruction techniques for persistent cerebrospinal fluid leak in patients undergoing endoscopic endonasal approach to the posterior fossa. *J Neurol Surg B Skull Base*. 2022 Jun;83(suppl S2):e318-e323.
39. Liu J, Pinheiro-Neto CD, Yang D, Wang E, Gardner PA, Hirsch BE, Snyderman CH, Fernandez-Miranda JC. Comparison of endoscopic endonasal approach and lateral microsurgical infratemporal fossa approach to the jugular foramen: an anatomical study. *J Neurol Surg B Skull Base*. 2022 Jun;83(suppl S2):e474-e483.
40. Khalafallah AM, Rakovec M, Burapachaisri K, Fung S, Kozachik SL, Valappil B, Abou-Al-Shaar H, Wang EW, Snyderman CH, Zenonos GA, Gardner PA, Baskaya MK, Dornbos III D, Choby G, Kuan EC, Roxbury C, Overdevest JB, Gudis DA, Lee VS, Levy JM, Thamboo A, Schlosser RJ, Huang J, Bettgowda C, London Jr NR, Rowan NR, Wu AW, Mukherjee D. The suprasellar meningioma patient-reported outcome survey: a disease-specific patient-reported outcome measure for resection of suprasellar meningioma. *J Neurosurg*. 2022 Jun;136(6):1551-1559.
41. Lavigne P, Wang EW, Gardner PA, Snyderman CH. From research to clinical practice: long-term impact of randomized clinical trial examining the effect of lumbar drains on cerebrospinal fluid leak rates following endonasal skull base surgery. *J Neurol Surg B Skull Base*. 2022 Aug;83(4):339-342.
42. Fields DP, McDowell MM, Schulien AJ, Algattas H, Abou-Al-Shaar H, Agarwal N, Alan N, Costacou T, Wang EW, Snyderman CH, Gardner PA, Zenonos GA. Low preoperative prealbumin levels are a strong independent predictor of postoperative cerebrospinal fluid leak following endoscopic endonasal skull base surgery. *World Neurosurg*. 2022 Nov;167:e110-e116.
43. Borghei-Razavi H, Eguiluz-Melendez A, Wenping X, Truong HQ, Fernandes-Cabral D, Najera E, Stefko ST, Fernandez-Miranda JC, Gardner PA. Surgical limitations of the microscopic transciliary supraorbital keyhole approach to the anterior and middle skull base. *World Neurosurg*. 2022 Nov;167:e1440-e1447.
44. Saleh S, Sullivan SE, Bellile E, Roxbury C, Das P, Abi Hachem R, Ackall F, Jang D, Celtikci E, Sahin MM, D'Souza G, Evans JJ, Nyquist G, Khalafallah A, Mukherjee D, Rowan NR, Camp S, Choby G, Van Gompel JJ, Ghiam MK, Levine CG, Field M, Adappa N, Locke TB, Rassekh C, Sweis AM, Goyal N, Zacharia B, Wilson MN, Patel S, Gardner PA, Snyderman CH, Wang EW, Glancz LJ, Bagchi A, Dow G, Robertson I, Rangarajan SJ, Michael II LM, McKean EL. Retrospective review of surgical site infections after endoscopic endonasal sellar and parasellar surgery: multicenter quality data from the North American Skull Base Society. *J Neurol Surg B Skull Base*. 2022 Dec;83(6):579-588.
45. McDowell MM, Jacobs RC, Valappil B, Abou-Al-Shaar H, Zenonos GA, Wang EW, Snyderman CH, Gardner PA. Dural sealants do not reduce postoperative cerebrospinal fluid leak after endoscopic endonasal skull base surgery. *J Neurol Surg B Skull Base*. 2022 Dec;83(6):589-593.
46. Champagne PO, Zenonos GA, Wang EW, Snyderman CH, Gardner PA. Endoscopic endonasal anterior clinoidectomy: volumetric assessment and feasibility. *World Neurosurg*. 2022 Dec;168:e269-e277.
47. Palmieri DE, Champagne PO, Valappil B, McDowell M, Gardner PA, Snyderman CH. Risk factors in a pediatric population for postoperative intracranial infection following endoscopic endonasal skull base surgery and the role of antibiotic prophylaxis. *Am J Rhinol Allergy*. 2023 Jan;37(1):13-18.
48. Agrawal N, Gersey ZC, Abou-Al-Shaar H, Gardner PA, Mantica M, Agnihotri S, Mahmud H, Fazeli PK, Zenonos GA. Major genetic motifs in pituitary adenomas: a practical literature update. *World Neurosurg*. 2023 Jan;169:43-50.

49. Champagne PO, Zenonos GA, Wang EW, Snyderman CH, Gardner PA. The evolution of endoscopic endonasal approach for olfactory groove meningiomas. *Operative Neurosurgery*. 2023 Feb;24(2):121-130.
50. Gardner PA, McDowell MM, Orhoro O, Snyderman CH, Gonzalez-Martinez J. A novel sublabial anterior transmaxillary approach for medically refractory mesial temporal lobe epilepsy: a comparative anatomic study. *Operative Neurosurgery*. 2023 Feb;24(2):e92-e103.
51. Khiyami AM, Jokar TO, Abdallah HM, Gardner PA, Zenonos GA, Styker AK, Fazeli PK. Polycystic ovary syndrome preceding the diagnosis of acromegaly: a retrospective study in 97 reproductive-aged women. *Reprod Biol Endocrinol*. 2023 Feb 1;21(1):14.
52. Gonzalez-Martinez JA, Abou-Al-Shaar H, Mallela AN, McDowell MM, Henry L, Fernandes-Cabral DT, Sweat J, Urban A, Fong J, Barot N, Castellano JF, Rajasekaran V, Bagic A, Snyderman CH, Gardner PA. The endoscopic anterior transmaxillary temporal pole approach for mesial temporal lobe epilepsies: a feasibility study. *J Neurosurg*. 2023 Apr; 138(4):992-1001.
53. Khiyami A, Mehrotra N, Venugopal S, Mahmud H, Zenonos GA, Gardner PA, Fazeli PK. IGF-1 is positively associated with BMI in patients with acromegaly. *Pituitary*. 2023 Apr;26(2):221-226.
54. Anstadt EE, Chen W, O'Brien J, Ickow I, Chow I, Bruce MK, Goldstein JA, Branstetter IV BF, Snyderman C, Wang EW, Gardner P, Schuster L. Characterization of the saddle nose deformity following endoscopic endonasal skull base surgery. *J Neurol Surg B Skull Base*. 2023 Jun;84:225-231.
55. Shah S, Durkin J, Byers KE, Snyderman CH, Gardner PA, Shields RK. Microbiologic and clinical description of postoperative central nervous system infection after endoscopic endonasal surgery. *World Neurosurg*. 2023 Jul;175:e434-e438.
56. Hebert AM, Kuan EC, Wang MB, Snyderman CH, Gardner PA, Bergsneider M, Fernandez-Miranda JC, Wang EW. An algorithm for the use of free tissue graft reconstruction in the endoscopic endonasal approach for pituitary tumors. *World Neurosurg*. 2023 Jul;175:e465-e472.
57. Strober WA, Valappil B, Snyderman CH. Impact of reverse septal flap on morbidity of nasoseptal flap reconstruction of skull base defects. *Am J Rhinol Allergy*. 2023 Jul;37(4):470-475.
58. Fong KY, Lim MJR, Fu S, Low CE, Chan YH, Deepak DS, Xu X, Thong M, Jain S, Teo K, Gardner PA, Snyderman CH, Nga VDW, Yeo TT. Postsurgical outcomes of nonfunctioning pituitary adenomas: a patient-level meta-analysis. *Pituitary*. 2023 Aug;26(4):461-473.
59. Choby G, Geltzeiler M, Almeida JP, Champagne P-O, Cetas J, Chan E, Ciporen J, Chaskes MB, Fernandez-Miranda J, Gardner P, Hwang P, Ji KSY, Kalyvas A, Kong KA, McMillan R, Nayak J, O'Byrne J, Patel C, Patel Z, Peris Celda M, Pinheiro-Neto C, Sanusi O, Snyderman C, Thorp BD, Van Gompel JJ, Young SC, Zenonos G, Zwagerman NT, Wang EW. Multicenter survival analysis and application of an olfactory neuroblastoma staging modification incorporating Hyams grade. *JAMA Otolaryngol Head Neck Surg*. 2023 Sep;149(9):837-844.
60. Adams GM, Crammond DJ, Shandal V, Gardner PA, Snyderman CH, Anetakis KM, Balzer JR, Thirumala PD. Minimally invasive extraocular cranial nerve electromyography. *J Neurosurg*. 2023 Sep;139(3):625-632.
61. John L, Smith H, Ilanchezhian M, Lockridge R, Reilly KM, Raygada M, Dombi E, Sandler A, Thomas BJ, Glod J, Miettinen M, Allen T, Sommer J, Levy J, Lozinsky S, Dix D, Bouffet E, MacDonald S, Mukherjee D, Snyderman CH, Rowan NR, Malyapa R, Park DM, Heery C, Gardner PA, Cote GM, Fuller S, Butman JA, Jackson S, Gulley JL, Widemann BC, Wedekind MF. The NIH pediatric/young adult chordoma clinic and natural history study: making advances in a very rare tumor. *Pediatr Blood Cancer*. 2023 Sep;70(9):1-16.

62. Drexler R, Rotermund R, Smith TR, Kilgallon JL, Honegger J, Nasi-Kordhishti I, Gardner PA, Gersey ZC, Abdallah HM, Jane JA, Marino AC, Knappe UJ, Uksul N, Rzaev JA, Galushko EV, Gormolysova EV, Bervitskiy AV, Schroeder HWS, Eordogh M, Losa M, Mortini P, Gerlach R, Azab M, Budohoski KP, Rennert RC, Karsy M, Couldwell WT, Antunes ACM, Westphal M, Ricklefs FL, Flitsch J. Defining benchmark outcomes for transsphenoidal surgery of pituitary adenomas: a multicenter analysis. *Eur J Endocrinol.* 2023 Sep 1;189(3):379-386.
63. Balogun Z, Dharmarajan H, Kanwar A, Gardner PA, Zenonos GA, Snyderman CH, Traylor K, Wang EW. Self-reported olfactory outcomes in transplanum and transtuberculum approaches. *J Neurol Surg B Skull Base.* 2023 Sep 25 [online ahead of print].
64. Patel VA, Polster SP, Abou-Al-Shaar H, Kalmar CL, Zenonos GA, Wang EW, Gardner PA, Snyderman CH. Trigeminal schwannoma: a retrospective analysis of endoscopic endonasal management, treatment outcomes, and neuropathic sequelae. *J Neurol Surg B Skull Base.* 2023 Oct;84(5):444-451.
65. Plute T, Abou-Al-Shaar H, McDowell MM, Mallela AN, Snyderman CH, Gardner PA. Endoscopic endonasal resection of a recurrent prepontine neurenteric cyst: 2-dimensional operative video. *Oper Neurosurg (Hagerstown).* 2023 Oct;25(4):E226.
66. Jafari A, Adappa ND, Anagnos VJ, Campbell RG, Castelnuovo P, Chalian A, Chitguppi C, Dallan I, El Rassi E, Freitag SK, Fernandez-Miranda JC, Ferreira Jr M, Gardner PA, Gudis DA, Harvey RJ, Huang Q, Humphreys IM, Kennedy DW, Lee JYK, Lehmann AE, Locatelli D, McKinney K, Moreau A, Nyquist G, Palmer JN, Prepageran N, Pribitkin EA, Rabinowitz MR, Rosen MR, Sacks R, Sharma D, Snyderman CH, Stefko ST, Stokken JL, Wang EW, Workman AD, Wu AW, Yu JY, Zhang MM, Zhou B, Bleier BS. Orbital resection by intranasal technique (ORBIT): a new classification system for reporting endoscopically resectable primary benign orbital tumors. *Int Forum Allergy Rhinol.* 2023 Oct;13(10):1852-1863.
67. Geltzeiler M, Choby GW, Ji KSY, Mace JC, Almeida JP, de Almeida J, Champagne PO, Chan E, Ciporen JN, Chaskes MB, Cornell S, Drozdowski V, Fernandez-Miranda J, Gardner PA, Hwang PH, Kalyvas A, Kong KA, McMillan RA, Nayek JV, Patel C, Patel ZM, Peris Celda M, Pinheiro-Neto C, Sanusi OR, Snyderman CH, Thorp BD, Van Gompel JJ, Zadeh G, Zenonos G, Zwagerman NT, Wang EW. Radiographic predictors of occult intracranial involvement in olfactory neuroblastoma patients. *Int Forum Allergy Rhinol.* 2023 Oct;13(10):1876-1888.
68. Findlay MC, Drexler R, Khan M, Cole KL, Karbe A, Rotermund R, Ricklefs FL, Flitsch J, Smith TR, Kilgallon JL, Honegger J, Nasi-Kordhishti I, Gardner PA, Gersey ZC, Abdallah HM, Jane JA Jr, Marino AC, Knappe UJ, Uksul N, Rzaev JA, Galushko EV, Gormolysova EV, Bervitskiy AV, Schroeder HWS, Eordogh M, Losa M, Mortini P, Gerlach R, Antunes ACM, Couldwell WT, Budohski KP, Rennert RC, Azab M, Karsy M. A multicenter, propensity score-matched assessment of endoscopic versus microscopic approaches in the management of pituitary adenomas. *Neurosurgery.* 2023 Oct 1;93(4):794-801.
69. Maoz SL, Wang EW, Hwang PH, Choby G, Kuan EC, Fleseriu CM, Chan EP, Adappa ND, Geltzeiler M, Getz AE, Humphreys IM, Le CH, Abuzeid WM, Chang EH, Jafari A, Kingdom TT, Kohanski MA, Lee JK, Nabavizadeh A, Nayak JV, Palmer JN, Patel ZM, Pinheiro-Neto CD, Resnick AC, Smith TL, Snyderman CH, St. John MA, Storm PB, Suh JD, Wang MB, Sim MS, Beswick DM. Long-term quality of life after treatment in sinonasal malignancy: a prospective, multi-center study. *Int Forum Allergy Rhinol.* 2023 Nov;13(11):2030-2042.
70. Wingrove PM, Arani KN, Snyderman CH, Gardner PA, Fernandes Cabral DT, Zenonos GA, Wang EW, Chabot J, Fernandez-Miranda JC, Chang YF, Hughes MA. Association of decreased enhancement of nasoseptal flap on postoperative MRI with risk of complication. *J Neurol Surg B Skull Base.* 2023 Nov 15 [online ahead of print].

71. Chen S, Ulloa R, Soffer J, Alcazar-Felix RJ, Snyderman CH, Gardner PA, Patel VA, Polster SP. Chordoma: a comprehensive systematic review of ongoing clinical trials. *Cancers*. 2023 Dec;15(24):5800.
72. Magill ST, Schwartz TH, Couldwell WT, Gardner PA, Heilman CB, Sen C, Akagami R, Cappabianca P, Prevedello DM, McDermott MW; International Tuberculom Sellae Meningioma Study. International Tuberculom Sellae Meningioma Study: Surgical outcomes and management trends. *Neurosurgery*. 2023 Dec 1;93(6):1259-1270.
73. Magill ST, Schwartz TH, Couldwell WT, Gardner PA, Heilman CB, Sen C, Akagami R, Cappabianca P, Prevedello DM, McDermott MW; International Tuberculom Sellae Meningioma Study. International Tuberculom Sellae Meningioma Study: Preoperative grading scale to predict outcomes and propensity-matched outcomes by endonasal versus transcranial approach. *Neurosurgery*. 2023 Dec;93(6):1271-1284.
74. Findlay MC, Drexler R, Azab M, Karbe A, Rotermund R, Ricklefs FL, Flitsch J, Smith TR, Kilgallon JL, Honegger J, Nasi-Kordhishti I, Gardner PA, Gersey ZC, Abdallah HM, Jane JA Jr, Marino AC, Knappe UJ, Uksul N, Rzaev JA, Bervitskiy AV, Schroeder HWS, Eordogh M, Losa M, Mortini P, Gerlach R, Antunes ACM, Couldwell WT, Budohoski KP, Rennert RC, Karsy M. Crooke cell adenoma confers poorer endocrinological outcomes compared with corticotroph adenoma: results of a multicenter, international analysis. *World Neurosurg*. 2023 Dec;180:e376-e391.
75. Algattas HN, Alattar AA, Gardner PA. Letter to the editor. Craniocervical junction disease management. *J Neurosurg*. 2023 Dec;140(4):1205-1206.
76. Plute T, Bin-Alamer O, Mallela AN, Zenonos GA, Wang EW, Gardner PA, Couldwell WT, Snyderman CH, Abou-Al-Shaar H. A comprehensive analysis of academic attributes of the Presidents of the North American Skull Base Society. *J Neurol Surg B Skull Base*. 2023 Dec 22 [online ahead of print].
77. Mamelak AN, Little AS, Gardner PA, Almeida JP, Recinos P, Soni P, Kshetry VR, Barkhoudarian G, Barkhoudarian G, Kelly DF, Dodd R, Mukherjee D, Gersey ZC, Fukuhara N, Nishioka H, Kim EH, Litre CF, Sina E, Mazer MW, Cui Y, Bonert V. A prospective multi-center observational study of surgical versus non-surgical management for pituitary apoplexy. *J Clin Endocrinol Metab*. 2024 Jan;109(2):e711-725.
78. Hallak H, Rindler R, Dang D, Abou-Al-Shaar H, Carlstrom LP, Singh R, Kanaan I, Link MJ, Gardner PA, Peris-Celda M. Trigeminal neuralgia pain outcomes following microsurgical resection versus stereotactic radiosurgery for petroclival meningiomas: a systematic review and meta-analysis. *J Neurosurg*. 2024 Feb;140(2):420-429.
79. Algattas HN, Alattar AA, Okonkwo DO, Wang EW, Snyderman CH, Hamilton DK, Friedlander RM, Zenonos GA, Gardner PA. A novel classification and management scheme for craniocervical junction disorders with ventral neural element compression. *J Neurosurg*. 2024 Feb;140(2):585-594.
80. Algattas HN, Nayar GM, Snyderman CH, Stefko ST, Al-Bayati AR, Gardner PA. Endoscopic endonasal approach for salvage embolization of indirect carotid-cavernous fistula: 2-dimensional operative video. *Oper Neurosurg (Hagerstown)*. 2024 Feb;26(2):240.
81. Kuan EC, Wang EW, Adappa ND, Beswick DM, London NR Jr, Su SY, Wang MB, Abuzeid WM, Alexiev B, Alt JA, Antognoni P, Alonso-Basanta M, Batra PS, Bhayani M, Bell D, Bernal-Sprekelsen M, Betz CS, Blay JY, Bleier BS, Bonilla-Velez J, Callejas C, Carrau RL, Casiano RR, Castelnuovo P, Chandra RK, Chatzinakis V, Chen SB, Chiu AG, Choby G, Chowdhury NI, Citardi MJ, Cohen MA, Dagan R, Dalfino G, Dallan I, Dassi CS, de Almeida J, Del Tos AP, DelGaudio JM, Ebert CS, El-Sayed IH, Eloy JA, Evans JJ, Fang CH, Farrell NF, Ferrari M, Fischbein N, Folbe A, Fokkens WJ, Fox MG, Lund VJ, Gallia GL, Gardner PA, Geltzeiler M, Georgalas C, Getz AE, Govindaraj S, Gray ST, Grayson JW, Gross BA, Grube JG, Guo R, Ha PK, Halderman

- AA, Hanna EY, Harvey RJ, Hernandez SC, Holtzman AL, Hopkins C, Huang Z, Huang Z, Humphreys IM, Hwang PH, Illoreta AM, Ishii M, Ivan ME, Jafari A, Kennedy DW, Khan M, Kimple AJ, Kingdom TT, Knisely A, Kuo YJ, Lal D, Lamarre ED, Lan MY, Le H, Lechner M, Lee NY, Lee JK, Lee VH, Levine CG, Lin JC, Lin DT, Lobo BC, Locke T, Luong AU, Magliocca KR, Markovic SN, Matnjani G, McKean EL, Meço C, Mendenhall WM, Michel L, Na'ara S, Nicolai P, Nuss DW, Nyquist GG, Oakley GM, Omura K, Orlandi RR, Otori N, Papagiannopoulos P, Patel ZM, Pfister DG, Phan J, Psaltis AJ, Rabinowitz MR, Ramanathan Jr M, Rimmer R, Rosen MR, Sanusi O, Sargi ZB, Schafhausen P, Schlosser RJ, Sedaghat AR, Senior BA, Shrivastava R, Sindwani R, Smith TL, Smith KA, Snyderman CH, Solares CA, Sreenath SB, Stamm A, Stolzel K, Sumer B, Surda P, Tajudeen BA, Thompson LDR, Thorp BD, Tong CCL, Tsang RK, Turner JH, Turri-Zanoni M, Udager AM, van Zele T, VanKoeveering K, Welch KC, Wise SK, Witterick IJ, Won TB, Wong SN, Woodworth BA, Wormald PJ, Yao WC, Yeh CF, Zhou B, Palmer JN. International consensus statement on allergy and rhinology: Sinonasal tumors. *Int Forum Allergy Rhinol*. 2024 Feb;14(2):149-608.
82. Galbiati F, Venugopal S, Abou-Al-Shaar H, Zenonos GA, Gardner PA, Fazeli PK, Mahmud H. Incidence of postoperative hyponatremia after endoscopic endonasal pituitary transposition for skull base pathologies. *Pituitary*. 2024 Feb;27(2):70-76.
83. Grimm DR, Beswick DM, Maoz SL, Wang EW, Choby GW, Kuan EC, Chan EP, Adappa ND, Geltzeiler M, Getz AE, Humphreys IM, Le CH, Abuzeid WM, Chang EH, Jafari A, Kingdom TT, Kohanski MA, Lee JK, Nayak JV, Palmer JN, Patel ZM, Pinheiro-Neto CD, Resnick AC, Sim MS, Smith TL, Snyderman CH, St. John MA, Storm P, Suh JD, Wang MB, Hwang PH. SNOT-22 subdomain outcomes following treatment for sinonasal malignancy: a prospective, multicenter study. *Int Forum Allergy Rhinol*. 2024 Feb 19 [online ahead of print].
84. Abdallah HM, Gersey ZC, Plute T, Remick M, Abou-Al-Shaar H, Fazeli PK, Mahmud H, Lang MJ, Gardner PA, Zenonos GA, Gross BA. Toward optimized and cost-efficient protocols for inferior petrosal sinus sampling in the diagnosis of Cushing disease. *Neurosurgery*. 2024 Mar;94(3):508-514.
85. Tosi U, Jackson C, D'Souza G, Rabinowitz M, Farrell C, Parsel SM, Anand VK, Kacker A, Tabae A, Zenonos GA, Snyderman CH, Wang EW, Evans J, Rosen M, Nyquist G, Gardner PA, Schwartz TH. Endoscopic endonasal repair of encephaloceles of the lateral sphenoid sinus: multi-institution confirmation of a new classification. *J Neurosurg*. 2024 Mar;140(3):705-711.
86. Ali MS, Algattas H, Zenonos GA, Wang EW, Snyderman CH, Gardner PA. Endoscopic endonasal far-medial approach: 2-dimensional operative video. *Oper Neurosurg (Hagerstown)*. 2024 Mar;26(3):346.
87. Coutinho da Silva MB, Hernandez Hernandez V, Gupta P, Lavinsky J, Zenonos GA, Wang EW, Snyderman CH, Gardner PA. Anteromedial petrous (Gardner's) triangle: surgical anatomy and relevance for endoscopic endonasal approach to the petrous apex and petroclival region. *Oper Neurosurg (Hagerstown)*. 2024 Mar;26(3):330-340.
88. Fleseriu CM, Beswick DM, Maoz SL, Hwang PH, Choby GW, Kuan EC, Chan EP, Adappa ND, Geltzeiler M, Getz AE, Humphreys IM, Le CH, Abuzeid WM, Chang EH, Jafari A, Kingdom TT, Kohanski MA, Lee JK, Nabavizadeh SA, Nayak JV, Palmer JN, Patel ZM, Pinheiro-Neto CD, Resnick AC, Smith TL, Snyderman CH, St. John MA, Storm J, Suh JD, Wang MB, Wang EW. Predictive factors for decreased baseline quality of life in patients with sinonasal malignancies. *Int Forum Allergy Rhinol*. 2024 Apr;14(4):775-785.
89. Karampouga M, Terrarosa AK, Patel B, Affolter K, Wang EW, Choby GW, Fu R, Bonhomme GR, Stefko ST, McDowell MM, Snyderman CH, Gardner PA, Zenonos GA. Anterolateral keyhole transorbital routes to the skull base: a comparative anatomical study. *Neurosurg Focus*. 2024 Apr;56(4):E3.

90. Fernandes Cabral DT, Fernandez-de Thomas RJ, Alattar A, Paul DA, Wang EW, Gardner PA. Endoscopic endonasal approach for resection of odontoid process, decompression of the cervicomedullary junction spinal cord, and resection of panus. *Neurosurg Focus Video*. 2024 Apr;10(2):V2.
91. Hoppe M, Gersey ZC, Muthiah N, Abdallah HM, Plute T, Abou-Al-Shaar H, Wang EW, Snyderman CH, Zenonos GA, Gardner PA. The utility of inflammatory biomarkers in predicting overall survival and recurrence in skull base chordoma. *Neurosurg Focus*. 2024 May;56(5):E16.
92. Jani RH, Raju S, Kim M, Gardner P, Zenonos GA, Snyderman C, Wang EW, Patel C, Germanwala AV. Endoscopic endonasal approach for residual and recurrent craniopharyngioma after transcranial approach: a multi-institution experience. *J Neurol Surg B Skull Base*. 2024 May 3 [online ahead of print].
93. Algattas HN, Gersey ZC, Fernandes-Cabral D, Alattar AA, Abdallah H, Muthiah N, Khiyami A, Mehrotra N, Abdulwahid T, Wang EW, Snyderman CH, Zenonos GA, Fazeli PK, Gardner PA. Endoscopic endonasal resection of Rathke cleft cysts: a single institution analysis of 148 consecutive patients. *J Neurosurg*. 2024 Jun 7:1-11 [online ahead of print].
94. Tang A, Calcaterra M, Harris M, Gardner PA, Zenonos GA, Stefko ST, Geltzeiler M, Zandberg DP, Snyderman CH, Wang EW, Choby G. The role of induction chemotherapy for orbital invasion in sinonasal malignancies: a systematic review. *Int Forum Allergy Rhinol*. 2024 Jul;14(7):1226-1239.
95. Tang A, Abdallah HM, Chang YF, Zenonos GA, Gardner PA, Choby GW, Wang EW, Snyderman CH. Changes in pituitary adenoma patient presentation and outcomes during the COVID pandemic at a Pituitary Center of Excellence. *Pituitary*. 2024 Jul 24 [online ahead of print].
96. Tang A, Taori S, Dang S, Gardner PA, Zenonos GA, Davar D, Kuan EC, Snyderman CH, Wang EW, Choby G. Immunotherapy in the management of sinonasal mucosal melanoma: a systematic review. *Otolaryngol Head Neck Surg*. 2024 Aug;171(2):368-380.
97. Grimm DR, Beswick DM, Maoz SL, Wang EW, Choby GW, Kuan EC, Chan EP, Adappa ND, Geltzeiler M, Getz AE, Humphreys IM, Le CH, Abuzeid WM, Chang EH, Jafari A, Kingdom TT, Kohanski MA, Lee JK, Nayak JV, Palmer JN, Patel ZM, Pinheiro-Neto CD, Resnick AC, Sim MS, Smith TL, Snyderman CH, St. John MA, Storm P, Suh JD, Wang MB, Hwang PH. SNOT-22 subdomain outcomes following treatment for sinonasal malignancy: a prospective, multicenter study. *Int Forum Allergy Rhinol*. 2024 Aug;14(8):1314-1326.
98. Phoominaonin I, Vargas Rosales AF, Choby GW, Wang EW, Zenonos GA, Snyderman CH, Gardner PA. Carotid plexus sympathetic nerves as a landmark for the abducens nerve within the cavernous sinus during endoscopic endonasal surgery: cadaveric anatomical study and surgical consideration. *Oper Neurosurg (Hagerstown)*. 2024 Aug 26 [online ahead of print].
99. Melder K, Mace JC, Choby G, Almeida J, Champagne PO, Chan E, Ciporen J, Chaskes MB, Fernandez-Miranda J, Fung NK, Gardner P, Hwang P, Ji KSY, Kalyvas A, Kong KA, Patel C, Patel Z, Peris Celda M, Pinheiro-Neto CD, Snyderman C, Thorp BD, Van Gompel JJ, Zenonos G, Zwagerman NT, Sanusi O, Wang EW, Geltzeiler M. Recurrence morbidity of olfactory neuroblastoma. *Int Forum Allergy Rhinol*. 2024 Sep;14(9):1435-1445.
100. Palmieri DE, Tadokoro KS, Valappil B, Pakala T, Muthukrishnan A, Seethala RR, Snyderman CH. DOTATATE PET imaging in olfactory neuroblastoma and association with SSTR expression. *J Neurol Surg B Skull Base*. 2024 Oct;85(5):439-444.

101. Ali HM, Leland EM, Stickney E, Lohse CM, Ioyha E, Valappil B, Filimonov A, Goetschel K, Young SC, Shahin MN, Sanusi O, Ndongo Sonfack DJ, Nadeau S, Champagne PO, Geltzeiler M, Zwagerman NT, Gardner PA, Wang EW, Zenonos GA, Snyderman C, Van Gompel J, Link M, Peris-Celda M, Stokken J, Choby G, Pinheiro-Neto CD. Multi-center study on sellar reconstruction after endoscopic transsphenoidal pituitary surgery. *Int Forum Allergy Rhinol*. 2024 Oct;14(10):1558-1567.
102. Maoz SL, Golzar A, Choby G, Hwang PH, Wang EW, Kuan EC, Adappa ND, Geltzeiler M, Getz AE, Humphreys IM, Le CH, Pinheiro-Neto CD, Fischer JL, Chan EP, Abuzeid WM, Chang EH, Jafari A, Kingdom TT, Kohanski MA, Lee JK, Lazor JW, Nabavizadeh A, Nayak JV, Palmer JN, Patel ZM, Resnick AC, Smith TL, Snyderman CH, St. John MA, Storm PB, Suh JD, Wang MB, Sim MS, Beswick DM. University of Washington quality of life subdomain outcomes after treatment of sinonasal malignancy: a prospective, multicenter study. *Int Forum Allergy Rhinol* 2024 Oct 14(10):1568-1581.
103. Mocharnuk J, Daniels KE, Filimonov A, North LM, Gardner PA, Wang EW, Snyderman CH. The prognostic implications of neutrophil-to-lymphocyte ratio in olfactory neuroblastoma. *Otolaryngol Head Neck Surg*. 2024 Oct;171(4):1212-1216.

Textbooks

1. Snyderman CH, Gardner PA (eds). Skull Base Surgery. In Myers EN (ed): *Master Techniques in Otolaryngology-Head and Neck Surgery*. Wolters Kluwer, Philadelphia, 2015.
2. Gardner PA, Snyderman CH, Jankowitz BT (eds): *Vascular Challenges in Skull Base Surgery*. Thieme, New York, 2022.

UPMC ENDOSCOPIC ENDONASAL SURGERY EQUIPMENT & INSTRUMENT SETS

PUH STRYKER SPINE/EEA DRILL

DESCRIPTION	CATALOG	QTY	CNT1	CNT2	CNT3
X-LONG ANGLED	Stryker 5407-120-482	1			
PI DRIVE PLUS (BLACK MOTOR)	Stryker 5407-300-000	1			
ELITE 14CM STRAIGHT	Stryker 5407-120-480	1			
LONG ANGLED	Stryker 5407-120-472	1			
Total		4			

IG NASAL POINTERS - PUH

Printed: 05/21/2019 09:54
Revised: 01/22/2014 10:41

Preferred Sterilization Method: Steam 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
NASAL POINTER	1						Stryker	6001-020-000
Total Instrument Count	1							

NEURO ICG CAMERA&LIGHT CORD

Printed: 06/25/2020 16:26
Revised: 11/08/2019 08:38

Preferred Sterilization Method: Sterrad 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
STORZ LIGHT CORD	1						Storz	495 ND
SPIES ICG CAMERA (IMAGE HD)	1						Storz	H3-Z Fi TH102
Total Instrument Count	2							

NEURO ENDOSCOPES - PUH

Printed: 06/25/2020 16:26
Revised: 09/17/2019 11:42

Preferred Sterilization Method: STERRAD/V-PRO1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
0* ICG SCOPE	1						Storz	28164 AC
45 DEGREE SCOPE	1						Karl Storz	7230FVA
30 DEGREE SCOPE	1						Karl Storz	7230BA
70 DEGREE SCOPE	1						Karl Storz	7230CVA
Total Instrument Count	4							

PISTOL GRIP BIPOLAR - PUH

Printed: 05/21/2019 09:50
Revised: 12/27/2012 10:03

Preferred Sterilization Method: Sterrad 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
GRAY CORD	1						Karl Storz	26176LA
BLACK HANDLE	2						Karl Storz	26184HM
COLLAR	2						Karl Storz	28164HSS
INSERTS								
SIDE WINDER	1						Karl Storz	28164FGL
STRAIGHT	1						Karl Storz	26184PTS
UP TOE ANGLED	1						Karl Storz	28164F6M
Total Instrument Count	8							

NEURO FRAZIER SUCTIONS - PUH

Printed: 05/21/2019 09:52
Revised: 03/01/2013 10:37

Preferred Sterilization Method: Steam 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
FRAZIER SHORT 7 FR. (CODMAN 70-1079)	2						V Mueller	NL1906
FRAZIER LONG 7 FR. (CODMAN 70-1087)	2						V Mueller	NL1905
FRAZIER SHORT 9 FR. (CODMAN 70-1080)	2						V Mueller	NL1900-9
FRAZIER SHORT 11 FR. (CODMAN 70-1081)	2						V Mueller	NL1900-11
FRAZIER LONG 11 FR. (CODMAN 70-1089)	2						V Mueller	NL1907
#9 FRAZIER SUCTION - LONG (CODMAN 70-1088)	2						V Mueller	NL1906
Total Instrument Count	12							

FUKUSHIMA SUCTIONS - PUH

Printed: 05/21/2019 09:53
 Revised: 12/27/2012 12:22

Preferred Sterilization Method: Steam 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
SHORT SUCTIONS								
TAPERED SUCTION 4FR.	2						NO MANUFACTURER PROVIDED	LI-M004
TAPERED SUCTION 6FR.	2						NO MANUFACTURER PROVIDED	LI-M006
TAPERED SUCTION 8FR.	2						NO MANUFACTURER PROVIDED	LI-M008
TAPERED SUCTION 9FR.	2						NO MANUFACTURER PROVIDED	LI-M009
MEDIUM SUCTIONS								
TAPERED SUCTION 4FR.	2						V Mueller	NL1955-004
TAPERED SUCTION 6FR.	2						V Mueller	NL1955-006
TAPERED SUCTION 8FR.	2						V Mueller	NL1955-008
TAPERED SUCTION 9FR.	2						V Mueller	NL1955-009
LONG SUCTIONS								
TAPERED SUCTION 4FR.	2						V Mueller	NL1956-004
TAPERED SUCTION 6FR.	2						V Mueller	NL1956-006
TAPERED SUCTION 8FR.	2						V Mueller	NL1956-008
TAPERED SUCTION 9FR.	2						V Mueller	NL1956-009
Total Instrument Count	24							

4/2/2024

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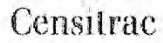


PUH NEURO PROTOTYPE SINUS TRAY

DESCRIPTION	CATALOG	QTY	CNT1	CNT2	CNT3
TOP SHELF					
LARGE PITUITARY (STORZ 455500 B)	Karl Storz RH551657	1			
DECKER MICRO RONGEUR, STRAIGHT - 6"	Symmetry 53-4000	2			
SINUS STRAIGHT SCISSORS	Karl Storz 449201	1			
SINUS SCISSOR --RIGHT	Karl Storz 449202	1			
SINUS LEFT CURVED SCISSOR	Karl Storz 449203	1			
REVERSE PUNCH (BACKBITER)	Karl Storz 459016	1			
STRAIGHT NASAL CUTTING FORCEP (THRU CUT)	Karl Storz 451020	1			
THRUCUT 45° LONG	Karl Storz 451520	1			
STRUMPEL VOSS FORCEP STRAIGHT	Karl Storz 456101	1			
STRUMPEL VOSS FORCEP UP	Karl Storz 456121	1			
ETHMOID LONG STRAIGHT (STORZ 456001B)	Karl Storz 456021	1			
ETHMOID LONG UP 45° (STORZ 456500B)	Karl Storz 456521	1			
ETHMOID 90° (STORZ 456801B)	Karl Storz 456801b	1			
FORCEPS BLAKESLEY RHINOFORCE STRAIGHT	Karl Storz 456003B	1			
FRONTAL SINUS GIRAFFE	Karl Storz 456511B	1			
KURZE SCISSORS RD. BARREL - STRAIGHT	Karl Storz 28164MZB	1			
KURZE SCISSORS RD. BARREL - RIGHT	Karl Storz 28164MZC	1			
KURZE SCISSORS RD. BARREL - LEFT	Karl Storz 28164MZD	1			
LURZE SCISSORSRD. BARREL - 45 DEGREE	Karl Storz 28164MZE	1			
ROTATABLE SCISSOR	Karl Storz 663327 (28164SAD)	1			
MINI THRUCUT STRAIGHT LONG	Karl Storz 663251	1			
MINI THRUCUT LEFT LONG	Karl Storz 663255	1			
MICRO THRUCUT - LEFT	Karl Storz 663256	1			
MINI THRUCUT 45 DEGREE UP LONG	Karl Storz 663257	1			
CUP FORCEP STRAIGHT	Karl Storz 663202	1			
CUP FORCEPS - RIGHT	Karl Storz 663205	1			
CUP FORCEPS - LEFT	Karl Storz 663206	1			
CUP FORCEP - 45 DEGREE	Karl Storz 663207	1			
Subtotal for TOP SHELF		29			
MIDDLE SHELF					
RETRACTABLE KNIFE	Karl Storz 28164A	1			
MALLEABLE SUCTION	Karl Storz 663818	1			
MALLEABLE FRAZIER SUCTION	Karl Storz 649183	1			
"J" CURETTE CLOSED	Karl Storz 628712	1			
ANTRUM CURETTE FORWARD SMALL	Karl Storz 629703	1			
ELEVATOR FREER SUCTION 7.75IN	Storz 474001	1			
BALL PROBE DOUBLE ENDED	Karl Storz 629820	1			
COTTLE ELEVATOR	V Mueller (Jarit 400-277) RH980	1			
OLIVE TIP SUCTION --LARGE	Karl Storz 586240	2			

4/2/2024

Censitrac



PUH NEURO PROTOTYPE SINUS TRAY

DESCRIPTION	CATALOG	QTY	CNT1	CNT2	CNT3
OLIVE TIP SUCTION	Karl Storz 586030	2			
#8 BLACK SUCTION	KLS Martin 18-523-18	1			
#10 BLACK SUCTION	KLS Martin 18-523-20	1			
Subtotal for MIDDLE SHELF		14			
BOTTOM SHELF					
#1 ANGLED KERRISON	Karl Storz 662121	1			
#2 ANGLED KERRISON	Karl Storz 662122	1			
#3 ANGLED KERRISON	Karl Storz 662123	1			
90 DEGREE UP KERRISON	Karl Storz 662102	1			
90 DEGREE DOWN KERRISON	Karl Storz 662112	1			
Subtotal for BOTTOM SHELF		5			
Total		48			

Last Definition Rev:	1UPMC-ACCT\iscjl	3/4/2024 01:03:25 PM
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Printed	1UPMC-ACCT\iscjl	4/2/2024 11:33:52 AM
Scrub		
Circulator		
Room #		

NEURO EEA TRAY - PUH

Printed: 06/25/2020 16:27
Revised: 06/17/2020 08:48

Preferred Sterilization Method: Steam 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
BOTTOM PAN LEFT TO RIGHT								
ADSON WITH TEETH (CODMAN 30-1186)	2						V Mueller	NL1400
GOLDTOP BAYONET FORCEPS - CUSHING CLASSIC PLUS TISSUE FORCEPS (CODMAN 36-6007)	2						V Mueller	NL1464
GERALD FORCEP 1X2 TEETH	2						V Mueller	NL1440
#8 BLACK SUCTION	1						KLS Martin	18-523-18
#10 BLACK SUCTION	1						KLS Martin	18-523-20
FRAZIER SUCTION 7FR	2						V Mueller	NL1900
#9 FRAZIER SUCTION - SHORT (CODMAN 70-1080)	2						V Mueller	NL1900-9
#11 FRAZIER SUCTION - SHORT (CODMAN 70-1081)	2						V Mueller	NL1900-11
SECOND ROW								
SMALL WEITLANER 5 1/2 IN - SHARP	1						V Mueller	SU3110
THIRD - ROW								
2" NASAL SPECULUM (SMALL) (CODMAN 79-7011)	1						V Mueller	RH102
ARMY/NAVY RETRACTOR	2						Codman	SU3660 - 1
FOURTH ROW								
DECKER MICRO BIOPSY FORCEP (CODMAN 53-4000)	1						V Mueller	NL6250
SELLA PUNCH 1MM BITE (CODMAN 80-1344)	1						V Mueller	VM81-1271
2MM KERRISON (CODMAN 80-1340)	1						V Mueller	NL3785-165
PAPER BAG								
#3 SAFETY KNIFE HANDLE	1						BARD-PARKER	374030
#3 KNIFE HANDLE (CODMAN 11-5530)	1						V Mueller	SU1403-001
#7 KNIFE HANDLE (CODMAN 11-5534)	1						V Mueller	SU1407
FREER ELEVATOR	1						V Mueller	RH750
COTTLE ELEVATOR	1						V Mueller	RH980
MCELVEEN DISSECTOR	1						Bausch & Lomb	N1706
DISSECTOR DOWN (STUBBY) (CODMAN 80-1316)	1						V Mueller	NL3853-003
DISSECTOR UP (STUBBY) (CODMAN 80-1315)	1						V Mueller	NL3785-136
STRING								
MOSQUITO CURVED (CODMAN 30-4517)	4						V Mueller	SU2702
CRILE ARTERY FORCEPS 5-1/2" STR	4						V Mueller	SU2730
KELLY FORCEP 6 1/2" (CODMAN 32-4071)	1						V Mueller	SU2760
ALLIS 6IN (CODMAN 32-7000)	4						V Mueller	SU4054
KOCHER FORCEP CURVED 6 1/4" (32-4110)	2						V Mueller	SU2800
SAROT NEEDLEHOLDER (CODMAN 36-3020)	2						V Mueller	CH2416

NEURO EEA TRAY - PUH

Printed: 06/25/2020 16:27

Revised: 06/17/2020 08:48

Preferred Sterilization Method: Steam 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
RYDER NEEDLE HOLDER (CODMAN 36-3012)	1						Mueller	CH2508
REGULAR NEEDLE HOLDER (CODMAN 36-2016)	1						Mueller	SU16060
METZENBAUM SCISSOR (STILLE 817-18)	1						Mueller	MO1600-S
MAYO SCISSOR STR (CODMAN 36-5051)	1						Mueller	SU1804
MAYO SCISSOR CVD (CODMAN 36-5061)	1						Mueller	SU1814
TENOTOMY SCISSOR (PILLING 640280)	1						Mueller	CH5675
PREP STICKS (CODMAN 36-6036)	3						Mueller	GL650
ADJUSTABLE HEMOCLIP APPLIER	1						Medtronic	MCEN21R
Total Instrument Count	56							

KLS MARTIN PITTSBURGH DISSECTORS - PUH

Printed: 05/21/2019 09:50

Revised: 06/18/2013 14:34

Preferred Sterilization Method: Steam 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
#1 MODIFIED SACHS DISSECTOR MEDIUM STRAIGHT	1						KLS Martin	07-005-01-07
#2 MODIFIED SACHS DISSECTOR LARGE STRAIGHT	1						KLS Martin	07-005-02-07
#3 MODIFIED FISCH DISSECTOR RIGHT STRAIGHT	1						KLS Martin	07-005-03-07
#4 MODIFIED FISCH DISSECTOR LEFT STRAIGHT	1						KLS Martin	07-005-04-07
#5 HOOK WITH BALL DISSECTOR STRAIGHT	1						KLS Martin	07-005-05-07
#6 CURETTE BLUNT 90° UP DISSECTOR STRAIGHT	1						KLS Martin	07-005-06-07
#7 MODIFIED COTTLE DISSECTOR STRAIGHT, MEDIUM	1						KLS Martin	07-005-07-07
#8 MODIFIED COTTLE DISSECTOR STRAIGHT, LARGE	1						KLS Martin	07-005-08-07
#9 MODIFIED RHOTON (ROSEN) DISSECTOR STRAIGHT SMALL	1						KLS Martin	07-005-09-07
#10 MODIFIED RHOTON (ROSEN) DISSECTOR STRAIGHT LARGE	1						KLS Martin	07-005-10-07
DISSECTOR HANDLE	4						KLS Martin	07-005-20-07
Total Instrument Count	14							

PUH LAZIC MICRO INSTRUMENTS (D-LINE ENDOSCOPIC SET) 1

DESCRIPTION	CATALOG	QTY	CNT1	CNT2	CNT3
LAZIC (MICRO FORCEP) BLACK	LAZIC 46.813.01	1			
LAZIC (MICRO PITUITARY CUP BLUNT)BLACK	LAZIC 46.856.01	1			
LAZIC (MICRO SCISSOR ,SHARP 45°)BLACK	LAZIC 46.835.02	1			
LAZIC (MICRO NEEDLEHOLDER CURVED)BLACK	LAZIC 46.815.02	1			
LAZIC (MICRO SCISSOR SHARP CURVED)BLACK	LAZIC 46.811.02	1			
LAZIC (MICRO FORCEP) GOLD	LAZIC 46.813.03	1			
LAZIC (MICRO PITUITARY CUP BLUNT) GOLD	LAZIC 46.856.03	1			
LAZIC (MICRO SCISSOR,SHARP 45° ANGLED) GOLD	LAZIC 46.835.04	1			
LAZIC (MICRO SCISSOR,SHARP CURVED) GOLD	LAZIC 46.811.04	1			
Total		9			

PUH ENDO PENS (RED/SILVER) GREEN TAPE

DESCRIPTION	CATALOG	QTY	CNT1	CNT2	CNT3
ENDO PEN	Sutter 700987S LEFT BITING	1			
ENDO PEN	Sutter 700953S SIDEWINDER	1			
ENDO PEN	Sutter 700991S STRIAGHT TIP	1			
Total		3			

ENDO PENS (RED/SILVER) GREEN TAPE

Printed: 06/25/2020 16:21
Revised: 01/03/2020 07:15

Preferred Sterilization Method: Steam 1

Comments / Instructions:

Item Description	Std Qty	Actual Qty	1st	2nd	Add	Final	Manufacturer	Catalog
ENDO PEN	1						SUTTER	700986S
ENDO PEN	1						SUTTER	700958S
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Total Instrument Count 4

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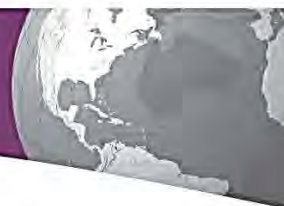
WEBSITES:

www.UPMC.com/skullbasesurgery

<http://www.neurosurgery.pitt.edu/>

<http://www.skullbasecongress.com>

UPMC Global Care



UPMC Global Care: Bridging Patient Care Partnerships Around the World

What is UPMC Global Care?

UPMC firmly believes that patients should have access to quality health care close to home whenever possible. However, medical treatment is not always possible in their home country. To serve medical needs of this nature, UPMC created the Global Care program.

The vision of UPMC Global Care is to offer an innovative service model for international patients that coordinates the care plan before the patient's arrival, provides superior quality care and clinical monitoring while in Pittsburgh, and enables the seamless transition of care, with regular follow-ups after discharge.

Our key differentiator is our total commitment to a service-oriented approach and our emphasis on an excellent and satisfying experience, not only for the patients and their families, but also for their referring physicians and financial sponsors. Referring physicians can communicate directly with our clinical experts at UPMC regarding treatment plan, discharge instructions, and follow-up care upon their patient's return home.

Last year, 22,000 patients traveled from around the world to access our top-rated care.



The Global Care program serves patients through clinical expertise, telemedicine consultations, and health care treatment at a number of facilities in the United States, Ireland, and Italy.

At UPMC, patients can expect:

- Timely responses to inquiries for care, with initial response occurring within one business day
- One point of access for pre-arrival, care delivery, and post-discharge communication
- A single price and single invoice for all services provided.

Why Choose UPMC Global Care?

Patients that receive treatment at UPMC, and their families have unique needs due to cultural barriers and the complexity of the health care system in the United States. To create the most comfortable atmosphere possible, hospitality teams provide a variety of services for each patient, including:

Clinical Care

Clinical care coordinators actively collaborate with physicians and treatment teams to create a comprehensive health plan and monitor the health of patients during treatment. Our physicians establish relationships with referring physicians throughout the care process and in an on-going capacity to ensure safe discharge and continuity of care upon patient's return home.

Patient Hospitality

Multilingual hospitality coordinators serve as cultural liaisons for patients and their families. They provide a single point of contact for each patient and serve to meet all non-medical needs, including communication, travel, housing, dietary, religious, and recreational needs.

Housing and Recreational Services

Hospitality coordinators will review local accommodation options and ensure patients and their families receive safe, convenient housing. For patients requiring extended stay in Pittsburgh, Hospitality coordinators will also assist patients to arrange local cell phone service and open bank accounts. Voted the "Most Livable City in the United States", Pittsburgh has many dining, cultural, shopping, and entertainment options to help patients relax and make the most of their visit.

Patient Financial Coordinators

Patient financial coordinators provide patients with a clear explanation of payment for services at UPMC and assist patients with communicating with insurance companies, sponsoring organizations, or embassy offices.

Visa and Travel Assistance

Medical acceptance letters will be provided for patients and their traveling companions to facilitate their visa application process and in-country interview at their respective US Consulate.

Patient Escort and Navigation

Our multilingual interpreters accompany patients and their companions to their medical appointments to alleviate the stress of having to find their way around the hospital, to facilitate patient registration, and to ensure culturally-sensitive communication with their healthcare provider.

Connect with UPMC Global Care | Find out more about UPMC's programs and services at UPMCGlobalCare.com.

UPMC LIFE
CHANGING
MEDICINE

Previously referred to as University of Pittsburgh Medical Center, UPMC is an integrated global health enterprise, and is affiliated with the University of Pittsburgh. To learn more about us, please visit UPMC.com.