



Peter H. Hwang, MD

Professor of Otolaryngology - Head & Neck Surgery (OHNS) and, by courtesy, of Neurosurgery

Otolaryngology (Head and Neck Surgery)

CLINICAL OFFICE (PRIMARY)

- **Stanford Dept of Otolaryngology, Head and Neck Surgery**

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Bio

BIO

Dr. Hwang completed his undergraduate degree at Stanford University, and his MD and otolaryngology residency at the University of California, San Francisco. After completing a fellowship in rhinology at the University of Pennsylvania, Dr. Hwang served as Director of Rhinology at Oregon Health & Science University. He returned to Stanford in 2005 to lead the Division of Rhinology and Endoscopic Skull Base Surgery and currently serves as Vice Chair of Clinical Affairs for the Department of Otolaryngology-Head & Neck Surgery. Dr. Hwang has served in leadership of the American Rhinologic Society for over a decade, most recently as President of the society. Dr. Hwang also serves as Associate Editor of the International Forum of Allergy and Rhinology and Associate Editor of the World Journal of Otolaryngology. He co-edited the textbook "Rhinology: Diseases of the Nose, Sinuses, & Skull Base," which was awarded the Benjamin Franklin Award for Scientific & Technical Book of the Year. Dr. Hwang teaches on the latest advances in endoscopic sinus and skull base surgery at many national and international venues. He also trains future academic leaders in rhinology through the Stanford fellowship in rhinology and endoscopic skull base surgery. His research interests include clinical outcomes of endoscopic skull base surgery; development of innovative medical devices for treating sinus disease; and novel topical therapies for chronic rhinosinusitis.

CLINICAL FOCUS

- Cancer > Head and Neck Cancer
- Endoscopic Sinus Surgery
- Endoscopic Skull Base Surgery
- Otolaryngology
- Otolaryngology - Head & Neck Surgery (Ear, Nose and Throat)

ACADEMIC APPOINTMENTS

- Professor - University Medical Line, Otolaryngology (Head and Neck Surgery)
- Professor - University Medical Line (By courtesy), Neurosurgery

ADMINISTRATIVE APPOINTMENTS

- Vice Chair, Department of Otolaryngology-Head & Neck Surgery, (2018- present)

- Vice Chair of Clinical Affairs, Department of Otolaryngology-Head & Neck Surgery, (2015-2018)
- Chief, Division of Rhinology & Endoscopic Skull Base Surgery, Stanford School of Medicine, (2005- present)
- Co-Director, Fellowship in Rhinology & Endoscopic Skull Base Surgery, Stanford University, (2005-2015)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- President, American Rhinologic Society (2015 - 2016)
- President-Elect, American Rhinologic Society (2014 - 2015)
- Associate Editor, World Journal of Otolaryngology-Head & Neck Surgery (2015 - present)
- 1st Vice President, American Rhinologic Society (2013 - 2014)
- Associate Editor, International Forum of Allergy & Rhinology (2011 - present)

PROFESSIONAL EDUCATION

- Residency: UCSF Dept of Otolaryngology Head and Neck Surgery (1996) CA
- Fellowship: University of Pennsylvania Dept of GME (1997) PA
- Internship: UCSF General Surgery Residency (1992) CA
- Medical Education: University of California at San Francisco School of Medicine (1991) CA
- Board Certification: Otolaryngology, American Board of Otolaryngology (1997)
- Fellowship, Univ. of Pennsylvania , Rhinology & Sinus Surgery (1997)
- Residency, UC San Francisco , Otolaryngology (1996)
- MD, UC San Francisco (1991)
- BS, Stanford University , Biology (1987)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

- Clinical outcomes in patients with chronic rhinosinusitis undergoing endoscopic sinus surgery
- Development of innovative medical devices for treatment of sinus disorders
- Founder of CORSICA, a national research registry for sinus cancer

CLINICAL TRIALS

- Chemotherapy Before Surgery and Radiation Therapy or Surgery and Radiation Therapy Alone in Treating Patients With Nasal and Paranasal Sinus Cancer That Can Be Removed by Surgery, Recruiting
- Identification and Characterization of Novel Proteins and Genes in Head and Neck Cancer, Recruiting

Teaching

STANFORD ADVISEES

Med Scholar Project Advisor

Riley Vo

Publications

PUBLICATIONS

- **A response to Min et al.** *International forum of allergy & rhinology*
Grimm, D. R., Qian, Z. J., Yong, M., Hwang, P. H.

2024

- **Comparative analysis of traditional machine learning and automated machine learning: advancing inverted papilloma versus associated squamous cell carcinoma diagnosis.** *International forum of allergy & rhinology*
Hosseinzadeh, F., Mohammadi, S. S., Palmer, J. N., Kohanski, M. A., Adappa, N. D., Chang, M. T., Hwang, P. H., Nayak, J. V., Patel, Z. M.
2024
- **Impact of sociodemographic status and sex on chronic rhinosinusitis and olfaction in people with cystic fibrosis.** *International forum of allergy & rhinology*
Han, E. J., Liu, C. M., Fischer, J. L., Mace, J. C., Markarian, K., Alt, J. A., Bodner, T. E., Chowdhury, N. I., Eshaghian, P. H., Gao, Y. A., Getz, A. E., Hwang, P. H., Khanwalkar, et al
2024
- **University of Washington Quality of Life subdomain outcomes after treatment of sinonasal malignancy: A prospective, multicenter study.** *International forum of allergy & rhinology*
Maoz, S. L., Golzar, A., Choby, G., Hwang, P. H., Wang, E. W., Kuan, E. C., Adappa, N. D., Geltzeiler, M., Getz, A. E., Humphreys, I. M., Le, C. H., Pinheiro-Neto, C. D., Fischer, et al
2024
- **The Utility of a "Second-Look" Debridement Following Endonasal Skull Base Surgery in the Pediatric Population.** *Journal of neurological surgery. Part B, Skull base*
Chang, M. T., Huang, A. E., Quon, J. L., Fernandez-Miranda, J. C., Wen, C. Z., Eide, J. G., Kshirsagar, R. S., Qian, Z. J., Nayak, J. V., Hwang, P. H., Adappa, N. D., Patel, Z. M.
2024; 85 (3): 313-317
- **Predictors of Sinonasal Improvement After Highly Effective Modulator Therapy in Adults with Cystic Fibrosis.** *The Laryngoscope*
Beswick, D. M., Liu, C. M., Overvest, J. B., Zemke, A., Khatiwada, A., Gudis, D. A., Miller, J. E., Kimple, A., Tervo, J. P., DiMango, E., Goralski, J. L., Keating, C., Senior, et al
2024
- **Recurrence morbidity of olfactory neuroblastoma.** *International forum of allergy & rhinology*
Melder, K., Mace, J. C., Choby, G., Almeida, J. P., Champagne, P., Chan, E., Ciporen, J., Chaskes, M. B., Fernandez-Miranda, J., Fung, N. K., Gardner, P., Hwang, P., Ji, et al
2024
- **The effect of PM2.5 on acute sinusitis: A population-based study.** *International forum of allergy & rhinology*
Grimm, D., Qian, Z. J., Yong, M., Hwang, P. H.
2024
- **SNOT-22 subdomain outcomes following treatment for sinonasal malignancy: A prospective, multicenter study.** *International forum of allergy & rhinology*
Grimm, D. R., Beswick, D. M., Maoz, S. L., Wang, E. W., Choby, G. W., Kuan, E. C., Chan, E. P., Adappa, N. D., Geltzeiler, M., Getz, A. E., Humphreys, I. M., Le, C. H., Abuzeid, et al
2024
- **Patient perspectives on chronic rhinosinusitis in cystic fibrosis: Symptom prioritization in the era of highly effective modulator therapy.** *International forum of allergy & rhinology*
Liu, C. M., Han, E. J., Fischer, J. L., Mace, J. C., Mattos, J. L., Markarian, K., Alt, J. A., Bodner, T. E., Chowdhury, N. I., Eshaghian, P. H., Getz, A. E., Hwang, P. H., Khanwalkar, et al
2024
- **Impact of dupilumab prescribing on utilization of medical and surgical therapies for chronic rhinosinusitis with nasal polyps.** *International forum of allergy & rhinology*
Low, C. M., Wang, A. R., Yong, M., Nayak, J., Patel, Z., Hwang, P. H.
2024
- **Ipsilateral Nasoseptal Flaps in a Transpterygoid Approach: Technical Pearls and Reconstruction Outcomes** *JOURNAL OF NEUROLOGICAL SURGERY PART B-SKULL BASE*
Chang, M. T., Grimm, D., Asmaro, K., Yong, M., Low, C., Lee, C. K., Nayak, J. V., Hwang, P. H., Fernandez-Miranda, J. C., Patel, Z. M.
2024
- **Impact of sinus surgery in people with cystic fibrosis and chronic rhinosinusitis in the era of highly effective modulator therapy: Protocol for a prospective observational study.** *PloS one*

- Liu, C. M., Fischer, J. L., Alt, J. A., Bodner, T. E., Chowdhury, N. I., Getz, A. E., Hwang, P. H., Kimple, A. J., Mace, J. C., Smith, T. L., Soler, Z. M., Goss, C. H., Taylor-Cousar, et al
2024; 19 (9): e0310986
- **In Response to Cost-effectiveness Analysis of Inferior Turbinate Reduction and Immunotherapy in Allergic Rhinitis.** *The Laryngoscope*
Yong, M., Aravinthan, K., Kirubalingam, K., Thamboo, A., Hwang, P. H., Nadeau, K., Walgama, E.
2023
 - **Determining the minimal clinically important difference for the questionnaire of olfactory disorders in people with cystic fibrosis and factors associated with improvement after highly effective modulator therapy.** *International forum of allergy & rhinology*
Miller, J. E., Taylor-Cousar, J. L., Overvest, J. B., Khatiwada, A., Mace, J. C., Alt, J. A., Bodner, T. E., Chowdhury, N. I., DiMango, E. A., Eshaghian, P. H., Getz, A. E., Gudis, D. A., Han, et al
2023
 - **Impact of functional endoscopic sinonasal surgery on oral corticosteroid burden and healthcare resource utilization in patients with chronic rhinosinusitis with nasal polyps in US real-world practice**
Isaman, D., Khan, A., Lee, S., Peters, A., Hwang, P., Reitsma, S., Petruski-Ivleva, N., Nash, S., Jacob-Nara, J. A.
WILEY.2023: 110
 - **Characteristics of patients with chronic rhinosinusitis with nasal polyps who did or did not undergo functional endoscopic sinus surgery: A US real-world retrospective cohort study**
Khan, A., Isaman, D., Lee, S., Peters, A., Hwang, P., Reitsma, S., Petruski-Ivleva, N., Nash, S., Jacob-Nara, J. A.
WILEY.2023: 109
 - **Surgical Correction of Nasal Obstruction and Its Effect on Eustachian Tube Dysfunction Symptoms.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*
Daum, R., Grimm, D., Castro Silva, B. R., Huang, A. E., Lee, J. Y., Nayak, J. V., Patel, Z. M., Hwang, P. H., Chang, M. T.
2023
 - **Acoustic resonance therapy is safe and effective for the treatment of nasal congestion in rhinitis: A randomized sham-controlled trial.** *International forum of allergy & rhinology*
Luong, A. U., Yong, M., Hwang, P. H., Lin, B. Y., Gopi, P., Mohan, V., Ma, Y., Johnson, J., Yen, D. M., DeMera, R. S., Bleier, B. S.
2023
 - **Chronic Rhinosinusitis After Maxillary Advancement Orthognathic Surgery.** *The Annals of otology, rhinology, and laryngology*
Ibrahim, N., Hwang, P. H., Jitaroon, K., Tyler, M. A.
2023: 34894231204654
 - **Factors that predict pursuing sinus surgery in the era of highly effective modulator therapy.** *International forum of allergy & rhinology*
Beswick, D. M., Han, E. J., Mace, J. C., Markarian, K., Alt, J. A., Bodner, T. E., Chowdhury, N. I., Eshaghian, P. H., Getz, A. E., Hwang, P. H., Khanwalkar, A., Kimple, A. J., Lee, et al
2023
 - **Eustachian tube dysfunction symptoms after endonasal skull base surgery.** *International forum of allergy & rhinology*
Grimm, D., Daum, R., Castro Silva, B. R., Lee, C. K., Fernandez-Miranda, J. C., Nayak, J. V., Patel, Z. M., Hwang, P. H., Chang, M. T.
2023
 - **Oral corticosteroid (OCS) burden and healthcare resource utilization (HCRU) in patients with chronic rhinosinusitis with nasal polyps (CRSwNP) who did or did not undergo functional endoscopic sinonasal surgery (FESS) in US real-world practice**
Khan, A. H., Isaman, D., Lee, S., Peters, A., Hwang, P., Reitsma, S., Petruski-Ivleva, N., Nash, S., Jacob-Nara, J., Jacob-Nara, J.
EUROPEAN RESPIRATORY SOC JOURNALS LTD.2023
 - **International consensus statement on allergy and rhinology: Sinonasal tumors.** *International forum of allergy & rhinology*
Kuan, E. C., Wang, E. W., Adappa, N. D., Beswick, D. M., London, N. R., Su, S. Y., Wang, M. B., Abuzeid, W. M., Alexiev, B., Alt, J. A., Antognoni, P., Alonso-Basanta, M., Batra, et al
2023
 - **Predictive factors for decreased baseline quality of life in patients with sinonasal malignancies.** *International forum of allergy & rhinology*
Fleseriu, C. M., Beswick, D. M., Maoz, S. L., Hwang, P. H., Choby, G., Kuan, E. C., Chan, E. P., Adappa, N. D., Geltzeiler, M., Getz, A. E., Humphries, I. M., Le, C. H., Abuzeid, et al
2023

- **Cost-effectiveness Analysis of Inferior Turbinate Reduction and Immunotherapy in Allergic Rhinitis.** *The Laryngoscope*
Yong, M., Aravinthan, K., Kirubalingam, K., Thamboo, A., Hwang, P. H., Nadeau, K., Walgama, E.
2023
- **Environmental Risk Factors for Pediatric Epistaxis vary by Climate Zone.** *The Laryngoscope*
Wei, E. X., Green, A., Chang, M. T., Hwang, P. H., Sidell, D. R., Qian, Z. J.
2023
- **Multicenter Survival Analysis and Application of an Olfactory Neuroblastoma Staging Modification Incorporating Hyams Grade.** *JAMA otolaryngology--head & neck surgery*
Choby, G., Geltzeiler, M., Almeida, J. P., Champagne, P. O., Chan, E., Ciporen, J., Chaskes, M. B., Fernandez-Miranda, J., Gardner, P., Hwang, P., Ji, K. S., Kalyvas, A., Kong, et al
2023
- **International Multicenter Study of Clinical Outcomes of Sinonasal Melanoma Shows Survival Benefit for Patients Treated with Immune Checkpoint Inhibitors and Potential Improvements to the Current TNM Staging System.** *Journal of neurological surgery. Part B, Skull base*
Lechner, M., Takahashi, Y., Turri-Zanoni, M., Ferrari, M., Liu, J., Counsell, N., Mattavelli, D., Rampinelli, V., Vermi, W., Lombardi, D., Saade, R., Park, K. W., Schartinger, et al
2023; 84 (4): 307-319
- **Incidence of hypocortisolism with long-term budesonide irrigations for chronic rhinosinusitis.** *International forum of allergy & rhinology*
Silva, B. R., Tyler, M. A., Ma, Y., Wang, J., Nayak, J. V., Patel, Z. M., Hwang, P. H.
2023
- **Endoscopic Endonasal Transtuberulum Approach for Pediatric Tuberoinfundibular Craniopharyngioma: 2-Dimensional Operative Video.** *Operative neurosurgery (Hagerstown, Md.)*
Vigo, V., Chang, J. E., Nunez, M. A., Prolo, L. M., Hwang, P. H., Fernandez-Miranda, J. C.
2023
- **Difficult Tracheal Intubation and Airway Outcomes after Radiation for Nasopharyngeal Carcinoma.** *The Laryngoscope*
Huang, A. E., Camire, D., Hwang, P. H., Nekhendzy, V.
2023
- **THE EFFECT OF ACOUSTIC RESONANCE THERAPY ON CPAP ADHERENCE**
Munafo, D., Gopi, P., Mohan, V., Hwang, P., Lin, B., Hekier, E., Lane, B., Guerrero, C., Dauphin, B., Kushida, C.
OXFORD UNIV PRESS INC.2023: A216
- **Long-term quality of life after treatment in sinonasal malignancy: A prospective, multi-center study.** *International forum of allergy & rhinology*
Mao, S. L., Wang, E. W., Hwang, P. H., Choby, G., Kuan, E. C., Fleseriu, C. M., Chan, E. P., Adappa, N. D., Geltzeiler, M., Getz, A. E., Humphreys, I. M., Le, C. H., Abuzeid, et al
2023
- **The Utility of a "Second-Look" Debridement Following Endonasal Skull Base Surgery in the Pediatric Population** *JOURNAL OF NEUROLOGICAL SURGERY PART B-SKULL BASE*
Chang, M. T., Huang, A. E., Quon, J. L., Fernandez-Miranda, J. C., Wen, C. Z., Eide, J. G., Kshirsagar, R. S., Qian, Z., Nayak, J. V., Hwang, P. H., Adappa, N. D., Patel, Z. M.
2023
- **Radiographic predictors of occult intracranial involvement in olfactory neuroblastoma patients.** *International forum of allergy & rhinology*
Geltzeiler, M., Choby, G. W., Ji, K. S., Mace, J. C., Almeida, J. P., de Almeida, J., Champagne, P., Chan, E., Ciporen, J. N., Chaskes, M. B., Cornell, S., Drozdowski, V., Fernandez-Miranda, et al
2023
- **Social Media Utilization in Otolaryngology: A Scoping Review.** *The Laryngoscope*
Huang, A. E., Chan, E. P., Stave, C. M., Patel, Z. M., Hwang, P. H., Chang, M. T.
2023
- **Oral Corticosteroid Burden and Healthcare Resource Utilization (HCRU) in Patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP) Undergoing Functional Endoscopic Sinonasal Surgery (FESS): A Real-World Retrospective Cohort Study**
Isaman, D., Khan, A., Lee, S., Peters, A., Hwang, P., Reitsma, S., Petruski-Ivleva, N., Nash, S., Jacob-Nara, J.
MOSBY-ELSEVIER.2023: AB201

- **Characteristics of Patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP) Who Did or Did Not Undergo Functional Endoscopic Sinus Surgery (FESS) in a US Real-World Retrospective Cohort Study**
Khan, A., Isaman, D., Lee, S., Peters, A., Hwang, P., Reitsma, S., Petruski-Ivleva, N., Nash, S., Jacob-Nara, J.
MOSBY-ELSEVIER.2023: AB203
- **Diagnosis, prognosticators, and management of acute invasive fungal rhinosinusitis: multidisciplinary consensus statement and Evidence-Based review with recommendations.** *International forum of allergy & rhinology*
Roland, L. T., Humphreys, I. M., Le, C. H., Babik, J. M., Bailey, C. E., Ediriwickrema, L. S., Fung, M., Lieberman, J. A., Magliocca, K. R., Nam, H. H., Teo, N. W., Thomas, P. C., Winegar, et al
2023
- **Tranexamic acid does not significantly lower postoperative bleeding after endoscopic sinus and nasal surgery.** *International forum of allergy & rhinology*
Khanwalkar, A., Chan, E., Roozdar, P., Kim, D., Ma, Y., Hwang, P. H., Nayak, J. V., Patel, Z. M.
2023
- **Rhinolithiasis misdiagnosed as intranasal osteoma: Diagnostic challenges in the telehealth era.** *SAGE open medical case reports*
Kiessling, P., Hwang, P., Chang, M.
2023; 11: 2050313X231207204
- **The link between allergic rhinitis and chronic rhinosinusitis.** *Current opinion in otolaryngology & head and neck surgery*
Grimm, D., Hwang, P. H., Lin, Y.
2022
- **High prevalence of persistent smell loss and qualitative smell dysfunction during the COVID-19 pandemic in the United States: urgent need for clinical trials.** *International forum of allergy & rhinology*
Lechner, M., Liu, J., Counsell, N., Yan, C. H., Paun, S., Eynon-Lewis, N., Sutton, L., Jayaraj, S., Batterham, R. L., Hopkins, C., Philpott, C., Lund, V. J., Hatter, et al
2022
- **Effect of dupilumab on Eustachian tube dysfunction in patients with chronic rhinosinusitis with nasal polyposis.** *International forum of allergy & rhinology*
Chang, M., Roozdar, P., Lin, Y. T., Lee, J. Y., Nayak, J. V., Patel, Z. M., Hwang, P. H.
2022
- **Endoscopic Skull Base Surgery in Children** *CURRENT OTORHINOLARYNGOLOGY REPORTS*
Low, C. M., Hwang, P. H.
2022
- **International Multicenter Study of Clinical Outcomes of Sinonasal Melanoma Shows Survival Benefit for Patients Treated with Immune Checkpoint Inhibitors and Potential Improvements to the Current TNM Staging System** *JOURNAL OF NEUROLOGICAL SURGERY PART B-SKULL BASE*
Lechner, M., Takahashi, Y., Turri-Zanoni, M., Ferrari, M., Liu, J., Counsell, N., Mattavelli, D., Rampinelli, V., Vermi, W., Lombardi, D., Saade, R., Park, K., Scharfetter, et al
2022
- **Prospective intraoperative and histologic evaluation of cavernous sinus medial wall invasion by pituitary adenomas and its implications for acromegaly remission outcomes.** *Scientific reports*
Mohyeldin, A., Katznelson, L. J., Hoffman, A. R., Asmaro, K., Ahmadian, S. S., Eltobgy, M. M., Nayak, J. V., Patel, Z. M., Hwang, P. H., Fernandez-Miranda, J. C.
2022; 12 (1): 9919
- **Applications of vibrational energy in the treatment of sinonasal disease: A scoping review.** *International forum of allergy & rhinology*
Phillips, K. M., Roozdar, P., Hwang, P. H.
2022
- **Skull base osteomyelitis in patients with head and neck cancer: Diagnosis, management, and outcomes in a case series of 23 patients.** *Laryngoscope investigative otolaryngology*
Czech, M. M., Hwang, P. H., Colevas, A. D., Fischbein, N., Ho, D. Y.
2022; 7 (1): 47-59
- **Skull base osteomyelitis in patients with head and neck cancer: Diagnosis, management, and outcomes in a case series of 23 patients** *LARYNGOSCOPE INVESTIGATIVE OTOLARYNGOLOGY*
Czech, M. M., Hwang, P. H., Colevas, A., Fischbein, N., Ho, D. Y.

2022

- **Deep learning classification of inverted papilloma malignant transformation using 3D convolutional neural networks and magnetic resonance imaging.** *International forum of allergy & rhinology*
Liu, G. S., Yang, A., Kim, D., Hojel, A., Voevodsky, D., Wang, J., Tong, C. C., Ungerer, H., Palmer, J. N., Kohanski, M. A., Nayak, J. V., Hwang, P. H., Adappa, et al
2022
- **Open and endoscopic surgery improve survival for squamous and non-squamous cell nasopharyngeal carcinomas: an NCDB cohort study.** *International forum of allergy & rhinology*
Finegersh, A., Said, M., Deconde, A., Hwang, P. H., Holsinger, F. C., Orosco, R. K.
2022
- **Telemedicine and Telementoring in Rhinology, Otolaryngology, and Laryngology: A Scoping Review.** *OTO open*
Yang, A., Kim, D., Hwang, P. H., Lechner, M.
2022; 6 (1): 2473974X211072791
- **Randomized controlled double-blinded clinical trial of the effect of bevacizumab injection in the management of epistaxis in HHT patients undergoing surgical cauterization.** *International forum of allergy & rhinology*
Khanwalkar, A. R., Rathor, A., Read, A. K., Ma, Y., Hwang, P. H.
2022
- **Clinical outcomes, Kadish-INSICA staging and therapeutic targeting of somatostatin receptor 2 in olfactory neuroblastoma.** *European journal of cancer (Oxford, England : 1990)*
Lechner, M., Takahashi, Y., Turri-Zanoni, M., Liu, J., Counsell, N., Hermsen, M., Kaur, R. P., Zhao, T., Ramanathan, M. J., Scharfetter, V. H., Emanuel, O., Helman, S., Varghese, et al
1800
- **Venous thromboembolism rates and risk factors following endoscopic skull base surgery.** *International forum of allergy & rhinology*
Chang, M. T., Jitaroon, K., Song, S., Roozdar, P., Wangworat, Y., Ibrahim, N., Ma, Y., Rao, V. K., Chang, S. D., Fernandez-Miranda, J. C., Patel, Z. M., Dodd, R. L., Hwang, et al
2021
- **Comparison of endoscopic sinus surgery timing in lung transplant patients with cystic fibrosis.** *International forum of allergy & rhinology*
Johnson, J. R., Hwang, P. H., Nayak, J. V., Patel, Z. M.
2021
- **Inflammatory molecular endotypes of nasal polyps derived from Caucasian and Japanese populations.** *The Journal of allergy and clinical immunology*
Nakayama, T., Lee, I. T., Le, W., Tsunemi, Y., Borchard, N. A., Zarabanda, D., Dholakia, S. S., Gall, P. A., Yang, A., Kim, D., Akutsu, M., Kashiwagi, T., Patel, et al
2021
- **The Effect of Povidone-Iodine Nasal Spray on COVID-19 Nasopharyngeal Viral Load in Patients: A Randomized Control Trial.** *The Laryngoscope*
Zarabanda, D., Vukkadala, N., Phillips, K. M., Qian, Z. J., Mfuh, K. O., Hatter, M., Lee, I. T., Rao, V. K., Hwang, P. H., Domb, G., Patel, Z. M., Pinsky, B. A., Nayak, et al
2021
- **Determinants of SARS-CoV-2 entry and replication in airway mucosal tissue and susceptibility in smokers.** *Cell reports. Medicine*
Nakayama, T., Lee, I. T., Jiang, S., Matter, M. S., Yan, C. H., Overvest, J. B., Wu, C., Goltsev, Y., Shih, L., Liao, C., Zhu, B., Bai, Y., Lidsky, et al
2021: 100421
- **Assessment of Opioid Use and Analgesic Requirements After Endoscopic Sinus Surgery: A Randomized Clinical Trial.** *JAMA otolaryngology-- head & neck surgery*
Ayoub, N. F., Choby, G., Turner, J. H., Abuzeid, W. M., Raviv, J. R., Thamboo, A., Ma, Y., Chandra, R. K., Chowdhury, N. I., Stokken, J. K., O'Brien, E. K., Shah, S., Akbar, et al
2021
- **Deep learning automated segmentation of middle skull-base structures for enhanced navigation.** *International forum of allergy & rhinology*
Neves, C. A., Tran, E. D., Blevins, N. H., Hwang, P. H.
2021

- **Surgical approach is associated with complication rate in sinonasal malignancy: A multicenter study.** *International forum of allergy & rhinology*
Beswick, D. M., Hwang, P. H., Adappa, N. D., Le, C. H., Humphreys DO, I. M., Getz, A. E., Suh, J. D., Aasen, D. M., Abuzeid, W. M., Chang, E. H., Kaizer, A. M., Kingdom, T. T., Kohanski, et al
2021
- **Challenging our assumptions: oral corticosteroids and chronic rhinosinusitis without nasal polyposis.** *International forum of allergy & rhinology*
Chang, M. T., Hwang, P. H.
2021
- **Olfactory Dysfunction in Patients Infected with 2019 Novel Coronavirus.** *Iranian journal of otorhinolaryngology*
Bakhshae, M., Barzegar-Amini, M., Motedayen, Z., Khojasteh-Taheri, R., Rafiee, M., Amini, M., Layegh, P., Hashemzadeh, K., Omidvar, D., Hwang, P. H., Hosseinpour, M.
2021; 33 (116): 163-171
- **Multi-compartment skull base orbital cavernous venous malformation: A rare presentation of a common orbital mass.** *American journal of ophthalmology case reports*
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