

## ULTRASONIC SURGERY IN OTORHINOLARYNGOLOGY: NEW FRONTIERS FOR PRECISE AND SAFE INTERVENTION

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### **Abstract**

**Background:** In otorhinolaryngology (head and neck surgery), surgical missions in low- and middle-income countries (LMICs) are increasingly vital. Maintaining high standards of care in resource-limited settings is a challenge that requires innovative, portable, and cost-effective solutions. Recent advancements, such as tablet-based and handheld point-of-care ultrasonography (POCUS), have revolutionized perioperative care, allowing for real-time diagnostics, guided biopsies, and monitoring where CT or MRI access is restricted. Simultaneously, the integration of piezosurgery—already established in dentistry—into rhinosurgery offers a more precise alternative to traditional mechanical tools (drills and chisels), which often carry risks of hemorrhage and thermal tissue damage.

**Aim:** This study aims to enhance rhinosurgical interventions by evaluating the efficacy and safety of piezoelectric instruments (piezotomes) and developing improved surgical techniques for septoplasty and maxillary sinus surgery.

**Materials and Methods:** A clinical study was conducted involving 25 patients at the Otorhinolaryngology Department of Samarkand State Medical University. The cohort included 15 patients requiring septoplasty and 10 patients requiring maxillary sinus cystectomy. The study compared piezoelectric scalpels with traditional surgical techniques. Key parameters included the degree of intraoperative bleeding (assessed via

the Fromme-Boezaart scale), precision of bone manipulation, endoscopic visibility, and surgical duration. Statistical analysis was performed using Stata 18 software.

**Results:** The use of a piezotome led to a statistically significant reduction in intraoperative bleeding compared to conventional methods. Surgeons noted high precision and low vibration levels, allowing for superior control during osteotomy. While the piezotome's irrigation system did not eliminate the need for continuous aspiration, it significantly minimized trauma to adjacent soft tissues. The preliminary findings suggest that piezosurgery is clinically effective in rhinosurgery, substantially reducing blood loss and improving surgical safety.

**Conclusion:** Ultrasound-based technologies, both for diagnostics (POCUS) and surgery (piezosurgery), represent a paradigm shift in ENT care. While piezosurgery is currently less common in sinus surgery than in dentistry, its benefits in reducing tissue trauma and hemorrhage are evident. Further longitudinal studies are required to compare long-term outcomes with traditional methods and to standardize these innovative protocols in clinical practice.

## Reference

1. Aswani J, Baidoo K, Otiti J. Establishing a head and neck unit in a developing country. *JLO*. 2012;126(6):552-555.
2. Fagan JJ, Zafereo M, Aswani J, Netterville JL, Koch W. Head and neck surgical subspecialty training in Africa: sustainable models to improve cancer care in developing countries. *Head Neck*. 2017; 39(3):605-611.
3. Chambers K, Creighton F, Abdul-Aziz D, Cheney M, Randolph G. Global health-related publications in otolaryngology are increasing. *Laryngoscope*. 2015;125(4):848-851.
4. Zender CA, Clancy K, Thuener JE, Mannion K. Surgical outreach and microvascular surgery in developing countries. *Oral Oncol*. 2018;81:69-74.
5. Pearce EC, Mainthia R, Freeman KL, Mueller JL, Rohde SL, Netterville JL. The

- usefulness of a yearly head and neck surgery trip to rural Kenya. *Otolaryngol Head Neck Surg.* 2013;149(5):727-732.
6. Becker DM, Tafoya CA, Becker SL, Kruger GH, Tafoya MJ, Becker TK. The use of portable ultrasound devices in low- and middle-income countries: a systematic review of the literature. *Trop Med Int Health.* 2016;21(3):294-311.
  7. Silva HP, Viana AL. Health technology diffusion in developing countries: a case study of CT scanners in Brazil. *Health Policy Plan.* 2011;26(5):385-394.
  8. Bonnard P, Boutouaba S, Diakhate I, Seck M, Dompnier JP, Riveau G. Learning curve of vesico-urinary ultrasonography in schistosoma haematobium infection with who practical guide: a “simple to learn” examination. *Am J Trop Med Hyg.* 2011;85(6):1071-1074.
  9. Shah S, Noble VE, Umulisa I, et al. Development of an ultrasound training curriculum in a limited resource international setting: successes and challenges of ultrasound training in rural Rwanda. *Int J Emerg Med.* 2008;1(3):193-196.
  10. Bell G, Wachira B, Denning G. A pilot training program for point-of-care ultrasound in Kenya. *Afr J Emerg Med.* 2016;6(3):132-137.
  11. LaGrone LN, Sadasivam V, Kushner AL, Groen RS. A review of training opportunities for ultrasonography in low and middle income countries. *Trop Med Int Health.* 2012;17(7):808-819.
  - Fokkens, W. J. (2020). EPOS2020: a major step forward. *Rhinology*, 58(1), 1. <https://doi.org/10.4193/RHIN20.401>
  11. Al-Mujaini A, et al. *OMJ.* 24, 70-80 (2009); doi:10.5001/omj.2009.18
  12. Siljander, B., Wang, A., Zhang, L., Shih, A., Sullivan, S., & Tai, B. (2014). Cool Mist Irrigation Improves Heat Dissipation during Surgical Bone Drilling. *Journal of Neurological Surgery Part B: Skull Base*, 75(04), 243–246. doi:10.1055/s-0034-1368098
  13. Pavlíková G, Foltán R, Horká M, Hanzelka T, Borunská H, Sedý J. Piezosurgery in oral and maxillofacial surgery. *Int J Oral Maxillofac Surg.* 2011 May;40(5):451-7. doi:10.1016/j.ijom.2010.11.013. Epub 2010 Dec 19. PMID: 21176870.
  14. Demirbilek, N., & Evren, C. (2019). Is Piezoelectric Surgery Really Harmless to Soft



Tissue? Journal of Craniofacial Surgery, 30(7), 1966-1969.

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