Measuring the impact of suture skill training during a short-term surgical trip (STSTs) using OSATS

Mateo Useche MD MPH[1], Ariana S. Rincon MD[2], Selamawit Gebrezgabiher MD[3], Zaid M. Yehala MD[3]; Samuel Volk BS[4], Myra A. Zaheer BS[5], Cody L. Messick BS[4], Alicia B. Yang BS[6], Daniel G. Eayssu MD[7], Joshua P Wiedermann MD[7].

1. Department of Otolaryngology–Head and Neck Surgery, University of Washington, Seattle. 2. Universidad Industrial de Santander, Bucaramanga, Colombia. 3. Department of Otolaryngology–Head and Neck Surgery, Ayder Referral Hospital, Mekelle, Ethiopia. 4. Mayo Clinic Alix School of Medicine, Arizona. 5. George Washington University Medical School. 6. Icahn School of Medicine at Mount Sinai, New York City. 7. Department of Otolaryngology –Head and Neck Surgery Mayo Clinic Rochester.

Introduction

- Approximately 5 billion people still lack timely, safe, and affordable surgical care, a deficit concentrated in sub-Saharan Africa and highlighted by the Lancet Commission.[1,2]
- STSTs have tried to meet this need yet objective evidence of their educational impact on host-country trainees remains limited.[3]
- The **Objective Structured Assessment of technical Skills (OSATS)**, offers reliable video-rateable framework for quantifying improvement.[4,5,6]
- Otolaryngology, head and neck surgery outreach programs in Africa have urged visiting teams to pair structured curricula to ensure skill transfer.[7,8]

Aim

- To evaluate the educational impact of a STST as an intervention to enhance suture skills, assessed with OSATS.

Methods

- Implementation of educational curriculum including didactic sessions, hands-on practice, and real-time feedback during a surgical trip in May 2024 and Feb 2025.
- Residents and consultants of the Otolaryngology-Head and Neck surgery department at Ayder Hospital in Mekelle, Ethiopia.
- OSATS pre- and post-curriculum were video recorded, in form of 5-points Likert scale, to assess performance. Asynchronous graded by experts.
- **Global domains** include use of instruments use, time and motion efficiency, needle insertion and bite sizes, knot tying, and self-correction
- **Individual suture evaluations included**: single and two-hand tie, simple interrupted, mattresses, deep dermal, drain stitch, and running subcuticular.

Figure 1: A. (LEFT) Didactic sessions implemented by visiting U.S. team giving real-time feedback on suture skills. **B.** (RIGHT) Post-educational intervention evaluation recorded with video-camera. **C.** Example of grading rubric, individual suture section.

Suture	1 Cannot Complete	2 Level of novice	3 Intermediate - Level of a medical student/PGY1	4 Advanced - Level of an upper class student/PGY	5 Expert - Consultant level
Simple Interrupted skin sutures					
Buried deep dermal sutures					
Horizontal Mattress					
Vertical mattress					
Drain stitch technique					
Running subcuticular (4 mins)					
Single-handed (left) tie					
Single-handed (right) tie					
Two-handed tie					

C.

Results

- Among 14 participants, 3 (21%) were PGY1, 4 (29%) PGY2, 4 (29%) PGY4 residents, and 3 (21%) consultants. The median Global Score improved from 23.5 [IQR 21.0–25.0] in May 2024 to 25.0 [IQR 24.0–31.0] in February 2025 (p = 0.042) (Table 1). Individual Suture Scores also increased from 22.0 [IQR 17.5–23.7] to 25.0 [IQR 21.2–28.0] (p = 0.04) (Table 1).

Table 1: Objective Structured Assessment of Technical Skills scores changes over time by type of participant

		OSATS Global Suture Scores			OSATS individual Suture Scores		
Group	**N**	**Median [IQR] 2024**	**Median [IQR] 2025**	**p-value**	**Median [IQR] 2024**	**Median [IQR] 2025**	**p-value**
All (C+R)	14	23.5 [21.0–25.0]	25.0 [24.0–31.0]	**0.042**	22.0 [17.5–23.7]	25.0 [21.2–28.0]	**0.004**
Consultant (C)	3	21.0 [20.0–22.5]	35.0 [31.0–36.5]	0.25	22.0 [20.5–23.0]	28.0 [27.0–32.5]	0.25
Resident (R)	11	24.0 [21.5–25.0]	24.0 [22.0–27.0]	0.272	22.0 [16.5–24.5]	22.0 [19.5–28.0]	**0.032**

Results

Figure 2: Paired pre-/post-training OSATS scores for consultants and residents. **(A)** Global Scores (overall) consultants, **(B)** Individual Suture Scores consultants, and **(C)** all Residents.

Table 2: Objective Structured Assessment of Technical Skills Global score changes over time by year of post-graduate training

PGY	N	Median [IQR] 2024	Median [IQR] 2025	p-value
PGY-1	3	19.0 [17.5–20.0]	19.0 [17.5–19.5]	0.317
PGY-2	4	25.0 [24.5–27.0]	25.0 [24.0–27.75]	0.564
PGY-4	4	24.5 [23.5–26.5]	26.0 [24.0–29.0]	0.25

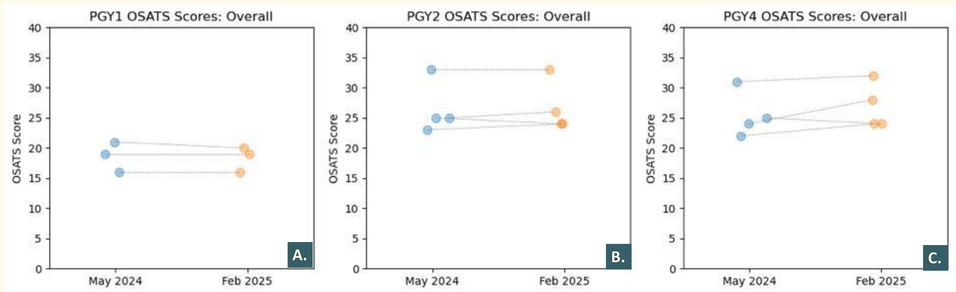

Figure 3: Postgraduate-year-stratified change in **global (overall)** OSATS performance from May 2024 to February 2025. Residency Postgraduate year one **(A)**, two **(B)**, and four **(C)**.

Table 3: Objective Structured Assessment of Technical Skills Individual suture score changes over time by year of post-graduate training

PGY	N	Median [IQR] 2024	Median [IQR] 2025	p-value
PGY-1	3	15.0 [12.5–18.5]	18.0 [16.0–19.5]	0.5
PGY-2	4	24.5 [21.25–26.75]	26.0 [23.5–28.75]	0.125
PGY-4	4	21.0 [19.25–23.5]	25.0 [21.0–28.25]	0.375

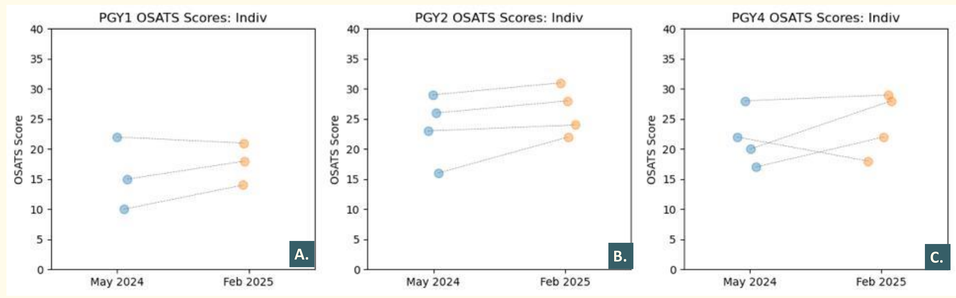

Figure 4: Postgraduate-year-stratified change in **individual suture** OSATS performance from May 2024 to February 2025. Residency Postgraduate year one **(A)**, two **(B)**, and four **(C)**.

Conclusions

- Structured curriculum implemented during a short-term surgical trip, improved suture skills among otolaryngology residents and consultants at Ayder hospital.
- Although global OSATS scores exhibited only modest and non-significant gains, significant improvements in individual suture technique scores were observed for all residents.
- No significant differences in improvements when stratified by year of training.

Contact

Mateo Useche MD MPH
University of Washington
museche@uw.edu

References

1. Meara JGD, Leather AJMMS, Hagander LP, Alkire BCMD, Alonso NP, Ameh EAP, et al. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. The Lancet (British edition). 2015;386(9993):569-624.
2. Truché P, Shoman H, Reddy CL, Jumbam DT, Ashby J, Mazhiqi A, et al. Globalization of national surgical, obstetric and anesthesia plans: the critical link between health policy and action in global surgery. Globalization and health. 2020;16(1):1-.
3. Hendriks TCC, Botman M, Rahmee CNS, Ket JCF, Mullender MG, Gerretsen B, et al. Impact of short-term reconstructive surgical missions: a systematic review. BMJ global health. 2019;4(2):e001176-e.
4. Martin JA, Regehr G, Reznick R, Macrae H, Murnaghan J, Hutchison C, et al. Objective structured assessment of technical skill (OSATS) for surgical residents. British journal of surgery. 1997;84(2):273-8.
5. Siddiqui NY, Galloway ML, Geller EJ, Green IC, Hur H-C, Langston K, et al. Validity and Reliability of the Robotic Objective Structured Assessment of Technical Skills. Obstetrics and gynecology (New York 1953). 2014;123(6):1193-9.
6. McQueen S, McKinnon V, VanderBeek L, McCarthy C, Sonnadara R. Video-Based Assessment in Surgical Education: A Scoping Review. Journal of surgical education. 2019;76(6):1645-54.
7. Mulwafu W, Fagan JJ, Mukara KB, Ibekwe TS. ENT Outreach in Africa: Rules of Engagement. OTO open : the official open access journal of the American Academy of Otolaryngology--Head and Neck Surgery Foundation. 2018;2(2):2473974X18777220-n/a.
8. Din TF, Macharia C, Harris T. Advancing African otolaryngology and head & neck surgery education and training through virtual academic platforms and multidisciplinary teams. Current opinion in otolaryngology & head and neck surgery. 2021;29(3):230-4.