



Postgraduate surgical hernia training with a standardized hernia surgery training tool: training while serving humanity

Basimbe Francis, MD, FACS^{a,b}, Isaac Mubezi, MD, FACS^{c,*}, Ignatius Kakande, MD^b, Chris Oppong, MD^d, Jacob Akoh, MD, FACS^d, Benjamin Desmond Tatumwa, RN^c

Introduction

The hernia surgery skills training course was first organized in 2016, after approval by the COSECSA (College of Surgeons of East, Central and Southern Africa) Executive at a meeting in Geneva, through representation by Prof. Laston Chikoya, then Chairman of the COSECSA Educational Committee. Uganda was selected as the hub of the training program, and Prof. Ignatius Kakande was charged with the responsibility of organizing it. He has successfully supervised the collaboration with Operation Hernia in organizing this course.

The Operation Hernia UK-COSECSA Training Course is a comprehensive program in groin Hernia surgery and has had over six previous courses, providing residents with an invaluable training opportunity. It is a structured program with integrated competence assessment, delivered on a one-to-one basis. This model, designed by Operation Hernia and Surgeons for Africa, has also been used to train residents in Rwanda. It has been published and can be applied to other surgical specialties^[1].

This study elaborates on a hernia surgery skills training program conducted with surgical residents and COSECSA fellow candidates. The training aimed to achieve an appropriate level of competence in mesh and tissue hernia surgery; train residents who complete the course to become trainers, thereby sustaining the program; and expand the program to surgical residents from other COSECSA countries using the Ugandan experience as a model.

The rationale of this training follows the background of the high burden of hernias, where the prevalence of hernias in African countries is high^[2,3]. And yet the rate of repair of hernias

HIGHLIGHTS

- Standardized training improved residents' hernia surgery skills and confidence.
- Mesh repair and tissue repair were taught using a structured, five-stage surgical training model.
- 92.7% satisfaction with lectures, 95.2% with hands-on surgical training sessions.
- Model adaptable to COSECSA (College of Surgeons of East, Central and Southern Africa) countries to address Africa's hernia surgery gap.
- Mentorship and assessment ensured sustained competence in hernia surgery.

is low (10–100/100 000) compared to rates in high-income countries^[4]. This gap highlights a critical need for enhanced surgical capacity and training in the region. Surgical trainees in African countries do not all have access to didactic structured training with competence assessment^[1]. Addressing this training deficit is essential to improve surgical outcomes and meet the demand for hernia repairs across these populations.

This training program represents a successful partnership between COSECSA and Operation Hernia. To date, the program has trained 56 residents, despite the 4-year gap between 2019 and 2023 due to the COVID pandemic and the Ebola outbreak 2022. The training continues to receive enthusiastic and highly positive feedback from participating surgical residents.

Methods

Didactic Lectures covering relevant aspects of hernia surgery are delivered at the beginning of the course. These include training videos on the Lichtenstein operation and the Shouldice operation. The videos were produced by Incision Academy^[5], a Dutch company specializing in surgical education by e-learning. Dr. Erik-Jan Vlieger, CEO of Incision Academy, granted permission for the videos to be used during the workshop. The second part of the program is a hands-on, one-to-one training in mesh repair (Lichtenstein) and non-mesh repair (Shouldice). This practical training usually spans 5 days with each trainer assigned a maximum of three trainees.

The lectures are delivered at a postgraduate medical school training institution. The theatre sessions take place at a modern medical facility in Eastern Uganda, located in a rural area, which provides excellent facilities for theatre training. A series of

^aHead of Department Surgery, Head of Gastrointestinal Surgery and Endoscopy St. Francis Hospital Nsambya, Kampala, Uganda, ^bMother Kevin Postgraduate Medical School, Uganda Martyrs University, Nkozi, Kampala, Uganda, ^cHead Department of Surgery, Hope & Healing Center, Kiwanyi, Iganga, Jinja, Uganda and ^dUniversity of Plymouth, UK

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Head Department of Surgery, Hope & Healing Center, Kiwanyi, Iganga, Jinja, Uganda. Tel.: +256 783796835. E-mail: isaacmubezim@gmail.com (I. Mubezi).

Copyright © 2025 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the Creative Commons Attribution License 4.0 (CCBY), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Annals of Medicine & Surgery (2025) 87:8304–8308

Received 16 May 2025; Accepted 7 October 2025

Published online 28 October 2025

<http://dx.doi.org/10.1097/MS9.0000000000004183>

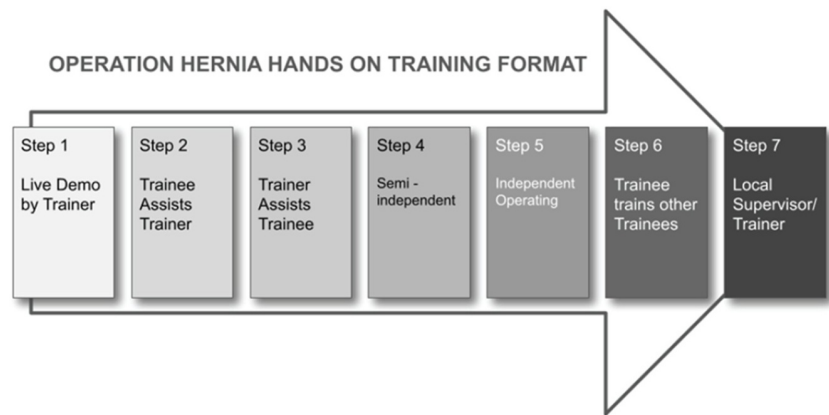


Figure 1. Hands-on training model depicting the format of the adopted training program.

evaluations and assessments are integrated into this training program. A pre-course surgical experience survey provides essential background information, enabling trainers to tailor training of residents. Pre- and post-course surveys assess residents’ knowledge of hernia surgery to evaluate knowledge acquired from the lectures. Additionally, residents complete evaluations of both the lectures and theatre training, which serve as a monitoring tool to support continuous improvement of the program.

The competence assessment of residents is usually in two parts: (1) continuous assessment throughout the training, used to tailor learning to individual participants, and (2) a formal end-of-training assessment of competence. As part of the final assessment, residents complete a self-assessment of their competence, which is compared with the evaluation by their trainers.

Mentoring is also an integral part of the training. The results of the formal assessments are shared with the residents’ supervisors for mentoring in their hospitals. Some residents benefit from dedicated mentoring sessions organized as part of the training course.

Hands-on training

This component of the course is delivered as an intense and effective “apprenticeship.” Each trainer reviews the documented surgical experience of their assigned trainees to inform them of their training strategy. Trainers adhered to a structured sequence of steps in instructing their trainees: demonstration of groin anatomy, delivery of spermatic cord, dissection of hernia sac, management of hernia sac, assessment & management of posterior wall, and management of cremaster muscle and insertion of

mesh. Trainers also evaluate general surgical skills like tissue handling and appropriate use of surgical instruments. Particular emphasis is placed on identifying all the anatomical structures, including the three main nerves – ilioinguinal, iliohypogastric, and genital branch of the genitofemoral nerves. Correct identification of the nerves reduces risk of injury, ischemia, and entrapment, all of which contribute to chronic groin pain.

Mesh repair: The appropriate technique of mesh insertion is demonstrated and taught, highlighting the critical steps that would reduce recurrence as well as other short- and long-term complications.

Non-mesh repair: Non-mesh or tissue repair remains an important option in the African setting because of limited availability of mesh and unsuitability of mesh insertion in contaminated hernia wounds. Shouldice repair – rather than Bassini repair – was demonstrated and taught during the course.

The format of the training adopted is depicted in Fig. 1 and explained in Table 1.

The entire hernia operation is deconstructed into several steps, with each “stage” in the Training Format comprising several components of the deconstruction.

Progression from one stage to the next depends on satisfactory assessment by the trainer. At each stage, the trainee engages in a debrief session with the trainer to reflect on their performance and assess their competence.

Precourse survey of surgical experience

In order to assess residents’ general surgical experience and their level of exposure to hernia surgery, a pre-course self-assessment

Table 1 Detailed explanation of training format	
Steps	Details
Step 1	The trainer demonstrates the procedure while the trainee assists.
Step 2	The trainee assists the trainer multiple times depending on the trainee's prior knowledge, skill, and aptitude, as well as the trainer's assessment.
Step 3	The trainer assists the trainee in performing parts of the procedure, or the entire operation, depending on the trainee's skill and learning progress.
Step 4	Semi-independent: The trainee performs the procedure with assistance from a fellow trainee, under supervision of a trainer who may be scrubbed or unscrubbed, but is prepared to scrub in, provide instruction, and assist as needed.
Step 5	Independent operating: The trainee performs the procedure independently, with the trainer supervising from a distance.
Step 6	The trainee trains other trainees.
Step 7	Local supervisor/audit: The trainee is assigned a local supervisor who provides opportunities to maintain the newly acquired skills and audit their logbook.

Table 2

Number of residents and trainers in the hernia surgery workshops over the years

Year	Number of residents	Number of trainers
2016	10	5
2017	9	3
2018	9	4
2019	12	4
2023	7	3
2024	9	4
Total	56	23

survey is administered. This provides valuable background information facilitating trainer allocation and supports tailored training for each resident.

Results

Over the past 8 years, 56 residents have been trained in open hernia surgical skills. A total of 23 trainers were in the program during this period, as shown in Table 2.

Fifty-six residents have been trained in open hernia surgical skills in the last 8 years.

Knowledge improvement in hernia surgery

Improvement in the overall knowledge of hernia surgery was measured using a score from pre- and post-course self-assessment feedback forms completed by the residents. Improvements were also observed across other aspects of hernia surgery discussed during the course (Figure 2).

Residents' feedback

This component is a crucial part of the training program, as effective feedback from residents informs the development and improvement. Trainees provided a formal, independent, and

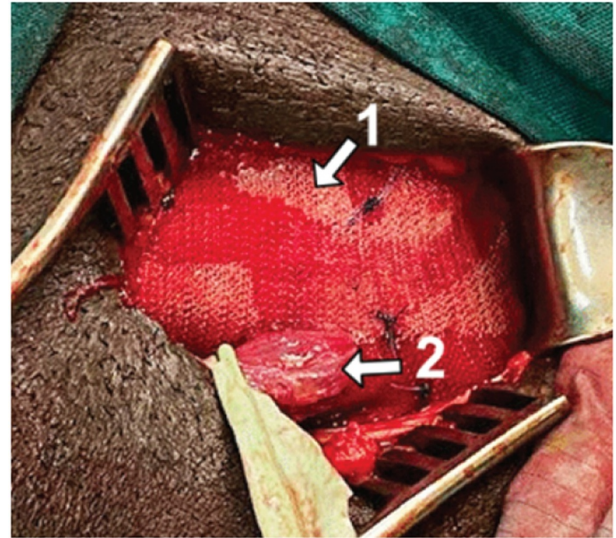


Figure 2. Mesh repair performed by a resident. Arrow 1 indicates mesh insertion, and Arrow 2 indicates the spermatic cord.

anonymized assessment of the training workshop by completing a feedback form. They evaluated all aspects of the course and included their general comments. Feedback on both lectures and the hands-on training was extremely positive.

Feedback: lectures

1. 92.7% of responses regarding the lectures were “good” to “excellent.”
2. 64% were “excellent” (Figure 3).

Feedback: theatre training

Of the responses, 95.2% regarding the theatre sessions were “good” to “excellent.” More time will be allocated to non-mesh repair in subsequent hernia courses (Figure 4).

Feedback From Lectures

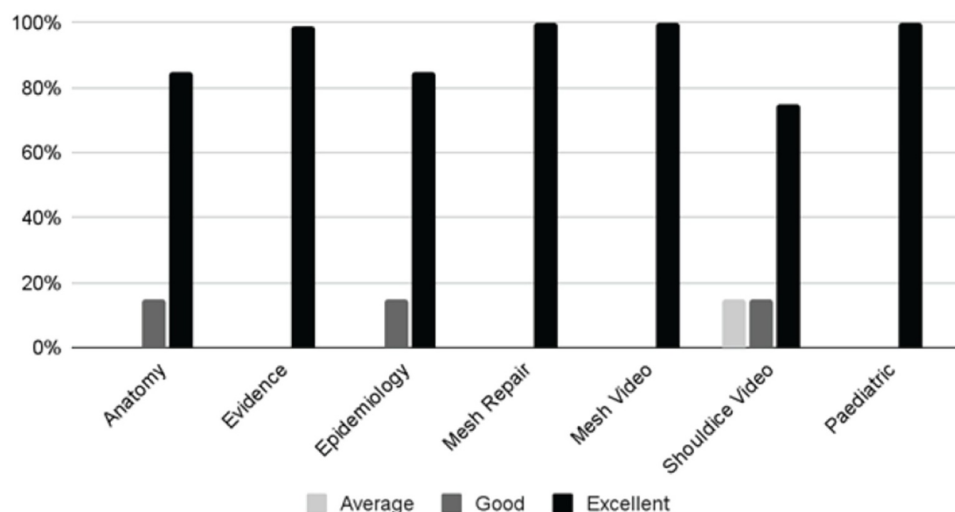


Figure 3. Feedback on lectures with three color categories representing average, good, and excellent across different subjects, anatomy, evidence, epidemiology, mesh repair, mesh video, Shouldice video, and paediatric surgery.

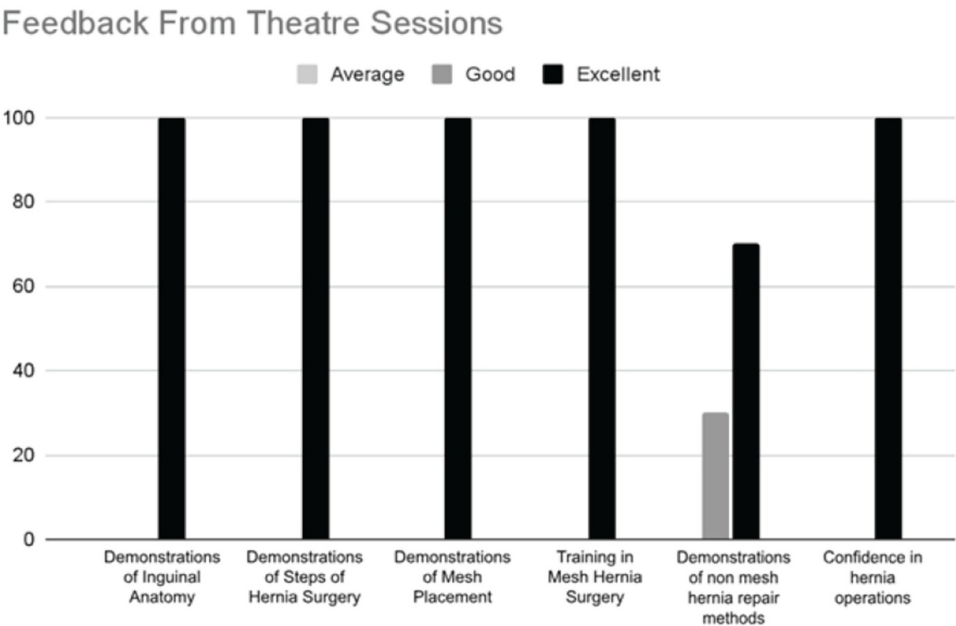


Figure 4. Feedback from theatre sessions covering demonstration of steps of hernia surgery, demonstration of mesh placement training in mesh hernia surgery, demonstration of non-mesh hernia repair methods, and confidence in performing hernia operations.

This very high approval rating from the residents is evidence of the quality of the training program they received and the high level of engagement from trainers.

Feedback comments from residents

A sample of trainee comments that stand out are listed below:

1. All residents have confirmed that the hernia course has improved their surgical skills and confidence in hernia surgery.
2. Feedback and critique from trainers were good.
3. Initially, I was very bothered about hernia operation because I never had one-to-one training and exposure. Today after the camp, I can say that I am very confident about the operation.
4. I had never seen a nerve in a hernia operation. I can now identify the relevant nerves.
5. I can properly identify all the relevant structures. I can confidently insert the mesh.
6. I dealt with fear of dissecting the sac.
7. Learned to dissect the sac bloodlessly along the correct planes.
8. I learned how to infiltrate local anesthesia.
9. I have never been confident that I can handle all types of hernia operations like I felt at the end of this training. With the knowledge I have acquired and the recognition of relevant anatomical structures, I feel I can find my way into safely operating on a hernia patient despite the variations.

Conclusion

The course has been an overwhelming success, judging by the assessment of especially the residents but also by the organizers on behalf of COSECSA and the Operation Hernia UK surgeons”

I have never been confident that I can handle all types of hernia operations, like I felt at the end of this training. With the knowledge I have acquired and the recognition of relevant anatomical structures, I feel I can find my way into safely operating on a hernia patient despite the variations.

This feedback from a resident sums up the success of the training program.

It is imperative, therefore, that more surgical trainees are given access to this essential training opportunity.

Ethical approval

Ethical approval was obtained from the St. Francis Hospital Nsambya Research and Ethics Committee (REC) (Reference Number: UG-REC-020; Approval Date: 15 April 2025; Approval Duration: 15 April 2025 –15 April 2026; Our Ref.: SFHN/REC/352).

Consent

The manuscript includes the following statement: Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review.

Sources of funding

There was no external funding received for this study. The authors declare that the study sponsors had no involvement in the collection, analysis, or interpretation of data; in writing the manuscript; or in the decision to submit the manuscript for publication.

Author contributions

I.M. contributed to the study concept and design, coordinated the implementation of the training program at Hope & Healing Center, participated in data interpretation, and led the writing of the manuscript. F.B. was involved in the development and supervision of the surgical training model, delivered didactic content during training, contributed to methodology design, and participated in critical revision of the manuscript. I.K. played a central role in organizing the training program under COSECSA, provided academic oversight, coordinated institutional collaboration, and contributed to the manuscript review and refinement. C.O. contributed to the conceptual framework for training and assessment, supported curriculum development, and provided guidance on integrating competence-based surgical education into the program. T.D.B. contributed to data collection during the surgical training camp, supported field coordination and logistics, and was involved in documenting field observations and drafting parts of the manuscript. J. A. provided expert input on training design, curriculum review, and feedback mechanisms and participated in the critical revision of the manuscript for intellectual content. All authors reviewed and approved the final manuscript and take full responsibility for its content.

Conflicts of interest disclosure

The authors declare no conflicts of interest.

Research registration unique identifying number (UIN)

Name: Postgraduate Surgical Hernia Training with a Standardized Hernia Surgery Training Tool: Training While Serving Humanity.

UIN: researchregistry11177.

Hyperlink: <https://researchregistry.knack.com/researchregistry#home/registrationdetails/680b38290141a402abbd8b8/>.

Guarantor

Dr. Isaac Mubezi.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Data availability statement

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

References

- [1] Lorenz R, Frunder COA, Lechner M, *et al.* Improving surgical education in East Africa with a standardized hernia training program. *Hernia* 2021;25:183–92.
- [2] Beard J, Ohene-Yeboah M, deVries C, *et al.* Hernia and Hydrocele. In: Debas H, Donkor P, Gawande A, Jamison DT, Kruk M, Mock CN, eds.. *Disease Control Priorities (Third Edition): Volume 1, Essential Surgery*. Washington, DC: World Bank; 2015.
- [3] Ohene-Yeboah M, Beard JH, Frimpong-Twumasi B, *et al.* Prevalence of Inguinal Hernia in adult men in the Ashanti Region of Ghana. *World J Surg* 2016;40:806–12.
- [4] Beard JH, Oresanya LB, Ohene-Yeboah M, *et al.* Characterizing the global burden of surgical disease: a method to estimate inguinal hernia epidemiology in Ghana. *W World J Surg* 2013;37:498–503.
- [5] Incision Academy: <https://www.incisionacademy.com/>