

# Unveiling Hidden Potential: Using Cost-Effective Vintage Operative Microscopes for Advanced Microsurgery Practice in LMICs

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## Abstract

- This study explores the feasibility of repurposing surplus vintage operative microscopes for neurosurgical training and practice in low- and middle-income countries (LMICs).
- Three modified Zeiss microscopes were sourced at minimal cost, refurbished, and used for training neurosurgeons on cadaveric specimens before being deployed to Chad, Guinea, and Nigeria.
- The initiative demonstrated that these microscopes significantly improved surgical precision and visualization, providing a cost-effective and sustainable solution for enhancing neurosurgical education and practice in resource-limited settings.

## Introduction

- In low- and middle-income countries (LMICs), access to high-quality surgical equipment is often limited due to financial and maintenance constraints. Traditional assumptions suggest that cutting-edge technology is necessary for achieving high-quality surgical outcomes.
- This study aims to demonstrate the effectiveness of repurposing vintage operative microscopes in enhancing surgical practice and training in LMICs. We also seek to challenge the prevailing notion that only modern equipment can ensure high-quality surgical care.

## Methods and Materials

- Our initiative identified, acquired surplus vintage operative microscopes from sources in the US where they were sold as-is. The prices of these microscopes were \$68, \$90, and \$240, respectively (Figure 1).<sup>1</sup>
- After initial maintenance, we conducted a series of training sessions using cadaveric specimens for visiting neurosurgeons from LMICs in our neurosurgery operative skills laboratory (Figure 2).
- These microscopes, along with additional sets of instruments, were then donated to the surgeons to take back to their countries for use in real surgeries where they had no operative microscopes. Monitoring and evaluation of the impact on surgical procedures were conducted.<sup>2</sup>



Figure 1. Surplus vintage operative microscopes acquired from the US, priced at \$68, \$90, and \$240, respectively.



Figure 2. Dr. Oluwole Oyeleye, our neurosurgeon colleague from Nigeria, simulates real surgeries on a human cadaver using one of the vintage microscopes in our neurosurgery operative skills laboratory.

## Results

- A total of three modified vintage Zeiss operative microscopes were distributed to three LMICs in Africa: Chad, Guinea, and Nigeria.
- The training sessions in our laboratory empowered neurosurgeons to effectively use and maintain the microscopes, ensuring their sustainable utilization.
- Our preliminary data indicated that the repurposed vintage microscopes proved to be highly effective in real surgical settings (Figure 3).
- Surgeons reported significant improvements in visualization and precision during complex procedures.
- These vintage microscopes, which have survived very well over the years, are still fully functional. They are robust and easy to maintain by the surgical team after basic training.
- Our initiative successfully challenged the assumption that only the latest technology can deliver high-quality outcomes, showcasing that these vintage microscopes are a viable solution in resource-limited settings.<sup>3</sup>



Figure 3. Dr. Yannick Canton Kessely, our neurosurgeon colleague from Chad, uses the microscope in an operating room setting for AV Fistula cases.

## Discussion

- The findings from this initiative reveal that repurposing vintage operative microscopes can significantly enhance surgical practice and training in LMICs.
- By utilizing these cost-effective, high-quality surplus microscopes, we have challenged the notion that only modern technology can deliver high-quality surgical outcomes.
- The positive feedback from surgeons underscores the practicality of this approach.

## Conclusions

- Our initiative demonstrates that significant advancements in surgical practice can be achieved in LMICs through innovative and resourceful approaches.
- The use of cost-effective vintage operative microscopes has the potential to transform surgical education and patient care, ensuring that high-quality surgical interventions are accessible to all, regardless of economic constraints.
- This model can be replicated in other resource-limited settings, providing a sustainable solution for improving global surgical care.

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