University of Cape Town

Faculty of Health Sciences

Anaesthesia providers' accessibility and use of video laryngoscopes in operating theatres in South Africa

Minor dissertation submitted in partial fulfilment of the requirements for the degree of Master of Medicine (MMed) in the
Department of Anaesthesia & Perioperative Medicine

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Declaration

I, *Dr Matthew Jeremiah Sitanda Young*, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Signature: Signed by candidate

Date: 16 March 2023

Format

The contents of this minor dissertation are presented in the 'accepted for publication' format.

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Data analyses and statistical advise

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Abstract

Introduction

Approaches to airway management have undergone a dramatic transformation since the advent of video laryngoscopy (VL). Access to VLs for anaesthesia providers (AP) in operating theatres in South Africa has not previously been described, and the current usage is unknown.

Methods

We designed a cross-sectional survey investigating AP access and type of VL, as well as AP usage of VL in general, in obstetric anaesthesia, and in patients infected with SARS CoV-2. By using a combination of survey and direct contact audit we attempted to contact all medical facilities with an operating theatre in South Africa.

Results

98% (661/676) of hospitals provided responses to the survey or were contacted directly via telephone. Of the total 559 hospitals with operating theatres, 65% (362/559) had access to a VL. 84% (1983/2357) of theatres are found in hospitals which have access to a VL. Larger hospitals are more likely to have video laryngoscopes. The C-MAC® and GlideScope® VL account for 85% of devices found in South Africa. 71% (395/559) of hospitals reported providing obstetric theatre services, while 58% (229/395) of these reported having access to a VL. 54% (301/559) of hospitals reported performing intubations on patients infected with SARS-CoV-2, of these 79% (238/301) reported having access to a VL.

Discussion

Our data quantified the expected inequality in the distribution of VLs. There are large discrepancies between the different provinces, as well as between state and privately funded hospitals in South Africa. Despite having become a common device, VL is underutilized, even in high-risk populations.

Introduction

Approaches to airway management have undergone a dramatic transformation since the advent of video laryngoscopy (VL).[1] Since their introduction around the turn of the century, a plethora of new VLs and other indirect laryngoscopes have been developed.[2] The use of video laryngoscopy quickly gained popularity for intubation in a variety of clinical scenarios and settings, including use by prehospital care providers, emergency physicians, intensivists, otolaryngologists, anaesthesiologists and other airway experts.[1] VLs create an indirect view of the upper airway, which has been shown to improve glottic visualization, especially in anatomically difficult intubation, increasing first-pass success rates and decreasing accidental oesophageal intubations.[3] Most current airway management guidelines now agree that a VL should ideally be present in all locations where airway interventions and intubation take place[4]. The Difficult Airway Society (DAS) 2015 guidelines for management of unanticipated difficult intubation in adults state that "*all anaesthetists should be trained to use, and have immediate access to, a videolaryngoscope,*"[5] while in 2018 the DAS "Guidelines for the management of tracheal intubation in critically ill adults." suggests the use of VL in the presence of a difficult airway or as a rescue strategy when the direct laryngoscope has failed.[6] In the recent literature authors have asked the question "*Has the time really come for universal videolaryngoscopy?*"[7] but for this to take place, access to VL must first be quantified and improved upon if necessary.

Access to VLs for anaesthesia providers in operating theatres in South Africa has not previously been described, and the current usage is unknown. International patterns vary considerably. A survey in India by Shruthi in 2020 showed that only 42% of Indian anaesthetists had access to VL, despite the All India Difficult Airway Association 2016 Guidelines stating: "*…all anaesthesiologists should have access to a VL.*"[8] In Hungary, Nagy performed a national survey of availability of VLs and alternative intubation devices and found that only 65% of respondents had access.[9] By contrast, Cook showed that by 2017, VL was already available in 91% of UK operating theatres. However, this data must be interpreted with caution, as they only achieved a 67% response rate.[10]

In 2021 South Africa was estimated to have a population of 60,14 million people with a gross domestic product (GDP) of $788 billion US dollars.[11] South Africa spends approximately 8.6% of its GDP on health, of which half is spent in the private sector, catering for only 16% of the population. The remaining 84%, however, carry a far greater burden of disease and depend on the under-resourced public health sector.[12] 79% of doctors work in the private sector, leaving only 21% of

doctors for the public (State) sector.[13] The distribution of airway equipment such as VLs is unknown in either sector.

In the global COVID-19 pandemic, the use of VL increased, as many organisations and protocols advised its use in patients with suspected or confirmed SARS CoV-2 infection.[14,15] The availability and usage of VL in patients infected with SARS CoV-2 in South Africa is unknown.

Another emerging use for VL is in obstetric anaesthesia, where difficult and failed intubation remain relatively more common despite advances in airway management.[16] Historically, the incidence of failed intubation among the pregnant population is estimated to be up to eight times that of the non-pregnant population.[17] Complications of general anaesthesia remain a leading cause of pregnancy-related anaesthetic mortality globally, and have accounted for over 50% of anaesthetic-related deaths, many of them airway related.[18] The usage and availability of VL in obstetrics in South Africa is unknown.

We aimed to describe anaesthesia providers' accessibility and usage of video laryngoscopes in South Africa. The primary outcome was to describe the proportion of operating theatres in which VL is available.

Secondary outcomes included describing the distribution of VL accessibility, use and type across State- and private-funded hospitals and, by province, the most common VLs in SA, the use of VL as per the South African Society of Anaesthesiologists' (SASA) COVID-19 Airway Management Guidelines,[15] and the proportion of institutions that use VL as their first choice in anaesthesia for obstetric and COVID-19 patients.

Methods

To describe the proportion of operating theatres in which VL is available, we designed a cross-sectional survey of all medical facilities with an operating theatre in South Africa. Facilities in which general anaesthesia is not performed, or where practitioners were unwilling to consent to divulge information, were excluded. Ethics approval was granted by the Human Research Ethics Committee of the Faculty of Health Sciences of the University of Cape Town (HREC 649/2021). Facility names were included in the questionnaire only for administrative purposes to ensure that a hospital's data had been collected, track responses and eliminate multiple entries.

To identify all facilities, the South African National Department of Health was contacted and supplied a list of 323 State hospitals with registered operating theatres. The four major private hospital groups,[19-22] together with other members of the National Hospital Network,[23] supplied a list of 350 private healthcare facilities, and the three military hospitals were included. This yielded a comprehensive list of 676 hospitals. Sample size for the survey was calculated using the Yamane (1961) formula *[**n = N / (1 + Ne^2)**], (where n= corrected sample size, N = population size, and e = margin of error, set at e = 0.05),* which has been well validated for determining cluster sample sizes.[24] We estimated a requirement of at least 250 responses for adequate power for the primary outcome, but aimed to achieve at least 175 in the State sector and 190 in the private sector to allow subgroup analysis.

An invitation to participate in the survey was advertised in the South African Society of Anaesthesiologists' weekly newsletter during November 2021 and shared via anaesthesia social media platforms around South Africa. A brief introduction to the study was provided, and informed consent was taken before being able to move onto the survey form. To ensure confidentiality, no personal information which could identify the person submitting the data was captured. Data were entered into a REDCap (Research Electronic Data Capture) registry, using anonymous electronic data entry. The REDCap database is maintained on a secure University of Cape Town server and registry is password- protected, with only the investigators able to access the raw data.

During December 2021, individual hospitals that had not yet had an entry into the database were contacted directly by telephone. An anaesthesia provider or the nurse in charge of the theatre complex was interviewed and verbal consent obtained, or the survey link was emailed to them for completion. Hospitals were excluded when they had been directly contacted but the theatre staff were unwilling to divulge any information, or if contacted ten or more times on various days and times and the investigators were unable to directly communicate with any relevant theatre staff.

When more than one identical entry was identified, the duplicates were removed. When duplicates within a hospital had conflicting responses regarding the availability of a VL, we presumed some staff were unaware of the VL's existence, and accepted the entry that confirmed the presence of a VL. Where duplicates conflicted with respect to the number of theatres, the greater number was chosen, as not all clinicians are aware of all areas in which surgical/interventional procedures are regularly performed under anaesthesia, such as cardiac catheterization laboratories and interventional radiology theatres. When more than one entry was identified for a hospital with a

conflicting response related to the use of VL in obstetric and COVID-19 cases, the majority response within the entries received was used.

Results

We collated data on 676 hospitals, 98% (661/676) of these hospitals provided responses to the survey. The remaining 2% (15/676) were excluded because they were uncontactable [14 hospitals], or clinicians declined to provide information [one hospital]. Fifteen percent (102/676) of hospitals did not physically have an operating theatre, or it was non-operational when contacted. The remaining 83% (559/676) of hospitals across South Africa were included in the study database as having operating theatre facilities to address the primary outcome.

Of the total 559 hospitals with operating theatres, 65% (362/559) had access to a VL. The distribution of theatres per hospital ranged from 1 to 35, with a heavily right-skewed distribution (mode of 2, median of 3, and average of 4.2). Hospitals with fewer theatres were less likely to have access to a VL; all facilities with more than 7 theatres reported availability of VL.

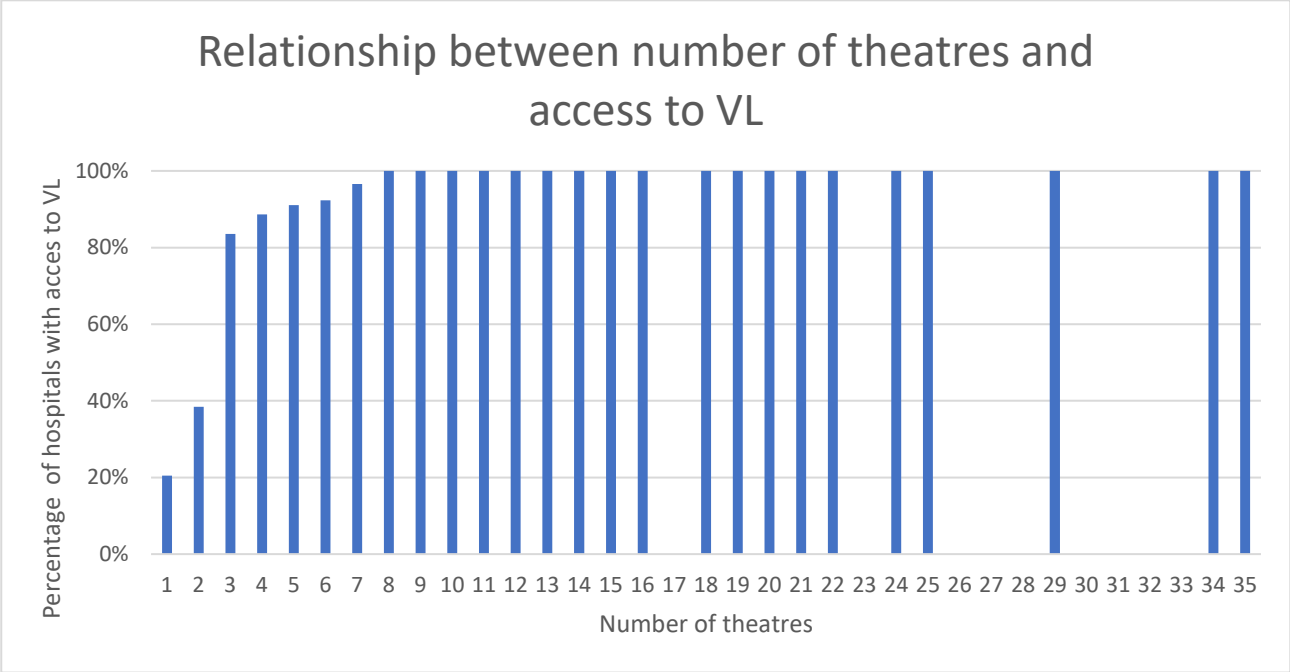

Figure 1. Relationship between number of operating theatres and access to VL.

Overall, only 20% (18/88 hospitals) of single theatre hospitals had access to a VL. As the number of theatres increased, so did the chances of the hospital having access to a VL; all private hospitals with more than three theatres had access, while in the State service this transition occurred only when hospitals had more than seven theatres. (Figure 1). 84% (1983/2357) of theatres are found in hospitals which have access to a VL

The majority (87%, 265/305) of private hospitals had access to VL, compared to a minority (38%, 97/254) of State-funded hospitals. When analysed on the basis of theatres per hospital, this equates to 95% (1371/1437) of private operating theatres being in hospitals which had access to VL, whereas in the State service this was only 67% (612/920).

Overall, 73% (265/362) of hospitals with access to VL are privately funded, while 80% (157/197) without VL are funded by the State.

The lowest availability was reported in Limpopo Province, where 6% (2/36) of State funded hospital have access, while the greatest occurred in Gauteng Province, where availability was 88% (123/139). (Figure 2)

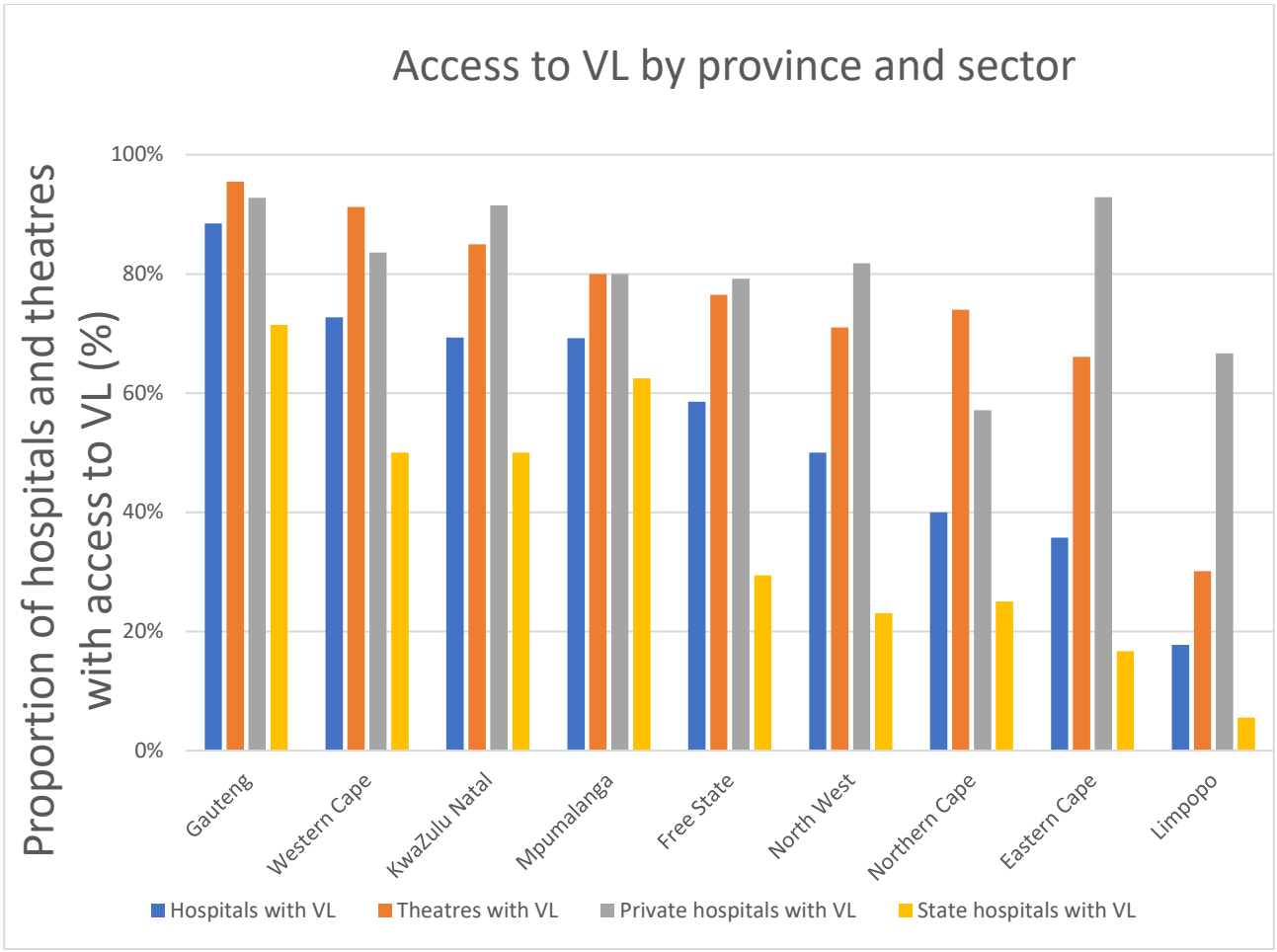

Figure 2. Access to VL by province and sector

The C-MAC® (Karl Storz, Tuttlingen, Germany) and the GlideScope® (Verathon international), accounted in total for 85% of devices. (Figure 3)

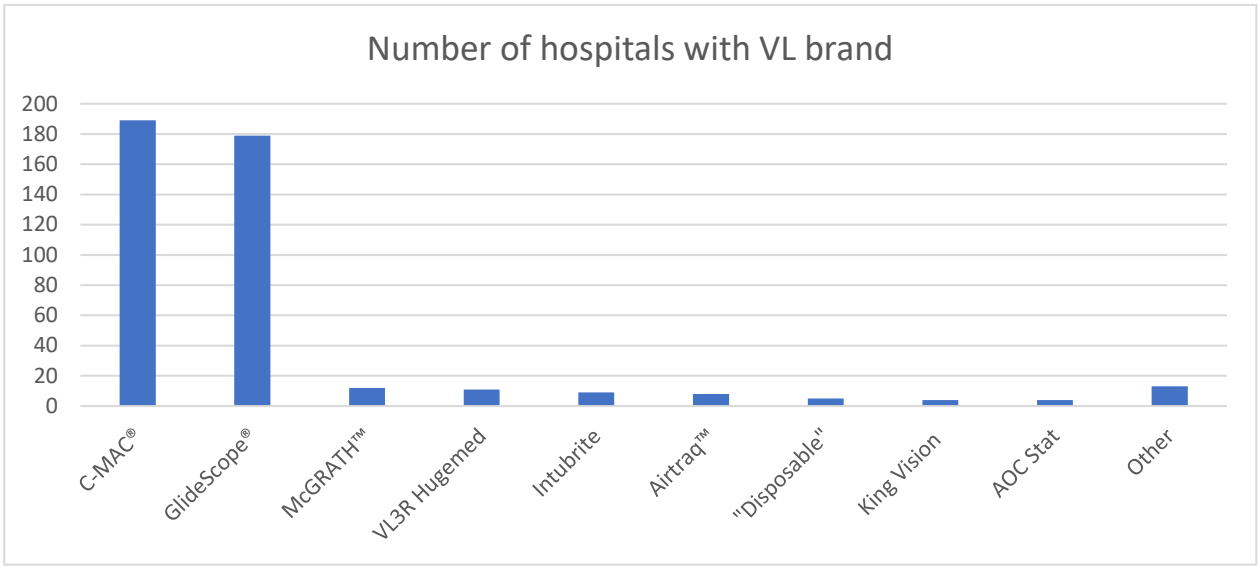

Figure 3. Number of hospitals with specific VL brands

Amongst hospitals in South Africa, 71% (395/559) reported providing obstetric theatre services. Overall, 58% (229/395) reported having access to a VL, and 25% (57/229) routinely used VL as their first line choice for obstetric patients requiring intubation.

In 49% (150/305) of private hospitals, obstetric services were available, with 90% (135/150) of these having access to a VL, and 30% (41/135) using VL as their first-line laryngoscopy device. In 96% (245/254) of state hospitals audited, obstetric care was available, with 38% (94/245) having access and 17% (16/94) routinely choosing VL as their first choice for obstetric laryngoscopy.

Fifty-four percent (301/559) of the 559 hospitals specifically reported performing intubations and theatre cases on patients confirmed and presumed to be infected with SARS-CoV-2. Of these, 79% (238/301) had access to a VL, of which 61% (146/238) used it routinely as their first-choice device for laryngoscopy in this patient cohort. Of private hospitals, 95% (164/173) had access to a VL and 65% (107/164) of those chose to use VL as their first choice of laryngoscopy for COVID-19. Fifty-eight percent (74/128) of State-funded hospitals performing intubations on patients infected with SARS-CoV-2 had access to a VL, and 53% (39/74) choose to use VL routinely.

Discussion

Across South Africa, 65% of hospitals with functioning operating theatre facilities have access to video laryngoscopes. When this is adjusted to account for the size of facilities and number of theatres per hospital, 84% of theatres are found in hospitals which have access to a VL. This finding is far higher than expected, and may reflect the effect of new guidelines and practices during the COVID pandemic on purchasing and provisioning of equipment. To compare this to international standards is difficult, as this metric has not been well described in the literature. It is significantly higher than the 42% in India shown by Shruthi *et al.*,[8] although the 25.8% survey response rate may undermine the statistical accuracy of this figure. Nagy *et al.*[9] in Hungary had a similarly poor response rate (21.6%), but demonstrated that only 65% of anaesthesiologists who responded have availability to VL. In contrast, Cook *et al.* achieved a 67% survey response rate in the United Kingdom in 2017, demonstrating that 91% of hospitals had access to VL. By using a combination of survey and direct contact audit, our study achieved a 97.8% response rate for hospitals in South Africa, and thus hopefully provides a reliable benchmark for the availability of VL at the end of 2021.

Our data quantify the expected inequality in the distribution of VLs in South Africa. The majority of VLs are based in private hospitals, and the doctors working in the private sector are more likely to use a VL when it is available. A prime example is in the provision of obstetric anaesthesia, which is particularly high risk, in a very sensitive patient group. Here, patients receiving general anaesthesia in the state sector have only a 6.5% (16/245) chance that the anaesthesia provider will use VL, while private-sector patients have more than a four-fold higher likelihood (27.3%, 57/395). Furthermore, for State patients where there is access to VL, there is a 17% (16/94) chance that it would be used for first line laryngoscopy, while this is nearly doubled in private hospitals (30%, 41/135).

The incorporation of video laryngoscopes into COVID-19 intubation guidelines was based on several assumptions, which remain unproven in the literature. The highest viral load of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is found in the sputum and upper airway secretions,[25] and video laryngoscopy was recommended in patients infected with COVID-19, to increase the distance between the operator and the patient's face, to reduce the risk of contamination.[26] In addition, video laryngoscopy offers a better view of the glottic entrance and can facilitate a quick-pass first-attempt tracheal instrumentation.[27] This is particularly important in this patient population, in whom desaturation occurs very rapidly on induction, and who have a high rate of airway-related adverse events.[28,29] Our data suggests that despite the promulgation of national guidelines[30] in many hospitals where there is access to VL, this equipment is still not routinely used for infectious patients. This may speak to a lack of practitioner familiarity, training or confidence with the technology.

Overall, South Africa can be regarded as an Upper Middle-Income Country (UMIC). However, there is an enormous discrepancy in the level of healthcare services provided between the large metropolitan and deep rural areas, as well as between provinces. This is accentuated by the disparity between State- and privately-funded facilities. While the best of South Africa is on par with standards of care in high-income, developed countries; rural South Africa may more accurately reflect the situation in underdeveloped regions of Africa, and elsewhere in the world. This provides a window on practice which may be unique, allowing contrasts within a single country that may elucidate otherwise disparate international data. The data presented here, while very specific to the South African context, may improve the generalizability of interpretation of data from a wide range of settings. Certainly, it provides impetus to undertake the further research necessary to establish whether our findings are generalisable to the rest of Africa.

Strengths of this study include the robust response rate and thorough sampling of hospitals across the country. Limitations include the lack of physical auditing of equipment within the hospitals, (which would be a very useful but mammoth undertaking), and the reliance on knowledge and recollection of staff contacted in the individual facilities. Some assumptions were made with respect to the discrepancies in duplicate responses, and the information on VL use was limited to a few simple questions. For instance, we did not gather information on the deliberate use of VL for anticipated anatomically difficult airways. However, this study has now established a baseline for further work.

Conclusion

Video laryngoscopy is available in the majority (65%) of hospitals in South Africa. Larger facilities are more likely to have a VL, and more than four-fifths of operating theatres nationally can access a device. Despite having become a common device, VL is underutilized, even in high-risk populations. Further research will be required to examine the perceived or actual barriers to VL use in our context, address the educational needs in terms of knowledge and/or skill gaps, and further quantify the impact of video laryngoscopy on patient outcomes in South Africa in the future.

References

1. Chemsian R, Bhananker S, Ramaiah R. Videolaryngoscopy. *Int J Crit Illn Inj Sci*. Jan 2014;4(1):35-41. doi:10.4103/2229-5151.128011
2. Lewis SR, Butler AR, Parker J, Cook TM, Schofield-Robinson OJ, Smith AF. Videolaryngoscopy versus direct laryngoscopy for adult patients requiring tracheal intubation: a Cochrane Systematic Review. *Br J Anaesth*. Sep 1 2017;119(3):369-383. doi:10.1093/bja/aex228
3. Lakticova V, Koenig SJ, Narasimhan M, Mayo PH. Video laryngoscopy is associated with increased first pass success and decreased rate of esophageal intubations during urgent endotracheal intubation in a medical intensive care unit when compared to direct laryngoscopy. *J Intensive Care Med*. Jan 2015;30(1):44-8. doi:10.1177/0885066613492641
4. Zaouter C, Calderon J, Hemmerling TM. Videolaryngoscopy as a new standard of care. *Brit J Anaesth*. Feb 2015;114(2):181-183. doi:10.1093/bja/aeu266
5. Frerk C, Mitchell VS, McNarry AF, et al. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. *Br J Anaesth*. Dec 2015;115(6):827-48. doi:10.1093/bja/aev371
6. Higgs A, McGrath BA, Goddard C, et al. Guidelines for the management of tracheal intubation in critically ill adults. *Br J Anaesth*. Feb 2018;120(2):323-352. doi:10.1016/j.bja.2017.10.021
7. Cook TM, Aziz MF. Has the time really come for universal videolaryngoscopy? *Brit J Anaesth*. 2022;doi:10.1016/j.bja.2022.07.038
8. Shruthi AH, Dinakara D, Chandrika YR. Role of videolaryngoscope in the management of difficult airway in adults: A survey. *Indian J Anaesth*. Oct 2020;64(10):855-862. doi:10.4103/ija.IJA_211_20
9. Nagy B, Rendeki S. A national survey of videolaryngoscopes and alternative intubation devices in Hungary. *PLoS One*. 2019;14(10):e0223645. doi:10.1371/journal.pone.0223645
10. Cook TM, Kelly FE. A national survey of videolaryngoscopy in the United Kingdom. *Br J Anaesth*. Apr 1 2017;118(4):593-600. doi:10.1093/bja/aex052
11. World Economics - The Global Authority on Geographic Investability.
12. A G. South African Health Review 2017. Health Policy and Legislation. 2017;doi:10.1787/9789264233386-en
13. Coovadia H, Jewkes, R., Sanders, D., & McIntyre, D. The health and health system of South Africa: Historical roots of current public health challenges. https://depts.washington.edu/sphnet/wp-content/uploads/2013/01/Coovadia.pdf
14. Cook TM, El-Boghdadly K, McGuire B, McNarry AF, Patel A, Higgs A. Consensus guidelines for managing the airway in patients with COVID-19: Guidelines from the Difficult Airway Society, the Association of Anaesthetists the Intensive Care Society, the Faculty of Intensive Care Medicine and the Royal College of Anaesthetists. *Anaesthesia*. Jun 2020;75(6):785-799. doi:10.1111/anae.15054
15. Hofmeyr. SASA COVID Airway/Anaesthesia Guidelines. https://docs.google.com/document/d/1M1zDXZ8c9ymqn5LlqIu50PU-KFlsG_6W-gVjjg7YeFg/edit#.
16. Quinn AC, Milne D, Columb M, Gorton H, Knight M. Failed tracheal intubation in obstetric anaesthesia: 2 yr national case-control study in the UK. *Br J Anaesth*. Jan 2013;110(1):74-80. doi:10.1093/bja/aes320
17. Samsoon GL, Young JR. Difficult tracheal intubation: a retrospective study. *Anaesthesia*. May 1987;42(5):487-90. doi:10.1111/j.1365-2044.1987.tb04039.x
18. Scott-Brown S, Russell R. Video laryngoscopes and the obstetric airway. *Int J Obstet Anesth*. May 2015;24(2):137-46. doi:10.1016/j.ijoa.2015.01.005
19. Life Health Care https://www.lifehealthcare.co.za/hospitals/.
20. Netcare https://www.netcare.co.za/Netcare-hospitals.
21. Mediclinic https://www.mediclinic.co.za/en/corporate/hospitals.html.
22. Intercare https://www.intercare.co.za/facilities?utm_source=healthhub.
23. National Hospital Network NPC http://nhn.co.za/members/.
24. Adam AM. Sample Size Determination in Survey Research. *Journal of Scientific Research and Reports*. 2020:90-97. doi:10.9734/jsrr/2020/v26i530263

25. Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in Different Types of Clinical Specimens. *JAMA*. May 12 2020;323(18):1843-1844. doi:10.1001/jama.2020.3786
26. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. *Can J Anaesth*. May 2020;67(5):568-576. Directives concretes a l'intention des equipes de soins intensifs et d'anesthesiologie prenant soin de patients atteints du coronavirus 2019-nCoV. doi:10.1007/s12630-020-01591-x
27. van Zundert A, Maassen R, Lee R, et al. A Macintosh laryngoscope blade for videolaryngoscopy reduces stylet use in patients with normal airways. *Anesth Analg*. Sep 2009;109(3):825-31. doi:10.1213/ane.0b013e3181ae39db
28. Wei H, Jiang B, Behringer EC, et al. Controversies in airway management of COVID-19 patients: updated information and international expert consensus recommendations. *Br J Anaesth*. Feb 2021;126(2):361-366. doi:10.1016/j.bja.2020.10.029
29. Hofmeyr R. The Role of Anaesthesiologists in the COVID-19 Pandemic: Practical lessons from Groote Schuur Experience. 2021;doi:10.1029/WFSA-D-21-00001
30. SASA Recommendations on Personal Protective Equipment (PPE) for anaesthesia providers during the COVID-19 pandemic. *https://docsgooglecom/document/d/1M1zDXZ8c9ymqn5LlgIu50PU-KFlsG_6W-gVjjg7YeFg/edit#*. 2020;

Appendices

Appendix A: HREC approval

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room G50- Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6492
Email: hrec-enquiries@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

25 October 2021

HREC REF: 649/2021

Prof R Hofmyer
Division of Anaesthesia & Perioperative Medicine
D-23 NGSH
Email: ross.hofmyer@uct.ac.za
Student: mjsyoung@gmail.com

Dear Prof Hofmyer

PROJECT TITLE: ANAESTHESIA PROVIDERS ACCESSIBILITY AND USAGE OF VIDEOLARYNGOSCOPES IN OPERATING THEATRES IN SOUTH AFRICA-MMED CANDIDATE-DR MATTHEW YOUNG

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

This approval is subject to strict adherence to the HREC recommendations regarding research involving human participants during COVID -19, dated 17 March 2020; 06 July 2020 & 01 July 2021.

Approval is granted for one year until the 30 October 2022.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

The HREC acknowledge that the student: Dr Matthew Young will also be involved in this study.

Please quote the HREC REF 649/2021 in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE
Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938
NHREC-registration number: REC-210208-007

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

HREC/REF 649/2021sa

Appendix B: REDCap survey

Anaesthesia providers accessibility and usage of video laryngoscopes in operating theatres in South Africa

Dear anaesthesia providers,

You are being invited to please participate in a survey researching your accessibility and usage of video laryngoscopes in operating theatres in South Africa, which has not previously been described and is currently unknown. This information can guide undergraduate and post-graduate medical training as well as influence future South African guidelines. Currently local guidelines follow the international trends; however, it is unknown whether these guidelines are relevant to our local South African setting. The investigators would like to describe current practice and accessibility.

This brief survey consists of between 8 and 15 questions (depending on your responses) and should take less than two minutes to complete.

The survey is completely anonymous, and your participation in this study is voluntary. By completing the survey, we will presume that you have given consent. You can withdraw from the study at any time by leaving the survey incomplete. Once the complete survey has been submitted, however, withdrawal will no longer be possible, as your data will no longer be personally identifiable.

Facility names are included in the questionnaire only for administrative purposes to ensure that all hospitals' data has been collected and not captured more than once. Hospital names will remain completely confidential, and will only be visible to the investigators. No hospital names or hospital groups will be shared or published.

This study has been approved by Human Research Ethics Research Committee (HREC), Faculty of Health Sciences, University of Cape Town. The HREC can be contacted at +27 21 406 6492 or at sumayah.ariefdien@uct.ac.za. HREC Reference number: 649/2021.

The study is being conducted by Dr Matthew Young and Ms Jo Park-Ross under the supervision of Prof Ross Hofmeyr, from the Department of Anaesthesia and Perioperative Medicine, University of Cape Town, South Africa. Please contact Matthew Young with any questions or concerns at matthew.young@uct.ac.za.

I have read the information above, and consent to partake in this survey	○ Yes ○ No

Province	◯ Eastern Cape ◯ Free State ◯ Gauteng ◯ Kwazulu Natal ◯ Limpopo ◯ Mpumalanga ◯ North West ◯ Northern Cape ◯ Western Cape
Hospital Name	_____ (If you work at multiple hospitals, you are invited and encouraged to complete the survey multiple times in order to capture data for each individual facility. A link giving the option to undertake the survey again will be provided when you click submit.)
Health Sector	◯ Private ◯ State
Hospital type	◯ Primary ◯ Secondary / District / Regional ◯ Tertiary / Academic
Number of operating theatres	_____ (Include all areas in which surgical/interventional procedures are regularly performed under anaesthesia, such as cardiac catheterization laboratories and interventional radiology theatres)
Number of doctors providing anaesthesia care	_____ (This can include non-specialist providers and trainees (such as registrars and medical officers). For private healthcare facilities without fixed staff, please attempt to estimate the number of providers attending on a regular basis or normal working day.)
Do you have access to a VL?	◯ Yes ◯ No
Where is your VL located?	☐ Immediately available in theatre ☐ Within the theatre complex ☐ On hospital premises (eg. ICU / EC / ED) ☐ Locked away / delayed availability ☐ I bring my own ☐ Other location (Multiple responses permissible - elect all options that apply)
Which other VL location?	_____

Which VL do you have?	☐ C-MAC® ☐ GlideScope® ☐ McGRATH™ ☐ Airtraq™ ☐ Disposable ☐ Other (Select all that apply)
Which other VL(s) do you have?	_____
Do you perform COVID-19 intubation at your institution?	◯ Yes ◯ No
Do most providers use VL as their first line choice of laryngoscopy in COVID-19 intubations?	◯ Yes ◯ No
Do you perform obstetric anaesthesia at your institution?	◯ Yes ◯ No
Do most providers use VL as their first line choice for laryngoscopy in obstetric intubations?	◯ Yes ◯ No
Is VL directly available in your obstetric theatre?	◯ Yes ◯ No

Appendix C: Anesthesia & Analgesia: Instructions for Authors

Anesthesia & Analgesia

INSTRUCTIONS FOR AUTHORS

We greatly appreciate your interest in submitting your manuscript to *Anesthesia & Analgesia* or *A&A Case Reports*. Our goal is to provide authors with a thorough yet timely review of their submissions. All decisions should be completed within 6 weeks, except for Review Articles and Special Articles, which may take up to 8 weeks. Authors will be updated as to the status of their manuscript and notified if delays occur.

Notice: The **Instructions for Authors** for *Anesthesia & Analgesia* and *A&A Case Reports* have been significantly revised. New submissions prepared using the previous Instructions will continue to be accepted for review through **March 8, 2016**. As of **March 9, 2016**, all new submissions should be prepared according to the Instructions that follow. Failure to do so may result in your submission being returned without review.

Mission and Scope

Anesthesia & Analgesia exists for the benefit of patients under the care of health care professionals engaged in the disciplines broadly related to anesthesiology, perioperative medicine, critical care medicine, and pain medicine. The Journal furthers the care of these patients by reporting the fundamental advances in the science of these clinical disciplines and by documenting the clinical, laboratory, and administrative advances that guide therapy. *Anesthesia & Analgesia* seeks a balance between definitive clinical and management investigations and outstanding basic scientific reports. The Journal welcomes original manuscripts containing rigorous design and analysis, even if unusual.

A&A Case Reports publishes short yet informative, peer-reviewed articles that simply ***describe*** (a) the unique perioperative or chronic pain-related clinical care of one to three patients; (b) an important teaching point or novel educational tool; or (c) an innovative solution to a perioperative services, patient safety, or global health management issue. Data collection and analyses are neither expected nor encouraged for an ***A&A Case Report***.

***Anesthesia & Analgesia* and *A&A Case Reports* Instructions for Authors**

Anesthesia & Analgesia and *A&A Case Reports* have specific **Instructions for Authors** for submitting articles, which are found below. We strongly encourage all authors to read these instructions completely and carefully, and to prepare their manuscripts in accordance with these instructions.

Articles that are not submitted in accordance with our instructions and guidelines may be rejected.

Questions?

If you have questions about these submission instructions, please contact the **Editorial Office** via editor@anesthesia-analgesia.org or phone at **(919) 378-1773**.

Manuscripts may only be submitted via the Editorial Manager online submission system. Submit your manuscript here.

If you are new to our journal, our Visual User Guide for Authors will help you step-by-step to create an author account and to submit your new manuscript via Editorial Manager.

If you are submitting a revised manuscript, our User Guide for Revisions will help you step-by-step to submit your revised manuscript via Editorial Manager.

Download a PDF version of the full Instructions for Authors of *Anesthesia & Analgesia and A&A Case Reports*

INSTRUCTIONS FOR AUTHORS

Section 1A: *Anesthesia & Analgesia* Article Types (Back to Contents)

Original Clinical Research Report
Original Laboratory Research Report
Brief Report
Narrative Review Article
Systematic Review Articles
Meta-Analysis
Editorial
The Open Mind
Special Article
Echo Rounds
Echo Didactics
Letter to the Editor
Book and Multimedia Reviews
Meeting Report

Section 1B: *A&A Case Report* Article Topics (Back to Contents)

A&A Case Reports publishes short yet informative, peer-reviewed articles that simply ***describe*** (a) the unique perioperative or chronic pain-related clinical care of one to three patients; (b) an important teaching point or novel educational tool; or (c) an innovative solution to a perioperative services, patient safety, or global health management issue. Data collection and analyses are neither expected nor encouraged for an ***A&A Case Reports*** submission.

A&A Case Reports

DESCRIPTIONS

Anesthesia & Analgesia

Original Clinical Research Report (Back to Top)

- An Original Clinical Research Report describes an investigation that focuses on the clinical practice of anesthesiology, perioperative medicine, critical care medicine, or pain medicine.
- Original Clinical Research Reports span the spectrum of patient-reported outcomes, clinical effectiveness, quality and performance improvement, patient safety, health services delivery, dissemination and implementation science, health policy, healthcare economics, and population health.
- Original Clinical Research Reports include a Title Page and structured Abstract of no more than 400 words. These Reports are divided into four sections: Introduction, Methods, Results, and Discussion.
- Original Clinical Research Reports range in length from 1,500 to 4,000 words (not counting the Abstract and references), typically with no more than 30-40 references and 4-6 tables and/or figures. Online supplemental material can be provided when appropriate.
- Study Reporting Requirement (EQUATOR)

- Instructions for manuscript preparation
- Instructions for Figure preparation
- Instructions for Table preparation
- Instructions for Supplemental Material

Original Laboratory Research Report (Back to Top)

- An Original Laboratory Research Report describes an investigation that focuses on an aspect of basic science related to anesthesiology, perioperative medicine, critical care medicine, or pain medicine.
- Original Laboratory Research Reports span the spectrum of cell biology, immunology, neurobiology, biochemistry, pharmacology, microbiology, and genetics.
- Original Laboratory Research Reports include a Title Page and structured Abstract of no more than 400 words. These Reports are divided into four sections: Introduction, Methods, Results, and Discussion.
- Original Laboratory Research Reports range in length from 1,500 to 4,000 words (not counting the Abstract and references), typically with no more than 30-40 references and 4-6 tables and/or figures. Online supplemental material can be provided when appropriate.
- Study Reporting Requirement (EQUATOR)
- Instructions for manuscript preparation
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- Instructions for Table preparation
- Instructions for Supplemental Material

Brief Report (Back to Top)

- A Brief Report describes a clinical or laboratory investigation that does not require the breadth of experimentation or documentation expected of an Original Research Report.
- A Brief Report typically involves the analysis of either retrospective or preliminary data, thus forming the basis for a subsequent more extensive investigation. A Brief Report can also be technical in nature, describing a new instrumentation or analytic technique.
- Brief Reports include a Title Page and an unstructured Abstract with no more than 100 words. Brief Reports contain an Introduction, Methods, Results, and a very brief (no more than 1 paragraph long) Discussion.
- Brief Reports are no more than 1500 words (not counting the Abstract and references), typically with no more than 10 references and 1 table and/or 1 figure.
- Study Reporting Requirement (EQUATOR)
- Instructions for manuscript preparation
- Instructions for Figure preparation
- Instructions for Table preparation
- Instructions for Supplemental Material

Narrative and Systematic Review Articles (Back to Top)

- A Narrative Review Article synthesizes previously published material into an integrated presentation of our current understanding of a topic and can be either focused or comprehensive in scope. A Narrative Review Article should describe aspects of a topic about which scientific and evidence-based consensus exists, as well as aspects that remain controversial and are thus topics for ongoing and future research.
- Another specific option is a Focused Narrative Review of the conventional or novel application of contemporary quantitative sciences (i.e., statistics, epidemiology, or database management) to issues of concern to anesthesia, critical care or pain researchers. Here the inclusion of programing code/illustrative datasets as online supplemental material is encouraged.
- For a Systematic Review, a formal strategy to search and to critically evaluate the medical literature should be applied and described. Such explicit methods are used in a Systematic Review to minimize bias in its content and findings.
- All Review Articles include a Title Page and an unstructured Abstract with no more than 400 words. Review Articles range in length from 1,500 to 5,000 words (not counting the Abstract and references), with up to 150 references and 4-6 tables and/or figures.
- Study Reporting Requirement (EQUATOR)
- Instructions for manuscript preparation
- Instructions for Figure preparation
- Instructions for Table preparation
- Instructions for Supplemental Material

Meta-Analysis (Back to Top)

- A Meta-Analysis uses analytic techniques to combine the quantitative results from existing individual studies, which are initially identified via a Systematic Review, thereby (a) allowing for a more precise estimate of the magnitude of benefit or harm of an intervention and/or (b) increasing the applicability of the results to a broader range of patients
- A Meta-Analysis should not be written and submitted as a Systematic Review Article but as a separate submission type.
- A Meta-Analysis includes a Title Page and structured Abstract of no more than 400 words. These manuscripts are divided into four sections: Introduction, Methods, Results, and Discussion.
- A Meta-Analysis ranges in length from 1,500 to 4,000 words (not counting the Abstract and references), typically with no more than 30-40 references and 4-6 tables and/or figures. Online supplemental material can be provided when appropriate.
- Study Reporting Requirement (EQUATOR)
- Instructions for manuscript preparation

- Instructions for Figure preparation
- Instructions for Table preparation
- Instructions for Supplemental Material

Editorial (Back to Top)

- Editorials are *solicited* by the Editorial Board
- An Editorial either (a) provides an editorial perspective on an article published in the Journal or (b) expresses the general policies or opinions of the Journal Editorial Board. If an Editorial is intended to provide an expert perspective on an article or topic published in the Journal, it is typically solicited from reviewer(s) who provided unusually thoughtful insight during the peer-review process, and which the Editors believe should be shared with the Journal readership.
- An Editorial includes a Title but not an Abstract. It is typically less than 2000 words (not counting the references), with no more than 15 references and occasionally 1 table and/or 1 figure.
- Instructions for manuscript preparation
- Instructions for Figure preparation
- Instructions for Table preparation
- Instructions for Supplemental Material

The Open Mind (Back to Top)

- The Open Mind is a unique forum for thoughtful, scholarly, and preferably well-referenced perspectives. The Open Mind is intended to stimulate lively yet civil discussion. It is a forum for (a) challenging myths or dogma and/or (b) proposing new approaches or solutions to an important issue facing the anesthesiology community.
- Submissions to The Open Mind include a Title Page but not an Abstract.
- Open Mind articles range in length from 1,500 to 3,000 words (not counting the references), with up to 20 references and 2-3 tables and/or figures.
- Instructions for manuscript preparation
- Instructions for Figure preparation
- Instructions for Table preparation
- Instructions for Supplemental Material

Special Article (Back to Top)

- A Special Article is a manuscript that does not fit in any of the other article types. They are typically invited by the Editorial Board to examine a particular topic.
- Occasionally, authors produce a publishable scholarly text that does not fit one of the other article types. After first communicating directly with the Journal's Editor-in-Chief, these may be submitted as a Special Article.
- All Special Articles include a Title Page and an unstructured Abstract with no more than 400 words. Special Articles range in length from 1,000 to 5,000 words (not counting the Abstract and references), with up to 150 references and 4-6 tables and/or figures.
- Instructions for manuscript preparation
- Instructions for Figure preparation
- Instructions for Table preparation
- Instructions for Supplemental Material

Echo Rounds (Back to Top)

- Echo Rounds provide a focused discussion of a unique or interesting perioperative clinical situation in which ultrasound was central to the clinical management. Submissions must provide succinct teaching points on echocardiographic/ultrasound views, techniques or calculations. Their teaching content must be supported by the current literature or standard reference texts of echocardiography, preferably those most accessible to the general reader.
- Authors are advised to examine previously published Echo Rounds (either via the Table of Contents or via the www.anesthesia-analgesia.org) to avoid submission of previously published topics.
- Echo Rounds should not be construed and presented as "mini Case Reports." Therefore, only the most relevant clinical details and specific echo findings should be succinctly presented in the first one-third of the manuscript. The specific echo findings and didactic discussion of the echo topic(s) should comprise the subsequent two-thirds of the manuscript.
- Echo Rounds include a Title Page but not an Abstract.
- Echo Rounds are short reports with no more than 800 words (not counting the Abstract and references) and 6 references.
- Echo Rounds should be accompanied by 1-3 echocardiographic still images and 1-3 video clips with legends. The video clips will be available online. The still images usually, but not always, correspond to the respective video clip(s). Figures and clips should be appropriately labeled (e.g., arrows, abbreviations of anatomic structures, etc.). Authors may elect to consolidate consecutive time segments into a single clip,