

# A cost analysis of the flexible optical scope (fiber- or videoscope) for difficult intubation in comparison with the Ambu® aScope™ disposable videoscope

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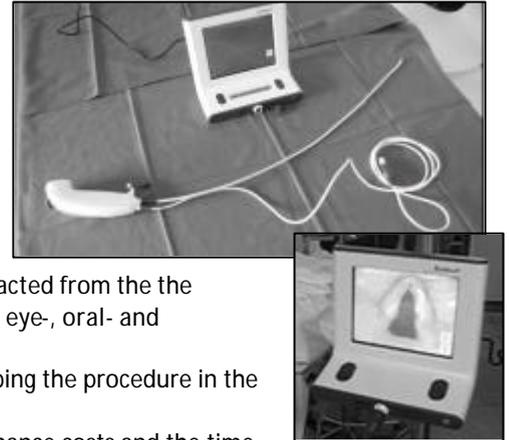
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## Introduction

The flexible optical scope (FOS) is the gold standard for managing the patient with an anticipated difficult airway. Until recently only non-disposable FOS (either fiberscopes containing optical fibers or videoscopes with a tip camera) were available.

A disposable alternative, the Ambu® aScope™ (photo), has now been introduced.

Despite focus on cost benefit analysis in healthcare, the actual costs of having a flexible scope (fiberscope or video-scope) available for cases of difficult intubation has never been published. The new possibility of using disposable flexible videoscopes for this purpose has highlighted the paucity of knowledge of the total costs of acquiring and maintaining the traditional scopes compared with disposable types.



## Material & Methods

The total number of FOS-intubations performed at a multi-disciplinary anesthesia department providing anesthesia for approximately 8.000 operations per year was extracted from the the Danish anaesthesia Database (DAD). The study departments included plastic and burns -, eye-, oral- and maxillofacial -, orthopaedic- and ear-nose-throat- surgery.

The costs incurred in performing FOS were calculated by observing, and in detail describing the procedure in the clinical setting.

Information of purchase price of the equipment for FOS-intubation, the related maintenance costs and the time consumption for servicing the equipment were obtained from the hospital's medicaltechnical department.

The purchase costs and operating costs of the washer-disinfector for the endoscopes were obtained from the manufacturer.

The costs of extra equipment used during the procedure were obtained from the procurement department of the hospital.

The service related costs were determined by measuring the time consumption by each group of staff involved in the overall procedure, including time spent for transport, preparation, cleaning, maintenance et cetera.

A series of intubations using the Ambu® aScope™ were performed for comparison.

The resulting cost per intubation includes all aspects related to the procedure except the actual time used for the intubation itself.

## Results

360 FOS intubations are performed per year using 12 different FOS. Of these, eight are traditional fiberscopes with eyepiece, four are videoscopes; two with a tip camera (Olympus BF1T240 and BF3C160), one hybrid (Olympus BFXP160F) and one fiberscope with a detachable camera (Storz MEDI PACK™ with DCI® camera). It is estimated that one third of the total number of intubations were performed using videoscopes and two thirds using fiberscopes.

Costs per intubation using FOS	Non-disposable FOS, mixed	Non-disposable FOS, video	Disposable FOS, video
<i>Intubations per year, n</i>	360	120	>25
Initial expenditure (scopes, racks and washer-disinfector)	109	187	299
Repair costs	82	45	-
Wage costs (nurse, physician, technician etc.)	45	45	5
Operating costs (washer-disinfector, power, water etc.)	32	38	-
Cost per flexible optical intubation	268	309	304

All amounts are in USD and excl. VAT. 1 USD = 4,94 DKK (26.11.2009)

## Discussion

We found that in our clinical setting the average cost of a single FOS intubation is USD 268\$. When using a non-disposable videoscope the costs are USD 309\$, and when using the disposable Ambu® aScope™ the costs are USD 304\$. These costs are highly dependent on local conditions, such as already existing facilities and wages. This makes exact extrapolation to other departments difficult, however the magnitude of the costs of the non-disposable and the single-patient FOS seem to be comparable. The low entry costs of disposable equipment may facilitate the distribution of flexible optical scopes to areas where these have been unavailable until now.

## Conclusion

The costs of having either a traditional non-disposable or a disposable flexible optical scope available for endotracheal intubation are of equal magnitude. This allows the clinician to let other parameters, such as clinical performance, availability, hygiene or storage capacity determine what kind of equipment to choose.