MP16-14: Evaluation of a novel portable cystoscopy device: The "GoScope"

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Background and Objective

Portable cystoscopy with the use of technology could provide rapid cystoscopy in resource-limited settings. **Ergonomics** in surgery is a growing field of interest and so this study aimed to provide an ergonomic assessment of a **3D-printed**, **phone-mounted** cystoscopy device, the "**GoScope**".

Methodology

Design & 3D Printing

Development of the GoScope was conducted in amelioration cycles of measurements and sketches, computer-aided design (CAD), printing, testing and re-design.

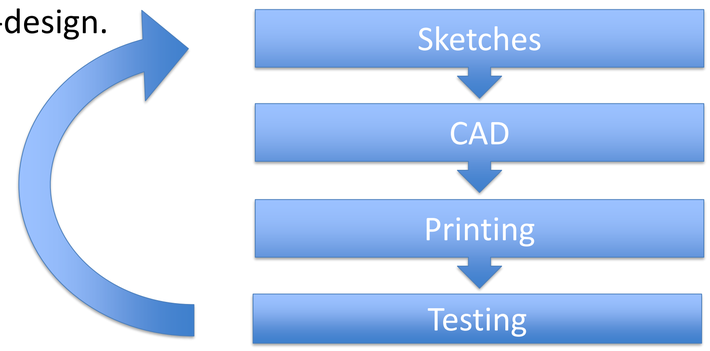
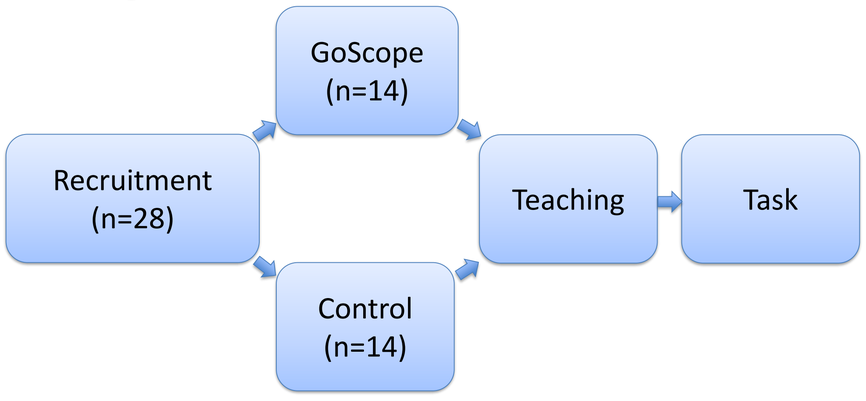


Figure 1: Image of GoScope fixed to iPhone 7 and rigid cystoscopy equipment, with Uro-Scopic trainer used for the cystoscopy task and video monitor.

Study Design

Prospective RCT, comparing the ergonomics of the GoScope with traditional rigid cystoscopy equipment in a simulated cystoscopy task. Novices with no prior cystoscopy experience were recruited. Both groups received didactic teaching.



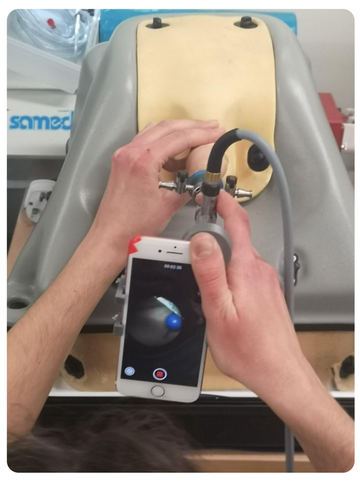


Figure 2: Study protocol flow diagram. **Figure 3:** GoScope in use.

Performance & outcome measures

Subjective ergonomic assessment:
- Modified Surgery Task Load Index (SURG-TLX).

Objective ergonomic assessment:
- Electromyography (EMG) of the trapezius muscle.

Expert opinion:
- EMG measurements & modified SURG-TLX.
- Feasibility of the device for use in clinical practice.

Results

	Control (n=14)	GoScope (n=14)	P value
Mean EMG range	846.5	991.1	**0.04***

Table 1: Mean Electromyography (EMG) data given in analogue digital conversion (ADC) output. Unpaired t test of EMG amplitude ranges of control and GoScope arm.

Question	Mean		P value
	Control (n=14)	GoScope (n=14)	
The device felt comfortable to hold and use	3.429	3.071	**0.34**
The device required significant time to get used to	3.000	2.286	**0.13**
The device got in the way while performing the task	2.357	2.571	**0.63**

Table 2: Subjective questionnaire data. Ease of use questionnaire section responses of control and experimental arm. No other sections of the questionnaire (pain/discomfort, mental demand, physical demand, task complexity, distractions, degree of difficulty) showed a statistically significant difference in response scores.

Question	Mean		P value
	Control (n=14)	Expert (n=12)	
The device got in the way while performing the task	2.571	3.583	**0.02***
Degree of difficulty	5.357	3.000	**0.005***

Table 3: Expert questionnaire response compared to experimental (GoScope) arm. No other sections reached statistical significance nor did EMG data.

Expert participants gave balanced feedback on the feasibility for use in clinical practice with suggestion for improvement.

Conclusions

- There is a desire among clinicians to incorporate portable technology devices such as mobile phones in urological practice.
- This study has shown promise for the potential future use of the GoScope in providing rapid and portable cystoscopy with the use of widely available technology.
- However, the ergonomics of the device may not be optimal, and future further improvements of the device would address this, using feedback from urologists.

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