

Role of Spectacle Mounted Video Recording System in Residency Training Programme

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Abstract

Telemedicine being an integrated part of clinical practice in today's armamentarium, has several utilities like tele consultation, tele surgery, tele education, tele monitoring, tele pharmacy, tele nursing etc. Improved technology and use of low cost simple gadgets have made it convenient to most of the people. Tele surgery and tele education are branches of interest for surgeons. Tele education is not only confined to the theory related skills but it is also useful for learning surgical skill. Trainee residents have a vast opportunity of learning and improving the surgical skills without actually waiting for the surgery especially in emergency procedures where senior consultant may not be present all the times and a skilled hand is required to perform the procedures in trauma patients. Tele surgery plays an important role in this scenario, by keeping a video library resident can learn surgical skills by recorded videos and also he can transmit these to senior consultant to get expert's opinion either intra operatively or post operatively. We present a simple, low cost, spectacle mounted and user friendly device for video recording which has several advantages over traditionally used video recorders.

Keywords: Tele Education; Trauma; Video Recording.

Introduction

Word 'Tele' means distance and word 'cheirourgia' means surgery. In Telepresence the surgical actions are guided by the expert surgeon from a distant site. Laparoscopic surgery provided the doorstep for Telesurgery [1,2].

Tele medicine is an important part of medicine in modern practice. It is useful in almost all branches of medicine, surgery, nursing and para clinical fields. Among the various utilities Tele surgery and Tele education are becoming important modalities, especially for trainee resident doctors [3,4]. Video recording is an important tool in keeping records and training resident doctors. It becomes more useful in emergency cases. It may not be possible practically

for senior consultant to be present all times for guidance during medical training Resident doctor can record pre operative examination, planning of the surgery and consultant can monitor and give expert opinions before surgery. Post operatively also resident can learn to improve his/her skills by showing pre recorded videos to the consultant. Traditionally used video recorders are bigger in size and require another person to record the surgery. Head mounted GoPro cameras are useful to serve this purpose but high cost, heavy equipment and difficulty in focusing the surgical site are problems associated with it. As the camera is situated at the forehead of the surgeon, it is cumbersome for him/her to focus the surgical site every time after changing the position. Hence it diverts surgeon's attention repeatedly towards proper focusing. We used Mobile

Eyewear Recorder to serve this purpose and it was found to be more helpful, as it is light weight and spectacle mounted surgeon need not to worry for focusing repeatedly. This article highlights the importance of cost effective spectacle mounted video recorder in the training of resident in emergency procedures.

Methodology

The study was conducted in the department of Plastic Surgery, JIPMER, and Pondicherry after taking informed consent from the patients. As we already were using a GoPro High Definition (HD) Hero3+ camera (Figure 1) mounted to the head with a camera strap (Figure 2) which was purchased at the cost of INR 25000/-. The head mounted camera was being used by resident doctors for emergency cases where senior consultant was not available all the times for monitoring and guiding. Several problems were faced by residents while surgery like heavy weight and tight strap of the camera leading to discomfort, uncertainty of focusing due to significant distance between surgeon's eye and camera lens as the camera was placed on forehead (Figure 2), surgeon needs to flex the neck significantly for adequate recording leading to neck pain in prolonged surgeries. To overcome these problem, instead of using head mounted we used spectacle mounted camera with the cost of INR 2999/- (Figure3, 4). OSATS [5] (Objective structured assessment of technical skill), (Table 1) score was assessed and compared for both the equipments (Head mounted and spectacle mounted). Four MCh residents took part in the study. They used both head mounted and spectacle mounted cameras during surgery in equal number of cases. The OSATS score was calculated and compared during head mounted and spectacle mounted procedures. Significant rise in OSATS score was seen in all residents while using spectacle mounted video recorder (Table 2).

Result

More than fifty percent of candidate had 80% improvement in the skill. Spectacle mounted recorder was well accepted by all residents. Various advantages noticed over head mounted camera were- cost effective, light weight, comfortable to wear, focuses whatever surgeon sees hence causes no diversion of attention, user friendly operation due to control buttons over the camera.



Fig. 1: Head mounted go pro camera



Fig. 2: Resident using head mounted camera



Fig. 3: Spectacle mounted camera



Fig. 4: Resident using spectacle mounted camera

Table 1: Parameters of OSATS score

Parameters	Score				
	1	2	3	4	5
Respect for Tissue:	Frequently used unnecessary forced on tissue or caused damage by inappropriate use of instruments	-	Careful handling of tissues but occasionally caused inadvertent damage	-	Consistently handled tissues appropriately with minimal damage
Time and Motion:	Many unnecessary moves	-	Efficient time motion but some unnecessary moves	-	Clear economy of movement and maximum efficiency
Knowledge and handling of instruments:	Lack of knowledge of instruments	-	Competent use of instruments but occasionally appeared stiff or awkward	-	Obvious familiarity with instruments
Flow of operation:	Frequently stopped procedure and seemed unsure of next move	-	Demonstrated some forward planning with reasonable progression of procedure	-	Obviously planned of course of procedure with effortless flow from one movement to the next.
Use of assistants:	Consistently placed assistants poorly or failed to use assistants	-	Appropriate use of assistants most of the time	-	Strategically used assistants to the best advantage at all times
Knowledge of specific procedure:	Deficient knowledge Needed specific instructions at most steps	-	Knew all important steps of procedure	-	Demonstrated familiarity with all aspects of operations

Table 2: Comparison OSATS score with head mounted and spectacle mounted camera

	Initial OSATS	Number of cases	Final OSATS with Head mounted camera	Final OSATS with spectacle mounted camera
Resident 1	25	4+4	27	28
Resident 2	24	5+5	26	29
Resident 3	24	6+6	25	27
Resident 4	25	5+5	26	28

Discussion

Practice of tele surgery was successfully performed on September 7, 2001, Operation Lindbergh, the first complete remote surgery on a 68 year old female patient, performed from a distance 7000 km [6].

The Potential Applications of Tele Surgery Include

Provide assistance to surgeons in developing countries, training of new surgeons, sharing operative plans and skills among trainees, recording the procedures for subsequent teaching and demonstration, real time record keeping of surgery, mentoring during surgery by senior surgeon, tele education of new residents who has not been exposed much. Learning by recorded videos is an effective tool of interactive learning as it provides the opportunity for live visual and verbal interaction between instructors and learners [4]. This becomes more useful in casualties as the resident gets an idea of handling and managing the emergency cases even if he/she is less exposed. Resident doctor can record the video for pre operative, intra operative or post operative learning.

Traditionally used camera has some disadvantages as it needs an extra person inside the

procedure room for recording, which may not be available in emergencies. Surgeon may feel cumbersome in providing space for recording person due to crowding near operating site. Use of head mounted Go Pro camera has resolved these problems as the operating surgeon can wear and record the surgery. Various disadvantages of GoPro are high cost, heavy weight, and difficulty in focusing of operating field. Through this article we would like to highlight the use of spectacle mounted camera recording system as a low cost and effective tool for video recording during surgery.

Conclusion

Spectacle mounted video recorder can be a simple, cost effective and user friendly effective tool in surgical field for resident training, improving skills, effective learning and record keeping.

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