DOI: 10.7860/JCDR/2016/18009.8161

Letter to Editor

Surgery Section

Mobile Cam Lap Endotrainer

SHANKAR RAM[1], ABY MADAN[2], NAZAR MUSTHAFA[3], SOUMYA KASTURI[4]

Keywords: Mobile phone, Laparoscopy, Trainning

Sir,

Several endotrainers are available in the market with varying cost and sophistication [1-3]. We have tried to make a simple cost effective and homemade endotrainer. This designed endotrainer uses a mobile camera which serves the purpose of a telescope, display monitor and camera holder. The device is simple, cheap, custom made, has a self-retaining scopic vision, co-operator independent. Thus it enables to practice laparoscopic techniques. The aim behind designing this endotrainer was to promote basic laparoscopic skills and inculcate it in the basic medical under-graduation programme. Apart from dissection the technique of intracorporeal knotting is very essential skill for basic as well as advanced laparoscopy. Even in the era of staplers and ligature the strength and reliance of the knot is unique which needs to be mastered.

DESIGN

1. A Cardboard box of moderate dimensions accommodating viewable framework of the mobile camera is used which is cheap, easily available and ideal for multiple punctures for the ports and instruments. Perforations are made with scissors by screwing movements. Also, at the port holes cardboard enables necessary pliability at the fulcrum of the instruments used. The working distance is between 20 to 30 cm.
2. Adhesive glue is used for fixation of fiber and fevicol for the thermocol to the cardboard box. White thermocol covering enables internal reflection and increases the brightness and contrast within the endotrainer chamber.
3. Cantilever like Ridges are made with plastic fiber channel (used for electricwiring) giving rise to a platform that holds the mobile phone and steps within makes angulations. A gap is left for the downward facing camera.
4. An LED 7 watt bulb light gives optimum exposure and avoids flickering when viewed in the mobile camera and also avoids unnecessary use of mobile flash. Excess light reduces shadows and interferes with depth perception.
5. Mobile phone – Micromax Nitro with 13 Megapixel rear camera gives adequate exposure and autofocus and auto brightness function.
6. The mobile is inserted through the designed fenestration in the roof on to the platform. The angulation can be adjusted for long and short focus over the step on the platform, such an arrangement which is self retaining in position.

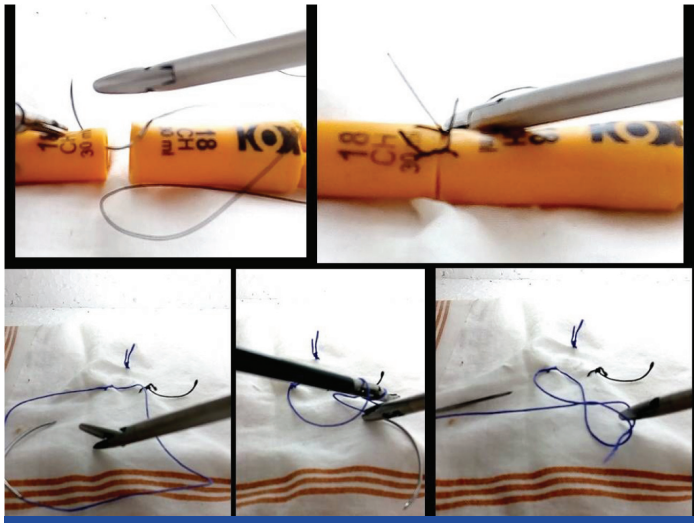
The designed endotrainer caters for effective and efficient learning of laparoscopic skills. Intracorporeal knotting, anastamosis, layered closure, dissection, extracorporeal knotting can be simulated. The instruments used are Maryland forceps, laparoscopic scissors, needleholder, Bhandarkar knot pusher. With the same principles other designs can be made with different mobile phones of different sizes as desired. The device is compact, simple, cost effective and light weight design. It costs less than 400 INR. A

[Table/Fig-1]: Internal view of mobile cam lap endotrainer.

[Table/Fig-2]: External view of mobile cam lap endotrainer in action.

mobile phone with good camera with autofocus and high definition is preferred for video capture, recording and self assessment at the finger tips.

The port positioning is based on baseball diamond concept [4] and desired azimuth and manipulation angle can be obtained for ergonomics. However, the mobile camera position remains constant as far as the lateral mobility, sideviewing and rotation are concerned. Within the constraints of degrees of freedom of movement a good panoramic view can be obtained. Just like the macula of the eye the angulation and positioning of the camera is designed for maximum focus and magnification achieved at the centre of the base which shall remain the target for the technique to be learnt. The endotrainer enables cooperator independence and can be practiced even in sitting position comfortably. A self made endotrainer also inculcates self interest in practicing more and shortening the learning curve. The videos are available in youtube in the following links.



[Table/Fig-3]: Suturing and Knotting training module

https://www.youtube.com/watch?v=HT4DdV5RZkI; https://www.youtube.com/watch?v=7PRGMx6PSno

REFERENCES

[1] Mir IS, Mohsin M, Malik A, Shah AQ, Majid T. A structured training module using an inexpensive endotrainer for improving the performance of trainee surgeons. *Trop Doct*. 2008;38(4):217-18.

[2] Ramalingam M, Senthil K, Murugesan A, Pai MG. Cost Reductive Laparoendoscopic Single Site Surgery Endotrainer and Animal Lab Training—Our Methodology. *Diagnostic and Therapeutic Endoscopy*. 2010;2010:598165, 6 pages, 2010. doi:10.1155/2010/598165

[3] Dhariwal AK, Prabhu RY, Dalvi AN, Supe AN. Effectiveness of box trainers in laparoscopic training. *J Minim Access Surg*. 2007;3(2):57–63. doi: 10.4103/0972-9941.33274.

[4] Mishra RK. Principles of Laparoscopic surgery. 3rd ed. Jaypee Brothers medical publishers pvt limited. New Delhi. India 2013.

PARTICULARS OF CONTRIBUTORS:

1. Resident, Department of Urology, TD Medical college Hospital, Alappuzha, Kerala, India.
2. Assistant Professor, Department of Urology, TD Medical College Hospital, Alappuzha, Kerala, India.
3. Professor and Chief, Department of Urology, TD Medical College Hospital, Alappuzha, Kerala, India.
4. Resident, Pediatric Cardiology, Amrita School of Medicine, Kochi, Kerala, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Shankar Ram,
Sandhyaram Hospital, Kadampazhipuram, Palakkad-678633, Kerala, India.
E-mail: ram.hss84@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Nov 26, 2015**
Date of Peer Review: **Jan 28, 2016**
Date of Acceptance: **Mar 02, 2016**
Date of Publishing: **Jul 01, 2016**