

## I - Pad Box Lap Endotrainer

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**Abstract :** A laparoscopic trainer has been constructed with I pad mini and Plastic box .The device can be easily made ,simple ,cheap and useful for learning basic Laparoscopic skills independently similar to conventional trainers .

**Keywords:** Laparoscopy, Endotrainer, I pad mini, Stress ball.

### I. Introduction

Many I- pad based laparoscopic trainers have evolved apart from the conventional laparoscopic endotrainers .Even a Mobile camera can be used for the same purpose<sup>(1-2)</sup> .The image captured can be live streamed in to larger screens with help of chromecast and other smart TV softwares and mobile Applications . We have evolved new simple custom made Compact design &constructed a laproscopic trainer that can be easily made with a plastic box and I pad mini and easily available materials .

### II. Materials and Methods

The construction is demonstrated step by step in the video given in this link . <https://youtu.be/xO3XnisIcY0>

Asialistic box of about 25 cms x 25 cms x 20 cms ideal with a silicone rubber lid that is pliable is chosen .Fenestrations are made on the lid for the ports and for the camera of I pad Mini to be inserted inside .Outside it is stabilized by a mobile cam holder with small vacuum cups or just laid on a simple stress ball . I pad is suspended in to plastic box with camera part inserted over the lid through a small slit at an angulation .This helps in focusing the exercise field and with the majority of the screen outside facing the operator along the diagonal axis like a rhomboid screen the images are captured with far and wide views .The surgical fields is created at the base of the box with help of layered crepe bandage or soft sponge and plastered with porous dynaplastor sponge resin making a tissue like surgical bed at the bottom .

The Light source is seated externally over a tongue shape flap focusing down created in the middle& Top of the plastic wall Just beneath the lid binding frame. A compact Single LED torch is used without reflector to lighten the region of interest in endotrainer and is pushed inside through the window .LED torch light can be recharged even while on usage .The light is focused with a wide beam without flickering on the I pad mini screen.

**Figure 1 . The basic frame work constitutes a plastic box with fenestrations and ports with slit for I pad Mini and a window on the side wall for LED torch. A stress ball or mobile phone holder is used to support I pad .**

The angle with which the camera is facing downwards and the angle by light source pointing to the centre of region differs by 10 to 30 degrees .The angulation can be adjusted moderately by changing the position of the ball and orientation of the light source .Only a limited side rotation is possible in this arrangement through the coronal slit in the lid over which I pad mini is seated .The magnification and clarity is adjusted with zoom and autofocus options.A simple switch can dim , bright (ON) and OFF the light.The light can be fixed to tongue flap with rubber or glove bands.



**Figure 2 .** I pad is placed and stabilized well over stress ball or mobile phone holder and seated in to the trainer.

The camera focus and as well as light is projected from the same end of the box The Shadows aid in depth perception like in the arrangement of 2D laparoscopy .Good vision and clarity is available in I pad mini. Plastic box with lid made of pliable material is suitable for ports and maneuvering the instruments through it.

### **III. Results**

Tasks performed include picking, cutting module with layers of gauze piece, dissection with peeling, Intracorporeal Suturing, Knotting and Simple anastomosis. The construction is very easy .The make and use are shown in the video available in the link. The tasks are performed with ease and same effectiveness as conventional endotrainer in region of interest and the performance is satisfying and training can be obtained independently.



**Figure 3.** Making of Flap for LED torch and placement of stress ball,I pad and instrument

#### IV. Discussion

Many such custom made models can be made with simple design and prepared according to one's needs, desire, ambience, convenience, availability of materials and cost effectiveness. The above architecture is one such design that would encourage and enable self construction and learning of basic laparoscopic skills independently at your fingertips.



**Figure 4.**Application of Sutures.



**Figure 4:**Out look- IPadBox Lap Endo Trainer

## V. Conclusion

With the surgical future transcends to new dimensions of minimal access surgery these kind of devices shall enable all the medical professionals begin to learn and acquire the basic skills as a part of fundamental learning in medical Schools .

## References

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