



UNIVERSITY OF LEEDS

This is a repository copy of *Evaluation and usability study of low-cost laparoscopic box trainer “Lap-Pack”: a 2-stage multicenter cohort study*.

White Rose Research Online URL for this paper:  
<https://eprints.whiterose.ac.uk/177965/>

Version: Supplemental Material

---

**Article:**

Chauhan, M [orcid.org/0000-0001-9742-5352](https://orcid.org/0000-0001-9742-5352), Sawhney, R, Da Silva, CF et al. (9 more authors) (2021) Evaluation and usability study of low-cost laparoscopic box trainer “Lap-Pack”: a 2-stage multicenter cohort study. *International Journal of Surgery: Global Health*, 4 (5). e59. e59-e59. ISSN 2576-3342

<https://doi.org/10.1097/gh9.0000000000000059>

---

**Reuse**

This article is distributed under the terms of the Creative Commons Attribution (CC BY) licence. This licence allows you to distribute, remix, tweak, and build upon the work, even commercially, as long as you credit the authors for the original work. More information and the full terms of the licence here:  
<https://creativecommons.org/licenses/>

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.



[eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk)  
<https://eprints.whiterose.ac.uk/>

SDC Table 1: Comparison of trainee surgical experience

<b>Trainee Code</b>	<b>Years of surgical experience</b>	<b>Number of years of experience in laparoscopic surgery</b>	<b>Number of laparoscopic procedures assisted</b>	<b>Number of laparoscopic procedures performed</b>
1	10	6	80	60
2	7	7	300	100
4	7	7	30	300
5	7	7	50	150
6	3	3	150	10
7	7	7	100	70
8	15	1	100	.

SDC Table 2: Usability evaluation questionnaire for box trainer

A. Face validity rating system for laparoscopic box trainer

INOVUS:	LAP-PACK:
Abdominal cavity	Visualization
Enclosed cavity	Use of camera
Elastic/flexible wall	Easily adjustable camera
Trocar used at port site	Dedicated light source
A0 – does not fulfill any of the criteria	B0 – does not fulfill any of the criteria
A1 – fulfills criterion 1	B1 – fulfills criterion 1
A2 – fulfills criterion 2	B2 – fulfills criterion 2
A3 – fulfills all 3 criteria	B3 – fulfills all 3 criteria
Total score: A + B (out of 6)	

B. Lap-Pack usability questionnaire

**Instructions** – Mark your level of agreement using a ‘circle’ (from a minimum of 1 to a maximum of 7) with the following statements about your experience with the tool during the experimental session you completed just now.

		Disagree					Agree	
Structure and Usability	Durable	1	2	3	4	5	6	7
	Waterproof	1	2	3	4	5	6	7
	Ease of Assembly/disassembly	1	2	3	4	5	6	7
	Portability	1	2	3	4	5	6	7
	Lightweight	1	2	3	4	5	6	7
Task View and Camera	Easy task view	1	2	3	4	5	6	7
	Tasks in visual field	1	2	3	4	5	6	7
	Isolated from ambient light	1	2	3	4	5	6	7
	Background colour/contrast	1	2	3	4	5	6	7
	Angular view of the task	1	2	3	4	5	6	7
	Image quality	1	2	3	4	5	6	7
	No shadow	1	2	3	4	5	6	7
	Image Colour	1	2	3	4	5	6	7
	Constant/non-shaky view	1	2	3	4	5	6	7
Replicable view of actual field	1	2	3	4	5	6	7	
Task specific skills	Peg Transfer	1	2	3	4	5	6	7
	Precision cutting	1	2	3	4	5	6	7
	Ligating loop	1	2	3	4	5	6	7
	Extra-corporeal knot tying	1	2	3	4	5	6	7
	Intra-corporeal knot tying	1	2	3	4	5	6	7
	Task completion probability	1	2	3	4	5	6	7
	Speed and efficiency	1	2	3	4	5	6	7
	Precision and accuracy	1	2	3	4	5	6	7
	Depth perception	1	2	3	4	5	6	7
	Appropriate port sites location	1	2	3	4	5	6	7
	Angle of task	1	2	3	4	5	6	7

SDC Table 3. Usability evaluation categories and sub-criteria

<b>Category</b>	<b>Criteria</b>	<b>Sub-criteria</b>
Usability	<p>Easy to assemble</p> <p>Easy to dissemble</p> <p>Mobility (can be used anywhere)</p>	<p>Lightweight</p> <p>Port site angle felt comfortable</p> <p>Port site height felt comfortable</p>
Camera	<p>Quality of image was adequate to perform the task</p> <p>No shadows were seen</p>	<p>Colour of image was adequate</p>
Views	<p>Easy to attain view for task completion</p> <p>Breadth of visual field is adequate</p> <p>Isolated from ambient light</p> <p>Background colour/contrast is adequate</p>	<p>Angle of view achieved made the task easy to perform</p> <p>View was constant and did not change with task</p> <p>View was replicable to operative field</p>
Material	<p>Durable</p>	<p>Waterproof</p>

SDC Table 4: Individual features scoring across various cohort studies

		<b>Lightweight</b>	<b>Mobility</b>	<b>Adequate image color</b>	<b>Image quality</b>	<b>Task view</b>	<b>Port site angle comfort</b>
<b>ARSICON</b>	Mean	6.50	6.33	6.50	6.33	6.33	6.33
	95% CI with p<0.05	6.17 - 6.83	6.11 - 6.56	6.17 - 6.83	6.02 - 6.56	6.06 - 6.61	6.02 - 6.65
Strongly agree or agree		100%	89%	100%	88%	95%	95%
<b>MAMC</b>	Mean	6.30	6.24	6.30	6.24		
	95% CI with p<0.05	6.04 - 6.57	5.97 - 6.51	6.04 - 6.57	5.89 - 6.59		
Strongly agree or agree		88%	81%	84%	84%		
<b>SJUH</b>	Mean	6.30		6.30		6.33	
	95% CI with p<0.05	6.00 - 6.59		6.00 - 6.59		5.90 - 6.76	
Strongly agree or agree		92 %	88%			89%	
<b>India combined</b>	Mean	6.37	6.27	6.37			
	95% CI with p<0.05	6.17 - 6.58	6.08 - 6.47	6.17 - 6.58			
Strongly agree or agree		92%	84%	90%			
<b>All combined</b>	Mean	6.35	6.17	6.35	6.17		
	95% CI with p<0.05	6.18 - 6.51	5.84 - 6.34	6.18 - 6.51	5.96 - 6.37		
Strongly agree or agree		92%	86%	86%	82%		

Note: The above scores are mean values of scores obtained for each category (on a 7-point Likert scale).