

# The Influence of an Online Platform (Hernia U) in Surgical Education and Patient Management

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## ABSTRACT

**Introduction:** Hernia U was created with the objective to expand the educational landscape of abdominal wall surgery. It is an online platform where surgeons can register with no cost and subscribe for different courses. The aim of this study is to evaluate the impact of the platform on patient management and surgical education.

**Methods:** A questionnaire regarding the influence of Hernia U in surgical education and patient management was emailed to professionals who had previously participated in any course of the Hernia U. Variables were shown with absolute and relative frequencies. Pearson's  $\chi^2$  and Fisher's exact test were performed to analyze relationships between variables as appropriate.

**Results:** Nine hundred three participants responded to the questionnaire. Seven hundred fifty-two (83.3%) were men; 248 (27.4%) participants were older than 50 years old; 240 (26.6%) were between 41 and 50 years old. Two hundred seventy-four (30.4%) participants had been in practice for more than 20 years, 242 (26.8%) between 11 and 20 years, and 161 (17.8%) between 5 and 10 years. When analyzing the impact of time spent on the platform, spending over an hour per week was significantly associated with self-reported change in practice patterns compared to spending less than an hour per week ( $p < 0.0003$ ). More experienced surgeons (10 or more years of practice) were less likely to change their practice patterns when compared to less experienced surgeons.

**Conclusion:** Hernia U has allowed surgeons to change their daily practice and to boost their education. Surgeons spending more than one hour weekly in the platform are more likely to adopt changes.

**Key Words:** Abdominal hernia, Abdominal wall, Medical education, Surgery.

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## INTRODUCTION

The internet has become an essential tool for surgical education, with multiple forms of information delivery emerging online: live lectures, telesurgery, case discussions, journal clubs, and so on.<sup>1-3</sup> The pioneer website for this technology was WebSurg, from IRCAD, France.<sup>2</sup> Over time, countless other platforms have appeared as alternatives to traditional routes of learning, with social media being the most notable new medium for knowledge sharing.<sup>4-8</sup> While online forums have allowed individuals to share and compare their experiences and pitfalls with unprecedented ease, this accessibility is often accompanied by both an overload of information and an uncertainty regarding who is actually qualified to give guidance. The solution may be as simple as providing gentle oversight, via a single forum moderator or an entire trained educational team.

Hernia U ([www.herniau.com](http://www.herniau.com)) was created as a formal virtual curriculum for abdominal wall surgery (AWS). This is notable for two reasons: one, as an online platform available to registered users free of charge, surgeons can access curated courses developed by experts in the field from anywhere in the world. Two, as AWS is an evolving surgical field, it allows for continuing education for surgeons of all ages and at all levels of experience. More than 10,000 professionals from 110 countries have already interacted with the platform. The objective of this study is to begin to evaluate the impact of the platform on patient management and surgical education.

## METHODS

### Design and Validation of the Survey

A 15-item online questionnaire was created using professional survey software (SurveyMonkey, San Mateo, CA, USA). The questionnaire is available as Supplemental file 1. The questions were created in the English language by two authors (RL and DL) and edited by two other authors (SMC and FM). Before sending the survey, four surgeons (members of Hernia U) tested the survey and further changes were performed in some questions to avoid ambiguity. The Checklist for Reporting Results of Internet E-Surveys was used to ensure survey quality.<sup>9</sup> Prior to beginning the survey, participants were informed of the investigators, the total estimated time to complete the survey, the aims of the study, and the number of questions on the questionnaire. Every page had only one question and the participants could go back to a prior question and change their answers. This study was exempt from institutional review board approval.

### Participants

Participants were registered members of Hernia U who had attended at least one of the activities available in the platform. The questionnaire was sent by email and was available for six weeks. All responses were password protected to prevent unauthorized access. Reminder emails, text messages, and messages in social media were sent to encourage responses. All survey responses were anonymous; IP addresses were utilized to prevent duplicate responses from a single participant. Furthermore, the survey website allowed an automatic method for capturing responses. The online questionnaire addressed the influence of Hernia U on participants' surgical education and management of patients. The use of online tools such as

surveys and their dissemination through email or social media is very common.<sup>5</sup> Our survey was delivered online in different formats that could be accessed by smartphone, computers, and tablets.

### Statistical Analysis

Data was analyzed by a biostatistician (DCS) using the R Project Statistical Computing software, version 30.30.1 ([www.r-project.org](http://www.r-project.org)).

Descriptive statistics and dependence analysis were performed. Continuous variables were resumed with position and medial rank measures, and categorical variables with distribution of frequencies. To analyze the relation between variables, Pearson's  $\chi^2$  and Fisher's exact tests were performed as appropriate. The level of significance used was 5% and the confidence, to the confidence intervals, 95%.

## RESULTS

Nine hundred three responses were received and analyzed. Sociodemographic data are listed in **Table 1**. Participants were asked how long they had been in practice at the time of completing the survey, with 274 (30.4%) answering more than 20 years, 242 (26.8%) between 11 and 20 years, and 161 (17.8%) between 5 and 10 years. **Table 2** reports how participants interacted with the platform. Most participants reported accessing Hernia U during the evening ( $n = 544$ ; 60.3%), with many using the site on a weekly basis ( $n = 383$ ; 42.6%), followed by 286 (31.8%) monthly, 170 (18.9%) casually, and 60 (6.7%) daily.

**Table 3** demonstrates how participants changed their practice after watching the courses online. Six hundred twelve (67.8%) participants reported that they changed their surgical approach. More experienced surgeons (10 or more years of practice) were more resistant to change their practice when compared to less experienced surgeons (**Table 4**). Using daily changes as reference, older surgeons were more willing to make occasional changes or no changes.

Participants who spent between 1 and 5 hours in the platform are 12 times more likely to change the practice when compared to participants who spent less than one hour. ( $p < .001$ ) (**Table 5**). There was no difference between age groups or gender regarding changing their practice after watching Hernia U courses ( $P = .05$ ,  $P = .848$  respectively). (**Tables 6 and 7**) In all age groups, the evening was the preferred time of the day to access the platform

**Table 1.**  
Sociodemographic Characteristics of the Participants

Demographic Characteristic	N	%
Gender		
Female	151	16.7
Male	752	83.3
Total	903	100
Age groups (years)		
20 – 25	9	1
26 – 30	116	12.9
31 – 35	134	14.9
36 – 40	155	17.2
41 – 50	240	26.6
> 50	248	27.4
Language		
Spanish	418	46.3
Portuguese	141	15.6
English	133	14.7
French	27	3
German	13	1.4
Chinese	12	1.3
Japanese	1	0.1
Other	157	17.4
Local of practice		
Europe	258	28.6
South America	220	24.4
North America	182	20.2
Asia	88	9.8
Central America	77	8.5
Africa	46	5.1
Middle East	28	3.1
Oceania	3	0.3
Years of practice		
Still in training	101	11.3
Less than 5 years	124	13.7
Between 5 and 10 years	161	17.8
Between 11 and 20 years	242	26.8
More than 20 years	274	30.4

**Table 2.**  
Participation in Hernia U

Attendance on Hernia U	N	%
Everyday	60	6.7
Weekly	383	42.6
Monthly	286	31.8
Casually	170	18.9
Preferred time of the day to access the platform		
Morning	97	10.8
Afternoon	261	28.9
Night	544	60.3
Time spent looking the platform weekly		
Less than 1 hour	254	28.2
1 hour	395	43.8
Between 1 and 5 hours	242	26.8
Between 5 and 10 hours	9	1
More than 10 hours	2	0.2

( $P = .04$ ). (**Table 8**) **Table 9** shows surgeon's preference for surgical technique. Three hundred eighty-five (42.7%) participants chose laparoscopic transabdominal preperitoneal (TAPP) for inguinal repair, followed by 328 participants (36.4%) who chose an open approach with mesh. Three hundred and sixty-seven surgeons who looked weekly for surgical education in the Hernia U platform reported changes in their practice. (**Table 10**) (See Supplemental File 2 for **Tables 7–10**).

## DISCUSSION

Our results demonstrate that participants who spend one hour or more per week on the platform are more prone to change their practice when compared to those who spend less time. Furthermore, most participants changed their surgical approach after watching one of the courses. This does not necessarily correlate with better surgical outcomes, and the objective of our study was to evaluate the impact of the platform in how surgeons adopt changes on clinical practice around the globe and not to evaluate clinical performance.

Most participants (60%) access the platform at night which is an important detail to know when organizing live events for a broad audience, but still challenging for global events due to different time zones. One solution

**Table 3.**  
The Influence of Hernia U in Changing Practice

	N	%
Changes in practice after watching the Hernia U course		
Daily changes	279	31
Occasional changes	524	58
No changes	99	11
Changes in the preoperative management		
No	569	63
Yes	334	37
Changes in surgical approach		
No	291	32.2
Yes	612	67.8
Changes in mesh choice		
No	568	63
Yes	335	37
Changes in Mesh fixation		
No	515	57
Yes	388	43
Changes in Peritoneum closure		
No	701	77.6
Yes	202	22.4
Changes in handling postoperative complications		
No	613	68
Yes	290	32
Importance of collaborating with other surgeons		
Extremely important	425	47.2
Very important	392	43.5
Somewhat important	69	7.6
Not so important	11	1.2
Not at all important	4	0.4

was to broadcast the same lecture in two different time zones. Some important live lectures were broadcast in two languages, English and Spanish, as Spanish is the primary language of half of the survey's respondents. The platform also offers subtitles in various languages (French, Arabic, Mandarin, etc.) for attendees who want to watch the recorded lectures.

Notably, 57% of the respondents have more than 10 years of surgical practice, which shows an honest interest in updating their AWS background. Furthermore, almost 70% of the respondents answered they have changed

their surgical practice. However, we found in our cohort that more experienced surgeons (10 or more years of practice) are more resistant to change their practice when compared to less experienced surgeons.

An interesting finding in our study was that most surgeons chose laparoscopic TAPP followed by open repair with mesh for inguinal hernias, while the robotic platform was poorly voted for either inguinal repair or small ventral hernias. This is a clear indication that the laparoscopic approach is becoming more popular among surgeons for hernia repair, but they still do not see a clear indication for the use of the robotic platform.

Literature suggests an increased utilization of social media as an educational tool among surgeons, residents, and medical students.<sup>10-12</sup> A survey applied in surgical groups on Facebook (International Hernia Collaboration, Mini friends, Robotic Surgery Collaboration) showed that among 309 participants, 65% look for surgical education every day. Eighty-five percent would consider changing their practice based on other surgeons' tips and tricks, while 62% had already changed.<sup>5</sup> In our survey, 90.6% of the participants answered that this type of collaboration is important. While the profile of surgeons and residents that participate in these groups or platforms could not be more different, this indicates a very high level of interest in interpersonal, interinstitutional, and international conversation. As may be expected, data from the Hernia U platform also showed an increased audience in 2020 during the COVID-19 pandemic when compared to the same number of lectures in the previous year.<sup>13</sup> From March through October, seven live surgeries were broadcasted in both years. From 2019 to 2020, surgeon's attendance increased from 803 to 1202, and mean logins per surgery increased from 114.7 to 195 ( $P = .021$ ).<sup>13</sup> Internet resources have gained popularity due to the influences of patient safety, work hour restrictions, and cost-effectiveness in surgical education.<sup>14</sup> However, a systematic review of the use of e-learning in surgical education showed that there are few studies showing the impact on long-term retention, transfer of abilities to clinical practice, and changes in patient outcomes.<sup>14</sup> This limitation applies to our study as well as it was not designed to directly evaluate how surgeons improved their surgical outcomes, but to evaluate how the platform has influenced their decision-making process.

There is a broad debate regarding ethical issues related to the dissemination of surgical cases online via either prerecorded videos or live broadcast. The Hernia U platform can only be accessed by medical professionals and students after proper registration and password-protected individual log-ins. All clinical photos and videos are edited to protect patients' identities in

**Table 4.**  
Changes in Practice after Watching the Hernia U Course by Years of Practice

Years of Practice	Daily Changes	%	Occasional Changes	%	No Changes	%	Total	Odds Ratio (95% CI)
Still in training	41	40.6	48	47.5	12	11.9	101	Reference
Less than 5 years	45	36.3	73	58.9	6	4.8	124	2.65 (0.95 – 7.33)
Between 5 and 10 years	61	37.9	88	54.6	12	7.5	161	1.67 (0.72 – 3.88)
between 11 and 20 years	67	27.7	161	66.5	14	5.8	242	2.19 (0.97 – 4.93)
More than 20 years	68	24.8	174	63.5	32	11.7	274	1.01 (0.50 – 2.06)
Total	282	31.3	544	60.3	76	8.4	902	

Pearson  $\chi^2$  (8) = 25.3046 Pr = 0.001

CI, confidence interval.

accordance with the Privacy Rule of the Health Insurance Portability and Accountability Act.<sup>15</sup> The Society of American Gastrointestinal and Endoscopic Surgeons has published a statement for clinical education and consultation endorsing the professional use of social media groups for medical and surgical education and quality improvement, and has also proposed an optional consent template for professionals.<sup>16</sup>

E-learning technology for surgical education has several limitations. For practical skills such as knot tying, studies have showed that active learning with individualized feedback by an instructor is superior to passive learning by watching a video with instructions.<sup>17-19</sup> However, studies that evaluated outcomes of online platforms that provided assessment or feedback showed superior performance.<sup>14</sup> Hernia U platform provides quizzes at the end of every lecture in the courses. Participants can only receive their certificate of attendance after watching the lectures and completing the quizzes with a minimal pass score.

Many studies have also reported concerns with published surgical videos on social media.<sup>20-22</sup> Despite its popularity and easy accessibility, social media is often questioned for quality of content given the lack of peer review. Medical students and residents should be trained to identify the most reliable and scientifically sound resources provided by specialists in that field. The Hernia U platform is composed of AWS specialists well known in international surgical societies; all material available is vetted by the platform’s review board for scientific background.

**Limitations of the Study**

This study has several limitations. By nature of design, this is a cross-sectional, descriptive study with limited quantitative data. Selection bias may have favored responses by those who are more comfortable with e-surveys, or those who found the platform more useful. There

**Table 5.**  
Change of Practice by Weekly Attendance in the Platform

Time Spent in the Platform per Week	Daily Changes	%	Occasional Changes	%	No Changes	%	Total	Odds Ratio (95% CI)
Less than 1 hour	44	17.3	159	62.6	51	20.1	254	Reference
1 hour	133	33.7	243	61.5	19	4.8	395	4.97 (2.85 – 8.64)
Between 1 and 5 hours	100	41.3	137	56.6	5	2.1	242	11.90 (4.66 – 30.40)
Between 6 and 10 hours	3	33.3	5	55.6	1	11.1	9	2.01 (0.24 – 16.43)
More than 10 hours	2	100	0	0.0	0	0.0	2	1 (0.57 – 6.37)
Total	282	31.3	544	60.3	76	8.4	902	

Pearson  $\chi^2$  (8) = 88.4192 P < 0.001

CI, confidence interval.

**Table 6.**

Participants Who Consider Changing Practice (Surgical Technique) After Watching Hernia U Courses by Age Groups

Age	Yes	%	No	%
20 – 25	9	100	0	0
26 – 30	115	99.1	1	0.9
31 – 35	131	97.7	3	2.3
36 – 40	149	96.1	6	3.9
41 – 50	225	93.8	15	6.2
> 50	230	92.7	18	7.3
Total	859	95.2	43	4.8

P = 0.05

were around 10,000 emails registered in our server at the time we did the survey and we have a low response rate (roughly 10%). Self-reported data necessitates implicit trust in participant responses, which may not always be honest. Furthermore, changes in surgical technique or patient management does not necessarily presume better results. Our results do not answer if the members had better surgical outcomes after attending one of the courses as this was not the objective of the study. The main strength of this study is the large number of total participants, as well as the breadth of experience across both age and nationality which might decrease the selection bias.

**CONCLUSION**

The use of online platforms for surgical education has increased in recent years. As more surgeons and students look for education online, the Hernia U platform has allowed users to revisit their surgical technique and patient management. Members that access Hernia U platform for more than one hour per week are more likely to change their surgical practice. However, more experienced surgeons are more resistant to change their practice. While this does not directly translate into improved surgical outcomes, it gives unrestricted access to updated and reliable information from experts on abdominal wall surgery with no cost.

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