



FACULTAD DE MEDICINA
PONTIFICIA UNIVERSIDAD
CATÓLICA DE CHILE



XXVIII IFSO
World Congress

ASYNCHRONOUS AND REMOTE TEACHING FOR THE ACQUISITION OF BARIATRIC SURGERY SKILLS THROUGH A STRUCTURED SIMULATION PROGRAM: A RANDOMIZED CONTROLLED TRIAL.

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ifso2025.org

Nothing to disclose.

Learning Curves of Laparoscopic Roux-en-Y Gastric Bypass and Sleeve Gastrectomy in Bariatric Surgery: a Systematic Review and Introduction of a Standardization



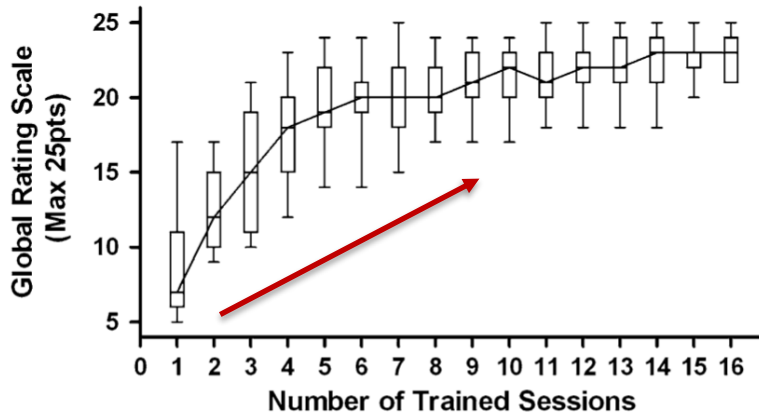
- SR: 28 publications, 27770 BS, 23974 RYGB.
- 3 learning phases:
 - Phase 1 Competency: 30-70 RYGB.
 - Phase 2 Proficiency: 70-150 RYGB.
 - Phase 3 Mastery: up to 500 RYGB.

Table 6 Comparison between learning curve and post-learning curve

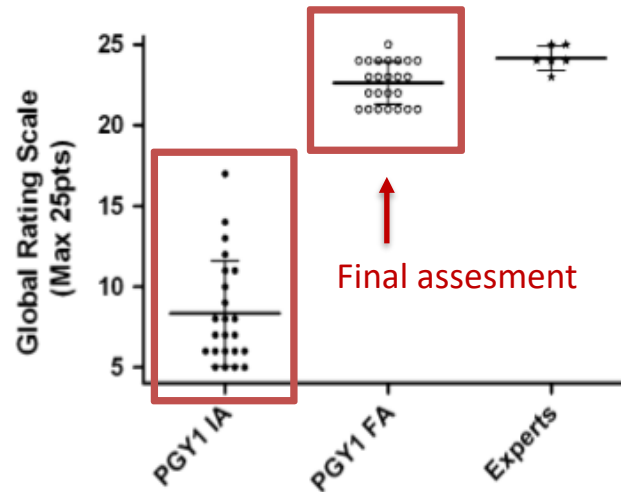
Author	N	LC	Operative time (mean ± SD)			Complication rate (N (%))		
			LC	Post-LC	P value	LC	Post-LC	P value
Abu-Hilal et al. (2007) [36]	100	50	127 (90–240) ^b	105(80–210) ^b	0.009	n/a	10 (10) ^c	n/a
Agrawal et al. (2011) [37]	74	75–100	160 (115–247) ^c	n/a	n/a	1 (1.4) ^c	n/a	n/a
Ali et al. (2010) [38]	611	72–127	n/a	n/a	n/a	93 (18.6)	141 (23.1) ^a	NS
Andrew et al. (2006) [39]	201	67–70	145 ± 30	118 ± 23	0.01	(19.4)	(11.9)	NS
Ballesta-López et al. (2005) [40]	600	100	166	109	n/a	21 (29.2)	10 (14)	n/a
Doumouras et al. (2017) [41]	11684	500	170.6	125.9	0.001	(11.3)	(7.7)	0.01
El-Kadre et al. (2013) [42]	2281	500	119	90	0.001	(2.5)	(1.75)	n/a
Geubbels et al. (2015) [43]	713	150	n/a	n/a	n/a	n/a	n/a	n/a
Huang et al. (2008) [44]	100	50	217 ± 51	105 ± 38	0.001	(15)	(3)	0.05
Jacobsen et al. (2012) [45]	2000	100	102	54	0.001	n/a	n/a	NS
Lublin et al. (2005) [17]	100	80–100	246 ± 70	183 ± 42	0.001	8 (12)	0 (0)	0.05
Nguyen et al. (2003) [46]	150	75	250 ± 77 ^c	n/a	0.01	9 (12)	1 (1)	0.03
Oliak et al. (2003) [18]	225	75	189	125	0.001	24 (32)	11 (15)	0.01
Poumaras et al. (2010) [47]	300	100	163 ± 53	119 ± 37	0.01	15 (15)	9 (4.5)	NS
Schauer et al. (2003) [19]	150	100	311	237	0.05	36 (36)	11 (n/a)	0.05
Shen et al. (2016) [48]	60	30	120 (80–440) ^b	80 (50–150) ^b	0.01	8 (26.7)	2 (6.7)	0.038
Shikora et al. (2005) [49]	750	100	212	132	n/a	26 (26)	87 (13)	n/a
Shin et al. (2005) [50]	100	50	113 (54–238) ^b	73 (39–145) ^b	0.0001	16 (32)	4 (8)	NS
Sovik et al. (2009) [51]	292	100	164 ± 75	66 ± 21	0.001 ^d	8 (20)	6 (15)	NS ^d
Suter et al. (2003) [52]	107	100–150	185 (110–355) ^{b, c}	n/a	n/a	22 (20.5) ^c	n/a	n/a
van Rijswijk et al. (2018) [53]	3051	50–100	57 (50–67) ^b	n/a	n/a	27 (12.9)	n/a	n/a
Victorzon et al. (2012) [54]	325	108	110 ± 30	82 ± 24	0.001	9 (8)	6 (3)	0.05
Carandina et al. (2019) [60]	99	30–60	109 (85–180)	82 (50–120)	0.001	7 (10.6)	0 (0)	0.02
Major et al. (2017) [55]	500	100–200	130 (100–160) ^b	80 (65–96) ^b	0.001	13 (13)	5 (5)	0.011
Prevot et al. (2014) [56]	84	30	139	93	0.01	n/a	n/a	n/a
Sánchez-Santos et al. (2016) [57]	2882	100	n/a	n/a	n/a	34 (11.7) ^c	n/a	n/a
Zachariah et al. (2013) [58]	228	50	52 ± 19	63 ± 29	0.012	4 (8)	3 (1.68)	0.022
Zacharoulis et al. (2012) [59]	102	68	105 (60–240) ^b	83 (50–200) ^b	0.003	(7.8) ^c	n/a	n/a

Surgical Simulation in advanced laparoscopic skills

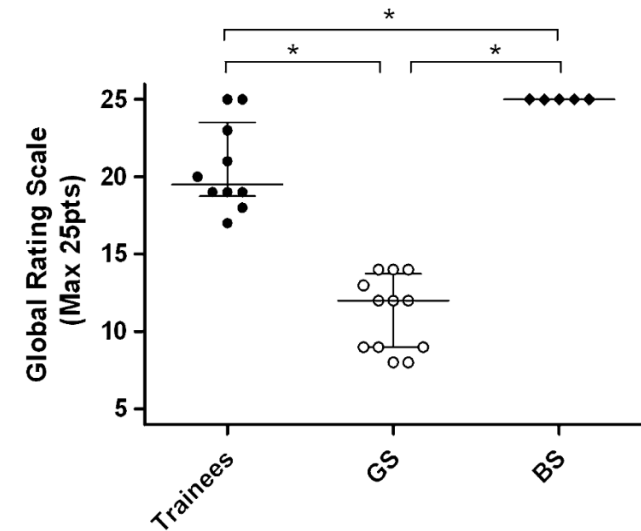
LEARNING CURVE: Surgical residents



SIMULATION BOX: SURGICAL RESIDENTS VS. BARIATRIC EXPERTS



REAL SCENARIO: SURGICAL RESIDENTS VS. GENERAL SURGEONS



Surgical Simulation in Bariatric Surgery

ORIGINAL CONTRIBUTIONS



Five-Year Experience Training Surgeons with a Laparoscopic Simulation Training Program for Bariatric Surgery: a Quasi-experimental Design

- Significant improvement in GRS (from 17 to 24) and SRS (from 13 to 19).
- *Learning curve stabilizes after session 6.*

Table 2 Results for pre- and post-assessment of manual gastrojejunostomy

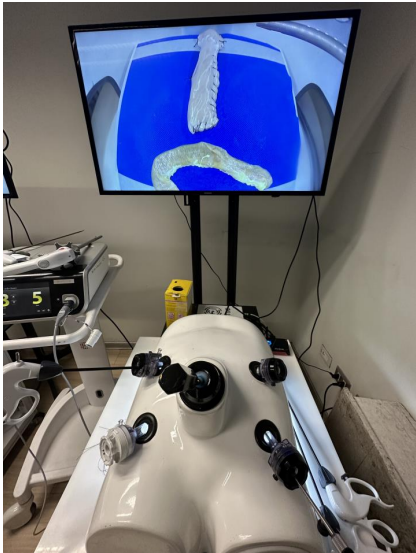
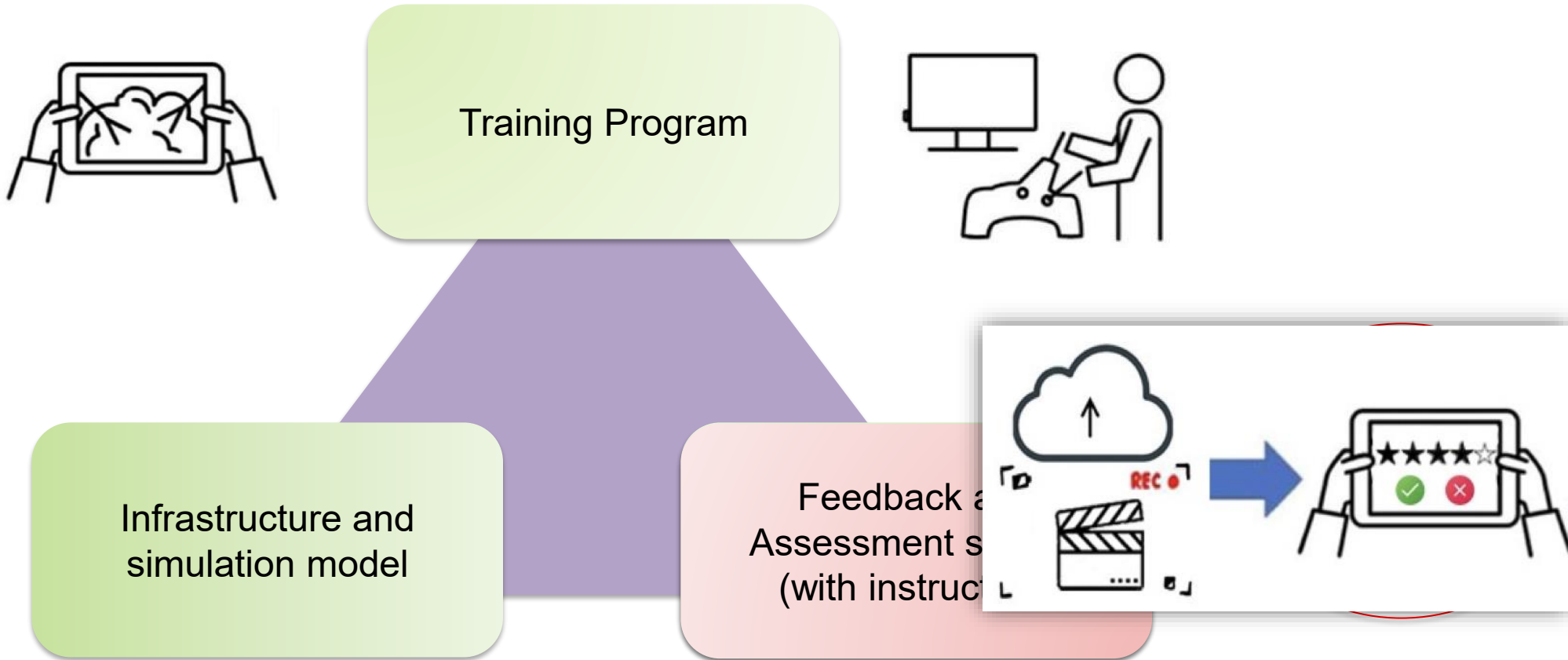
	Pre-assessment	Post-assessment	<i>p</i> -value
Time in minutes	53 ± 14	27 ± 6	< 0.001*
Permeability (%)	88	100	0.063
Leakage (%)	26	0	< 0.001*
GRS	17 ± 3	24 ± 1	< 0.001*
SRS	13 ± 2	19 ± 1	< 0.001*

GRS general rating scale, SRS specific rating scale. *Statistically significant

Enhancing Competency in Bariatric–Metabolic Surgery: The Impact of Simulation–Based Training on Surgeons' Experience

- At follow-up:
 - 57% reported very advanced experience.
 - 97% affirmed enhancements in technique and outcomes.
 - 90% noted increased confidence and deemed simulation essential.
- *Procedure-specific relevance* was rated:
 - 63% for exploratory laparoscopy.
 - 66% for RYGB.
 - 70% for sleeve gastrectomy.

Proper implementation



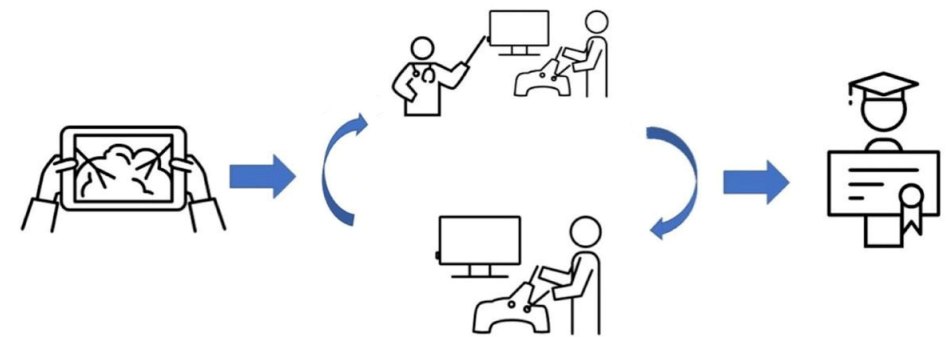
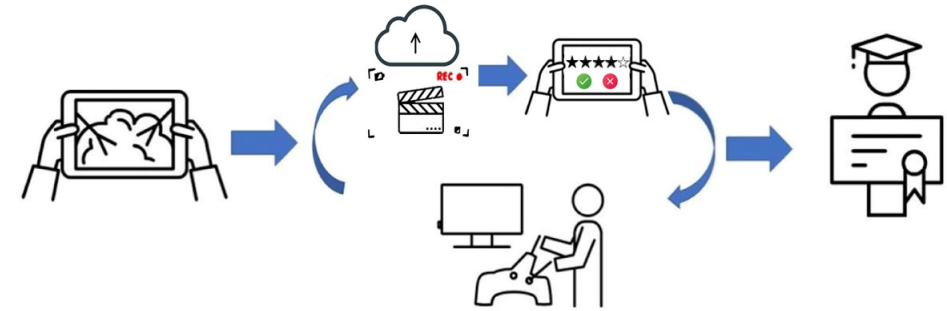
General objective



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- Determine whether a bariatric surgery training program using surgical simulation with asynchronous and remote feedback is as effective as in-person training in developing surgical skills among trainee surgeons.

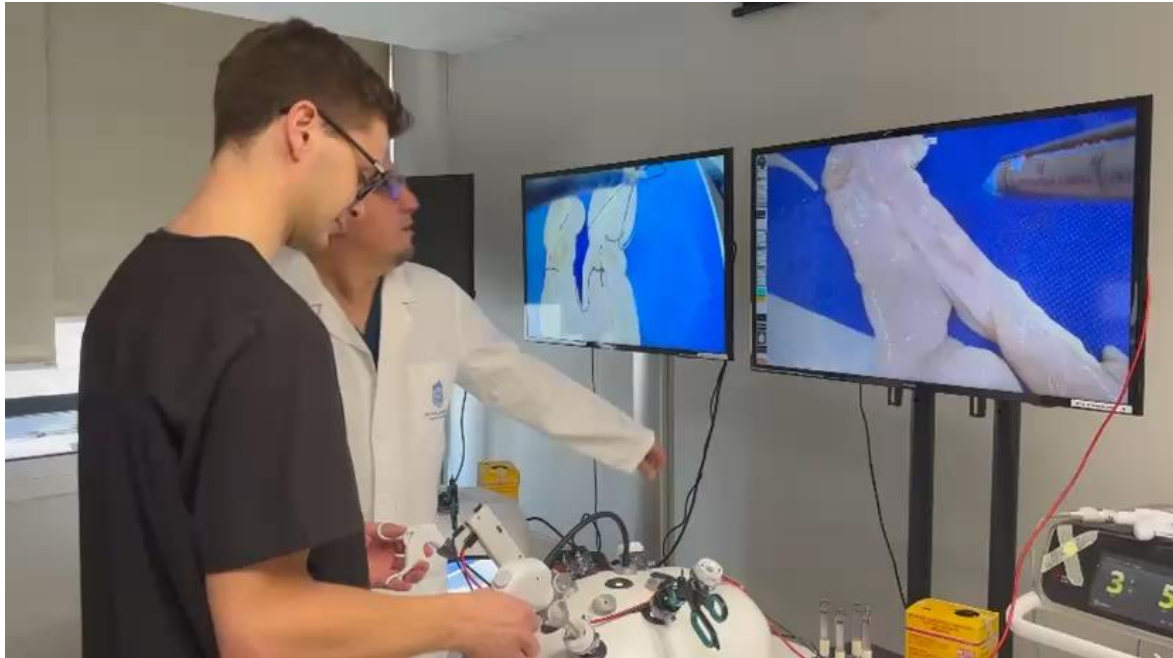
- **Randomized controlled trial**, equivalence design.
- **Inclusion criteria:**
 - Surgeons in training with completed basic and advanced simulation courses.
- **Exclusion criteria:** prior experience in esophagogastric surgery.
- **Participants (N 25)**, randomly assigned two groups:
 - In-person group.
 - Asynchronous and remote group.
- **Measurements** across sessions:
 - General and specific OSATS scale scores.
 - Execution times.
 - Leakage and permeability tests.



In-person



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Online Platform (C1Do1)



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C1DO1 INSTITUCIONES

CREAR CURSO MIS CURSOS 9+ Español Hola Milenko

Etapa: (RCT) Curso EGB

Curso: (RCT) Curso EGB
Carrera: Carrera Medicina
Facultad: Facultad de Medicina

PENDIENTE

Nombre: Eduardo Castro
Mail: eduardocastroalvarado@gmail.com

Evaluación

Feedback

No hay feedback

00:06:34 / 00:52:20

C1DO1 INSTITUCIONES

CREAR CURSO MIS CURSOS Hola Milenko

Aspectos técnicos de cirugía laparoscópica esofágica, gástrica y bariátrica

Desarrollo de habilidades avanzadas en cirugía laparoscópica esofagológica y bariátrica a través del entrenamiento en escenarios simulados

Etapas

1. Pre Evaluación - Gastroesofago Arante...	LOGRADO	Ver
2. Pre Evaluación - Enteroesofago anastom...	LOGRADO	Ver
3. Enteroesofago anastomosis c/Endograp...	LOGRADO	Ver
4. Enteroesofago anastomosis c/Endograp...	LOGRADO	Ver
5. Enteroesofago anastomosis c/Endograp...	LOGRADO	Ver
6. Hemioesofago Nalal (Triple Simple) y M...	LOGRADO	Ver
7. Hemioesofago Nalal (2 tipos de puntad...	LOGRADO	Ver
8. Hemioesofago Nalal (Simple NO Bloquea...	LOGRADO	Ver
9. Hemioesofago Nalal (Simple Bloqueado...	LOGRADO	Ver
10. Hemioesofago Nalal (punto X y 3 tipo...	SIN REALIZAR	Ver

Usted debe realizar una gastroesofago anastomosis manual. Como evaluación inicial dispone de un tiempo máximo de 40 minutos para realizarla. Dispone de 4 sedas 3/0 de 25 cm y debe realizar el procedimiento utilizando los puertos de trabajo superior...

VER EVALUACIÓN EVALUACIONES IR A ETAPA

Etapa: Prueba Piloto - (RCT) Curso EGB

Curso: Prueba Piloto - (RCT) Curso EGB
Carrera: Carrera Medicina
Facultad: Facultad de Medicina

LOGRADO

Nombre: Milenko Gimulid
Mail: m.gimulid@uc.cl

Evaluación

Feedback

00:24:16:001

Se corto el hilo demasiado corto

2 00:25:14:159

3 00:25:29:332


Total 0 0 0 0 1

AI (future perspectives)



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Feedback

1 00:00:14:000

El estudiante realiza la primera punción con la aguja en el tejido superior para colocar una sutura interrumpida.

Feedback sugerido: ¡Muy bien! Note que la entrada de la aguja fue precisa. Ahora, asegúrate de que el punto de salida sea equidistante y simétrico al punto de entrada para una buena aproximación de los bordes. ¡Sigue practicando esa precisión!

2 00:00:20:000

3 00:00:40:000

4 00:01:42:000

5 00:02:10:000


Total 0 8 0 0 0

Análisis Detallado

Descripción

El vídeo, grabado desde una vista superior, presenta un escenario de simulación quirúrgica. La escena principal es un tapete o campo quirúrgico de color azul. Sobre este, hay dos especímenes de tejido biológico con una apariencia similar a segmentos de intestino o de otros órganos tubulares. Una de las piezas, que parece ser un segmento de intestino más grande, ya tiene varias suturas negras o azules preexistentes y nudos. La segunda pieza es un segmento tubular más largo y curvado que también muestra signos de manipulación. El vídeo se centra en el uso de dos instrumentos laparoscópicos: una pinza para sujetar el tejido y un portaagujas para manipular la aguja e hilo. Al principio del vídeo (0:00-0:55), se demuestra la técnica de sutura en la pieza de tejido ya...

CIDO INSTITUCIONES - CREAM CURSO MIS CURSOS Hola Darlena



Feedback

1 00:00:05:000

El operador inicia la colocación de una sutura en el tejido intestinal utilizando instrumentos laparoscópicos, demostrando la precisión en la captura del tejido.

Feedback sugerido: Excelente control de la aguja y la mordida en el tejido. Sigue manteniendo esa precisión para asegurar una aproximación adecuada de los bordes.

2 00:00:25:000

3 00:00:45:000

4 00:01:50:000

5 00:02:15:000

Total 0 6 0 0 0

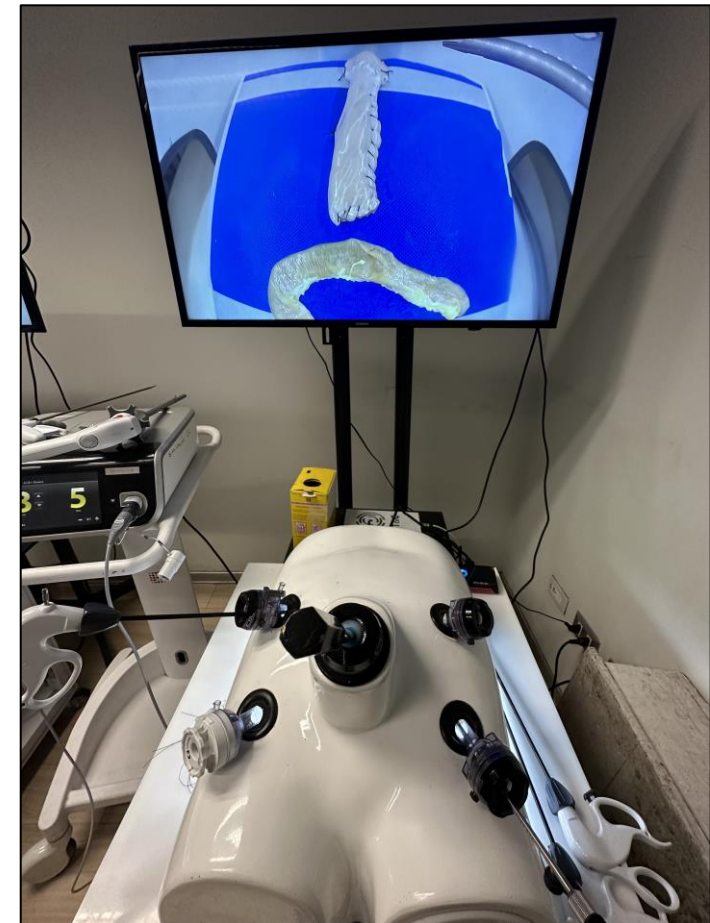
Análisis Detallado

Descripción

El vídeo presenta una vista aérea detallada de un procedimiento de sutura y anastomosis en un trozo de tejido biológico, que parece ser un segmento de intestino o una víscera hueca, dispuesto sobre un paño quirúrgico azul. Dos instrumentos laparoscópicos son los principales actores: un portaagujas o pinza fina en la izquierda y una pinza de agarre o grasper en la derecha. En el inicio, se observan varias suturas negras ya colocadas. Los instrumentos trabajan en tándem, manipulando el tejido. El portaagujas se utiliza para pasar una aguja con hilo negro a través de los bordes del tejido, formando puntos de sutura interrumpidos. Una vez que cada punto se ha pasado, los instrumentos colaboran para anudar el hilo y asegurar la unión. Después de completar varios puntos, se introduce un...

Training program

- 120 hours of training
- 25 sessions (+theoretical exam):
 - 4 J-J anastomosis sessions.
 - 5 HH y Funduplications.
 - 4 GY LSA sessions.
 - 12 GY HSA sessions.
 - Sessions 1, 3, 5, 8, 11, and 12 assessed.



Global Rating Scale

Score	Respect for tissue	Time and motion	Instrument handling	Flow of operation and planning	Specific Knowledge
1	Frequently uses unnecessary force on tissue or causes damage due to improper instrument use.	Many unnecessary movements.	Repeatedly makes tentative or awkward movements with the instruments.	Frequently stops operating or needs to discuss the next move.	Poor knowledge. Requires specific instruction for most of the steps.
2					
3	Careful tissue handling, but occasionally causes inadvertent damage.	Time/motion efficient, but with some unnecessary movements.	Competent instrument use, though occasionally hesitant or awkward.	Demonstrated ability to plan, with steady progression of the surgical procedure.	Knew all important aspects of the operation.
4					
5	Consistently handles tissue appropriately with minimal damage.	Economy of movement with maximum efficiency.	Fluid tissue manipulation without awkwardness.	Each movement was clearly planned, with effortless flow from one to the next.	Demonstrated familiarity with all aspects of the operation.

Specific Rating Scale



Score	Laparoscopic Suture	Enterotomy	Posterior wall	Anterior wall
1	Lack of skill in needle positioning and driving through the tissue. Appears not to recognize the techniques for knot-tying.	Enterotomies poorly placed or disorganized. Poor relationship between enterotomies and tissue apposition. The size is excessively large or small.	Poor stitch placement, not adequately covering the vertex (from outside-in and inside-out). Continuous sutures are blindly placed without ensuring equidistance or closure of the posterior wall. Does not cover the anterior wall from the posterior wall. Poor suture efficiency.	Poor stitch placement, not covering the vertex (from outside-in and then inside-out). Continuous sutures are blindly placed without ensuring equidistance or closure of the anterior wall. Uncertainty remains as to whether stitches only pass through the anterior wall.
2				
3	Maintains the needle in the correct position. Uses appropriate knot-tying technique, but sometimes hesitates and/or lacks coordination in movements.	Adequate size of enterotomies, although performed with some hesitation.	Proper stitch placement, closes the vertex. Asymmetric advances, insufficiently covers the anterior wall.	Proper stitch placement, closes the vertex. Asymmetric advances.
4				
5	Precise needle placement; performs the knot-tying technique without difficulties.	Appropriate size and location of the enterotomies, without additional movements.	Visibly covers the vertex, equidistant stitches, achieves good (non-excessive) progress.	Visibly covers the vertex, equidistant advances, achieves good (non-excessive) progress.

- Ongoing trial:
 - 15 participants recruited.
 - 7 participants finished the training program (3 intervención, 4 control).

Preliminary results

INTERVENTION

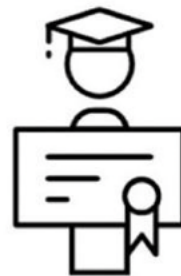
INITIAL ASSESMENT:

- Median GRS scores: 19.
- Median SRS scores: 12.
- Mean time: 50,6 minutes.



FINAL ASSESMENT:

- Median GRS scores: 24.
- Median SRS scores: 18.
- Mean time: 28 minutes.



CONTROL

INITIAL ASSESMENT :

- Median GRS scores: 16.
- Median SRS scores: 12.5.
- Mean time: 55,2 minutes.



FINAL ASSESMENT:

- Median GRS scores: 24.5.
- Median SRS scores: 19.5.
- Mean time: 28.5 minutes.

- Asynchronous and remote assessment and feedback is as effective as the traditional face-to-face modality for acquiring surgical skills in bariatric and esophagogastric surgery.
- The use of an online platform for teaching allows for regional or international expansion of simulation-based training.

Thanks.

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