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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Nothing to disclose.

Introduction

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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
Pournaras 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

Whertmann et al., Obesity Surgery 2020.

Surgical Simulation in advanced laparoscopic skills

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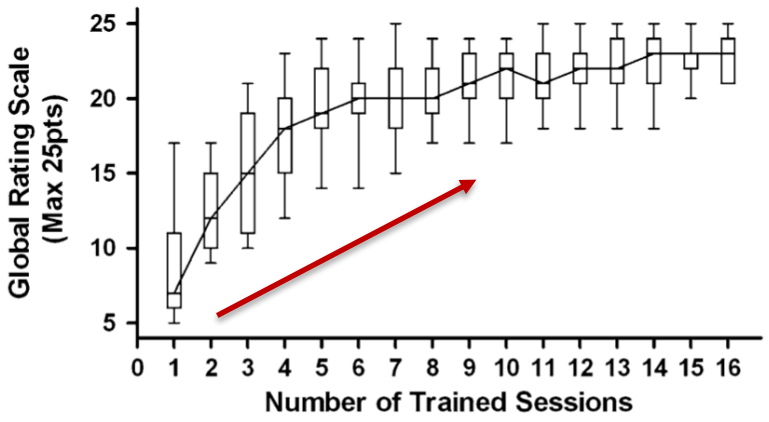
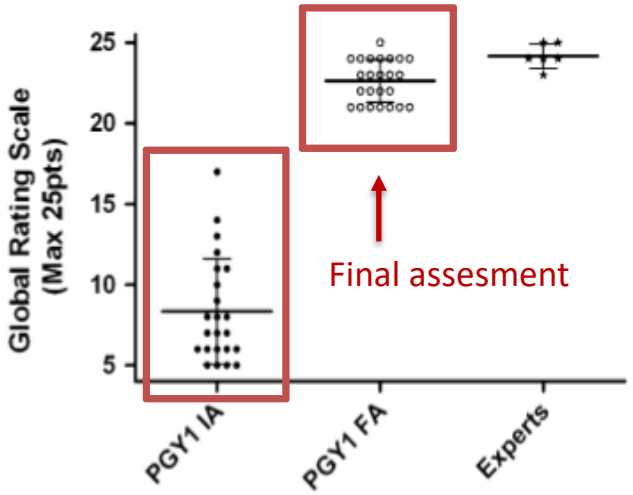
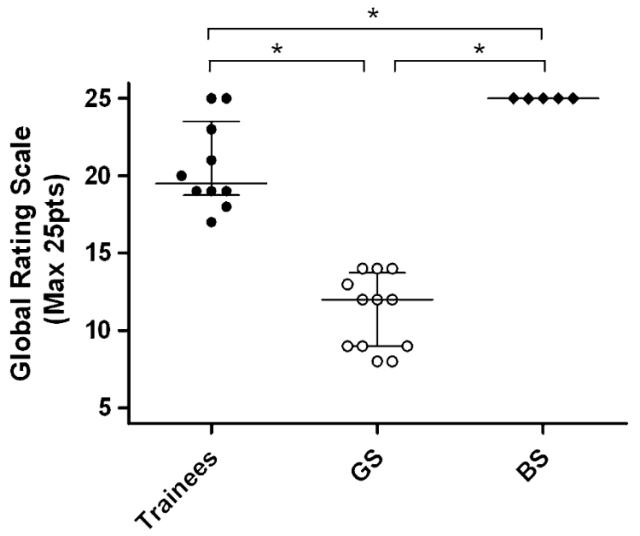
LEARNING CURVE:
Surgical residents



SIMULATION BOX:
SURGICAL RESIDENTS
vs.
BARIATRIC EXPRERTS



REAL SCENARIO:
SURGICAL RESIDENTS
vs.
GENERAL SURGEONS



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Varas J et al., Surgical Endoscopy 2012.
Boza C et al., Surgical Endoscopy 2016.

Surgical Simulation in Bariatric Surgery

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Obesity Surgery (2023) 33:1831–1837
https://doi.org/10.1007/s11695-023-06616-0

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	*p*-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

J Laparoendosc Adv Surg Tech A. 2025 Jul 15. doi: 10.1177/10926429251359745.
Online ahead of print.

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.

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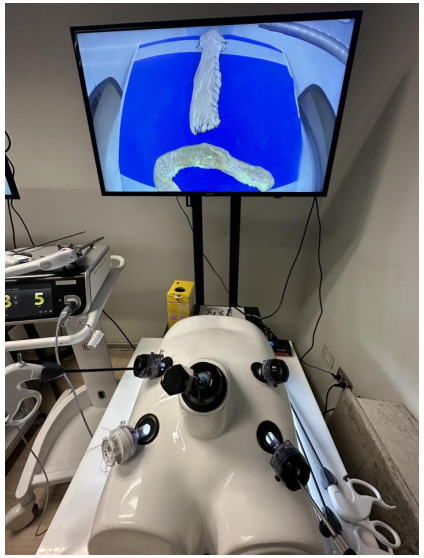
Duran Espinoza V. et al., *OBES SURG* (2023). https://doi.org/10.1007/s11695-023-06616-0
Figueroa et al., J Laparoendosc Adv Surg Tech A 2025. doi: 10.1177/10926429251359745.

Proper implementation

Training Program



Infrastructure and simulation model

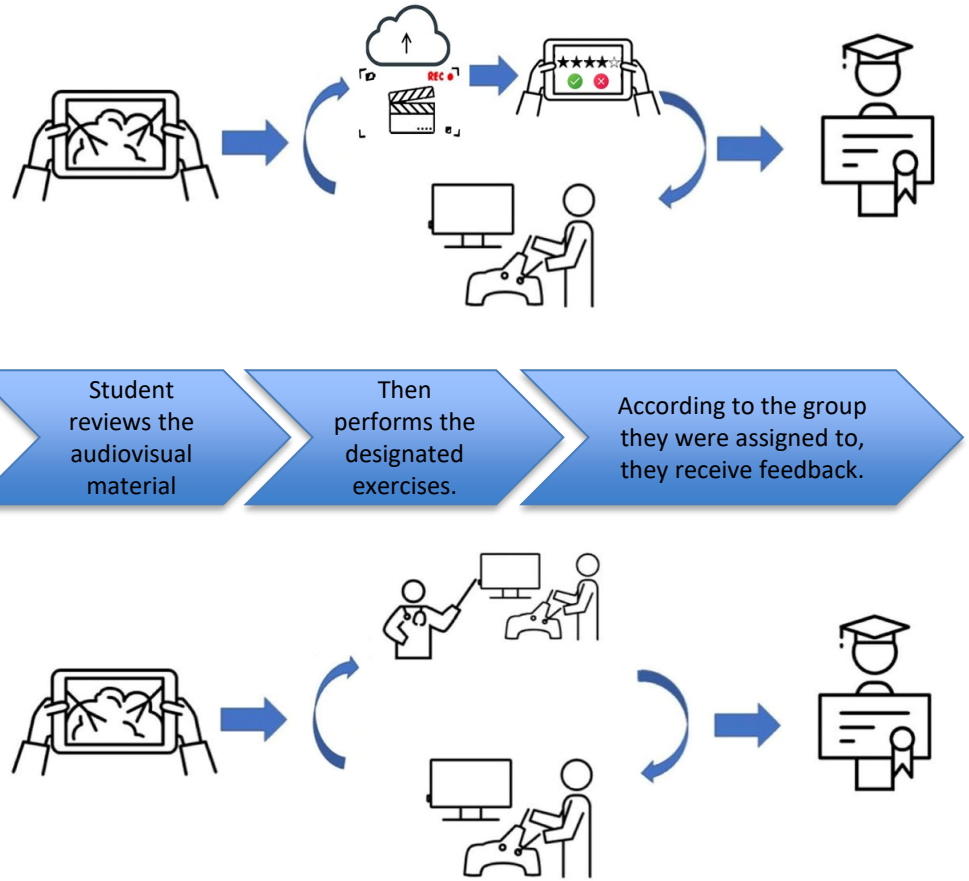
Feedback a
Assessment s
(with instruct

General objective

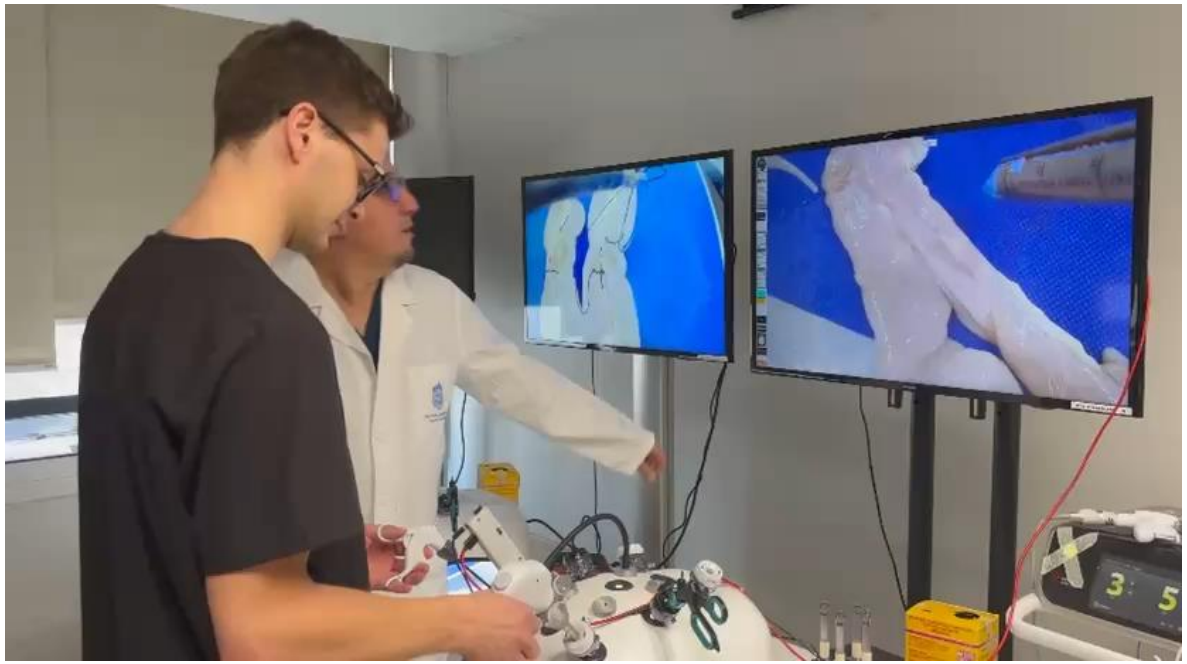
- Determine whether a bariatric surgery training program using surgical simulation with asynchronous and remote feedback is as effective as in-person training in developing surgical skills among trainee surgeons.

Methods

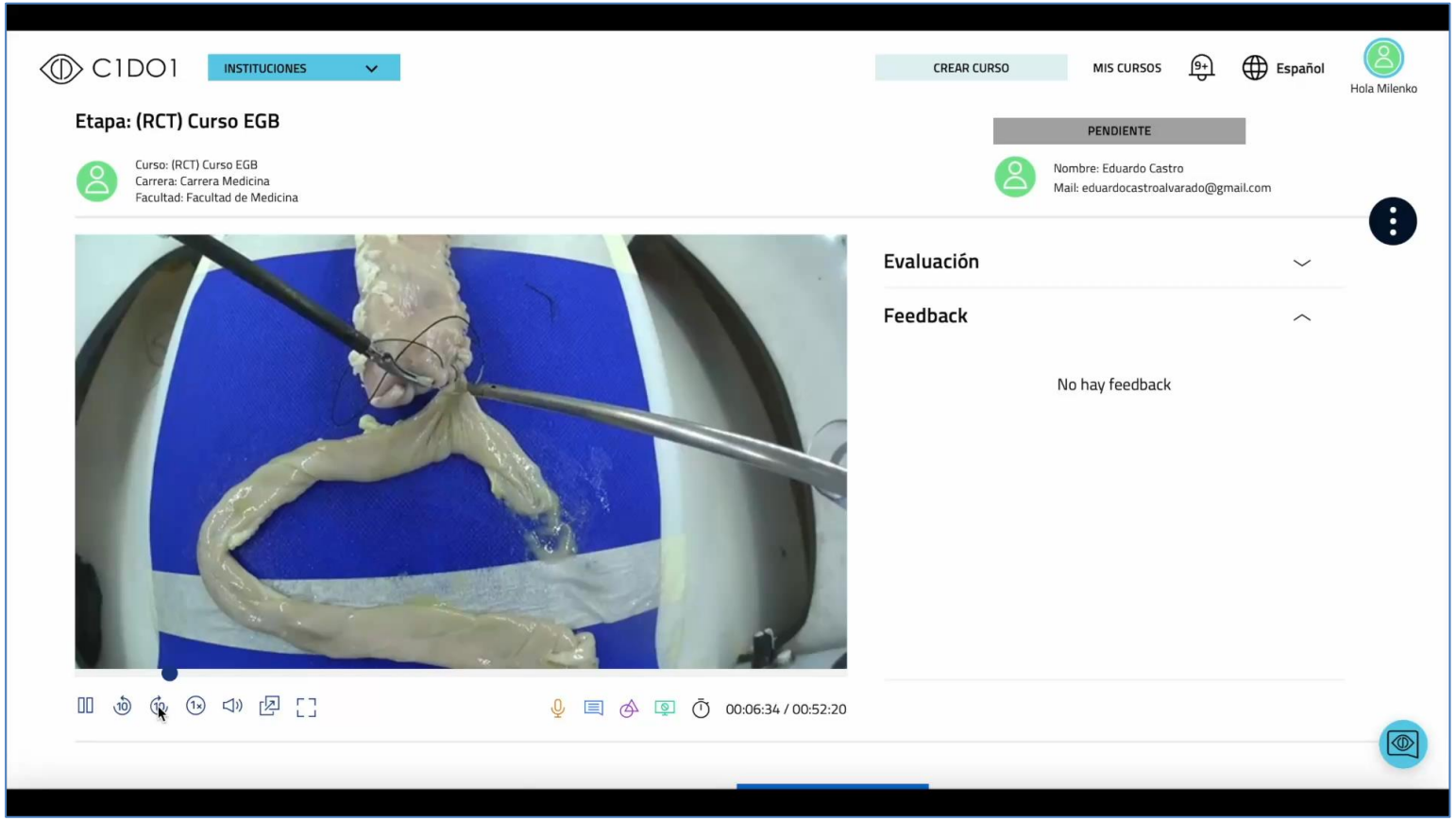
- **Randomized controlled trial**, equivalence design.
- **Inclusion criteria**:
  - Surgeons in training with completed basic and advanced simulation courses.
- **Exclusion criteria**: prior experience in esophagogastric surgery.
- **Participants (N 25)**, randomly assigned two groups:
  - In-person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

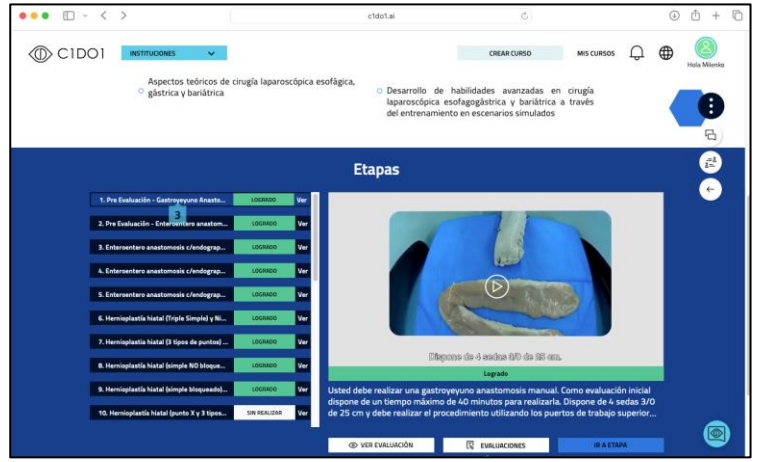


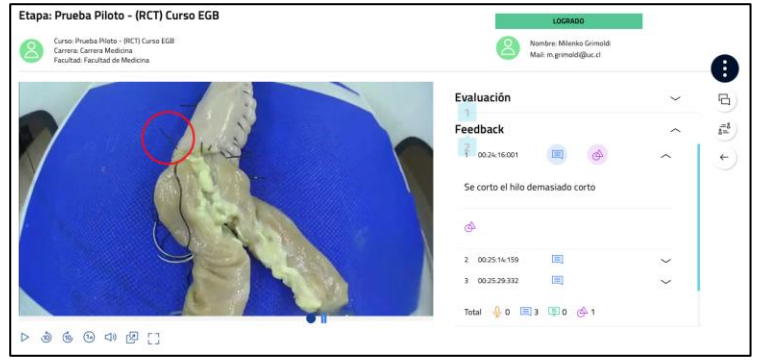
In-person



Online Platform (C1Do1)







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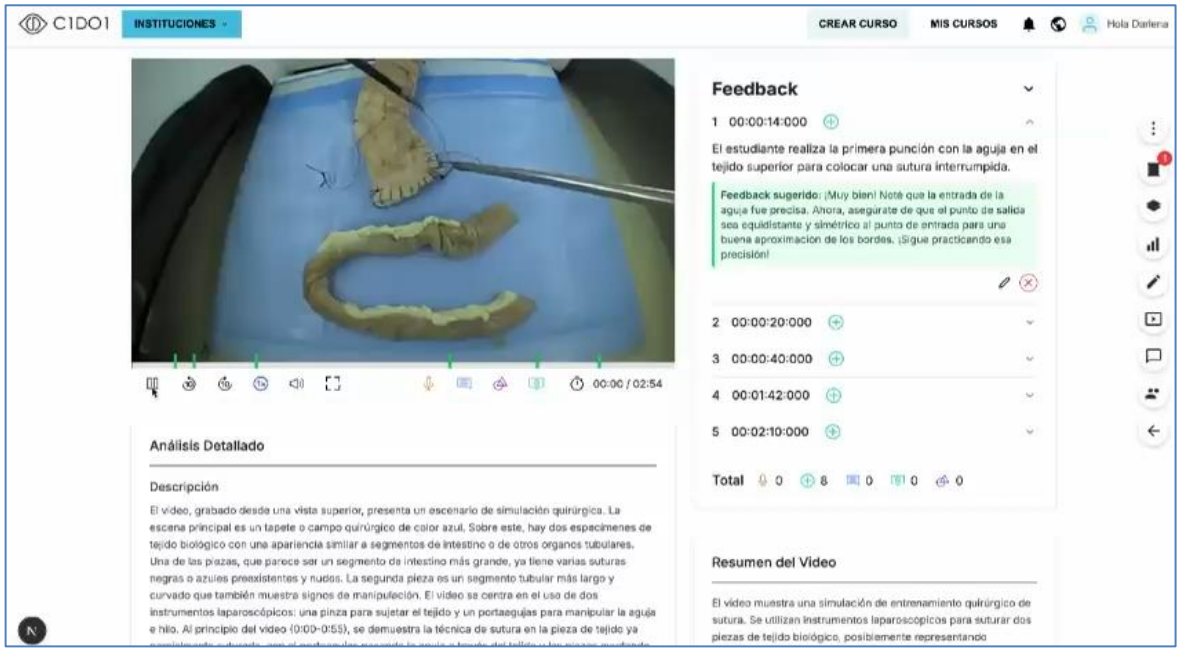
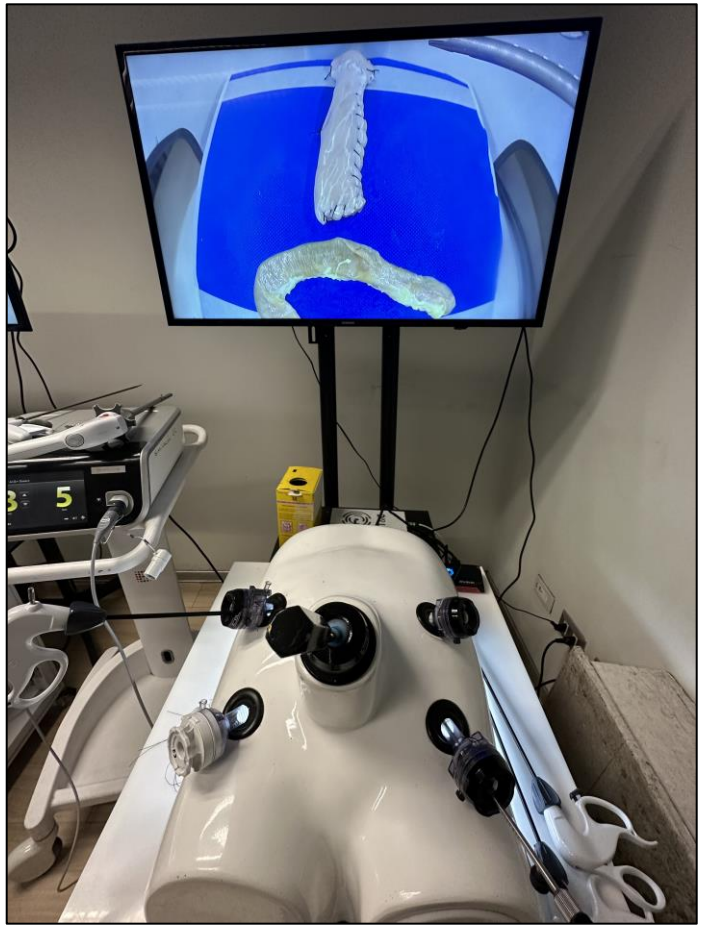
AI (future perspectives)



Training program

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



Global Rating Scale

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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

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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.

Current trial status

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

Preliminary results

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INTERVENTION	CONTROL
INITIAL ASSESMENT: - Median GRS scores: 19. - Median SRS scores: 12. - Mean time: 50,6 minutes.	INITIAL ASSESMENT : - Median GRS scores: 16. - Median SRS scores: 12.5. - Mean time: 55,2 minutes.
FINAL ASSESMENT: - Median GRS scores: 24. - Median SRS scores: 18. - Mean time: 28 minutes.	FINAL ASSESMENT: - Median GRS scores: 24.5. - Median SRS scores: 19.5. - Mean time: 28.5 minutes.

Anticipated conclusions

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- 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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