

How to train and be trained in bariatric interventions in 2024

Dr. Julián Varas

Associate Professor of Surgery – Vice Chair of Simulation at UC - Pontificia Universidad Católica de Chile

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[X] I have the following potential conflict(s) of interest to report:

- Receipt of grants/research supports: FONDECYT, ANID Chilean Gov.
- Stock shareholder: Founder and CEO of C1DO1, Spinoff of the Pontificia Universidad Católica de Chile. The C1DO1 platform was used in the methodologies presented today to provide training with remote and asynchronous feedback.

¿What do we need to learn practical skills?

- 1 **Space and infrastructure & necessary hardware**
(Simulator, room/space, cameras, etc.)
- 2 **Training program (Validated)**
- 3 **Teaching, network of instructors**
(who will do the feedback?)

3 pillars for
practical skills
training



Pillar 1

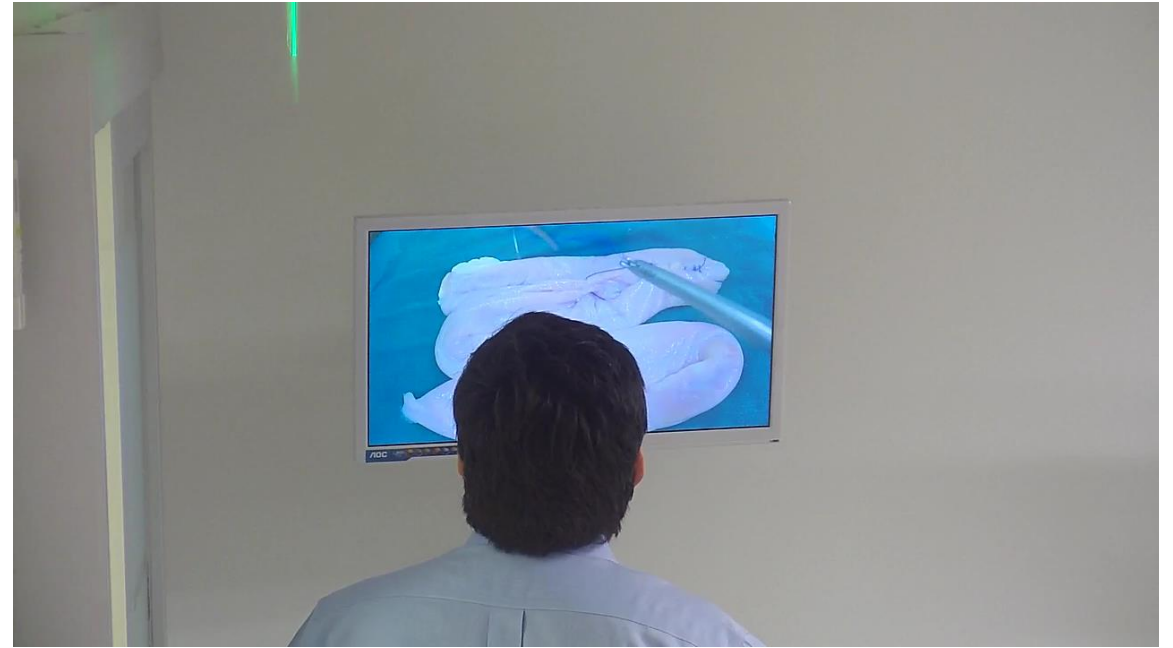
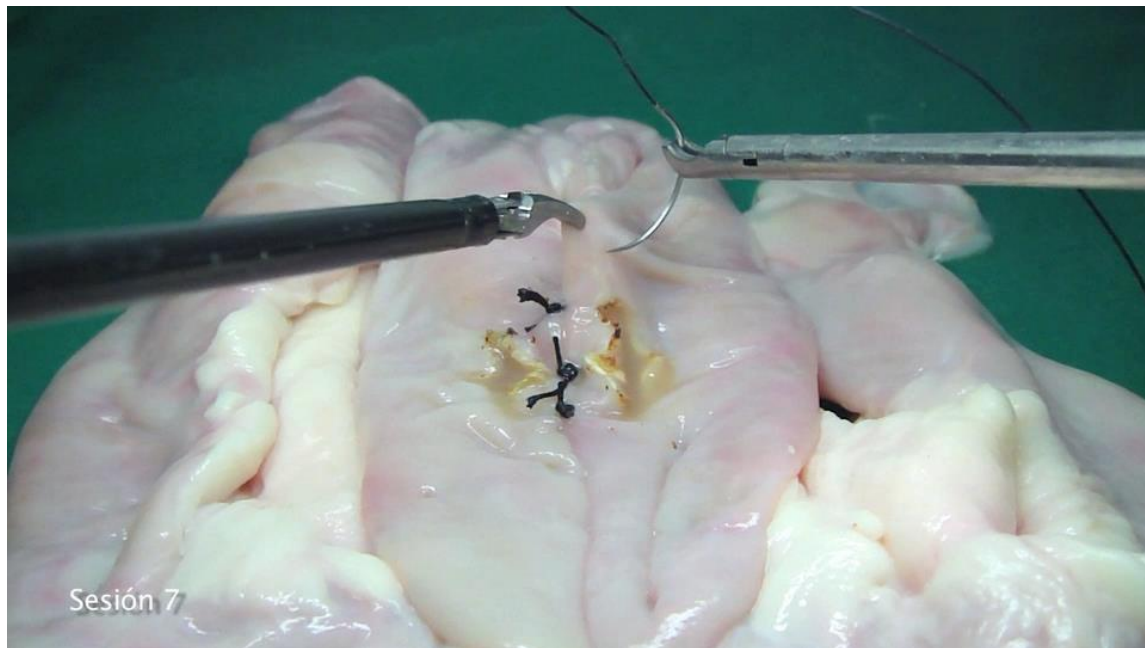
Most training centers have some sort of Pillar 1

To have the first pillar doesn't mean you have a complete simulation training center (You are missing pillars 2 & 3)



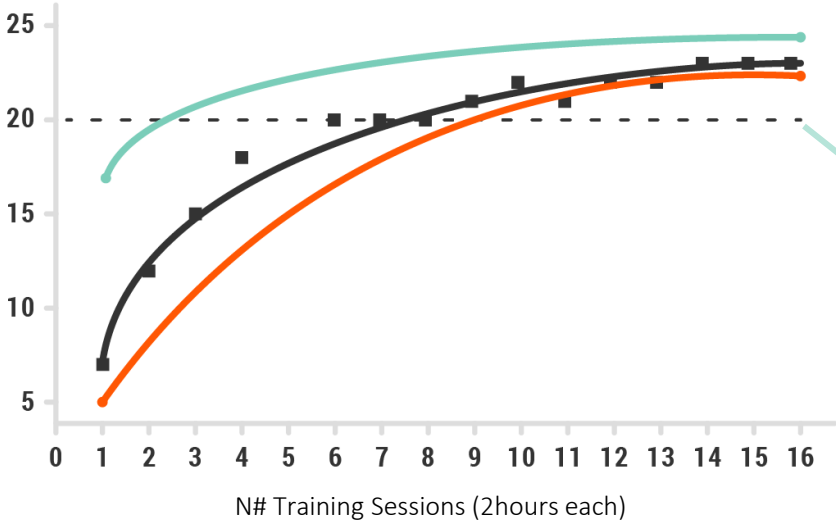
Pillar 2

Training Program

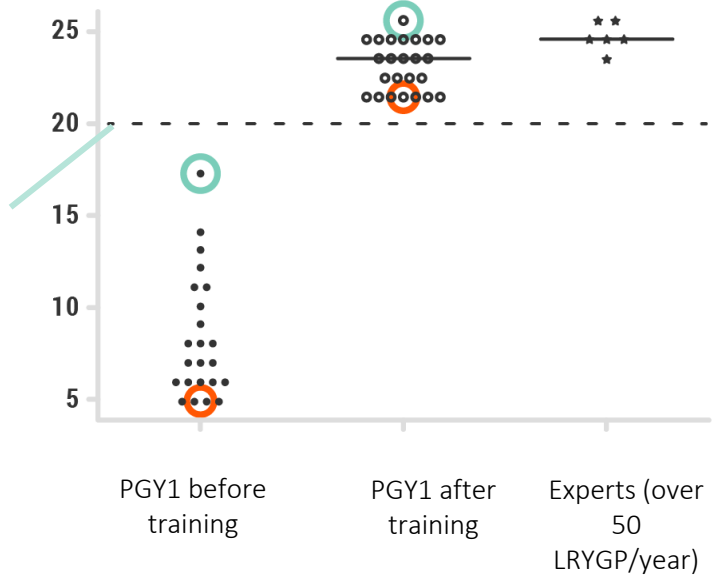


Pillar 2

Eg. Advanced laparoscopy training program



Expert Level



In this validation experiment, all students (n = 25) acquired skills above the expert threshold *

*Varas J et al (2012) Significant transfer of surgical skills feasibility of learning advanced laparoscopy in a general surgery residency. Surg Endosc

Skills obtained with the advanced program are transferred to the Operating room

Surg Endosc
DOI 10.1007/s00464-016-4942-6



Simulation-trained junior residents perform better than general surgeons on advanced laparoscopic cases

**Camilo Boza¹ · Felipe León¹ · Erwin Buckel¹ · Arnoldo Riquelme² ·
Fernando Crovari¹ · Jorge Martínez¹ · Rajesh Aggarwal^{3,4} · Teodor Grantcharov⁵ ·
Nicolás Jarufe¹ · Julián Varas¹**

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Trained junior residents perform better than general surgeons on advanced cases

Comparison between

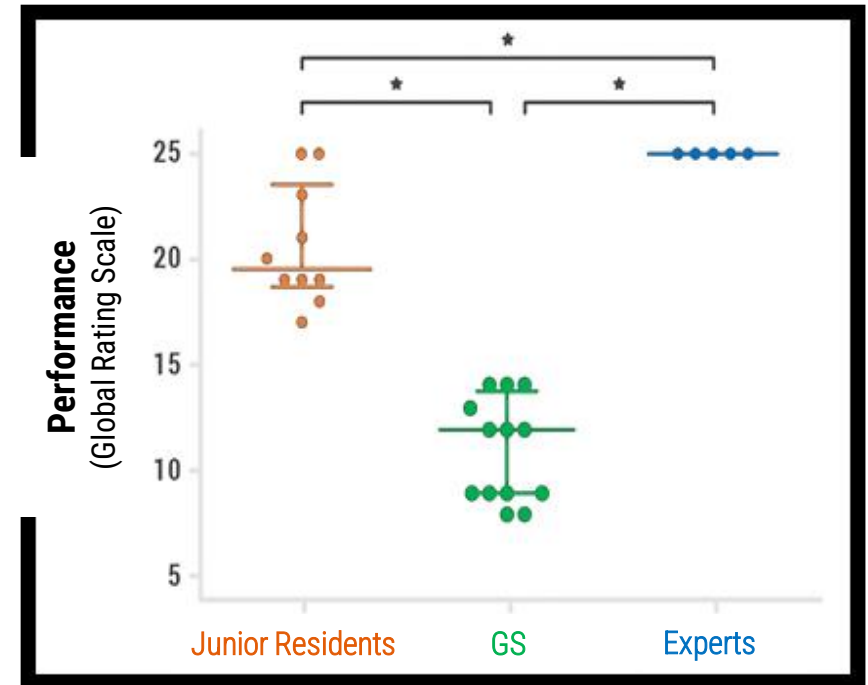
Simulation trained **Junior Residents**

Vs

General surgeons (GS) with no Simulation training

Vs

Experts (surgeons with over 60 cases a year)



Pillar 3

How we used to teach...



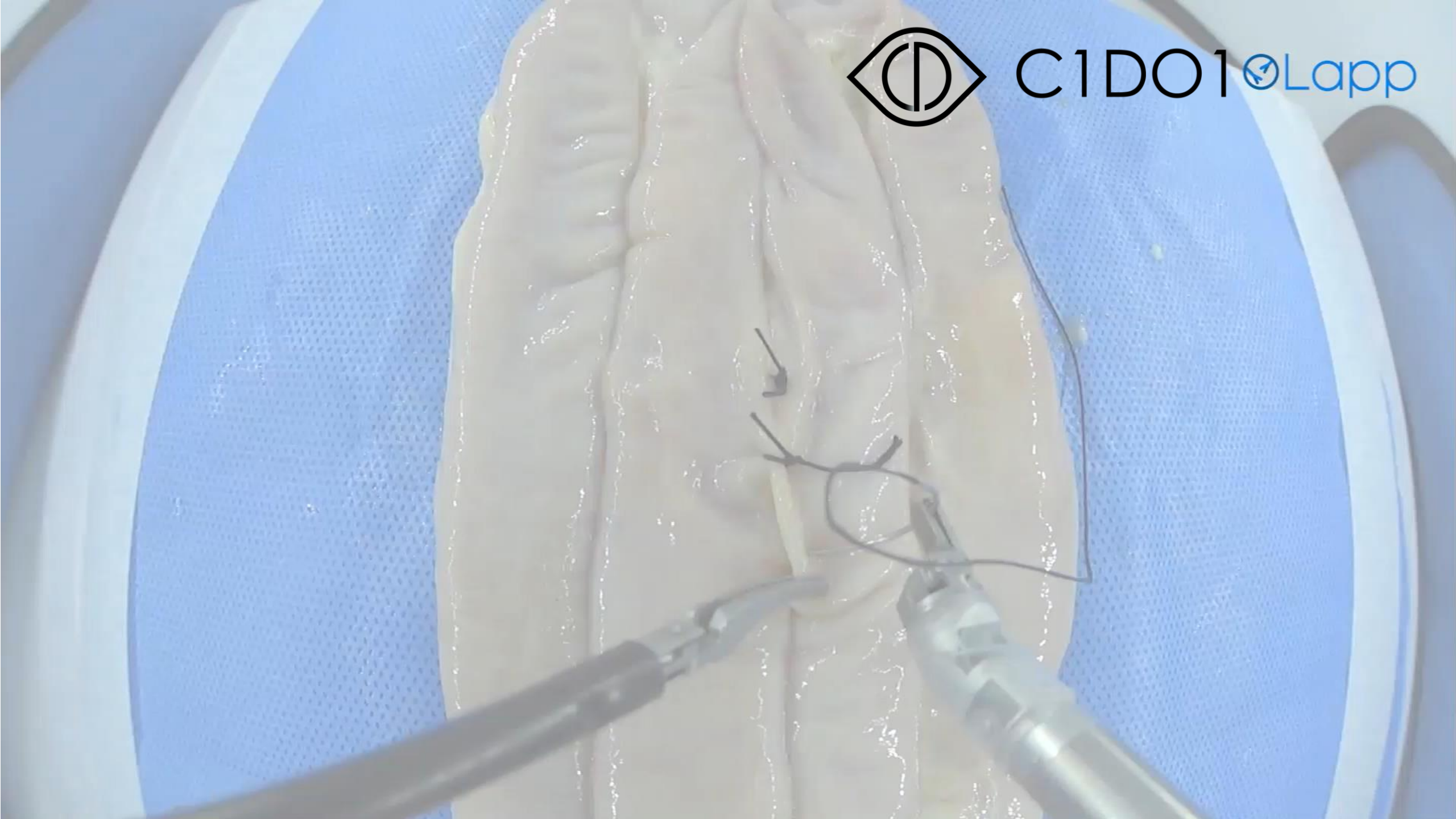
How are we training nowadays?

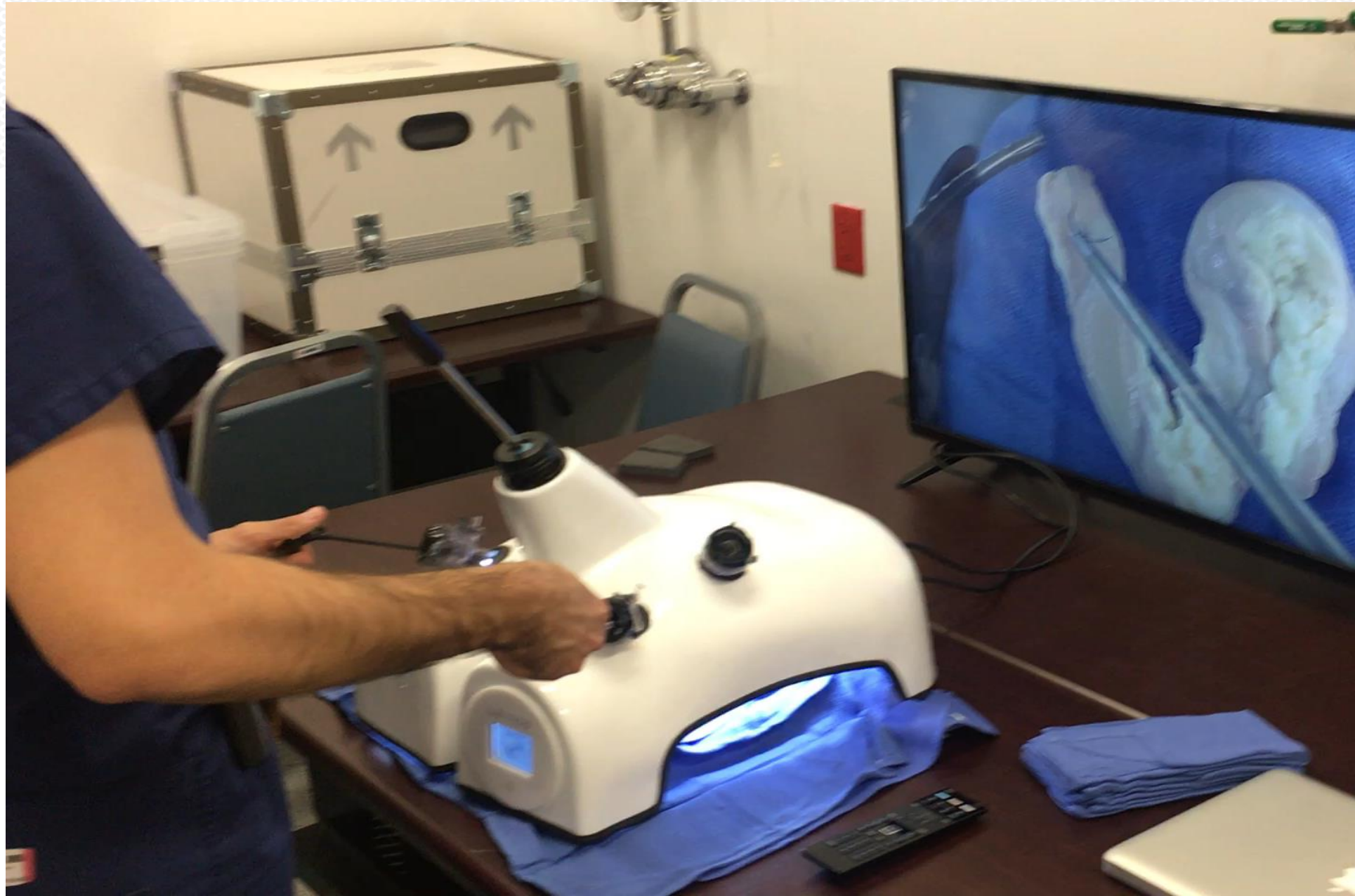



C1D01
Lapp

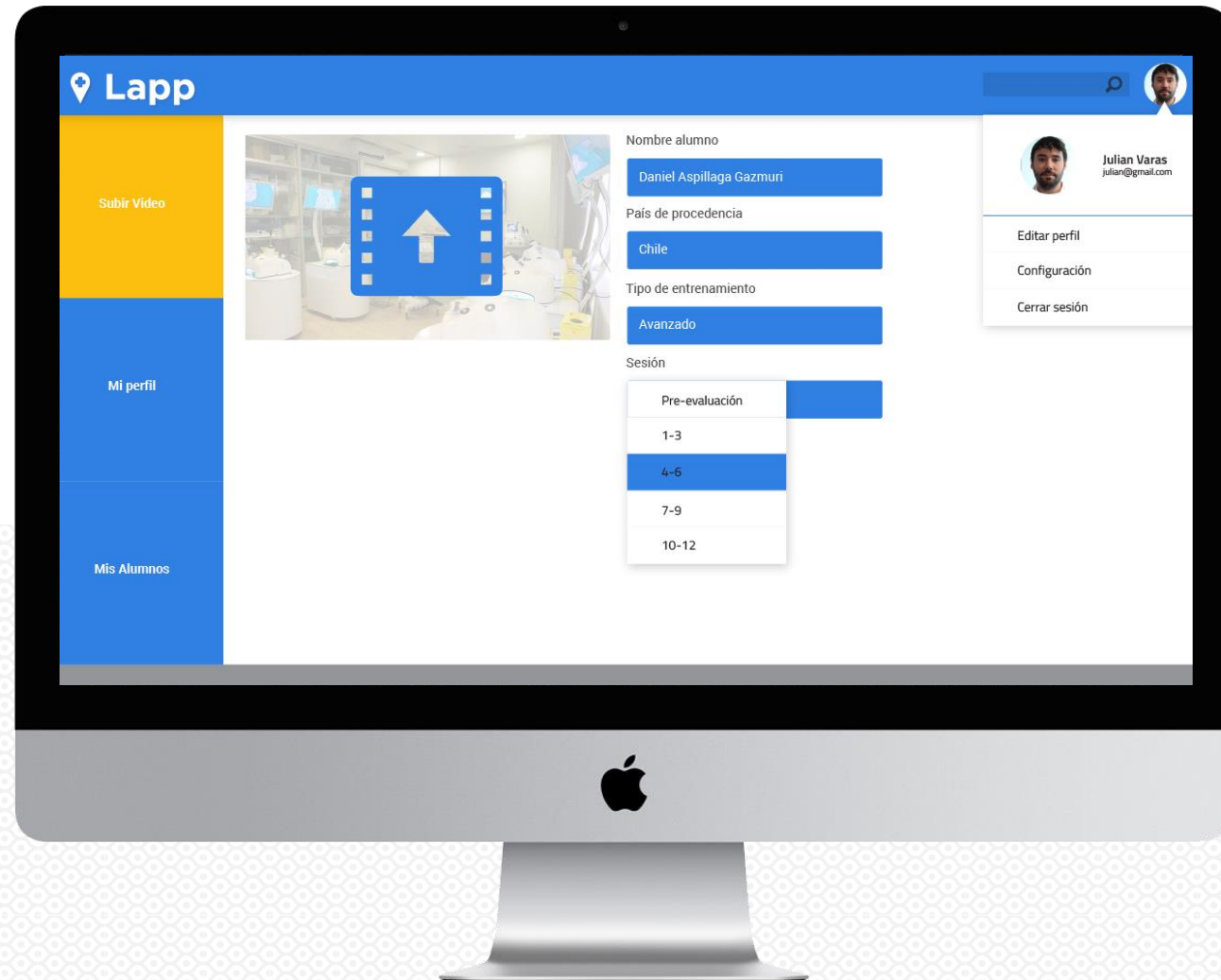


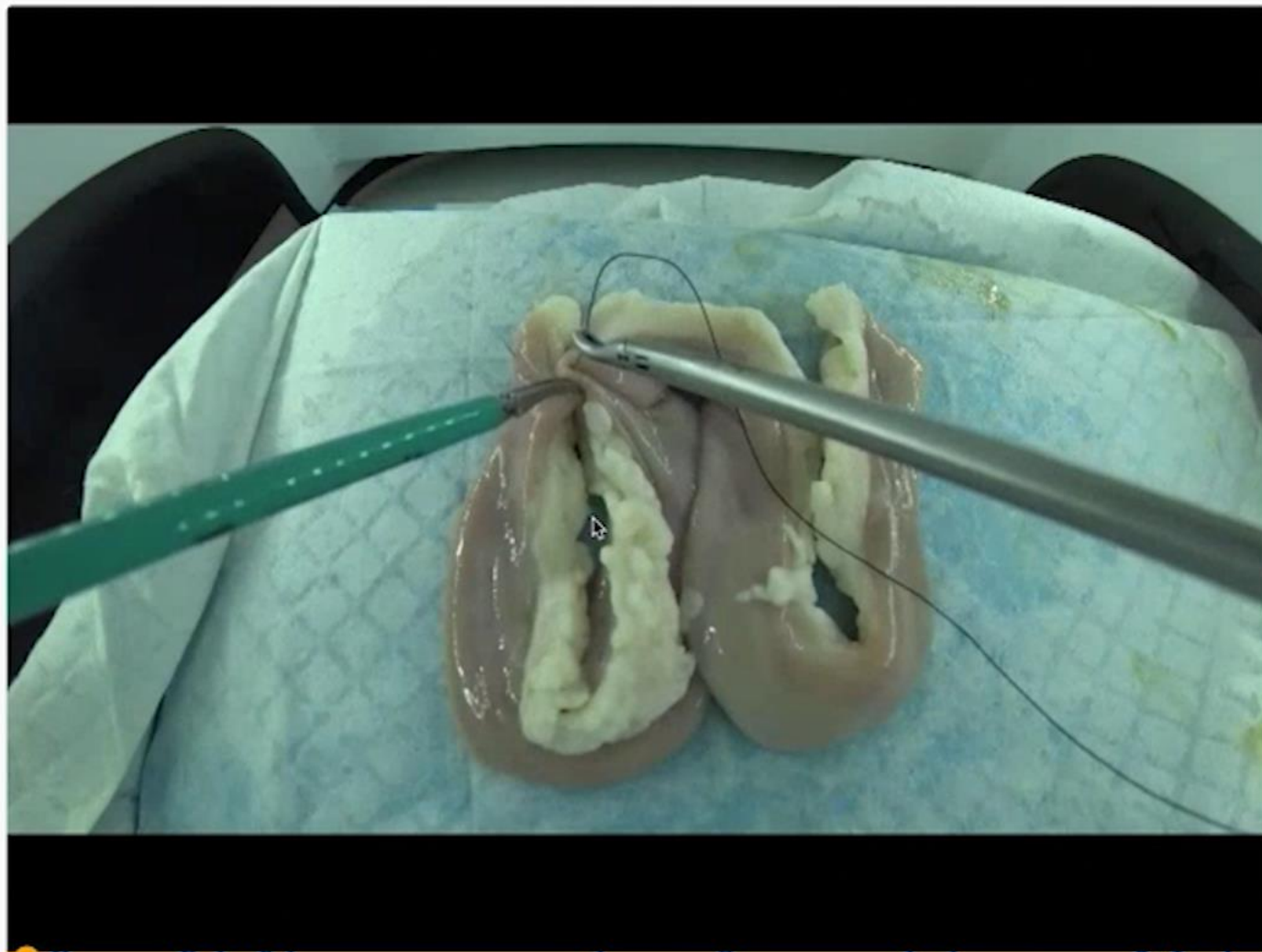
C1DO1 Lapp





Video gets uploaded to the  C1DO1 cloud 





Student Nathan Brand

Administrator Establishment UCSF

Teacher Julian Varas

Level Session 5

Institution UCSF

Country United States

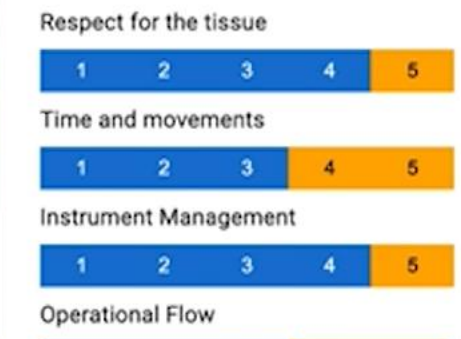
Exercise Session 5: Five groups of approximation stitches (three per group) + enterotomies.

RECORD

PASS FAIL

Evaluation OSATS score/ Minimum Total Duration required 17/17 01:05:52:700

General OSATS scale



Times

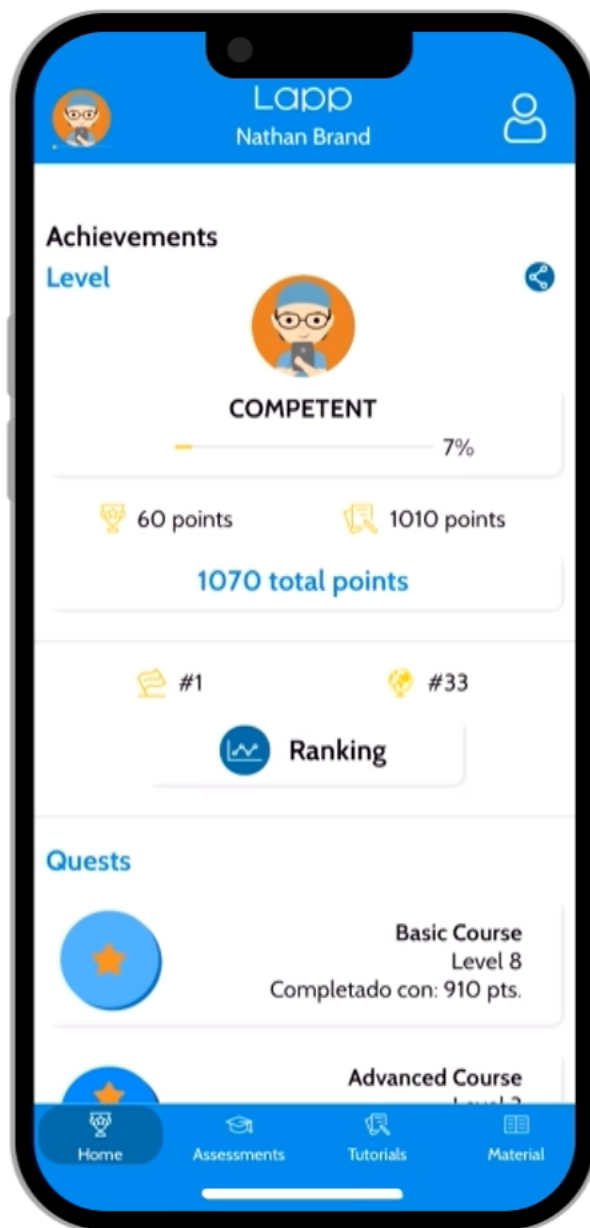
36:23 - 36:52	29.6 seconds (00:30)
35:36 - 36:01	24.4 seconds (00:24)
34:54 - 35:25	30.6 seconds (00:31)
34:13 - 34:34	20.3 seconds (00:20)
33:14 - 33:47	32.2 seconds (00:32)
27:48 - 32:42	294.2 seconds (04:54)
20:39 - 26:43	364.4 seconds (06:04)
14:22 - 19:47	324.8 seconds (05:25)
07:47 - 13:11	324.6 seconds (05:25)

Total Score: 17

Specific scale

A certified expert trainer evaluates the video and provides personalized digital feedback inputs

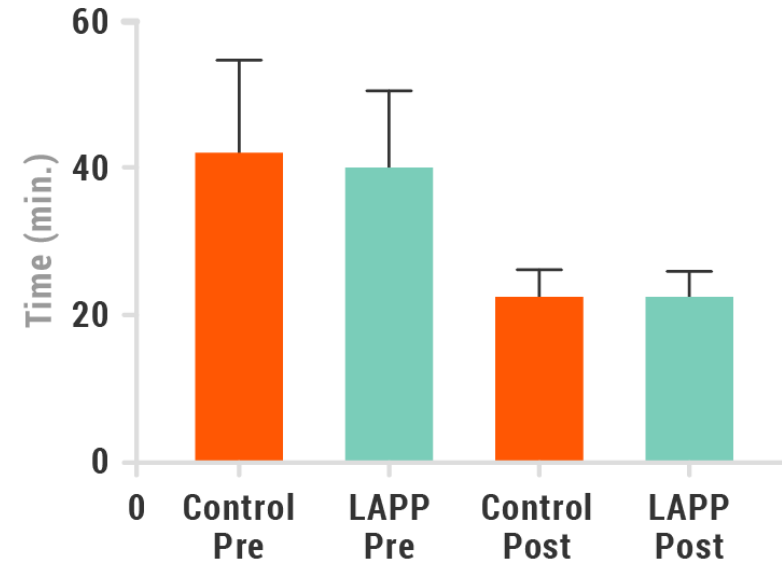
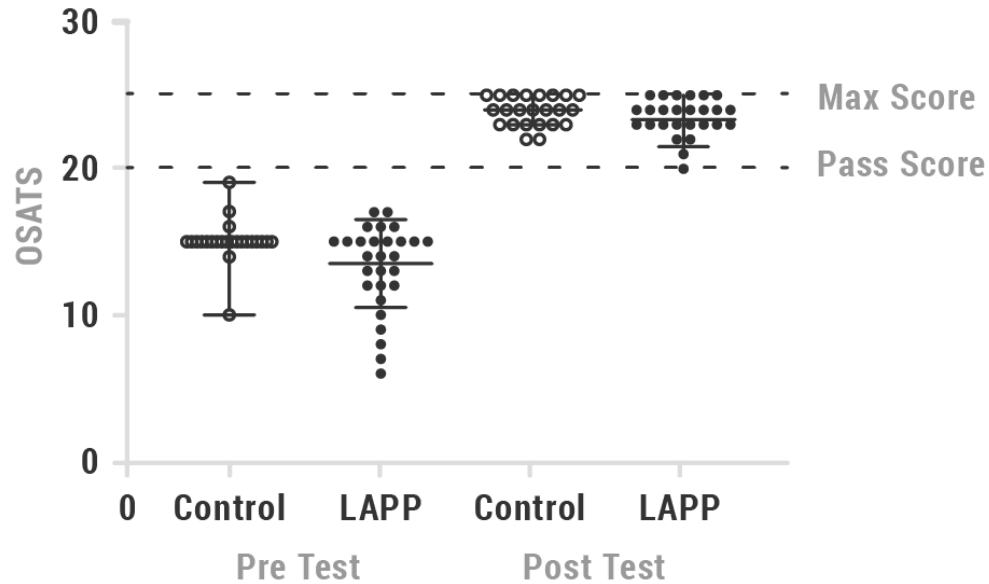






C1DO1: as good as in-person feedback*

Lapp



- Comparison of both groups: in-person feedback (control) and remote deferred feedback (Lapp group).
- **A Performance global rating scale** on initial and final evaluation
- **B Procedure time** at the initial evaluation (Pre) and final evaluation (post)


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

Valentina Duran Espinoza¹  · Francisca Belmar Riveros² · Cristian Jarry Trujillo¹ · Maria Ines Gaete Dañobeitia³ · Isabella Montero Jaras¹ · Mariana Migueles Schilling¹ · Brandon Valencia Coronel¹ · Gabriel Escalona¹ · Pablo Achurra Tirado³ · Nicolas Quezada³ · Fernando Crovari³ · Julian Varas Cohen¹

LRGYB training program

- 60 hours of hands-on training
- Manual gastrojejunostomy
- Stapled gastrojejunostomy
- Stapled jejunojejunostomy
- In-person feedback from expert instructors

Duran Espinoza V, Belmar Riveros F, Jarry Trujillo C, Gaete Dañobeitia MI, Montero Jaras I, Migueles Schilling M, et al. Five-Year Experience Training Surgeons with a Laparoscopic Simulation Training Program for Bariatric Surgery: a Quasi-experimental Design. *Obes Surg* [Internet]. 2023 Jun [cited 2024 Jun 24];33(6):1831–7. Available from: <https://link.springer.com/10.1007/s11695-023-06616-0>

XXVII IFSO World Congress



Melbourne 2024

Bariatric Simulated training program with remote and Asynchronous Feedback

Etapas

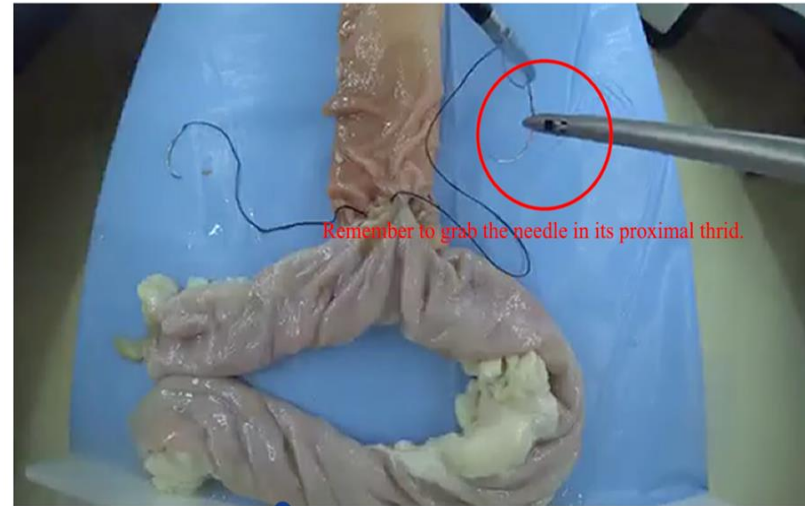
1. Pre Evaluación - Gastroyeyuno Anastomosis...	Ver
3 2. Enteroentero anastomosis c/endograpadora ...	Ver
3. Enteroentero anastomosis c/endograpadora ...	Ver
4. Enteroentero anastomosis c/endograpadora ...	Ver
5. Enteroentero anastomosis c/endograpadora ...	Ver
6. Hernia y Nissen Punto simple [Grabar]	Ver
7. Hernioplastía hiatal y Nissen (Triple Simple)	Ver
8. Hernioplastía hiatal y Nissen (simple bloque...	Ver
9. Hernioplastía hiatal y Nissen (simple NO blo...	Ver
10. Hernioplastía hiatal y Nissen punto X [Grab...	Ver



Dispone de 4 sedas 3/0 de 25 cm.

Usted debe realizar una gastroyeyuno 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...

IR A ETAPA



00:15:33 / 00:46:16

Evaluación

1 No

2 Sí

OSATS - Pared Anterior

1 2 3 4 5

OSATS - Enterotomía


1 2 3 4 5

Feedback

2



Remote and asynchronous training network: from a SAGES grant to an eight-country remote laparoscopic simulation training program

María Inés Gaete¹ · Francisca Belmar¹ · Matías Cortés¹ · Adnan Alseidi² · Domenech Asbun³ · Valentina Durán¹ · Gabriel Escalona¹ · Pablo Achurra¹ · Ignacio Villagrán¹ · Fernando Crovari¹ · Fernando Pimentel¹ · Julián Varas¹ 



369 Trainees

- 29% Completed the Basic Program
- 13% Completed the Advanced Program

Fourteen Institutes:

- 7 in Chile
- 1 in the USA
- 1 in Bolivia
- 1 in Brazil
- 1 in Ecuador
- 1 in El Salvador
- 1 in Paraguay
- 1 in Perú



33 Administrators and 8 Trained Instructors in 8 Countries



6,729 Uploaded Videos

 3%	 26%
 56%	 15%

28,711 Feedback Inputs






18 Training Centers in 10 Countries



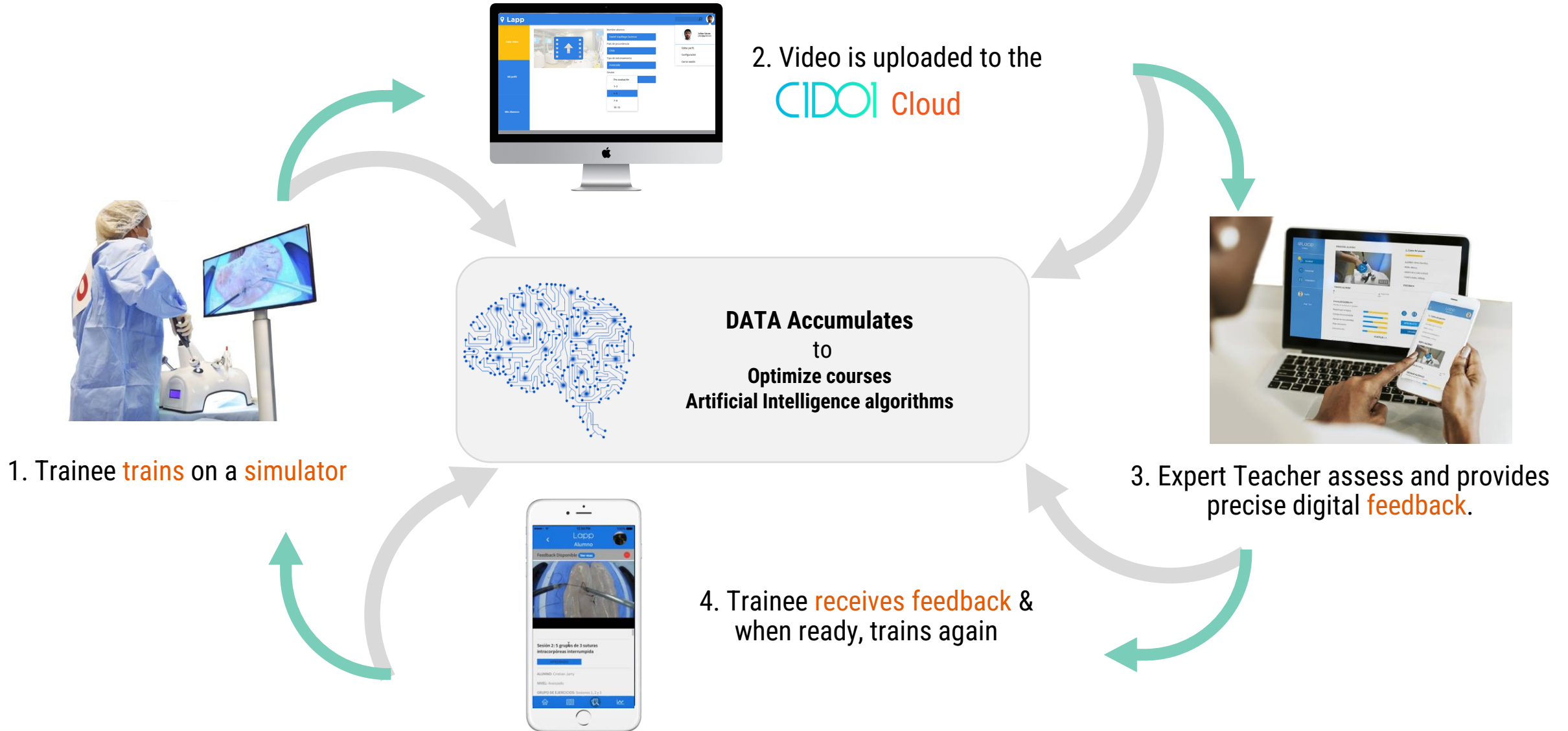
2022 SAGES ORAL

Remote and asynchronous training network: from a SAGES grant to an eight-country remote laparoscopic simulation training program

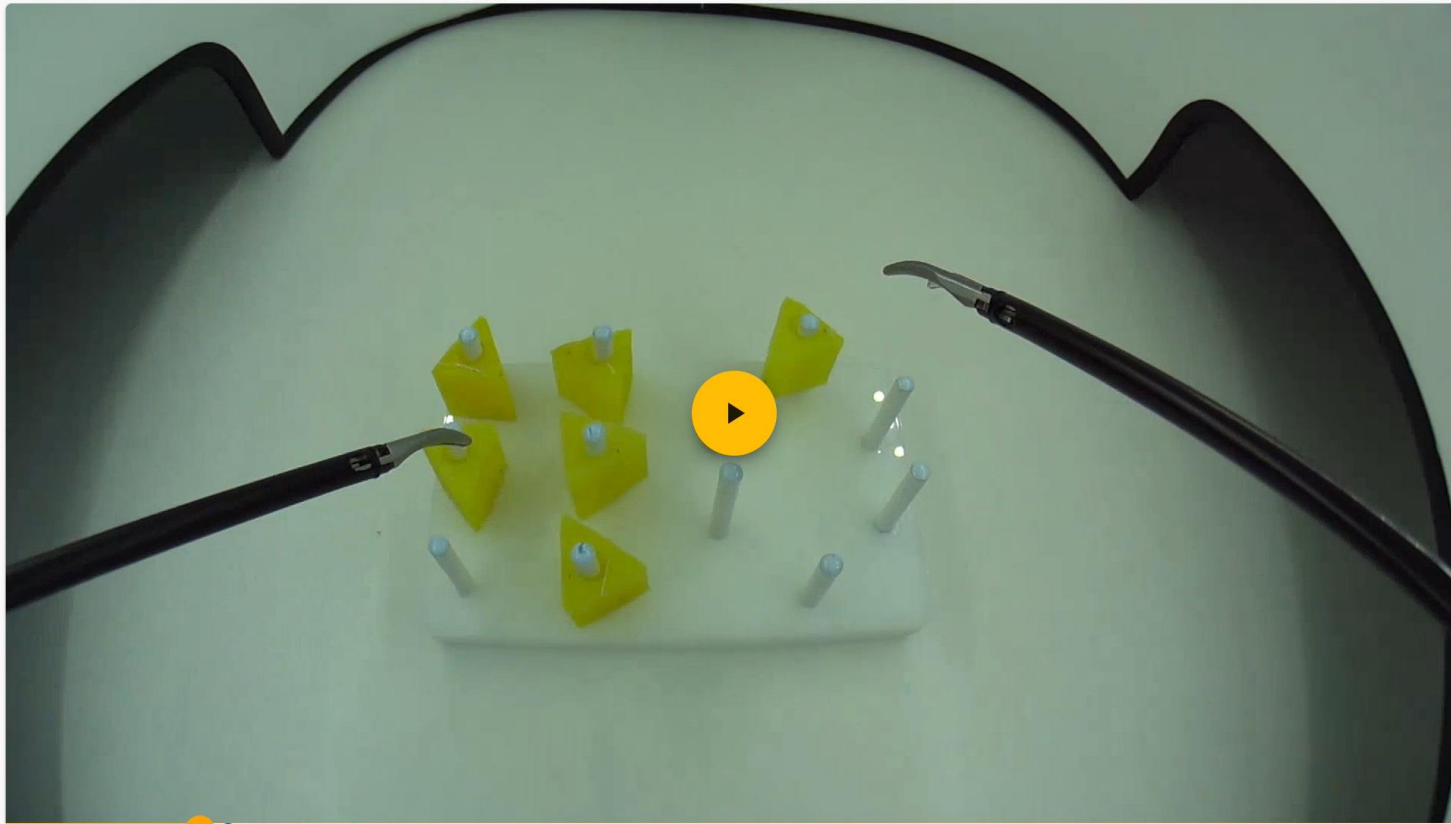
María Inés Gaete¹ · Francisca Belmar¹ · Matías Cortés¹ · Adnan Alseidi² · Domenech Asbun³ · Valentina Durán¹ · Gabriel Escalona¹ · Pablo Achurra¹ · Ignacio Villagrán¹ · Fernando Crovari¹ · Fernando Pimentel¹ · Julián Varas¹ 



Learning Cycle with data inputs



Automation in Basic Curricula



Student



Alexis Sanchez

Administrator Establishment

Carlos Martinez

Teacher

Julian Varas

Level

Group 1

Institution

UC

Country

Chile

Exercise

Object transfer - Part 1

PASS

FAIL

COMPLETE

FEEDBACK

Evaluation

Total

Duration /

Maximum

03:37:700

/ 00:55

Times

00:07 - 03:45 : 217.7 seconds

(03:38)

Feedbacks

00:35



Artificial intelligence in laparoscopic simulation: A promising future for large-scale automated evaluations, Surgical Endoscopy 2022.

Belmar F, Varas J et Al.

```

# Analisis: elementos
mi, md, mdj, mdj = 0,0,0,0
contacto = False
for i, elemento in enumerate(boxes["elementos"]):
    for j, cc in enumerate(boxes["cav_jos_izquierda"]):
        if (puesto[cc[0], cc[1]] , elemento) and (not "usa" in cc[0]):
            boxes["elementos"][i][0].append("cav_jos_izquierda")
            boxes["elementos"][i][0].append("usa")
            boxes["cav_jos_izquierda"][j][0].append("usa")
    for j, cc in enumerate(boxes["cav_jos_derecha"]):
        if (puesto[cc[0], cc[1]] , elemento) and (not "usa" in cc[0]):
            boxes["elementos"][i][0].append("cav_jos_derecha")
            boxes["elementos"][i][0].append("usa")
            boxes["cav_jos_derecha"][j][0].append("usa")

if (len( boxes["elementos"][i][0]) == 0):
    try:
        area = ((elemento[2] - elemento[0]) * (elemento[3] - elemento[1]) -
                cuadro_elemento - libros[0].int(elemento[1]) * 0.5 * elemento[1])
        if (cuadro_elemento < cuadro_elemento == 1).size > 0):
            (area >= 0):
                adl = area
                adl = 1
                contacto = True
                actualizar(estadisticas, "primer_movimiento", cap)
                actualizar(estadisticas, "ultimo_movimiento", cap , 2)
            if (cuadro_elemento < cuadro_elemento == 2).size > 0):
                (area >= 0):
                    adl = area
                    adl = 1
                    contacto = True
                    actualizar(estadisticas, "primer_movimiento", cap)
                    actualizar(estadisticas, "ultimo_movimiento", cap , 2)
            if (cuadro_elemento < cuadro_elemento == 3).size > 0):
                (area >= 0):
                    adl = area
                    adl = 1
                    contacto = True
                    actualizar(estadisticas, "primer_movimiento", cap)
                    actualizar(estadisticas, "ultimo_movimiento", cap , 2)
    except:
        pass
    
```

```

)
# Read until video is completed
v = True
ultimoFrame = None
while(cap.isOpened()):
    # Capture frame by frame
    ret, frame = cap.read()
    if (ret == True):
        if ((x % 3) == 0):
            frame = cv2.resize(frame , (600,600))
            image = frame.toTensor()
            pinak = binary(torch.nn.functional.interpolate(image.unsqueeze(0), scale_factor=2))
            interior = binary(torch.nn.functional.interpolate(image.unsqueeze(0), scale_factor=2))
            nb_components, output, stats, centroids = cv2.connectedComponentsWithStats(image)
            analisis = np.zeros((600,600,3)).astype(np.uint8)
            analisis[interior == 1] = [255,0,0]
            analisis[interior == 3] = [0,255,255]
            consolidado = np.hstack((frame, analisis ))
            centriz = np.zeros((600,600,3)).astype(np.uint8)
            centriz[interior == 1] & (pinak == 1)] = 1
            if (centriz_max) == 1):
                actualizar(estadisticas, "primer_contacto", cap)
                actualizar(estadisticas, "ultimo_contacto", cap , 2)
            else:
                ultimoFrame = frame
            cv2.imshow("frame", consolidado)
            if cv2.waitKey(25) & 0xFF == ord('q'):
                break
            if cv2.waitKey(25) & 0xFF == ord('r'):
                cv2.imwrite("capturas/imagenes/keep"+str(frame)
            #print((x))
            x += 1
        # Break the loop
        else:
            break
# When everything done, release
# the video capture object
cap.release()
# Release all resources
    
```

```

if(("recipiente_inicio" in boxes and not boxes["recipiente_inicio"]):
    try:
        h_inicio = boxes["recipiente_inicio"]
        h_final = boxes["recipiente_final"]
        h_movimiento = h_inicio - h_final
        contacto = False
        for i, elemento in enumerate(boxes["elementos"]):
            if (dentro(elemento[0], elemento[1]) , boxes["recipiente_inicio"]):
                boxes["elementos"][i][0].append("recipiente_inicio")
            if (dentro(elemento[0], elemento[1]) , boxes["recipiente_final"]):
                boxes["elementos"][i][0].append("recipiente_final")
            if (len(boxes["elementos"][i][0]) == 0):
                contacto = True
                actualizar(estadisticas, "primer_movimiento", cap)
                actualizar(estadisticas, "ultimo_movimiento", cap , 2)
            boxes["elementos"][i][0].append("recipiente_inicio")
            if (len(boxes["elementos"][i][0]) == 0) and (output[output["recipiente_inicio"]][i][0] == 0):
                contacto = True
                actualizar(estadisticas, "primer_contacto", cap)
                actualizar(estadisticas, "ultimo_contacto", cap , 2)
            else:
                actualizar(estadisticas, "primer_contacto", cap , int(estadisticas["ultimo_contacto"] + 1))
        if (hboxes is None):
            hboxes = boxes["elementos"].copy()
            for i in range(len(hboxes)):
                hboxes[i].append("hboxes")
                hboxes[i].append("hboxes")
                hboxes[i].append("hboxes")
        else:
            hboxes["hboxes"] = hboxes["hboxes"] + [0] , [0] , [0] , [0]
            for i, elemento in enumerate(boxes["elementos"]):
                if ("hboxes" in elemento[0]):
                    hboxes["hboxes"].append(elemento[0], elemento[1])
                    hboxes["hboxes"].append(i)
            else:
                hboxes["hboxes"].append(elemento[0], elemento[1])
                hboxes["hboxes"].append(i)
            hboxes["hboxes"] = hboxes["hboxes"] + [0] , [0] , [0] , [0]
            for i, elemento in enumerate(boxes["elementos"]):
                if (elemento[0] == 1) and (alligando - elemento[0] > 4000):
                    hboxes["hboxes"] = 0
                    elemento[0] = 0
                    if (elemento[1] == 1):
                    
```

Towards online global certification of technical surgical skills: a viable and scalable method for assessing technical surgical skills objectively using remote technology

Francisca Belmar¹ · Iván Paul¹ · Catalina Ortiz¹ · Javier Vela¹ · Caterina Contreras¹ · Domenech Asbun² · Adnan Alseidi³ · Gerald M. Fried⁴ · Jeffrey Wiseman⁴ · Gabriel Escalona¹ · Nicolas Jarufe⁵ · Pablo Achurra^{1,5} · Julián Varas^{1,5} 



00:09:25/00:22:08



00:09:25/00:22:44

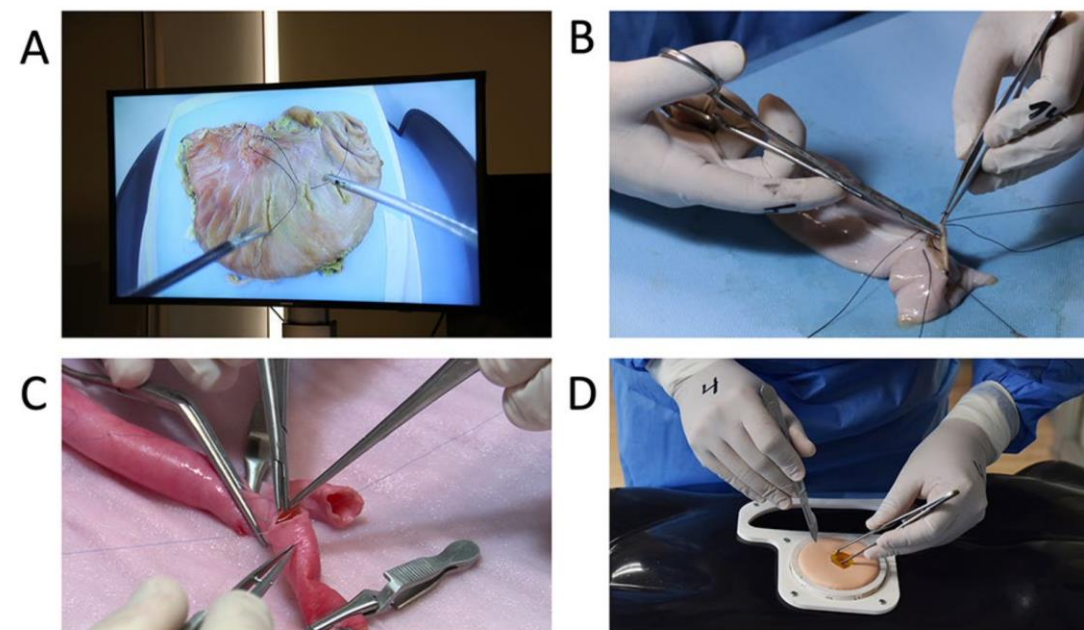
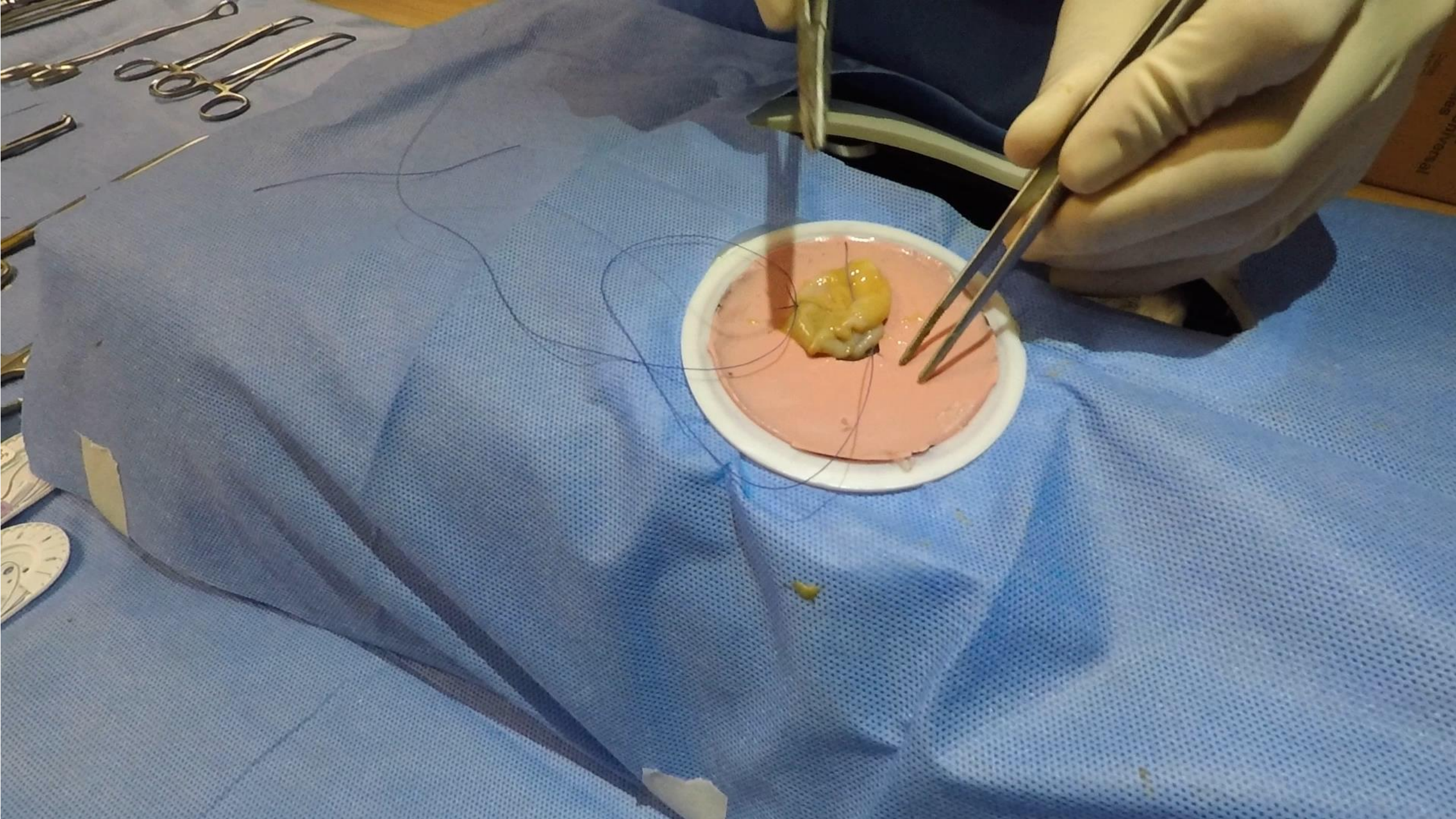
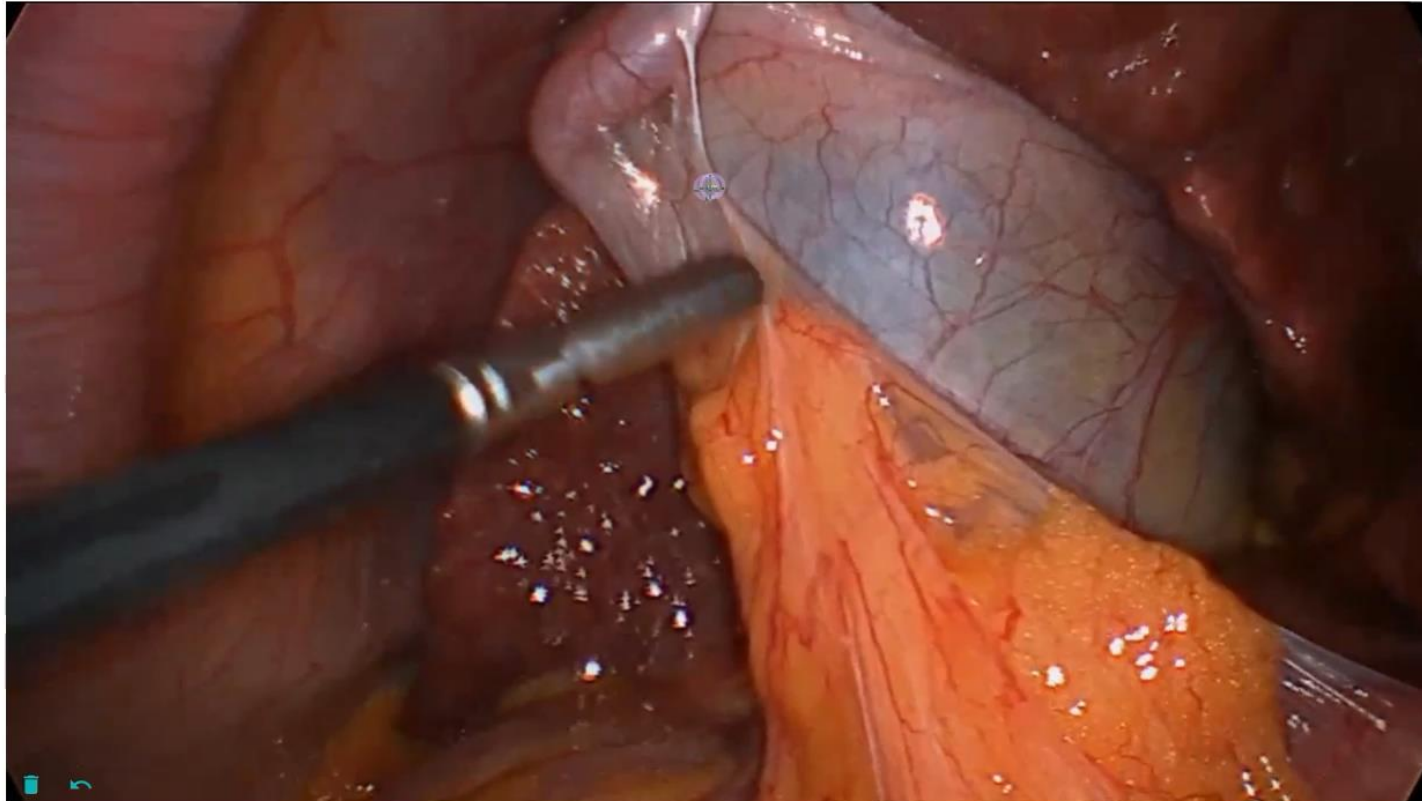


Fig. 1 Four of the seven OSCE stations: **A** Basic and advanced laparoscopic skills. **B** Intestinal anastomosis. **C** Vascular anastomosis. **D** End colostomy confection





Information OSATS Feedbacks

FEEDBACKS

04:53 [download] [share] [comment] [like]



Feedback tools: [microphone] [comment] [share] [timer]



Drawing feedback

Iniciando curso básico

Lapp clinical practice



08:38:687 /
46:55:509



Datos Procedimiento

Terminando curso avanzado

Lapp clinical practice



05:45:739 /
49:09:568



Datos Procedimiento

Ambos en sus primeras 5 colecistectomías, mismo staff y centro

Innovations in surgical training: exploring the role of artificial intelligence and large language models (LLM)

Inovações no treinamento cirúrgico: explorando o papel da inteligência artificial e dos grandes modelos de linguagem (LLM)

JULIAN VARAS¹ ; BRANDON VALENCIA CORONEL¹ ; IGNACIO VILLAGRÁN² ; GABRIEL ESCALONA¹ ; ROCIO HERNANDEZ³ ; GREGORY SCHUIT³ ; VALENTINA DURÁN¹ ; ANTONIA LAGOS-VILLASECA⁴ ; CRISTIAN JARRY¹ ; ANDRES NEYEM³ ; PABLO ACHURRA¹ .

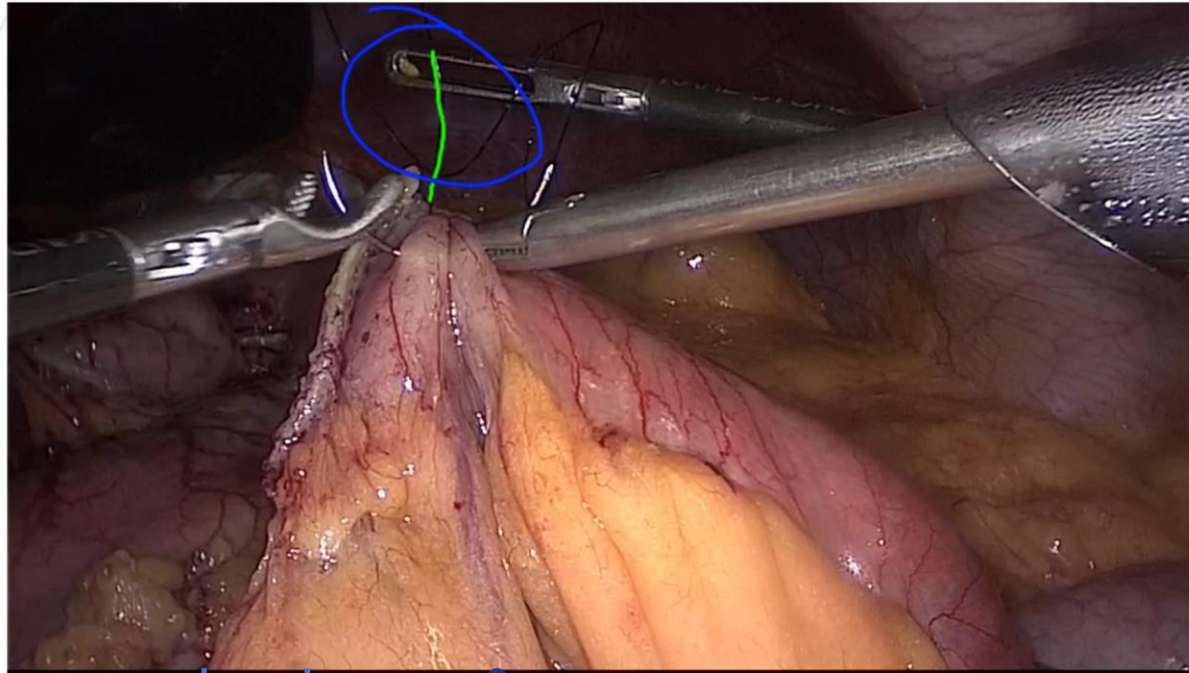
January 3, 2024

Practical Guide to Machine Learning and Artificial Intelligence in Surgical Education Research

Daniel A. Hashimoto, MD^{1,2}; Julian Varas, MD³; Todd A. Schwartz, DrPH^{4,5}

» [Author Affiliations](#)

JAMA Surg. 2024;159(4):455-456. doi:10.1001/jamasurg.2023.6687



00:38:13 / 01:32:28

Score

Feedback

- 1 00:15:36:156
- 2 00:23:35:152
- 3 00:38:13:811

Consider techniques to retrieve the thread independently, reducing reliance on a helper.



Total 0 3 0 1

Tiempos

DELETE EVALUATION

SAVE EVALUATION

SEND EVALUATION





Etapa: Curso de suturas Internado de Cirugía 2024

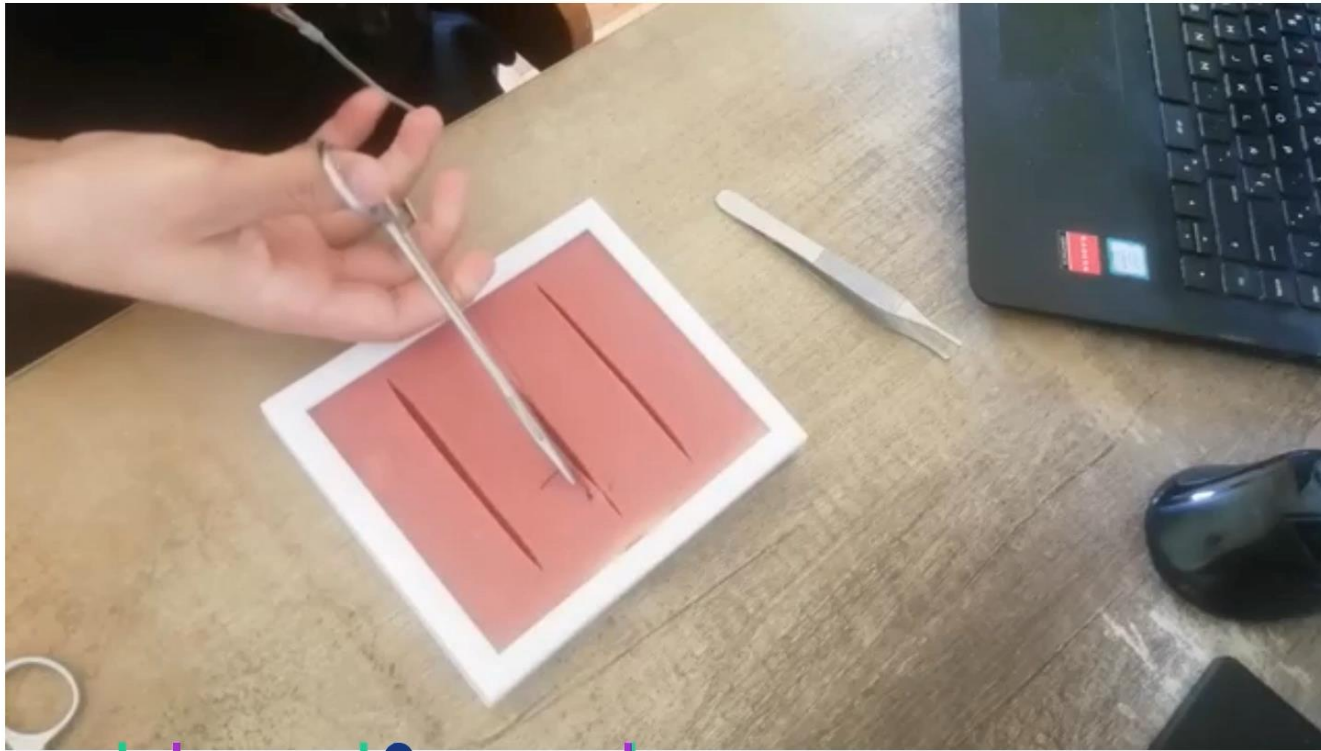


Curso: Curso de suturas Internado de Cirugía 2024
Carrera: Carrera Medicina
Facultad: Facultad de Medicina

POR LOGRAR



Nombre: DOMINGO PACHECO
Mail: domingo.pacheco@uc.cl



Evaluación

Feedback

1	00:00:29:121				
2	00:00:42:057				
3	00:01:26:485				
4	00:01:34:135				

ASISTIR

GENERAR RESUMEN



Intentos Anteriores



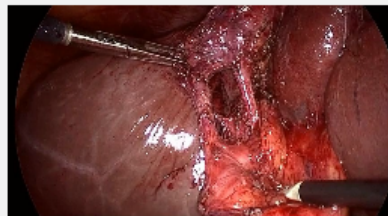
Capabilities of Gemini Models in Medicine

(a) Video dialogue example

Hello, I am a medical student analyzing this surgical procedure video for my studies. Which surgical procedure is shown in this video?



...



The surgical procedure shown in this video is a laparoscopic cholecystectomy - the surgical removal of the gallbladder. This is a common procedure and is often performed when gallstones cause pain or complications, such as inflammation of the gallbladder (cholecystitis).

Which specific surgical phase is shown this video clip?



The specific surgical phase shown in this video clip is the dissection and isolation of the cystic duct and artery. This phase comes after the initial access to the abdominal cavity and visualization of the gallbladder, which can be seen retracted superiorly by forceps, and before the clipping and dividing of the cystic duct and artery. The surgeon is using a laparoscopic dissector to carefully separate the cystic duct and cystic artery from the surrounding tissue. This is a critical step as it allows the surgeon to clearly identify and isolate these structures before they are clipped and divided and can help to prevent injury to the common bile duct and hepatic artery.



00:04:13/00:09:00



Score

Feedback

00:01:37



00:02:02



va

00:03:37



00:03:49



va

00:04:13



va

Buena tracción, la aguja entra casi en los 90°

va

00:04:33



va



Feedback summary

Recommendation 1

Editar

Positive aspects:

1. Excellent presentation, clear and precise.
2. Good verbal and non-verbal communication.

Aspects to be improved:

1. Use more non-verbal language.
2. Consider exploration of pain characteristics, including location, intensity, symptom characteristics, relieving or aggravating factors, and 24-hour pain behaviour. It is recommended that pain assessment tools be reviewed to improve this.

CHOOSE

Recommendation 2

Editar

The professor praised the student's presentation for being clear and precise, but suggested using more non-verbal language. He recommended a more detailed exploration of the characteristics of the pain, including location, intensity, symptoms, aggravating factors and its behaviour over a 24-hour period, suggesting to review the pain assessment instruments to improve this point. He noted that the phrase "already perfect" is repeated several times, which could negatively influence the patient's reception during the interview. Although the overall communication was good, he suggested avoiding looking too much at the notes to improve the flow of the conversation and make it feel more natural, rather than like a survey. To achieve this, he recommended more practice.

CHOOSE

Summary

How to train and be trained in bariatric interventions in 2024

Dr. Julián Varas

Associate Professor of Surgery – Vice Chair of Simulation at UC - Pontificia Universidad Católica de Chile

CONTACT: JEVARAS@UC.CL
<https://C1DO1.AI>

XXVII Ifso World Congress



Melbourne 2024