What's the Future of Robotic Bariatric Surgery?

Erik B. Wilson, MD, FACS

Professor of Surgery

Vice Chair of Surgery

Bariatric Surgery Medical Director Memorial Hermann Hospital

Division Chief, Minimally Invasive and Elective General Surgery

University of Texas Medical School at Houston

MIST
MINIMALLY INVASIVE SURGEONS OF TEXAS

UTHealth®
The University of Texas Health Science Center at Houston

McGovern Medical School

My Disclosures

- Intuitive-Teaching/Research
- Covidien-Teaching
- Johnson&Johnson-Teaching/Research
- Gore-Teaching
- Activ Surgical-Research
- Boston Scientific-Teaching
- USGI-Research
- GI Windows-Consulting
- Many of the systems shown are in development and not regulatory approved

What Is the Goal of Minimally Invasive Surgery?

Better minimally invasive surgery

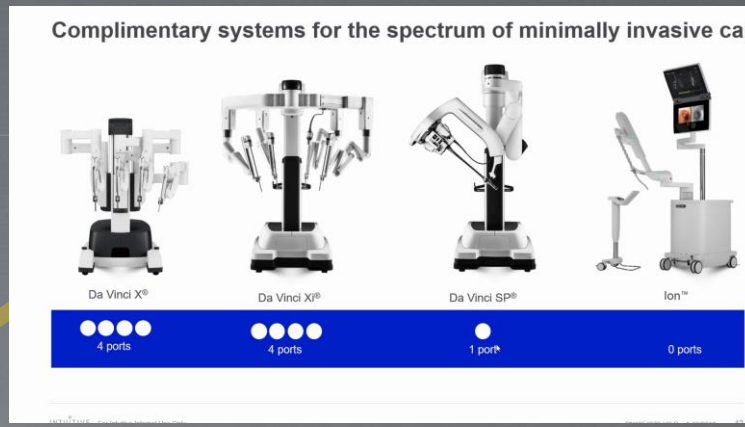
1. More precise and accurate
2. More reproducible and consistent
3. Easier on the surgeon physically and mentally
4. More efficient--quicker

More minimally invasive surgery

1. Stop open surgery
2. Optimize the procedure to the patient
3. Fewer incisions
4. No incisions

Digital platforms are Driving the Process

Evolution of Robotic Platforms



1999

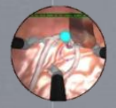
da Vinci®
- Eliminates lap compromises
- Introduction of 4th arm (2003)
- Simple instruments

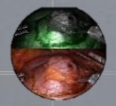
2006

da Vinci® S™
- 3D HD Vision (720p)
- Cross-quadrant access
- Streamlined set-up

2009

da Vinci® Si™
- Dual Console option
- Enhanced HD Vision (1080i)
- Upgradable architecture


- FIREFLY™

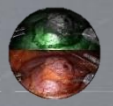

- SINGLE-SITE™


- SKILLS® SIMULATOR™


- ADVANCED INSTRUMENTATION

2014

da Vinci® Xi™
- Multi-quadrant access
- Crystal clear 3D HD vision
- Platform for future technologies


- FIREFLY™ (EXPECTED MID 2014)

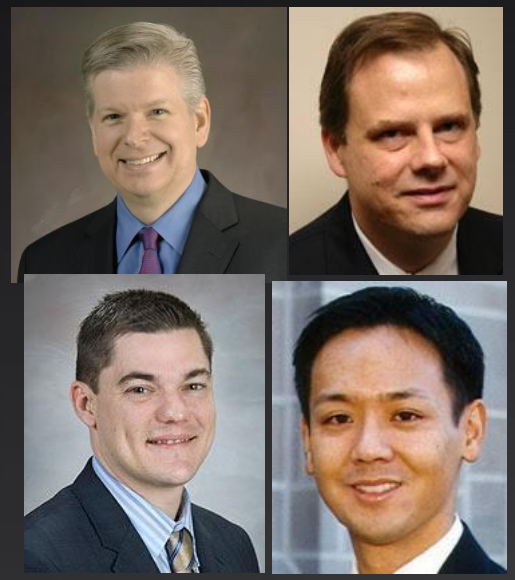

- XI SKILLS SIMULATOR™ (AVAILABLE NOW)


- INTEGRATED ENERGY (AVAILABLE NOW)


- VESSEL SEALER (EXPECTED MID 2014)


- STAPLER (EXPECTED MID 2014)
- FUTURE INNOVATION SINGLE PORT SURGERY

Prospective Comparison of Robotic versus Standard Laparoscopic Roux-en-Y Gastric Bypass



Erik Wilson, MD, FACS

Sherman Yu, MD, FACS

Terry Scarborough, MD, FACS

Brad Snyder, MD

Journal of Robotic Surgery 2008

UT HOUSTON

MIST
MINIMALLY INVASIVE SURGEONS OF TEXAS

Complications

605 total patients	356 lap patients	249 robot patients
Wound Infection	4 (1.1%)	1 (0.4%)
Stricture	8 (2.2%)	8 (3.2%)
Vomiting/Dehydration	19 (5.3%)	13 (5.2%)
Abdominal Pain	6 (1.7%)	4 (1.6%)
Total Minor	37 (10.4%)	26 (10.4%)
Intraluminal Bleed	4 (1.1%)	2 (0.8%)
Abdominal Wall Bleeding	0	1 (0.4%)
Trocar Hernia	2 (0.6%)	2 (0.8%)
Rhabdomyolysis	1 (0.3%)	2 (0.8%)
Stroke	1 (0.3%)	0
Pulmonary Embolism	0	2 (0.8%)
Leak	6 (1.7%)*	0*
Total Major	14 (3.9%)	9 (3.6%)

No significant differences except *p=0.040
All complications are reported over 90 days postop
No mortalities in either group

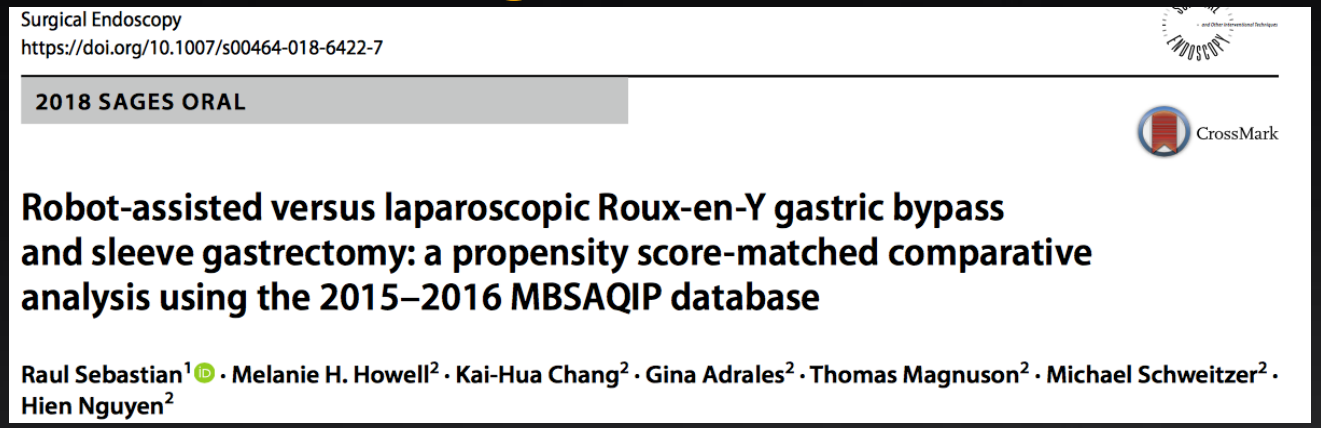
‘03 to ‘11--1695 Robotic Bypasses

- Retrospective review of prospective databases
- University of Texas – Houston (578 patients)
  - Database 2003-2011: Three robotic surgeons (E. Wilson, T. Wilson, Snyder)
- Celebration Florida Hospital (409 patients)
  - Database 2009-2011: One robotic surgeon (Kim)
- Eastern Maine Medical Center (708 patients)
  - Database 2005-2011: One robotic surgeon (Toder)
  - Mean BMI 48.9 (range 32-92)

Outcomes

Robotic Gastric Bypasses		1695
Early Major Complications (<30 days)		
Anastomotic Leak	2	0.12%
Abscess	3	0.18%
Bleeding requiring transfusion	14	0.83%
Pulmonary embolism/infarct	2	0.12%
Stricture requiring dilation	5	0.29%
Total	26	1.5%
Mortality	0	0%

Large Data- Gastric Bypass and Sleeve



Surgical Endoscopy
https://doi.org/10.1007/s00464-018-6422-7

2018 SAGES ORAL

Robot-assisted versus laparoscopic Roux-en-Y gastric bypass and sleeve gastrectomy: a propensity score-matched comparative analysis using the 2015–2016 MBSAQIP database

Raul Sebastian[1] · Melanie H. Howell[2] · Kai-Hua Chang[2] · Gina Adrales[2] · Thomas Magnuson[2] · Michael Schweitzer[2] · Hien Nguyen[2]

- 190,494 sleeves (12,877 matched) and 79,429 bypasses (5780 matched)
- Robotic sleeve vs. lap: lower postop bleeding (0.16% vs 0.43%, p<.001), lower stricture (0.19% vs 0.33%, p<.001), longer operative time (103 vs 73 min), otherwise no differences
- Robotic bypass vs. lap: fewer blood transfusions (0.64% vs 1.16%, p.001), longer operative time (158 vs 120 min), otherwise no differences
- Secondary matching performed to normalize operative times and conversion rate showed same results for sleeve but better results for robotic bypass: reduced LOS, few leaks, less renal complications, less DVT

Fine Robotic Bypass is Ok But I'm Not Convinced. What About Revisions?

Bariatric revisional surgery

Obes Surg. 2010 Jul 30. [Epub ahead of print]

Reasons and Outcomes of Reoperative Bariatric Surgery for Failed and Complicated Procedures (Excluding Adjustable Gastric Banding).

Patel S, Szomstein S, Rosenthal RJ.

Section of Minimally Invasive Surgery and The Bariatric and Metabolic Institute, Cleveland Clinic Florida, 2950 Cleveland Clinic Blvd., Weston, FL, 33331, USA.

Abstract

BACKGROUND: The rise of bariatric surgery has lead to an increasing number of reoperations for failed bariatric procedures. The reasons and types of these operations are varied in nature and remain to be defined.

METHODS: A retrospective review of a prospectively collected database was conducted to identify patients who underwent laparoscopic revisional surgery for non-gastric banding-related bariatric procedures between 2001 and 2008.

RESULTS: Of 384 secondary bariatric operations, 151 reoperative procedures were performed. Twenty-six vertical banded gastroplasties (17.2%), 2 mini-gastric bypasses (1.3%), 2 non-divided bypasses (1.3%), 1 distal Roux-en-Y gastric bypass (RYGBP; 0.7%), and 2 sleeve gastrectomies (1.3%) were converted to RYGBP. Three RYGBP (2%) and four jejunoileal bypass procedures (2.6%) were reversed secondary to malnutrition. One jejunoileal bypass (0.7%) and one biliopancreatic diversion (0.7%) underwent sleeve gastrectomies. Three pre-anastomotic rings were removed due to erosion (2%). Eleven pouch trimmings (7.3%), 16 redo gastrojejunostomies (10.6%), 5 redo jejunojejunostomies (3.3%), 36 remnant gastrectomies (23.8%), and 2 gastrogastric fistula takedowns (1.3%) were performed for pouch enlargements, strictures, and gastrogastric fistulas. Thirty-six patients (23.8%) underwent a combination of these procedures. The major morbidity (13.2%) was related to leaks. Other complications included wound infection, intra-abdominal abscess formation, and trocar site hernias. The mortality rate was 2%.

CONCLUSIONS: Reoperative bariatric surgery is a complex and growing field in bariatric surgery. The indications for surgical reoperation can vary depending on the procedure and reason for intervention. Laparoscopy appears to be a feasible approach. Though safe, morbidity and mortality are significantly higher than in primary bariatric procedure

151 revisions between 2001 and 2008

13.2% leak rate
2% mortality rate

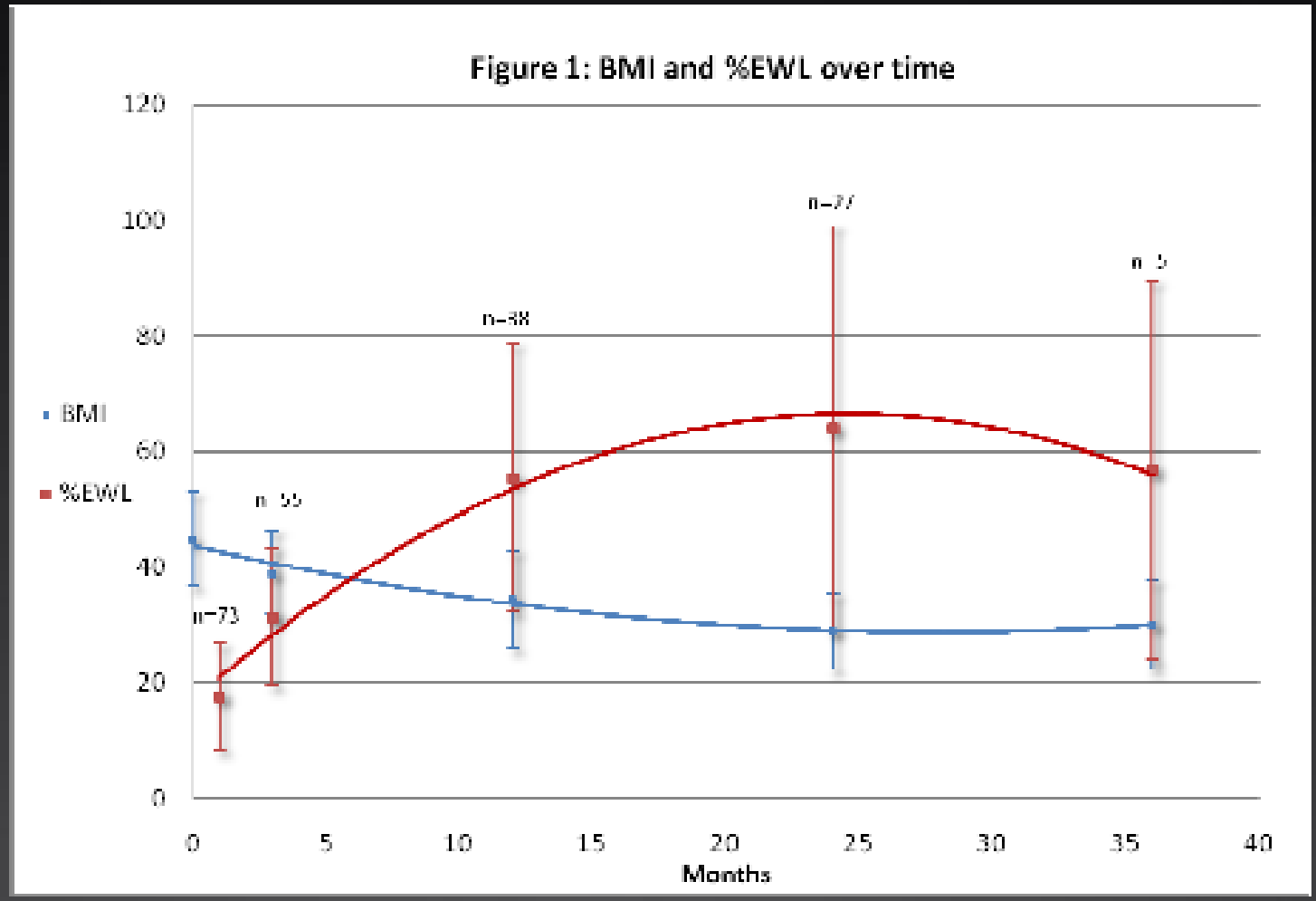
Revisional Bypass Weight Loss

99 patients / 2004-2010

42 Vertical GBs

29 Adjust GBs

28 Fixed GBs



Revisional Gastric Bypass

Complications	
Gastrointestinal leak	0(0%)
Intraabdominal abscess	1(1%)
Hemorrhage	0(0%)
Pulmonary Embolism	0(0%)
Pneumonia	1(1%)
Rhabdomyolysis	1(1%)
Intestinal obstruction	2(2%)
Incisional hernia	1(1%)
Marginal Ulcer	1(1%)
Dehydration	2(2%)
Epigastric abdominal pain	2(2%)
Nausea Vomiting	4(4%)

Robotically assisted revision of bariatric surgeries is safe and effective to achieve further weight loss.

Snyder B1, Wilson T, Woodruff V, Wilson E

2004-2011: 99 revisions

17% overall complication rate
24% 90-day readmission rate
no leaks
no peri-operative mortalities
average operative time 204 min

World J Surg. 2013 Nov;37(11):2569-73.

2009-2019 Gastric Bypass

2020 SAGES ORAL

Outcomes of primary versus revisional robotically assisted laparoscopic Roux-en-Y gastric bypass: a multicenter analysis of ten-year experience

Pouya Iranmanesh[1] · John Fam[2] · Thomas Nguyen[1] · David Talarico[2] · Kavita D. Chandwani[1] · Kulvinder S. Bajwa[1] · Melissa M. Felinski[1] · Leon V. Katz[2] · Sheilendra S. Mehta[3] · Stephan R. Myers[2] · Brad E. Snyder[1] · Peter A. Walker[4] · Todd D. Wilson[1] · Angielyn R. Rivera[1] · Connie L. Klein[1] · Shinil K. Shah[1,5] · Erik B. Wilson[1]

Received: 27 June 2020 / Accepted: 29 September 2020

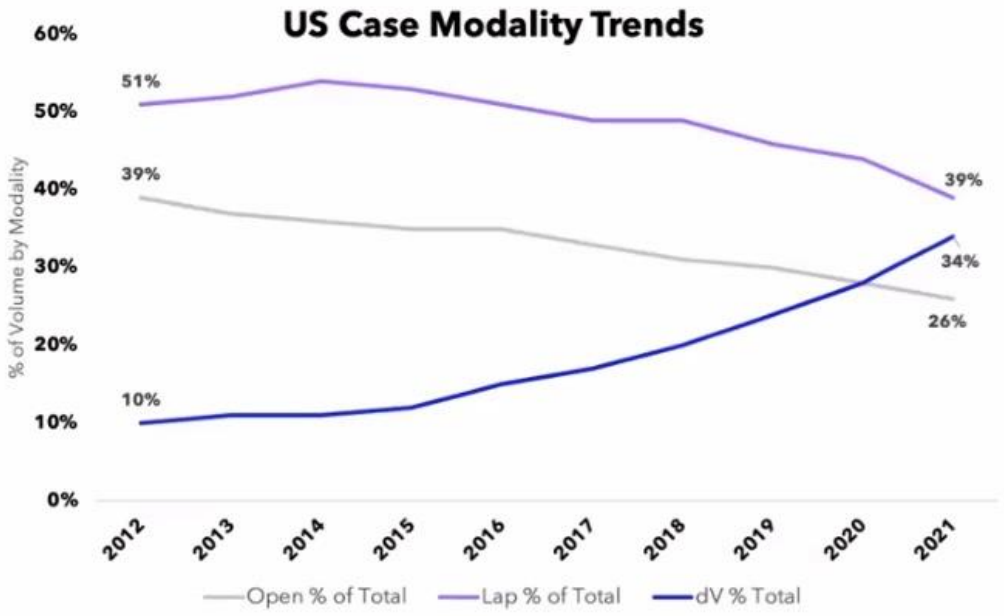
	Primary	Revision	P value
Leaks	.2% (2/806)	1.1%(3/266)	.101
GJ Leaks	.1% (1/806)	.4 (1/266)	.435

- Gastrointestinal leaks are a dreaded complication in bariatric surgery.
- Leak rates in the literature range from 0.1% to 1.2% after primary laparoscopic RYGB and 4.5 to 11.8% after revisional laparoscopic RYGB.
- Robotic results were consistent with the lowest leak rates found in the literature and the incidence of leaks after revisional RYGB was markedly below what has been reported with the laparoscopic approach, suggesting an advantage of robotic assistance for revisional RYGB.

US Elective Soft Tissue Open, Lap and Robotics

MIS Adoption

Da Vinci is driving customer's surgical strategies



3rd party data using IQVIA for applicable procedures in US for 2012 – 2021, 2021 volume is projected growth from 2020.
% is a % of total case volume by modality

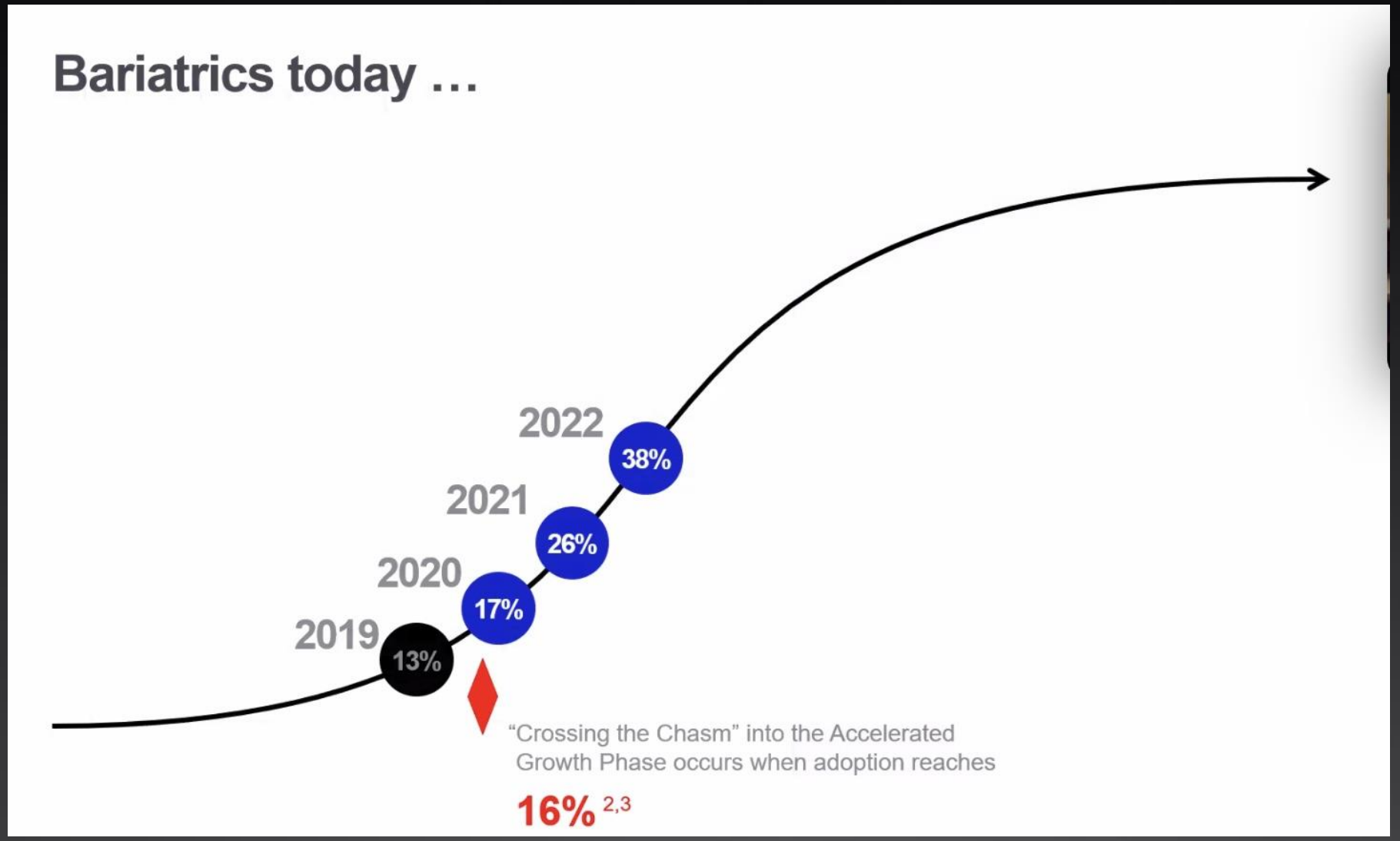
77%
of resident applicants believed robotic surgery would be very important to their future[1]

47%
Growth from new surgeons trained on da Vinci through a residency or fellowship[2]

1,300+
Total equivalency certificates, 2021-2022 academic year[2]

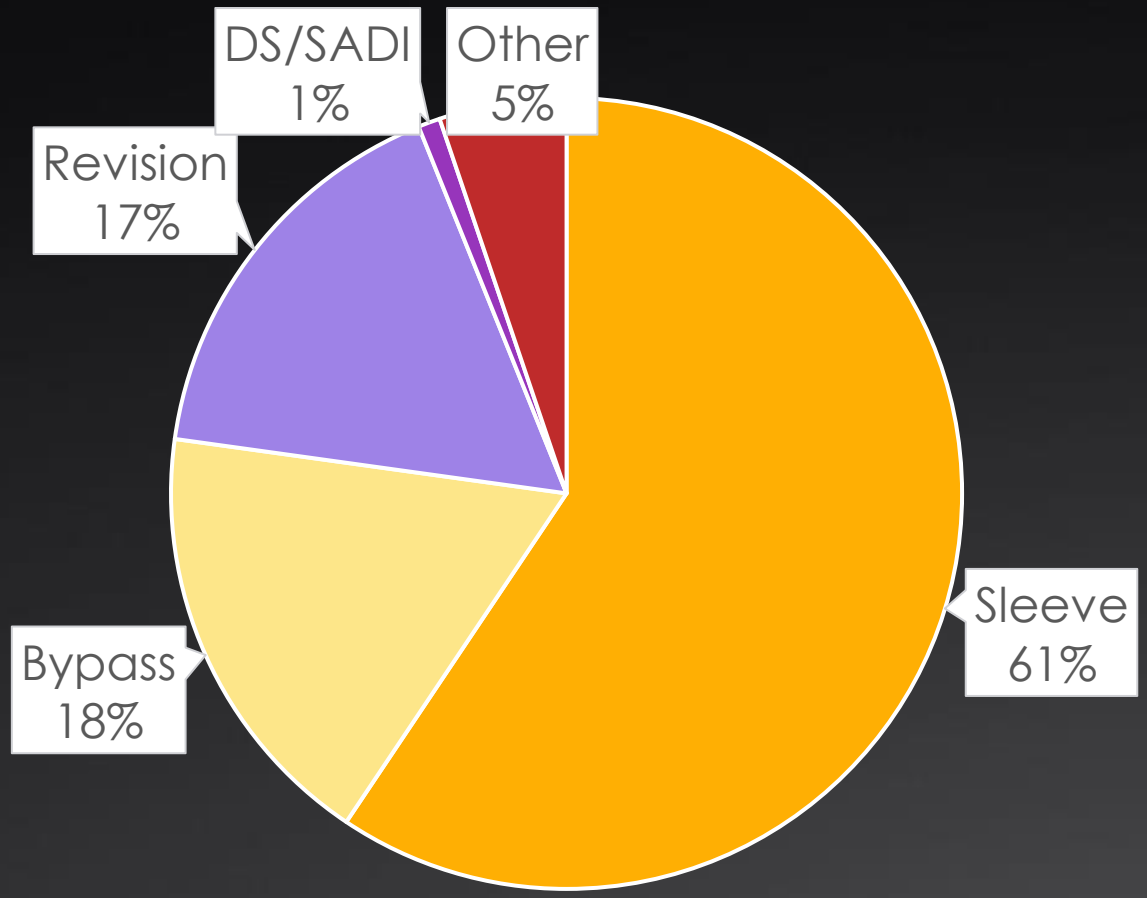
1. Krause, W., Bird, J. The importance of robotic-assisted procedures in residency training to applicants of a community general surgery residency program. J Robotic Surg 13, 379–382 (2019). https://doi.org/10.1007/s11701-018-0859-5
2. Information based on Intuitive internal data

Robotic Bariatric Surgery

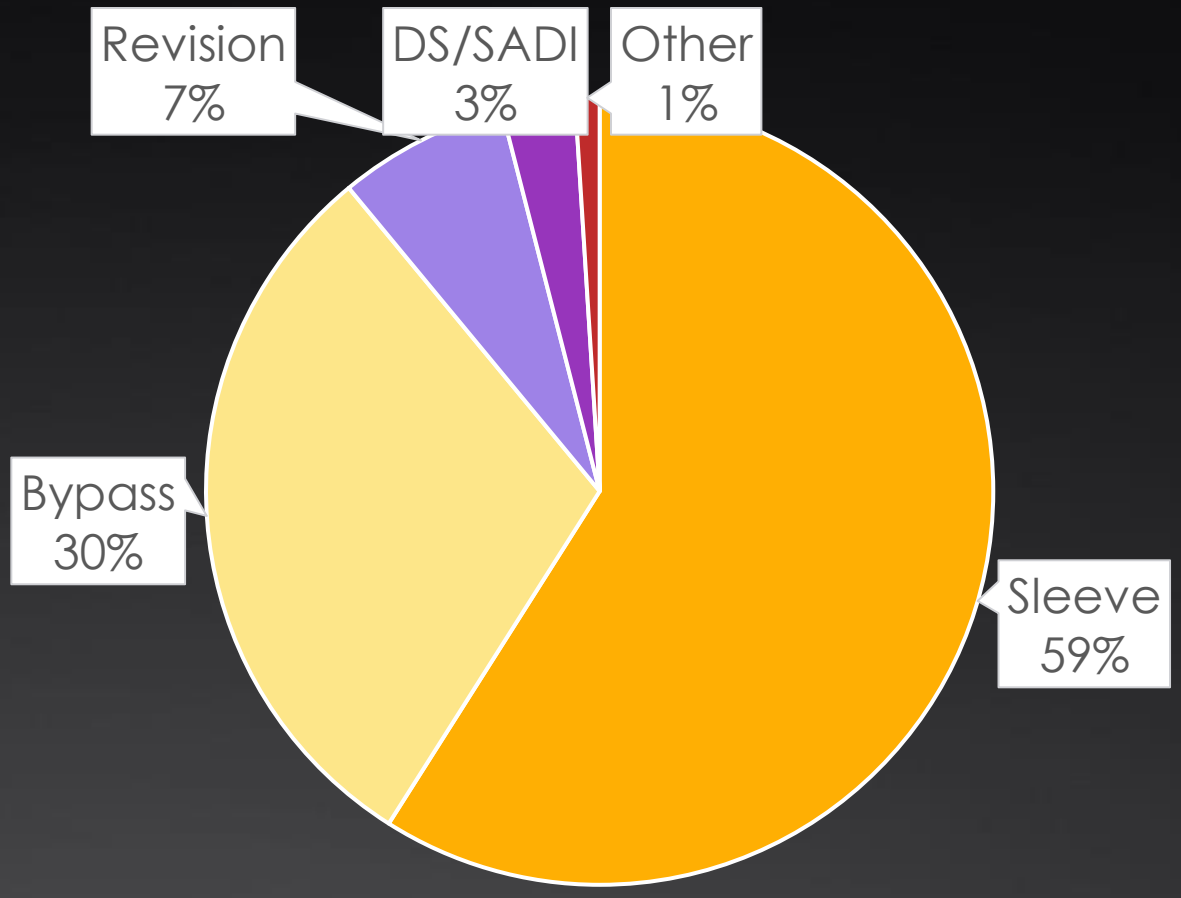


>100,000 robotic bariatric cases in 2023: Approaching 50% of US

Robotics Prefering Anastomotic Procedures



2020 Overall Bariatric Procedure Mix*



2022 da Vinci Bariatric Procedure Mix

**based on MBSAQIP procedure estimates*

The Longitudinal Efficiency of Robotic Surgery: an MBSAQIP Propensity Matched 4-Year Comparison of Robotic and Laparoscopic Bariatric Surgery

Mark Dudash[1] · Jason Kuhn[1] · James Dove[1] · Marcus Fluck[1] · Ryan Horsley[1] · Jon Gabrielsen[1] · Mustapha Daouadi[1] · Anthony T. Petrick[1] · David M. Parker[1]

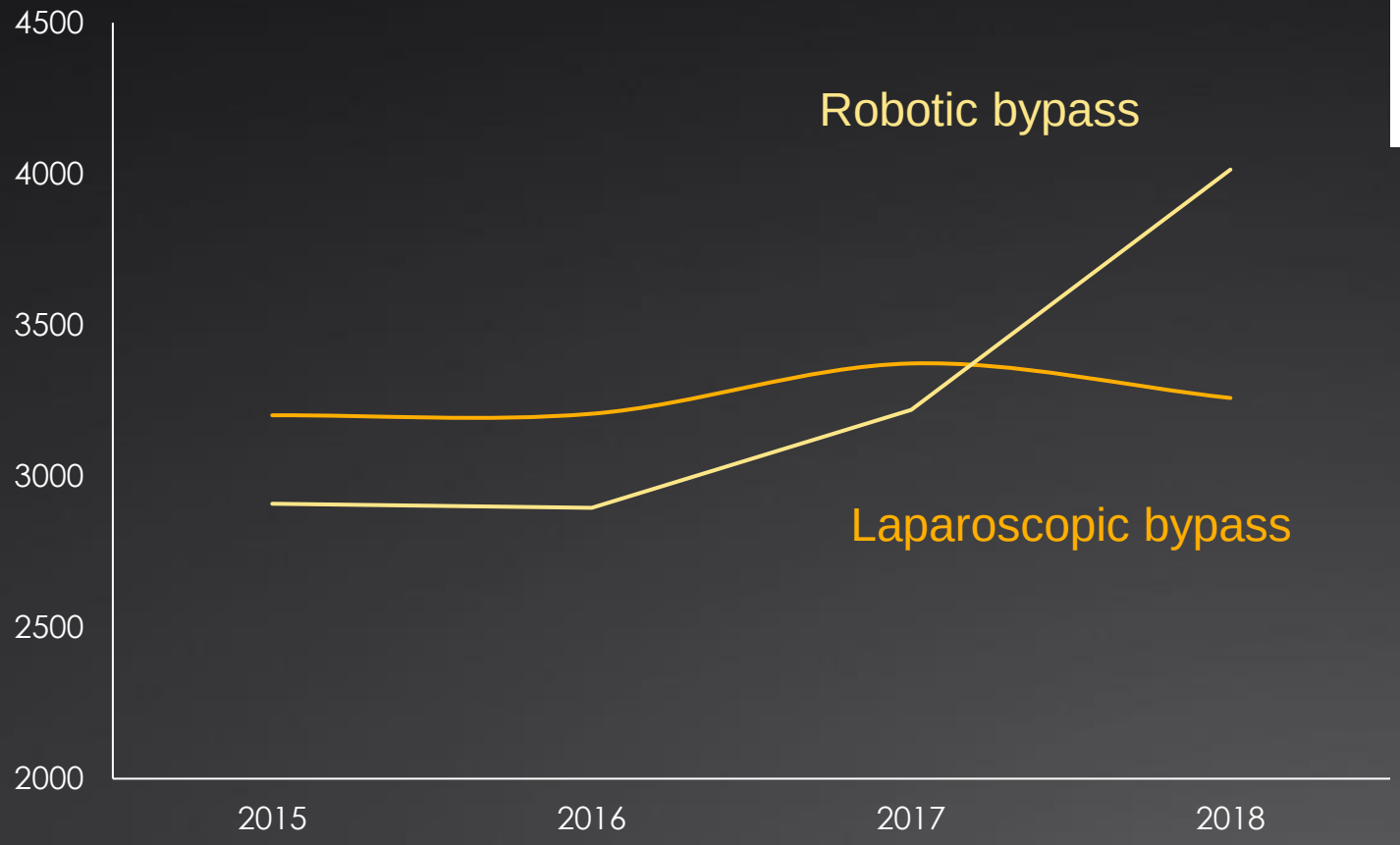
Published online: 3 June 2020

Operative time, minutes (median (IQR))						
Procedure	Lap (*n*)	Lap	Robotic (*n*)	Robotic	Op-time Δ (min)**	*p* value *
RYGB						< 0.0001
2015	3202	105 (77, 137)	2910	137 (111, 176)	+ 32	
2016	3207	105 (78, 139)	2896	139 (109, 182)	+ 34	
2017	3373	105 (78, 139)	3220	144 (113, 191)	+ 39	
2018	3259	106 (79, 143)	4015	143 (113, 186)	+ 37	
Sleeve						< 0.0001
2015	7176	65 (50, 88)	5465	93 (72, 123)	+ 28	
2016	8365	63 (48, 85)	7299	89 (67, 121)	+ 26	
2017	9067	61 (46, 82)	9251	87 (65, 118)	+ 26	
2018	9252	61 (46, 82)	11,845	89 (66, 119)	+ 28	

IQR interquartile range, *Lap* laparoscopic

*Analyzed using sqrt transformation

**Difference in robotic and laparoscopic median operative times



Slower Times in Robotic Bariatrics

But Lap Bypass Growth is Flat

Robotic Bypass Growth is Accelerating
35% of Robotic Cases Bypass

Robotic DS Growing Too
Many more robotic DS than Lap DS

Is Robotics Increasing Complexity?

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Sleeve	28,124	57,090	75,359	99,781	105,448	125,318	135,401	154,976	152,413	122,056	**152,866**
RYGB	57,986	64,875	61,218	51,724	45,276	40,316	40,574	42,945	45,744	41,280	**56,527**
Band	55,932	34,946	25,060	18,335	11,172	7,310	6,318	2,660	2,375	2,393	**1,121**
BPD/DS	1,422	1,730	1,790	772	1,176	1,236	1,588	2,123	2,272	3,555	**5,525**
Revision	9,480	10,380	10,740	22,195	26,656	30,077	32,238	38,971	42,881	22,022	**31,021**
SADI										488	**1,025**
OAGB										1,338	**1,149**
Other	5,056	3,979	4,833	193	6,272	5,665	5,606	5,847	6,060	1,221	**7,339**
ESG										1,500	**2220**
Balloons					700	5,744	6,280	5,042	4,655	2,800	**4100**
Total	**158,000**	**173,000**	**179,000**	**193,000**	**196,700**	**215,666**	**228,005**	**252,564**	**256,400**	**198,651**	**262,893**

High Performance Robotics?

VS

High Performance Robotics?

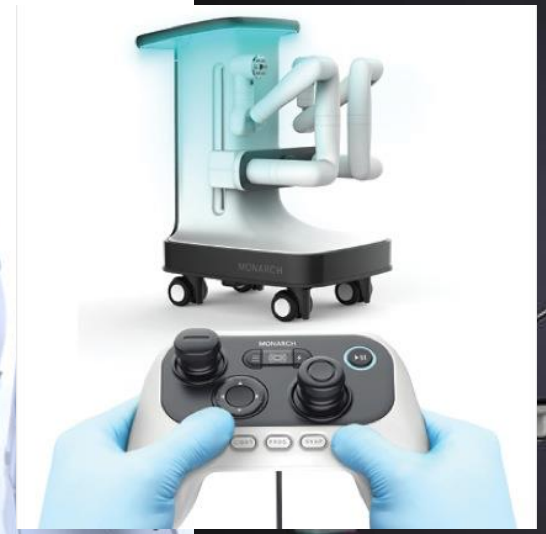
Culture of converting open surgery to laparoscopy with robotics

Raising the Floor

Not Raising the Ceiling?

Robotics is Surgical Driving Improvement?

- Slower
- Haptics
- Hybrid approaches
- Ports and setup variability
- Lots of learning curves and feedback overload?
- The roller coaster of surgical technique
- Cost, Cost, Cost



TH
AR
Desig
- M
- Fl

Investigational device currently under development. Not cleared or approved for sale in U.S. or any market.

High Performance Robotics

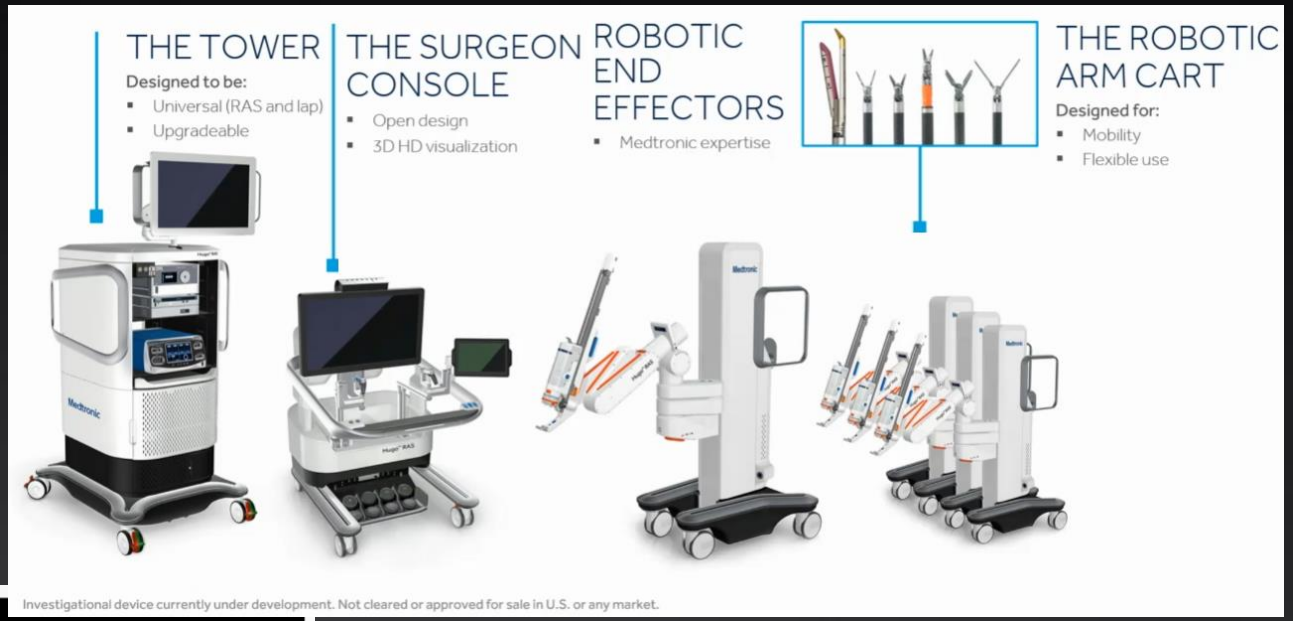
We are still 20 minutes slower on average cases

Reduced Latency
Reverse Scaling
Rotational Scaling
Very fast instrument exchanges
More ports and arms
Multiuse instruments
Combined endolumenal and laparoscopy at one console

Modular Arms

Medtronic Hugo

Mantra

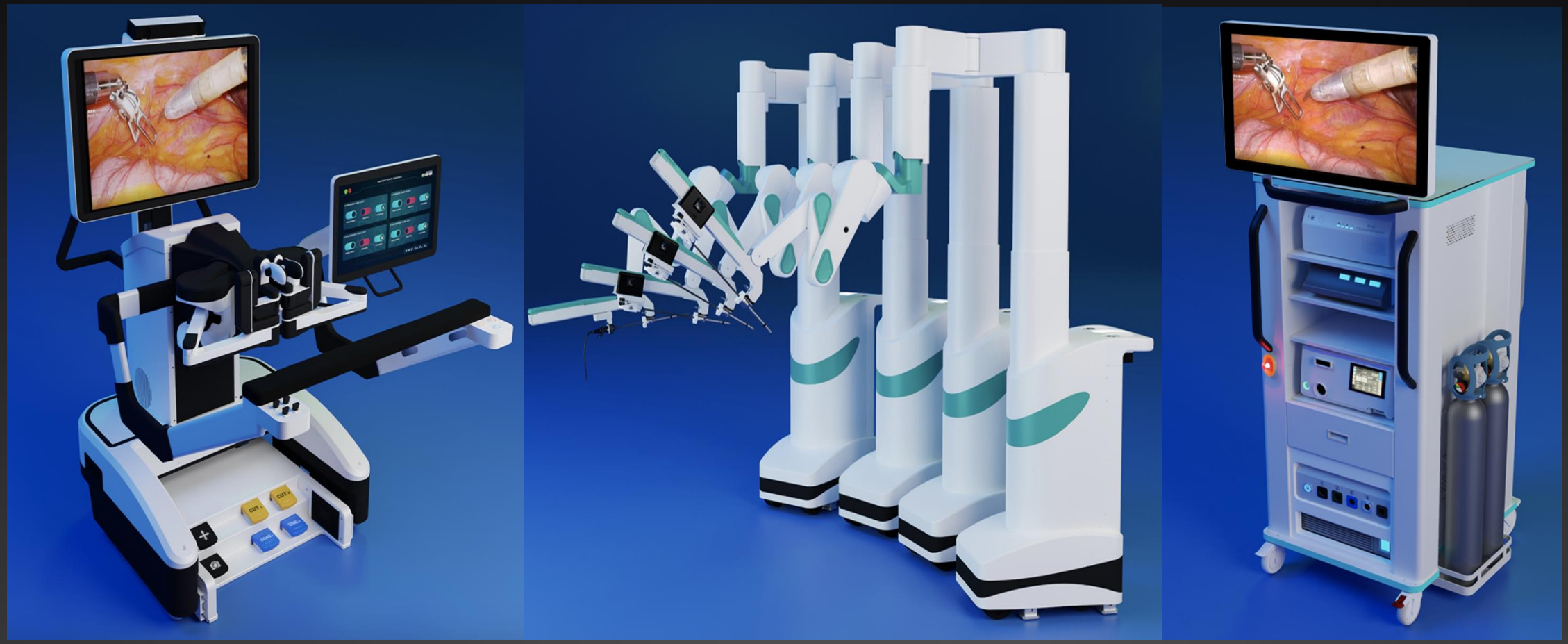


Renovo

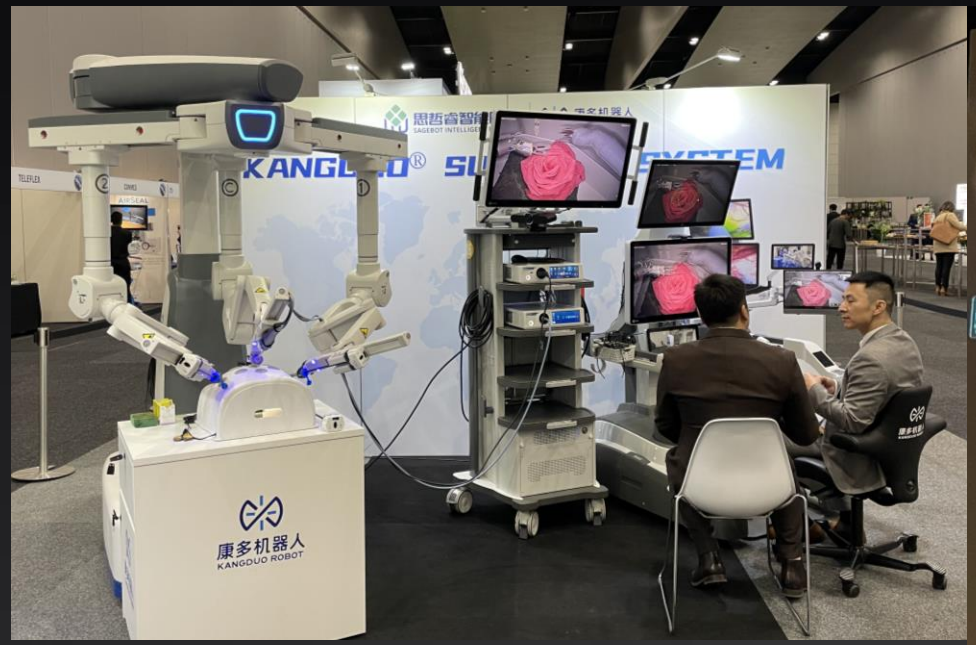
CMR Versius

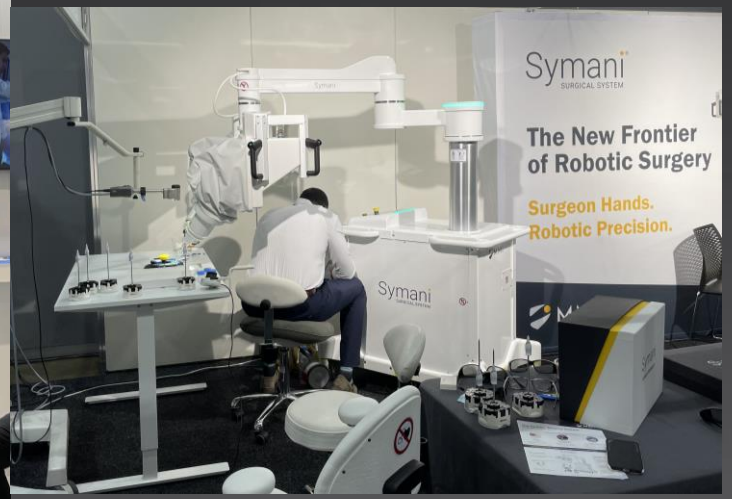
MIST
MINIMALLY INVASIVE SURGEONS OF TEXAS

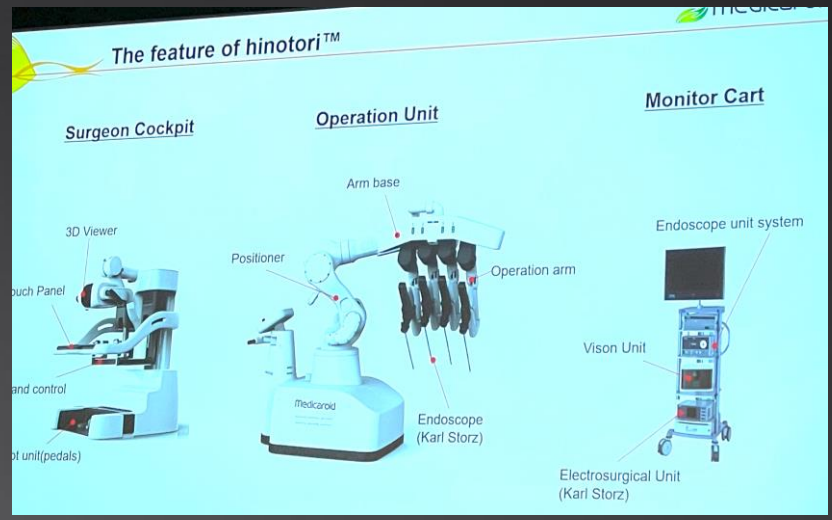
SSI Mantra



Boom Mounted Arms

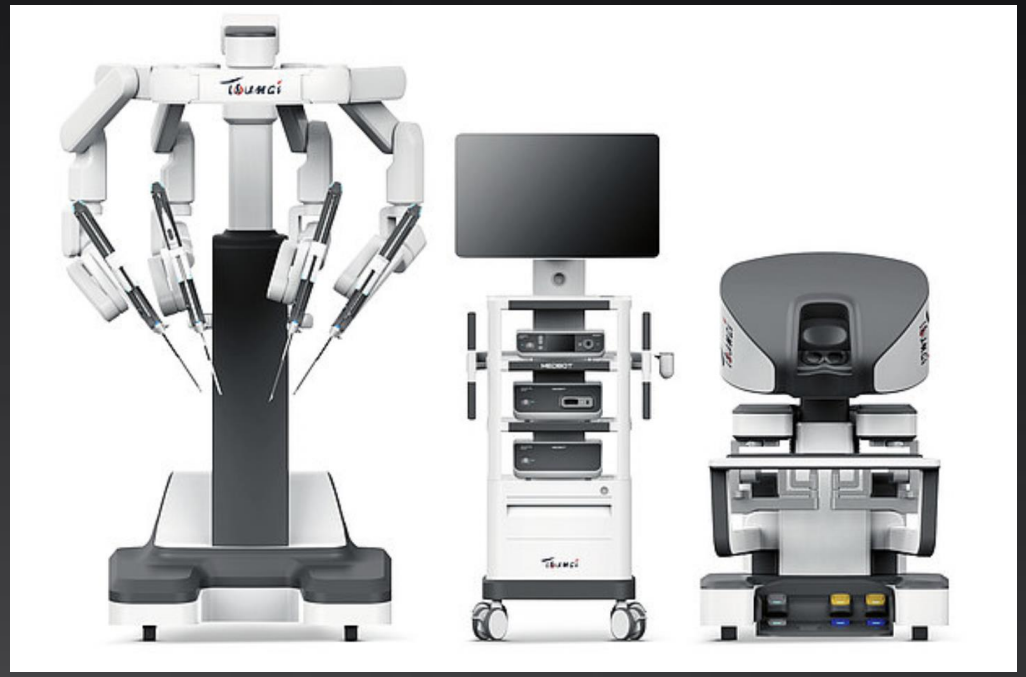






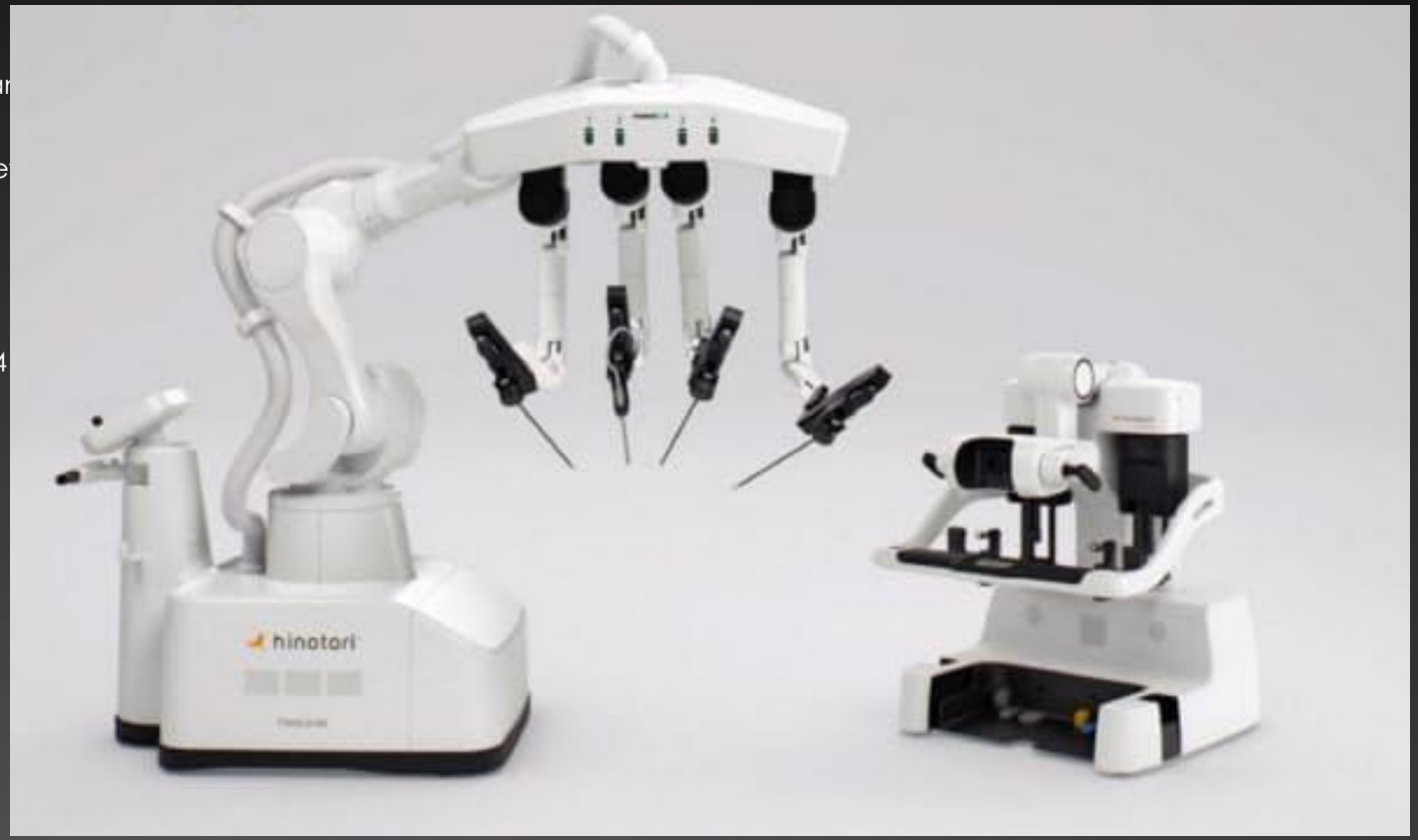
Microport (Medbot): Toumai®

- Developed by Shanghai Microport Medbot (Group) Co., Ltd., Shanghai, China
- The first four arm robotic surgery system in China
- **Immersive console** with **single boom** design
- Completed a registered clinical trial for application in urologic surgery in January 2021
- Completed over 1500 surgical procedures (all specialties)
- 100+ 5G **remote surgeries**
- The platform is used in over 60 hospitals throughout China
- Single Port not yet in clinical use
- Largest medical tech company in China



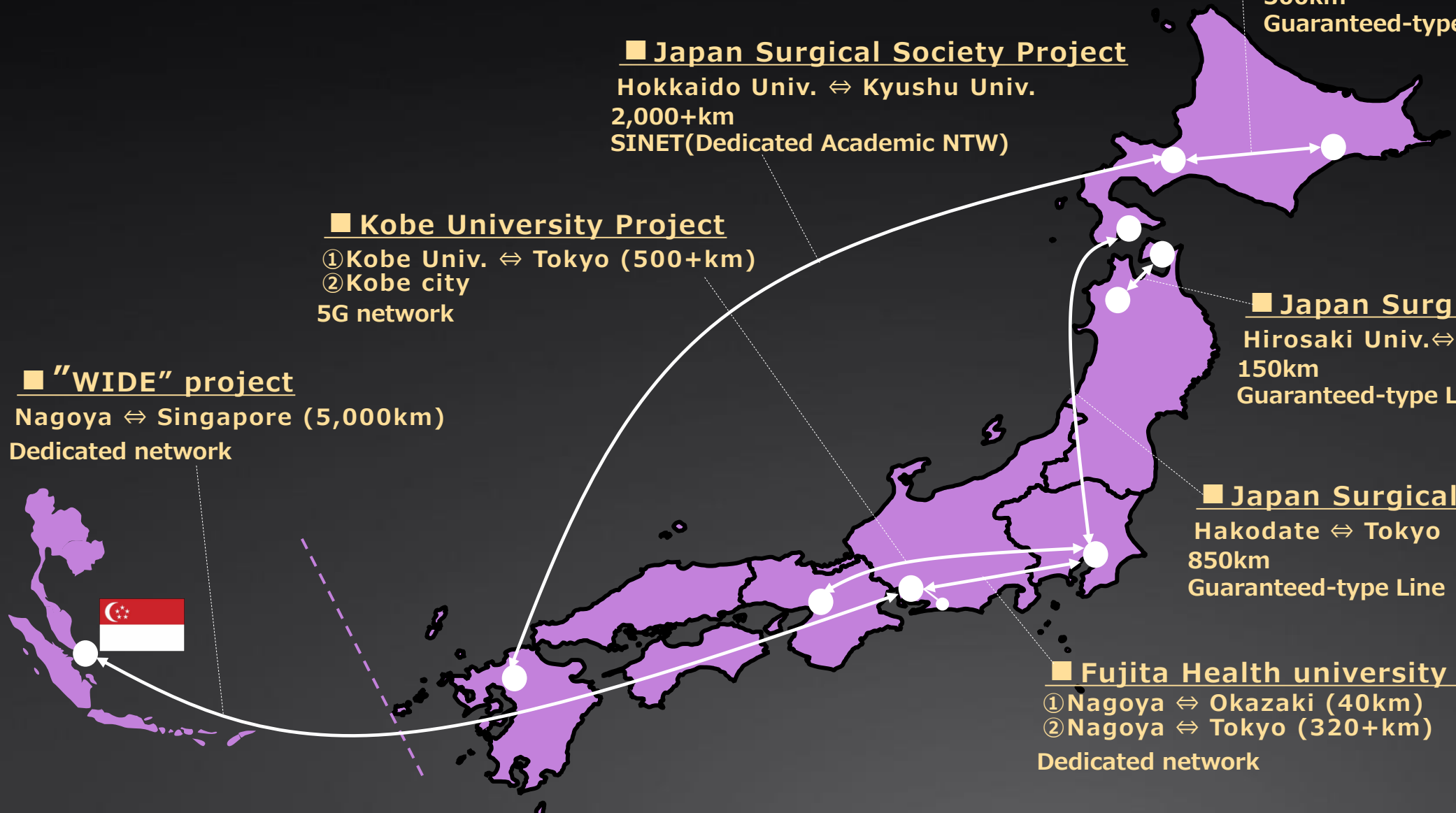
Medicaroid: Hinotori Robot

- The Hinotori system, developed by Medicaroid Corporation in Kobe, Japar
- This robotic surgical system features a **semi-open console** with a 3D HD vie provided by a microscope-like eyepiece.
- **Single boom** design
- The console includes loop-like handles that allow surgeons to control the 4 wristed robotic arms
- The Platform is currently in use in Japan with plan to extend to other countries in Asia
- Significant use in urologic surgical applications
- Approved only in Japan
- **Telesurgery capable**



HINOTORI (MEDICAROID):
R&D and Feasibility Study for Realization of Tele-Surgery

※All the feasibility study used animal, dry model or cadaver.



■ Japan Surgical Society Project
Hokkaido Univ.⇔ Kushiro General Hospital
300km
Guaranteed-type Line

■ Japan Surgical Society Project
Hokkaido Univ. ⇔ Kyushu Univ.
2,000+km
SINET(Dedicated Academic NTW)

■ Kobe University Project
①Kobe Univ. ⇔ Tokyo (500+km)
②Kobe city
5G network

■ Japan Surgical Society Project
Hirosaki Univ.⇔ Mutsu General Hospital
150km
Guaranteed-type Line

■ ”WIDE” project
Nagoya ⇔ Singapore (5,000km)
Dedicated network

■ Japan Surgical Society Project
Hakodate ⇔ Tokyo
850km
Guaranteed-type Line

■ Fujita Health university project
①Nagoya ⇔ Okazaki (40km)
②Nagoya ⇔ Tokyo (320+km)
Dedicated network

KANGDUO ROBOT® *Surgical System*

SAGEBOT — KANGDUO

5-Arms

Dual Console

Dual Console

SR3000

What's Next? DaVinci 5

Haptic Feedback

Improved Ergonomics

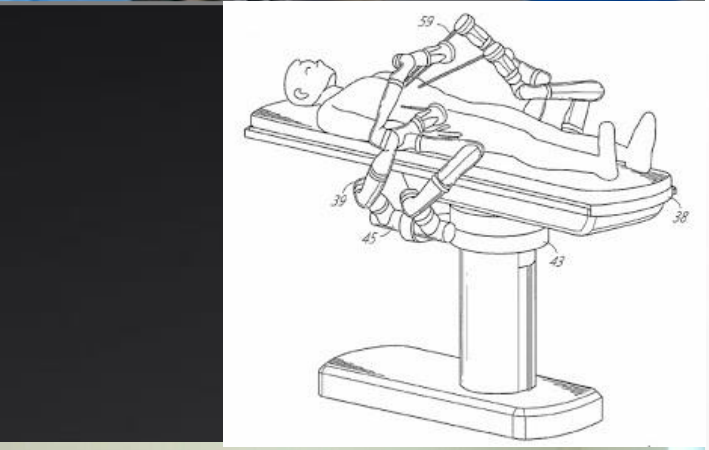
More Integrated and Efficient

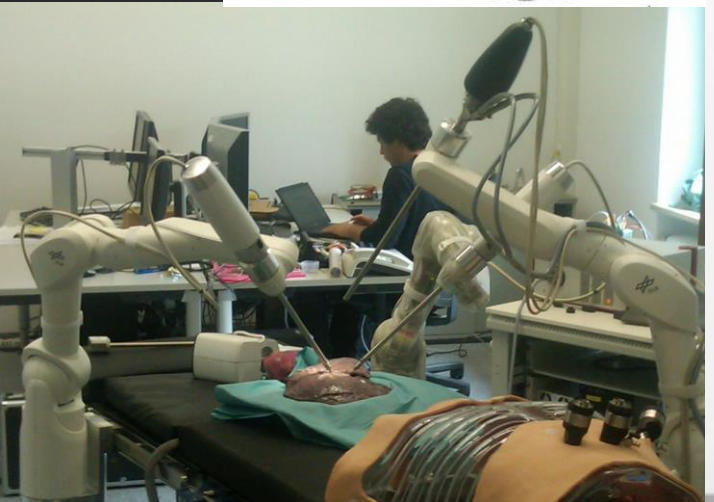
Modern High Level Processing Power

Data Analysis

Table Mounted Arms

Johnson & Johnson Ottava

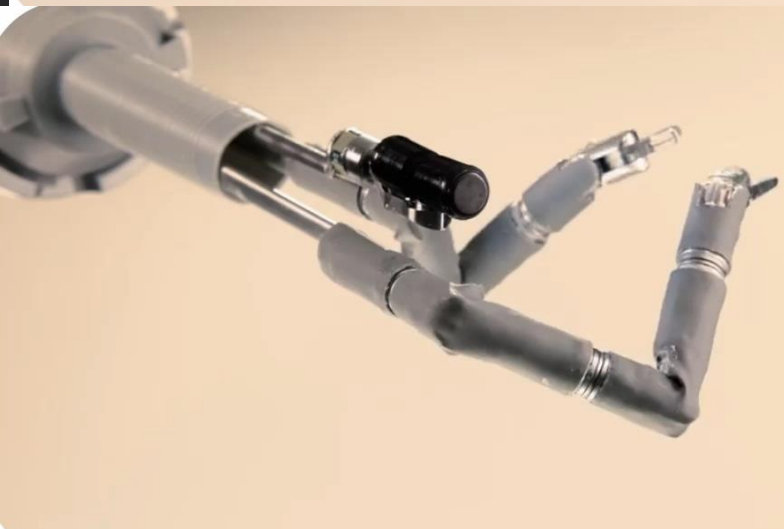




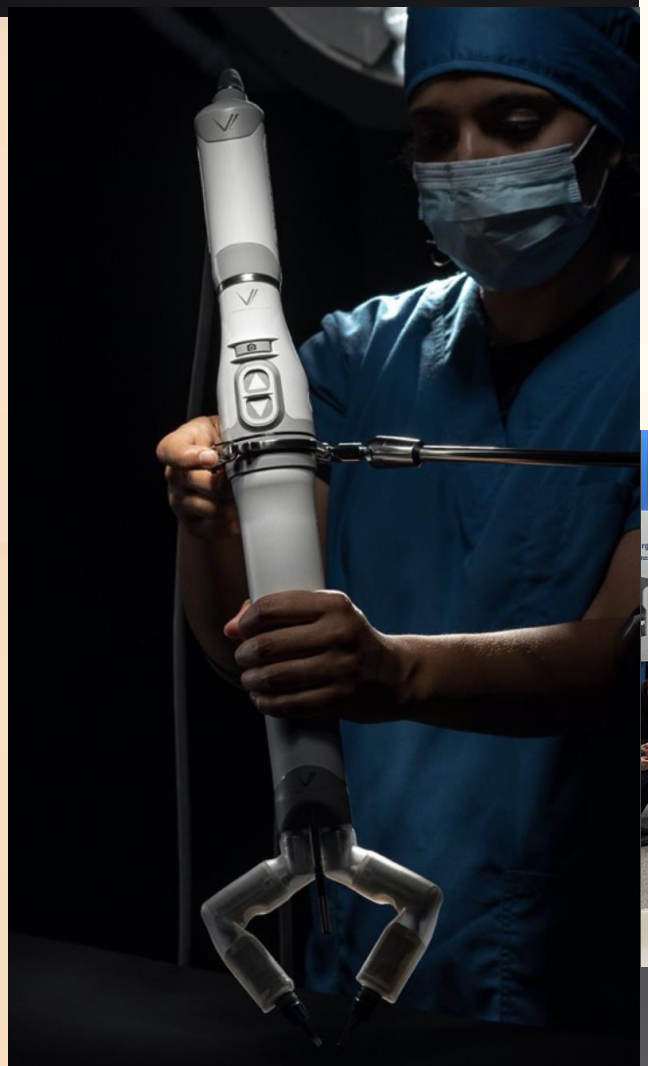
Single Port Systems

DaVinci SP

Vicarious



Virtual Incision



Shurui Single

Task Focused Module Systems

Moon

Keeps Surgeon at Bedside

Restores Complete Control

Improved Ergonomics

Preserves Clinical Practice

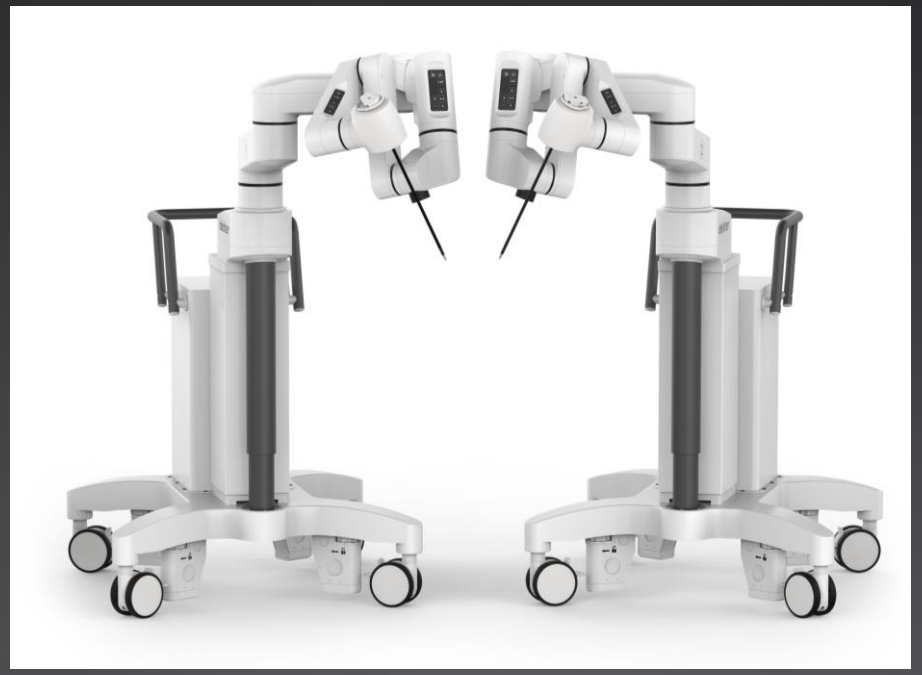
Accessible & Labor Saving

Applies to Broad Indications

Surgeon Happiness & Volume

Levita

Distalmotion
Dexter

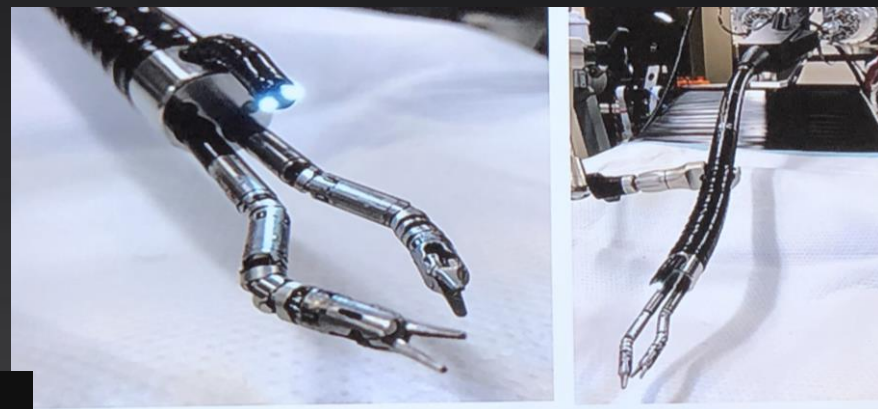


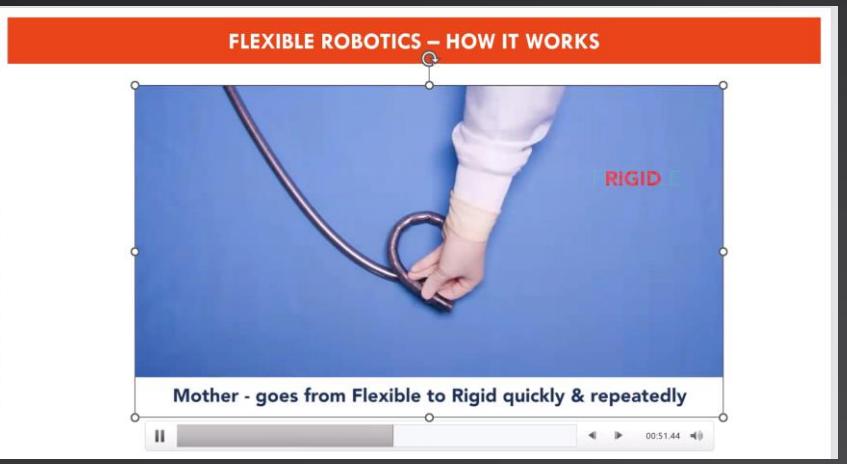
Endolumenal Robotics

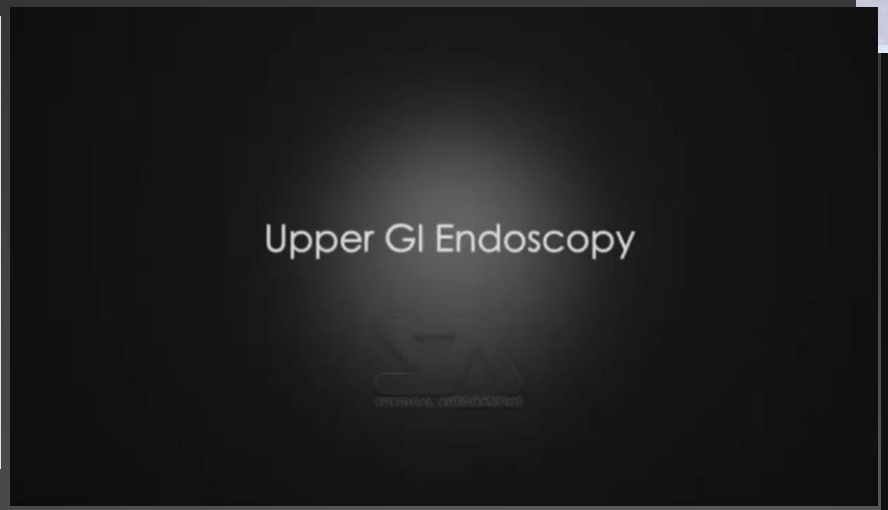
-Flexible shafted transoral or transanal with robotic driven camera
-Passive instruments evolving to active instruments
-Involved in first Robotic CELS (combined endolumenal laparoscopic surgery) cases

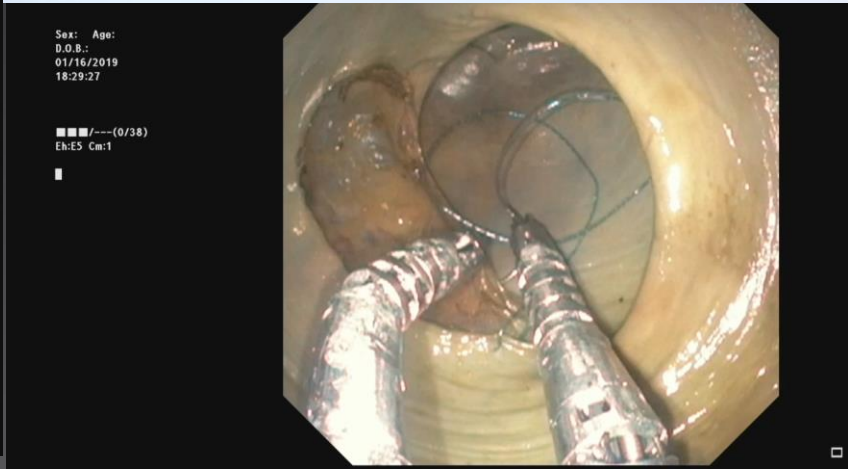
-Table based designs and cart designs
-Endolumenal designs too
--Possible integrated robotic CELS with Verb

-3 arms in 1 flexible port
-Open surgeon console
-Limited excursion of arms
-Goal towards 15mm diameter and long length









-Open vs Immersed Surgeon Side Cart?
-12mm, 8mm, 5mm, or 3mm instruments?

Asensus
Senhance
Luna

Ergonomics? Who Wins

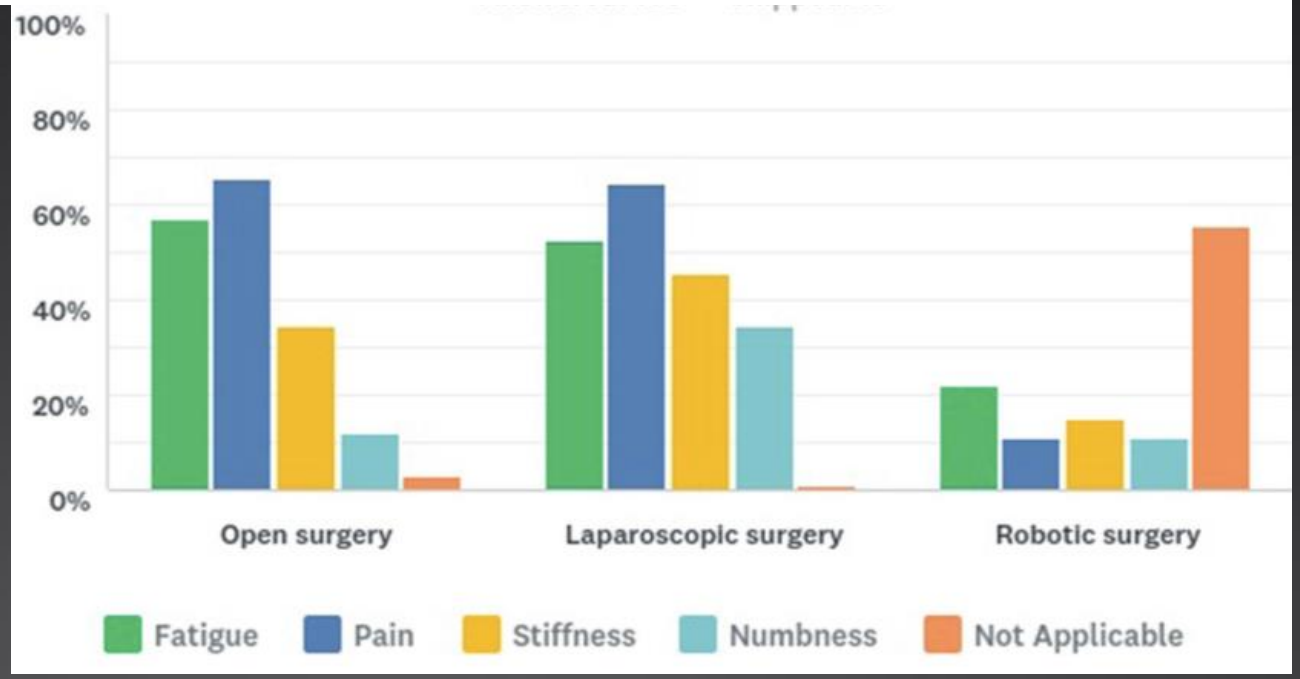
Surgical Endoscopy
https://doi.org/10.1007/s00464-018-6460-1

The prevalence of musculoskeletal injuries in bariatric surgeons

Salman AlSabah[1] · Eliana Al Haddad[1] · Haris Khwaja[1]

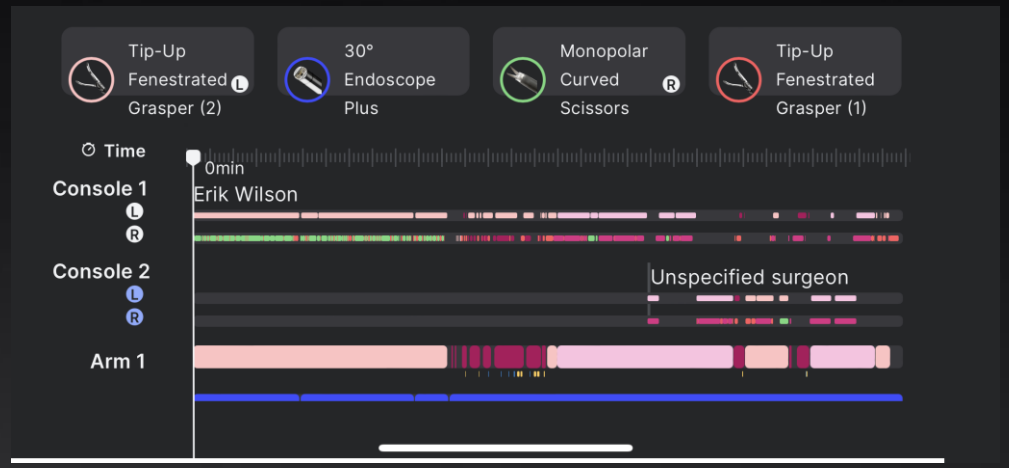
Received: 12 January 2018 / Accepted: 18 September 2018

Have you ever experienced any abnormal levels of discomfort/pain that you would attribute to surgical reasons?	
Yes (pain scale)	**66.0**
0	7.8
1–3	64.1
4–6	26.2
7–10	1.9
No	**34.0**



Opening the Black Box in the Operating Room

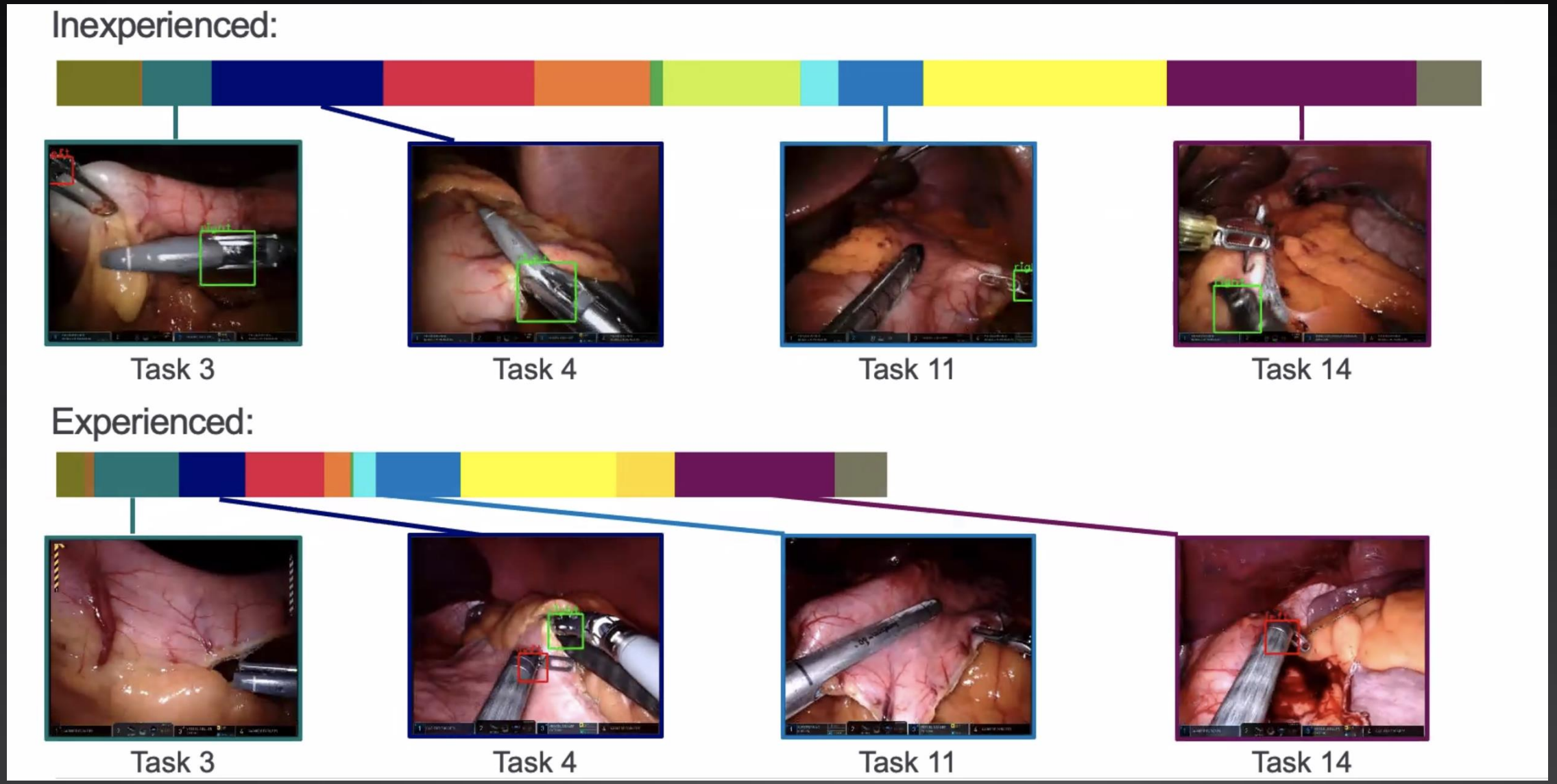
Acquire the data
Classify it (annotate and segregate)
Analyze it (self, experts, cloudsourced, machine learning)
Make it useful



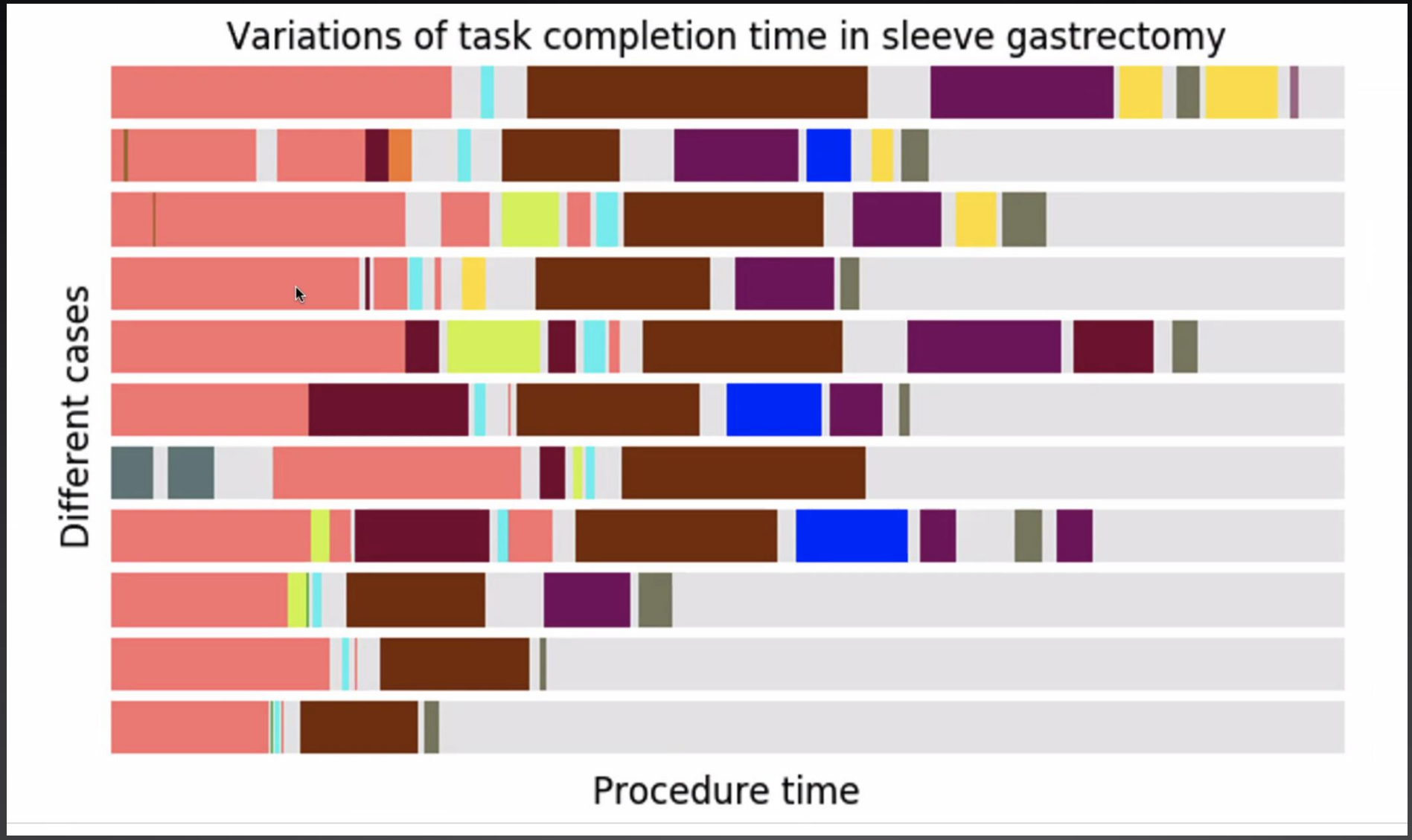
OR Black Box
Proximie
Theator
Touch Surgery
CSATS
Activsight
Versius
Orpheus
Apella
Artisight
CareSyntax

- Whats the Best AI Analysis Platforms for Bariatrics Now and Future?

Machine Learning Task Recognition



Algorithms to Identify Workflow Variability



Ongoing Development: Activ Co-Pilot

A surgical documentation solution to drive more accurate billing

Problem

Inefficient surgical documentation workflow cause incomplete and inaccurate notes

Physician Burnout
200% increase in medical errors

Denials
Up to 65% due to insufficient documentation

Solution

Activ Co-Pilot populates image snapshots and a corresponding written description of complex and abnormal anatomy, pathology and physiology observed during a surgical case. This is particularly useful when unforeseen intraoperative complications or delays occur, and the reimbursement opportunity substantially increases (2-3X) for hospitals and physicians.

Use Case 1: Lap Chole

- Visceral and vascular injuries
- Bile duct injury

$8k increase in reimbursement

Use Case 2: Colorectal

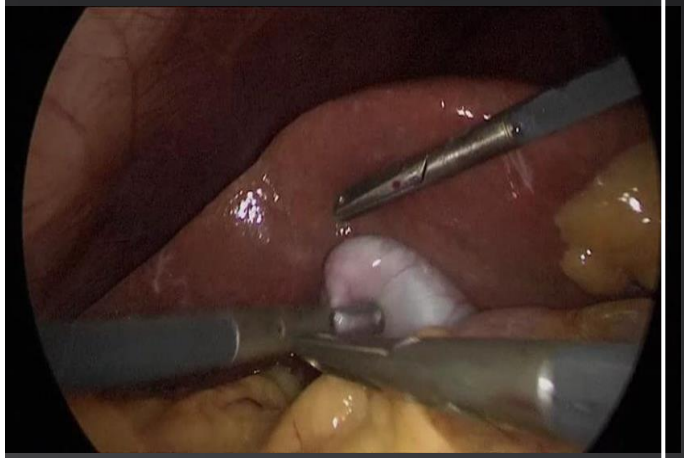
- Bowel injury, obstruction, perforation, ischemia, fistula
- Hemorrhage

$21k increase in reimbursement

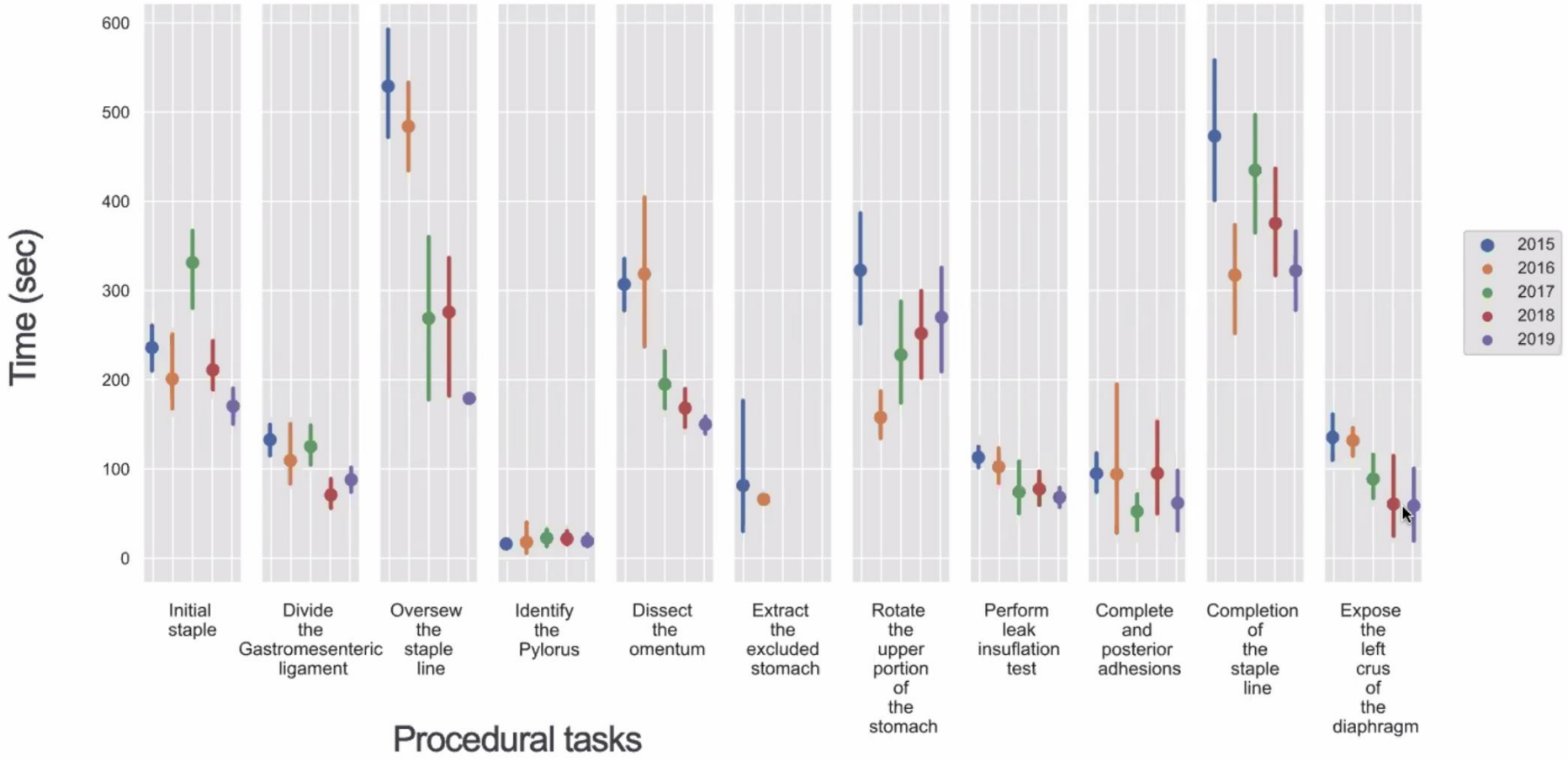
Solution Prototype

Question: During a cholecystectomy, it is crucial to manage the surrounding organs and structures for a clear view and safe removal of the gallbladder. Given the current stage of preparation, how are the surgical tools being utilized to facilitate this process, and what might be the reasons for the specific actions being performed by the graspers?

Answer: In the image of the cholecystectomy surgery, there are three graspers at work. One grasper is engaged with the gallbladder, likely holding it steady to either move it into a better position for the procedure or to provide tension so that the structures around it can be more easily seen or accessed. This is a common step to expose the cystic duct and artery which need to be clipped and cut during the surgery. Another grasper is retracting the liver; this is done to provide access to the gallbladder underneath it, as the liver can obstruct the surgical field if not retracted. The liver retraction also helps in reducing the risk of liver injury during the surgery. The third grasper does not have a specific verb or target associated with its action, indicating that it may be in transition or its purpose at the moment of the image is not defined. It could be used for a variety of tasks such as moving other tissues out of the way, providing additional tension or counter-tension, or it could be about to engage with another structure.



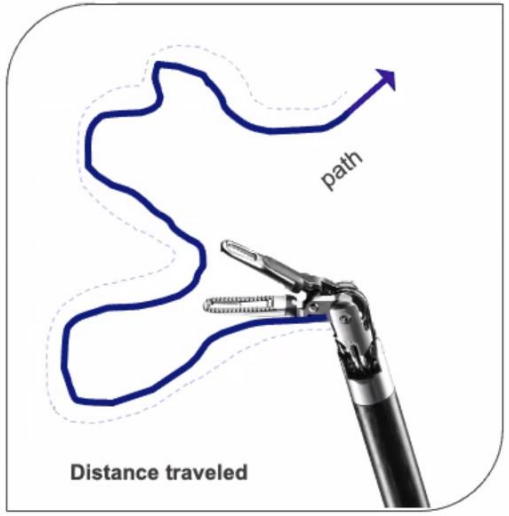
Digitally Produced Task Based Insights

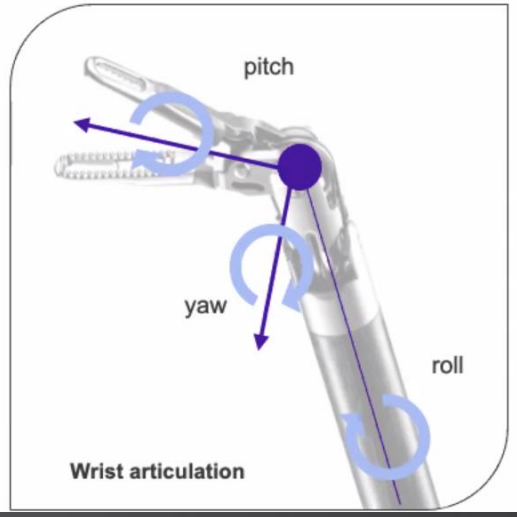


Robotic Sleeve Gastrectomy
Mark Tousignant, MD, FACS

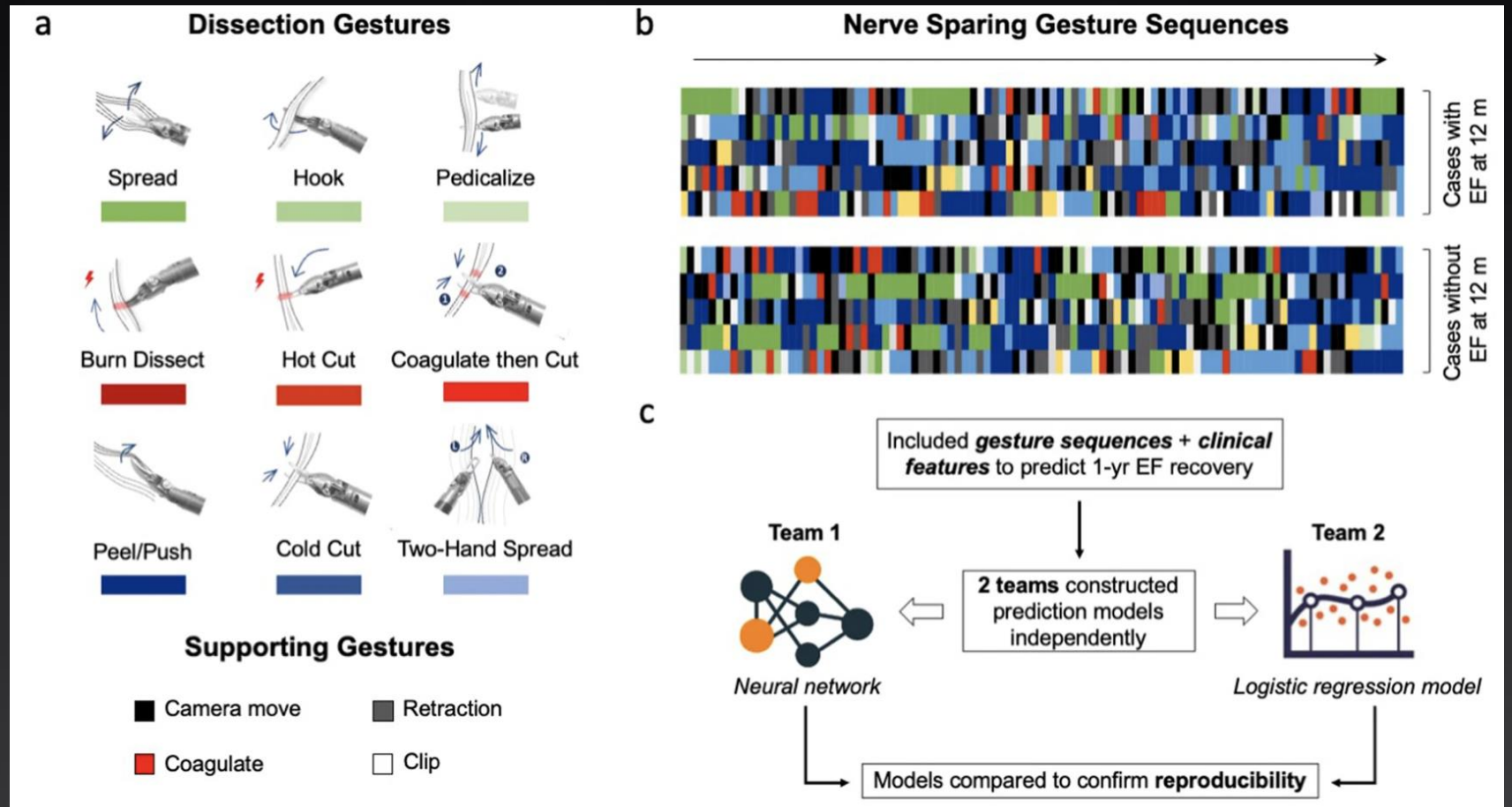
Kinematics: Robotic Objective Performance Indicators

- Completion time
- Camera activation count
- Camera control duration
- Camera distance traveled
- Instrument distances and trajectories
- Movement speeds
- Third arm swap count
- Ratio of dominant / non-dominant arm use
- Wrist articulation
- Instrument idle time





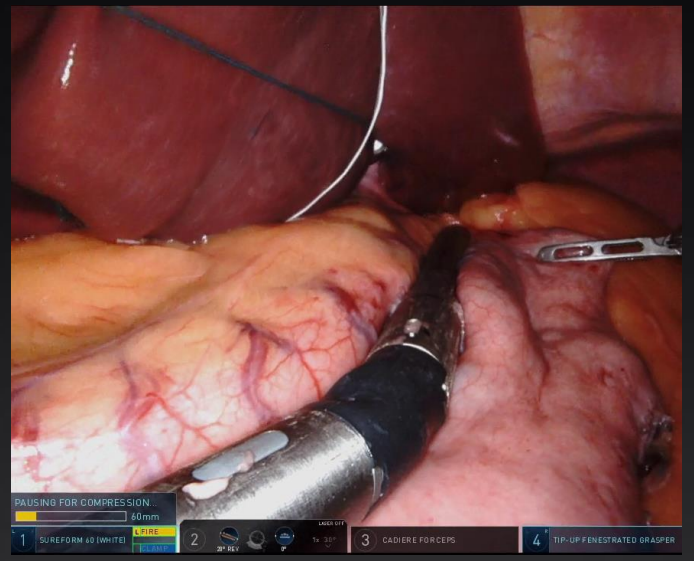
Kinematics: Robotic Gestures



a Gesture classification, including 9 dissection gestures and 4 supporting gestures. **b** Color-coded nerve-sparing gesture sequences (showing only the first 100 gestures). Colors represented corresponding gestures in **a**. **c** One-year EF recovery prediction model construction process. Two teams independently constructed and tested their prediction models to confirm the reproducibility of results.

Echelon

Sureform



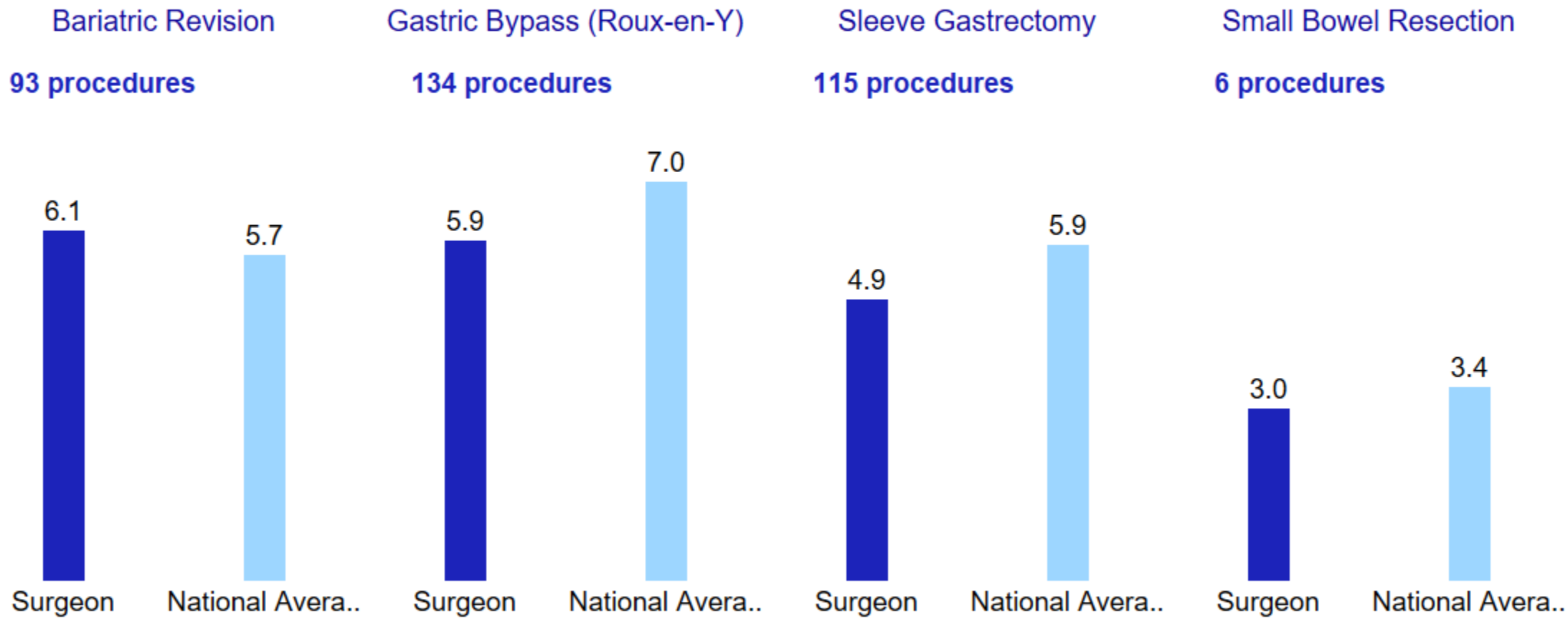
Tristapler Signia

Task Autonomy

Titan

Average SureForm Stapler Fires by Procedure

Dr. Erik Wilson

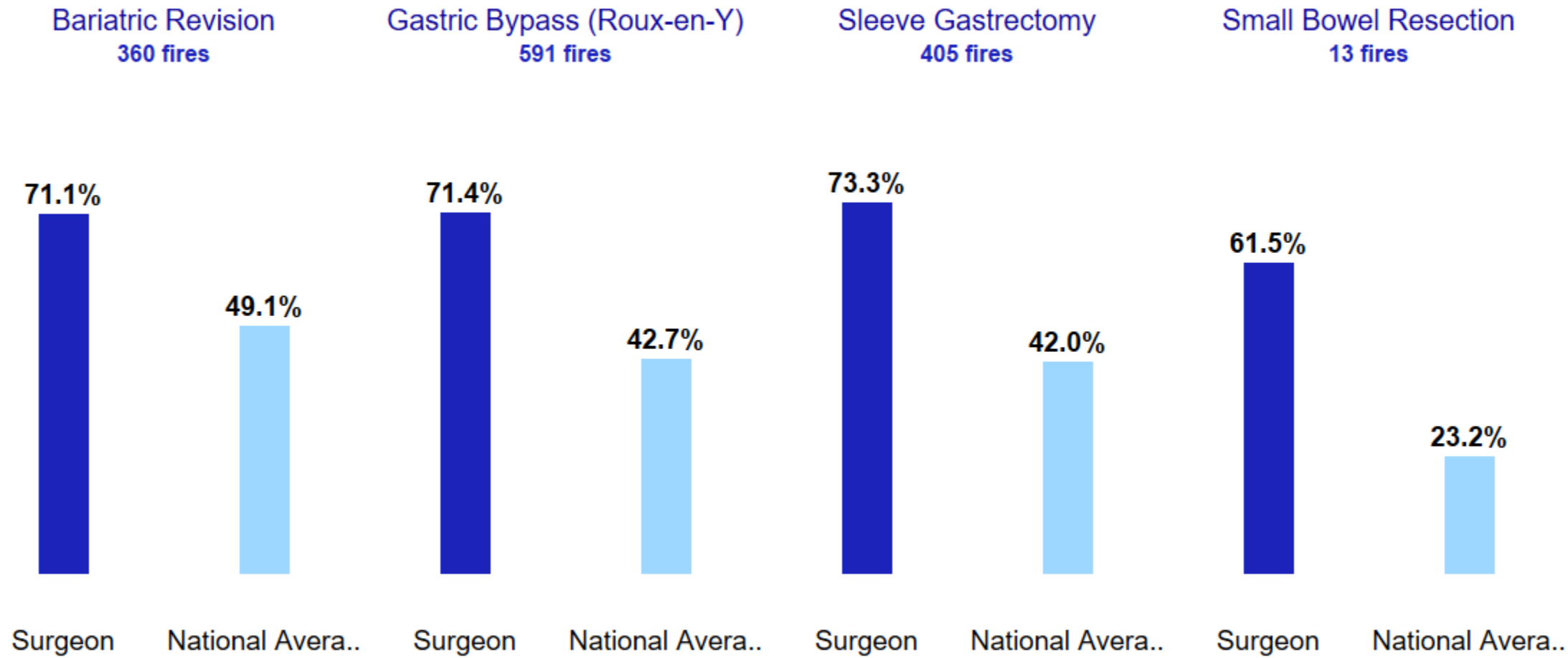


This data comparison is not case matched for patient complexity and/or disease status. The data have not been peer-reviewed and have not been published. Use of any laparoscopic instruments during the case and the complexity of the case cannot be inferred from the system logs. **This data can only be shared with Dr. Erik Wilson, unless written consent is provided.** Includes data from 10/8/2018 through 8/2/2022.

INTUITIVE

Percent of SureForm Fires with at least 1 Pause

Dr. Erik Wilson



This data comparison is not case matched for patient complexity and/or disease status. The data have not been peer-reviewed and have not been published. Use of any laparoscopic instruments during the case and the complexity of the case cannot be inferred from the system logs. **This data can only be shared with Dr. Erik Wilson, unless written consent is provided.** Includes data from 10/8/2018 through 8/2/2022.

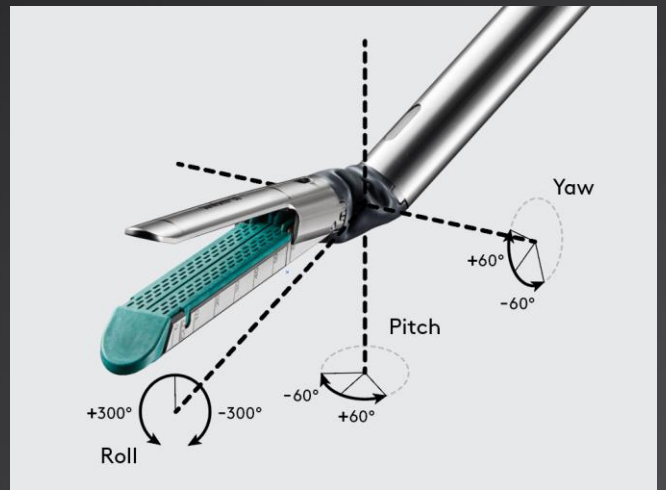
INTUITIVE

Using Kinematic Data

* SmartFire parameters were tight
* SmartFire could pause throughout a fire to allow time for tissue to compress but would time out after 3 times of minimal movement (5mm)
* No override

Improving the Algorithm

- SmartFire can now pause more frequently throughout a fire to allow more time for tissue to compression
- These changes were made to balance well with good staple line formation
- Forcefire allows override



Staple Firing Kinematics with Outcomes-Filicori

Characterizing Advanced Stapling Technique Using Objective Performance Indicators in Robotic-Assisted Sleeve Gastrectomy: A Retrospective Cohort Study

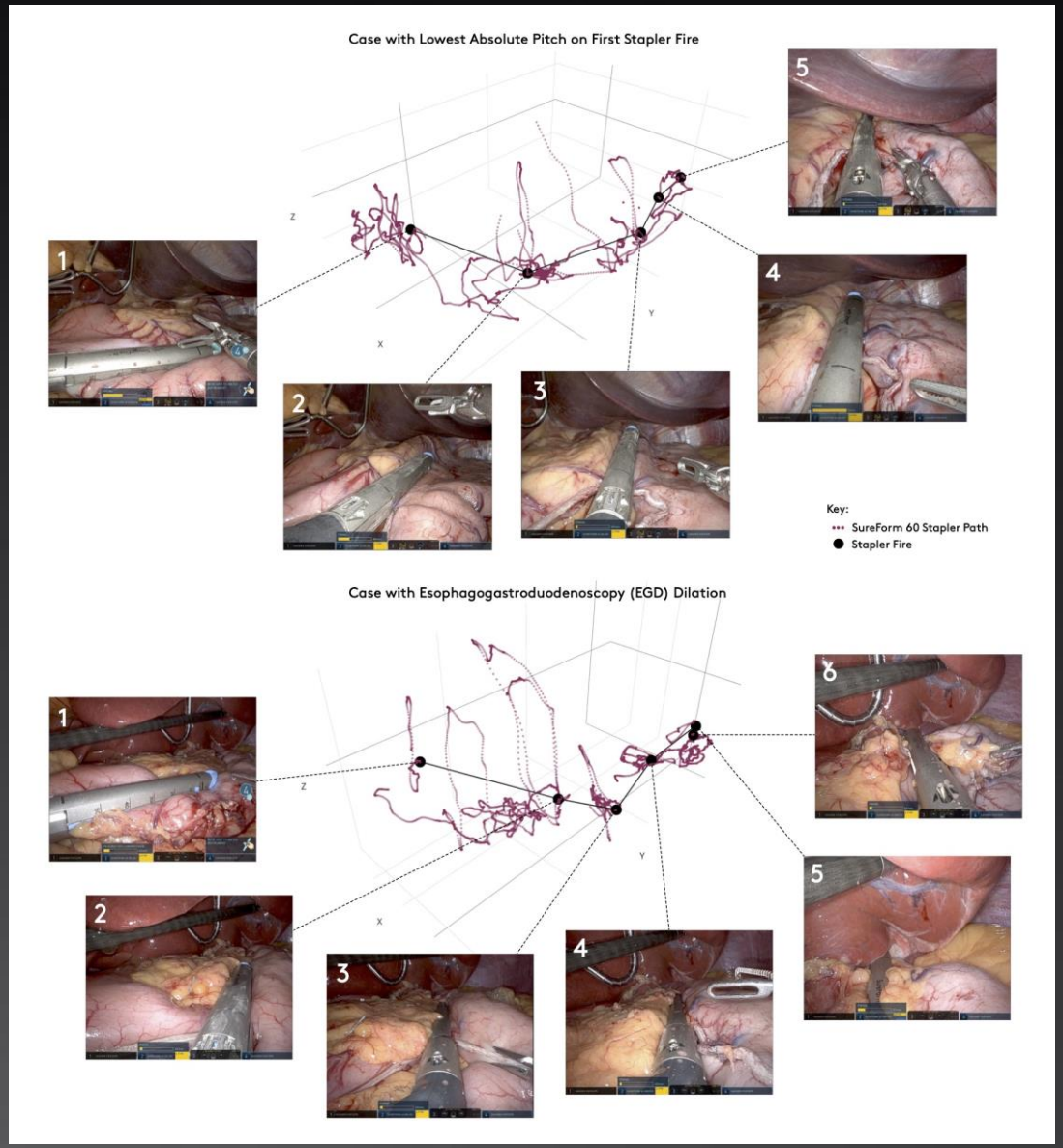
Sarah Choksi, MD[1,2], Bishaka Hirachan, BS[1,2], Jon Winalski, MD[1,2], Kavita Jain, MD[1,2], Ruben Salas-Parra, MD[1], Craig Profant, MD[1,2], Dimitre Stefanov, PhD[1,3], Max Berniker, PhD[4], Vikrom Dhar, MD[1,2], Mitchell Roslin, MD[1,2], Andrew Yee, PhD[4], Filippo Filicori, MD[1,2]

Objective Performance Indicators

Sureform stapler in 344 robotic sleeve gastrectomies and correlate these measures with postoperative outcomes.

1. Stapling angles correlate with postoperative PO intolerance and staple line leaks

2. Cartridge staple height and peak firing force do not correlate with postoperative bleeding .



Robotics Hype vs Reality

It makes surgery better more most surgeons but not every surgeon, it raises the floor and raises surgical skill set in difficult situations: THIS DEFINITELY INCLUDES REVISIONS

* It hasn't changed dramatically in its form and function in 20 years—Until NOW
* The drive to more minimally invasive with smaller and fewer access points and endolumenal will be led by robotic platforms—combined approaches (CELS)
* Task specific vs specialty specific vs procedure specific digital platforms are all being developed. If you truly want to improve cost and value, then we need to support this development.
* Ergonomics is something the next generation of surgeons seriously care about
* Kinematic data is very powerful and justifies robotic platforms
* Robotic platforms are hard to make better but that's not stopping massive efforts and investments in new platforms

SURGICAL DISRUPTIVE
TECHNOLOGY SUMMIT

www.surgicaldisruptivetechsummit.org

Erik B. Wilson, MD, FACS
Professor and Vice Chair of Surgery
Division Chief, Minimally Invasive Surgeons of Texas
University of Texas Health Science Center at Houston

The 10th Annual Surgical Disruptive Technology Summit is the preeminent forum for innovation in general minimally invasive surgery bringing together entrepreneurs, venture capitalists, surgeons, and medical device companies all in one place to showcase new ideas, products and procedures. There will be multiple in depth panels in surgical robotics, endolumenal surgery, artificial intelligence, surgical training and many more.

THANK YOU
Jan 23-25, 2025
Houston Texas

MIST MINIMALLY INVASIVE SURGEONS OF TEXAS
UTHealth The University of Texas Health Science Center at Houston
McGovern Medical School