Johnson & Johnson

MEDICAL DEVICES COMPANIES

ECELON 3000: Next-Gen Stapling Device in Thoracic Surgery

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ECHELON™ Staplers: **Ongoing innovation to help reduce complications**

2005–2009

ECHELON FLEX™ Stapler

Enhanced compression for bariatric and colorectal surgery

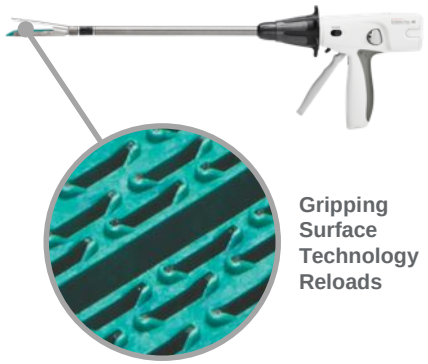
2011–2012

ECHELON FLEX™ Powered Stapler

Stability of powered firing to reduce distal tip movement

2014–2020

ECHELON FLEX™ Powered Stapler with GST Reloads



Evidence showing an association with:

Reduction in bleeding complications[1]

Reduction in hospital costs[1]

Compared to Medtronic staplers

Controlled tissue movement to deliver improved outcomes, backed by real-world evidence

2021

ECHELON™+ Stapler with GST Reloads

ECHELON™+ Anvil

Advancing security even in challenging conditions*

2023 ~2024

ECHELON™ 3000 Stapler

Improved access, easier placement, more control

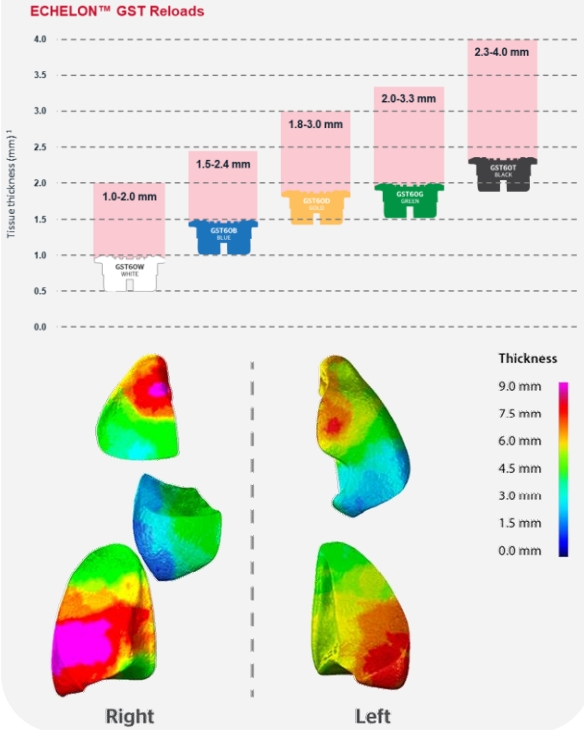
1 Rawlins L, Johnson BH, Johnston SS, et al. Comparative Effectiveness Assessment of Two Powered Surgical Stapling Platforms in Laparoscopic Sleeve Gastrectomy: A Retrospective Matched Study. Medical Devices: Evidence and Research. 2020:13:195–204. doi: https://doi.org/10.2147/MDER.S256237. Analysis of clinical and economic outcomes from 982 laparoscopic sleeve gastrectomy cases between March 1, 2017 and December 31, 2018 from Premier Healthcare Database (0.61% versus 2.24%, p=0.0012; $9,771 vs. $10,487, p<0.001). (140350-200514)

*Challenging tissue—thick, fragile, and varying thickness and density

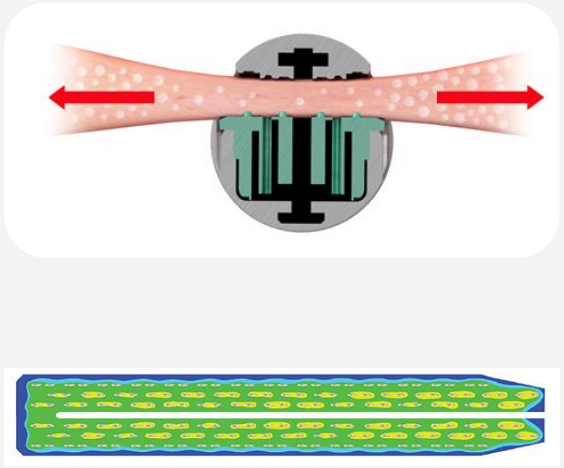
ECHELON Design Principles

Device-tissue interaction is at the heart of the stapler design process

FLEXIBILITY FOR VARIABLE TISSUE THICKNESSES

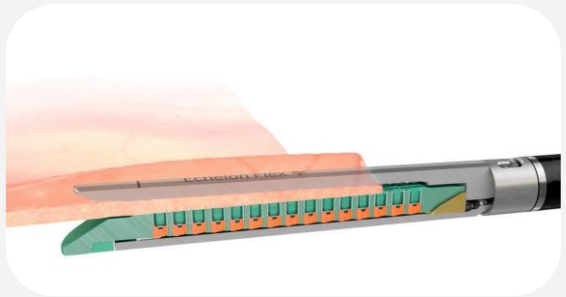


TWO-STAGE COMPRESSION



CONTROLLING TISSUE MOVEMENT

ENHANCED COMPRESSION FOR CHALLENGING TISSUE - DYNAMIC FIRING



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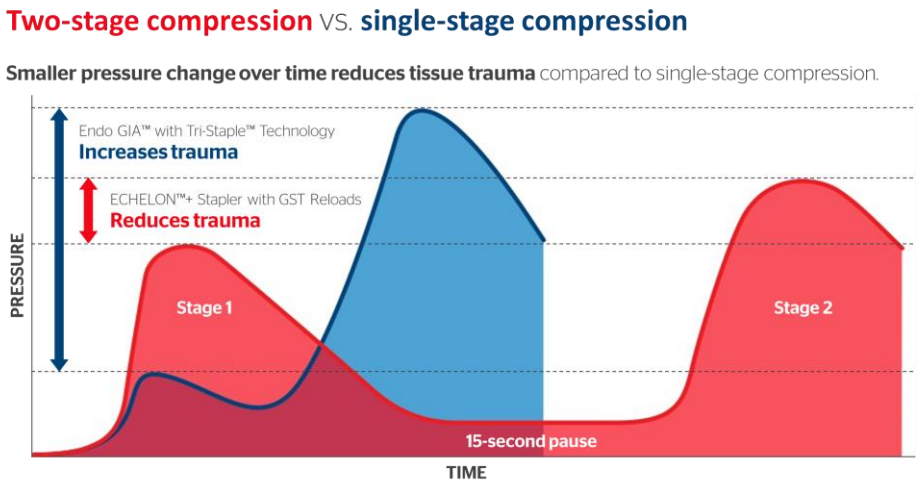
ECHELON Design Principles



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Thickness of Cadaveric Human Lung Tissue

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ABSTRACT

Background: Choosing the correct surgical staple height is dependent on knowledge of specific tissue thickness and compressibility. The purpose of this study was to measure the thickness of cadaveric human lung tissue.

Materials and Methods: Between December 2012 and February 2013, whole lungs were procured from 12 donors. Inclusion criteria included negative serology, no prior thoracic surgery, and completion of measurements within 72 hours of death. Tissue thickness was measured in the anterior-to-posterior direction using a tissue measuring device (TMD) at 41 lung locations. The tissue measuring device applied a constant pressure (8 g/mm²) via a plunger for 15 seconds before reading the thickness.

Results: Cadaveric lung tissue thickness displayed a large variation by location and within each location. Mean thickness in the anterior-to-posterior direction ranged from 1.5 mm (right middle lobe [inferior peripheral] location) to 9.0 mm (right inferior lobe [mid-central] location). In general, the periphery of the lung lobes was thinner than the central locations (e.g., mean peripheral location thickness: 4.1 mm; mean central location thickness: 5.9 mm). The thinnest tissues among the 12 donor cadaveric lung specimens were found in the one donor with a history of severe emphysema/chronic bronchitis. Height (P = 0.012) and weight (P = 0.036) were positively correlated with tissue thickness. Additionally, after adjusting for height,

- Lungs were procured from 12 donors.
- No prior thoracic surgery, and completion of measurements within 72 hours of death
- Tissue thickness was measured in the anterior-to-posterior direction using a tissue measuring device (TMD) at 41 lung locations
- The tissue measuring device applied a constant pressure (8 g/mm2) via a plunger for 15 seconds before reading the thickness.
- Mean thickness in the anterior-to-posterior direction ranged from 1.5 mm (right middle lobe [inferior peripheral] location) to 9.0 mm (right inferior lobe [mid-central] location).
- In general, the periphery of the lung lobes was thinner than the central locations
- lung tissue was 3.0 mm thicker for females than males after adjusting for heights

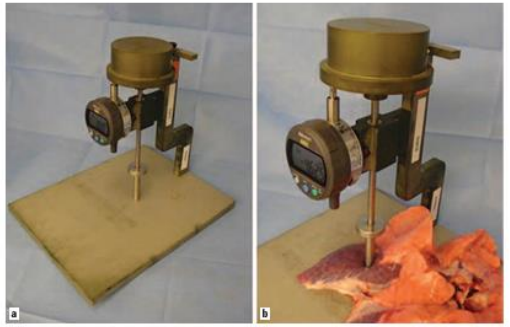


Figure 2. (a) Tissue measuring device before sample measurement, and (b) Tissue measuring device shown in the process of measuring the thickness of a location on a cadaveric human lung specimen.

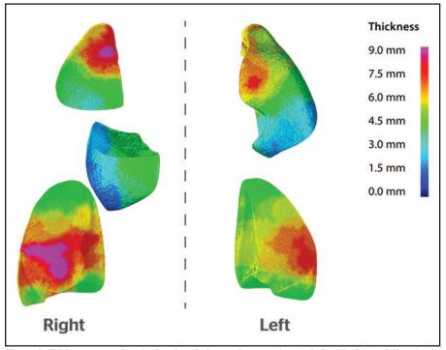


Figure 4. Thickness map of excised cadaveric human lung specimens derived by interpolating values between singular points of measurement.

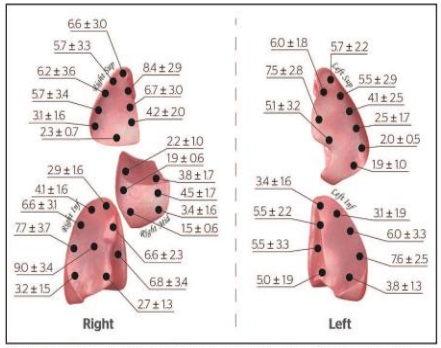
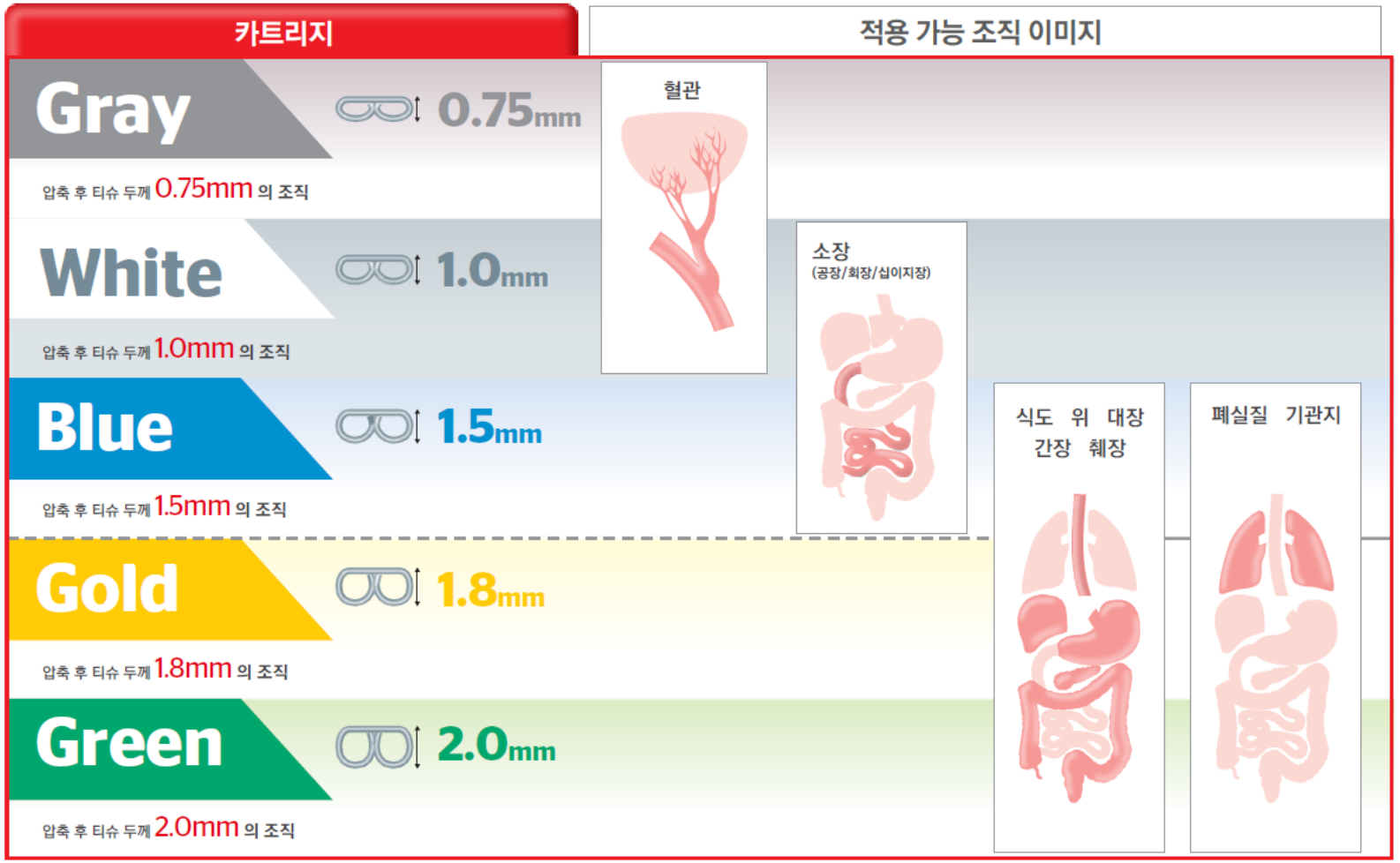


Figure 3. Mean thickness of excised cadaveric human lung specimens (N = 12) from a representative sampling of locations. Thicknesses were measured in the anterior-posterior direction under a pressure of 8 g/mm² for 15 seconds.

조직에 따른 카트리지 적용



+ Black

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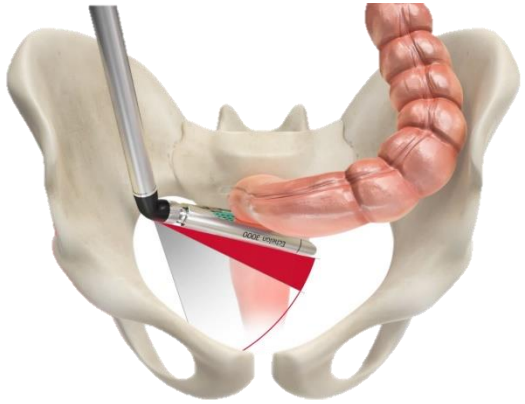
Designed to address the unique needs of patients & surgeons

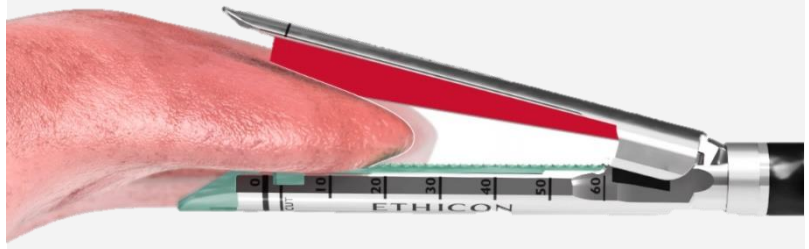
Colorectal

Better access and angle of approach to increase the likelihood of transecting the colon in a single firing and a wider jaw aperture to enable easier placement on tissue like radiated tissue



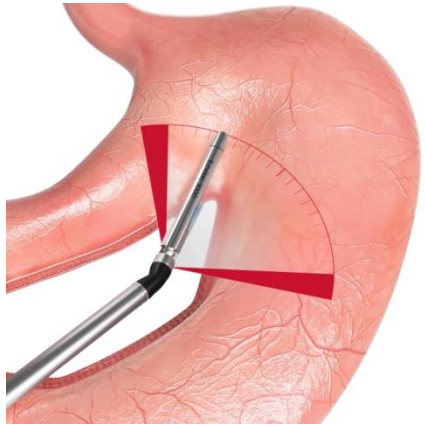
Thoracic

Improved access in the tight thoracic cavity and a wider jaw aperture to place thick, variable lung tissue more easily within the jaws



Bariatric

Allows surgeons to place the jaws of the stapler precisely where they want from the first firing to the last with one-handed powered articulation and the ability to set the jaws to any point within the articulation span



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ECHLEON™ 3000 Stapler

Clinical Challenges: ACCESS & CONTROL

Colorectal

Accessing the tight male pelvis during a Low Anterior Resection

Thoracic

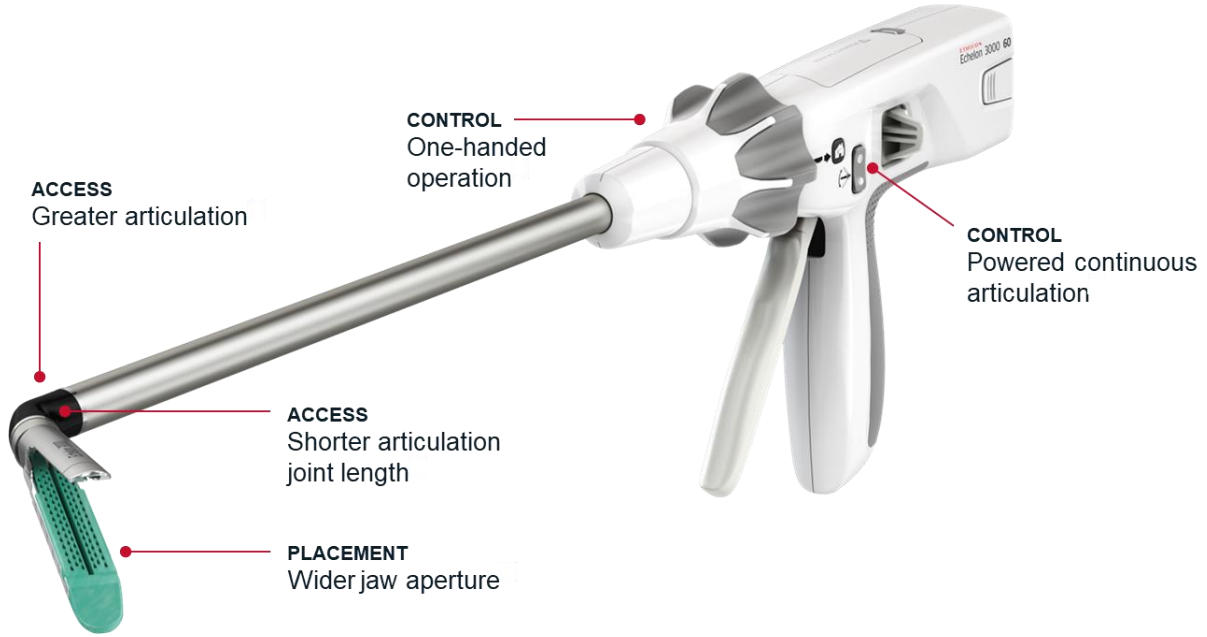
Limited size of the chest cavity & variable lung parenchyma

wider jaw aperture to place
thick, variable tissue more easily within the jaws

Bariatric

Precise control over the shape of a gastric sleeve

Improved access, easier placement, more control



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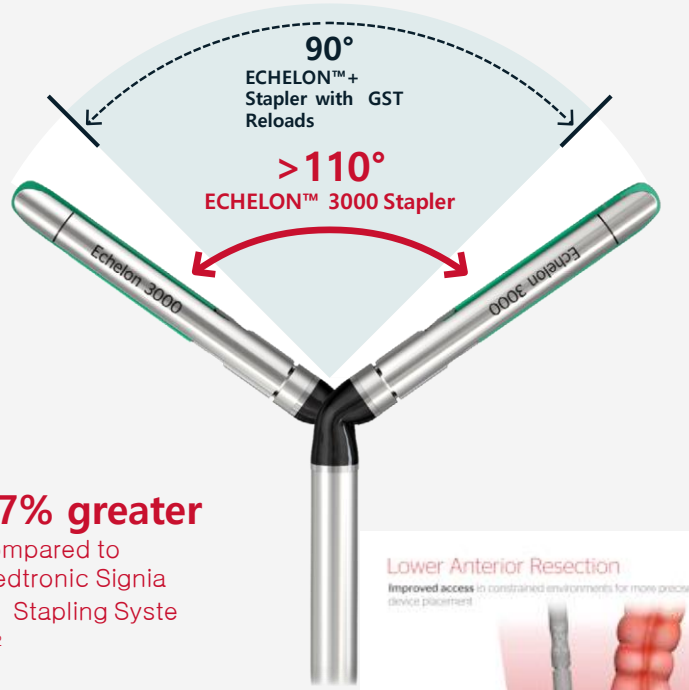
Product information – 1

Improved access for challenging anatomy[1]

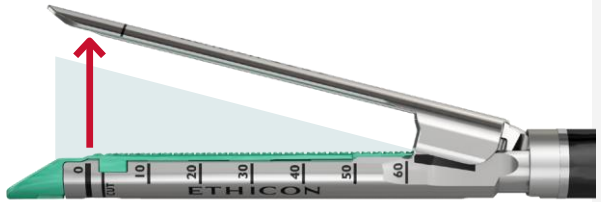
Greater articulation vs. current leading hand-held laparoscopic staplers[1]



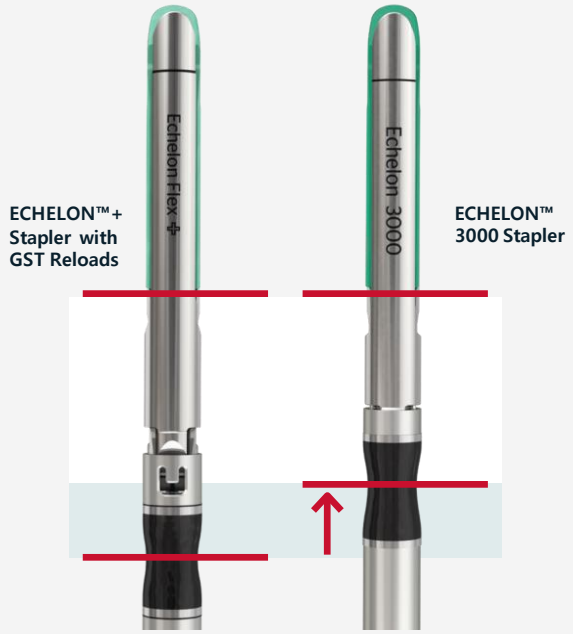
27% greater
compared to Medtronic Signia™ Stapling System[2]

Widest jaw aperture vs. current leading hand-held laparoscopic staplers[1]

39% wider
compared to competitor



Shorter articulation joint length vs. other Ethicon Powered Staplers[4]



27% shorter
for tighter turns in constrained conditions

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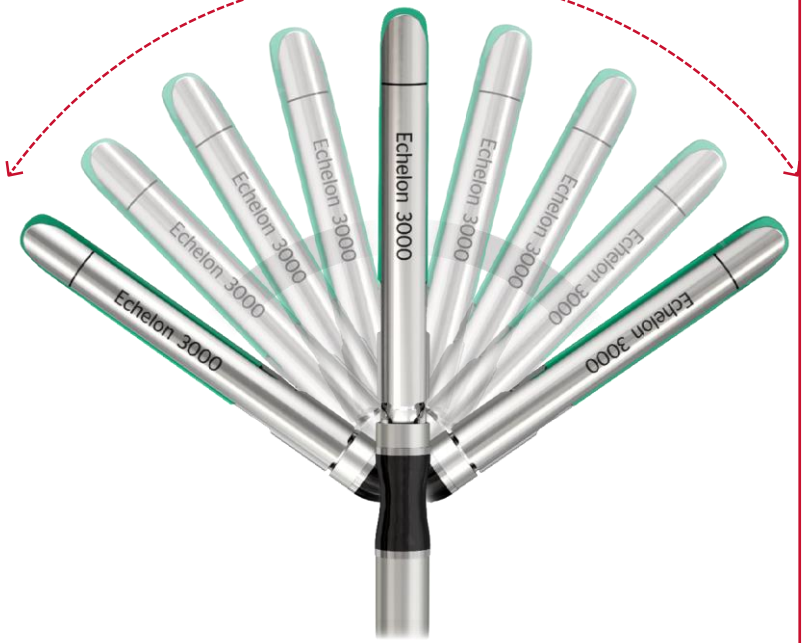
1 Comparison of average articulation angle and average jaw aperture between the ECHELON™ 3000 Stapler, ECHELON™+ Stapler, and Medtronic Signia™ Stapling System. (207537-220323) **2** Comparison of average maximum articulation angle for ECHELON™ 3000 60mm Stapler (56.51°) vs. Medtronic Signia™ Stapling System 60mm (44.56°), p<0.05. (201022-220112) **3** Comparison of average jaw aperture for ECHELON™ 3000 Stapler 60mm (22.79mm) vs. Medtronic Signia™ Stapling System 60mm (16.38mm), p<0.001. (202186-220126) **4** Comparison of articulation joint length between ECHELON™ 3000 Stapler (28.4mm) vs. ECHELON™+ Stapler (38.7mm).

Product information – 2

Enhanced control for precise placement on tissue[1]

Powered continuous articulation[2]

Set to any point[2]



One-handed operation[3]

Instinctive controls with software that provides simple haptic and audible feedback[4]

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Product information – 2

Enhanced control for precise placement on tissue[1]

**기계를 보지 않고도 사용자에게 Information 을 주기 위해,
진동을 통한 HAPTIC FEEDBACK 을 전달**

HAPTIC FEEDBACK 이 발생하는 3 가지 상황

1. Articulation 이 최대 각도에 도달 시,

   2 번의 진동

2. Jaw 를 닫은 후 Articulation 을 할 시,

   Pre – compression 단계에서 조직을 잡은 상태로 Articulation 하게 된다면 과도한 Tension 이 조직에 가해질 위험성,

   2 번의 진동

3. Reload (cartridge) 가 없는 상태에서 fire 하거나,

사용된 Reload 를 장착한 상태에서 Fire 한 경우,

   Staple 이 되지 않는 상황에서 Cutting 만 된다면 risky 한 상황,

   5 번의 진동

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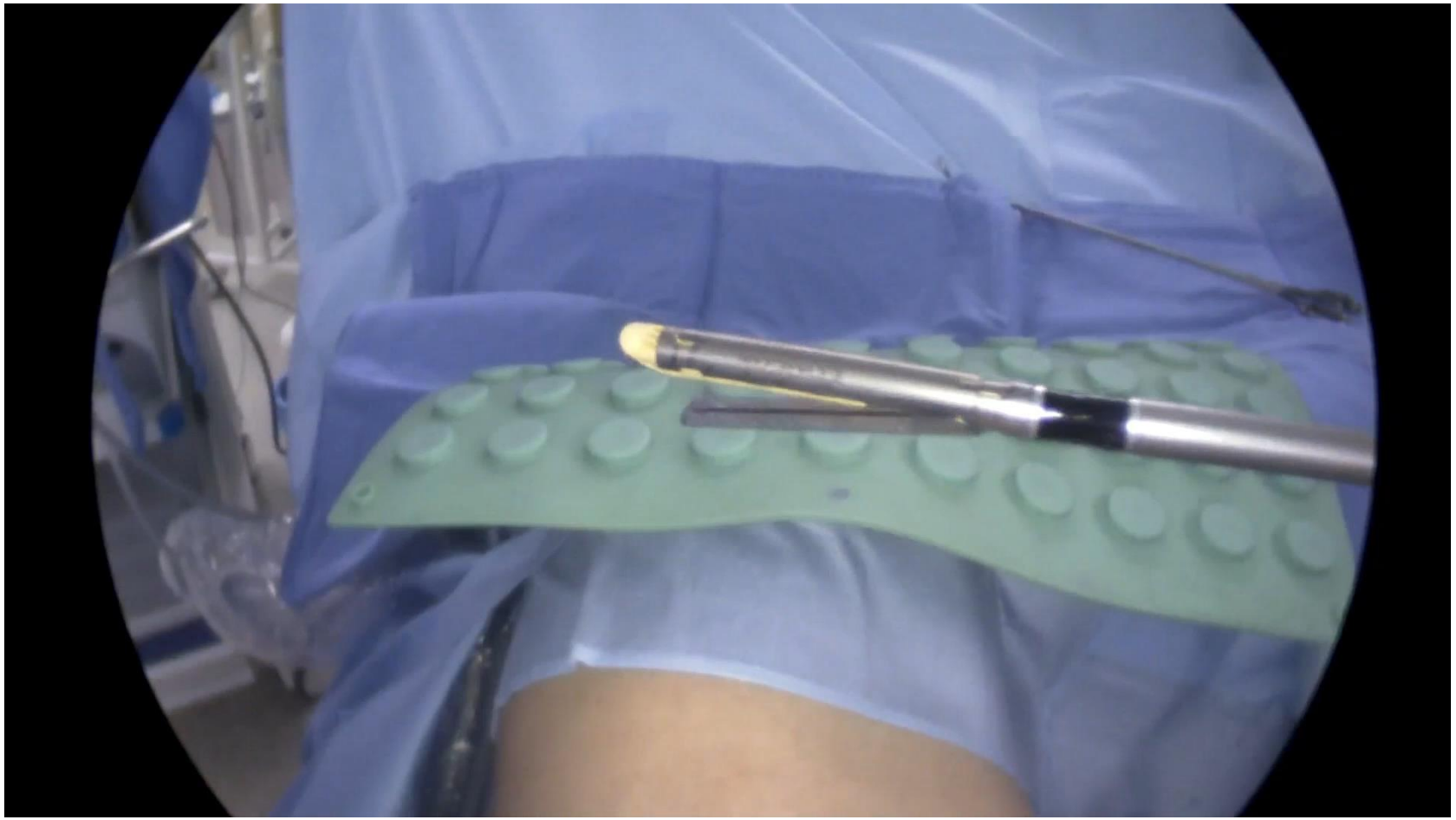
ECHELON 300 Device controlling



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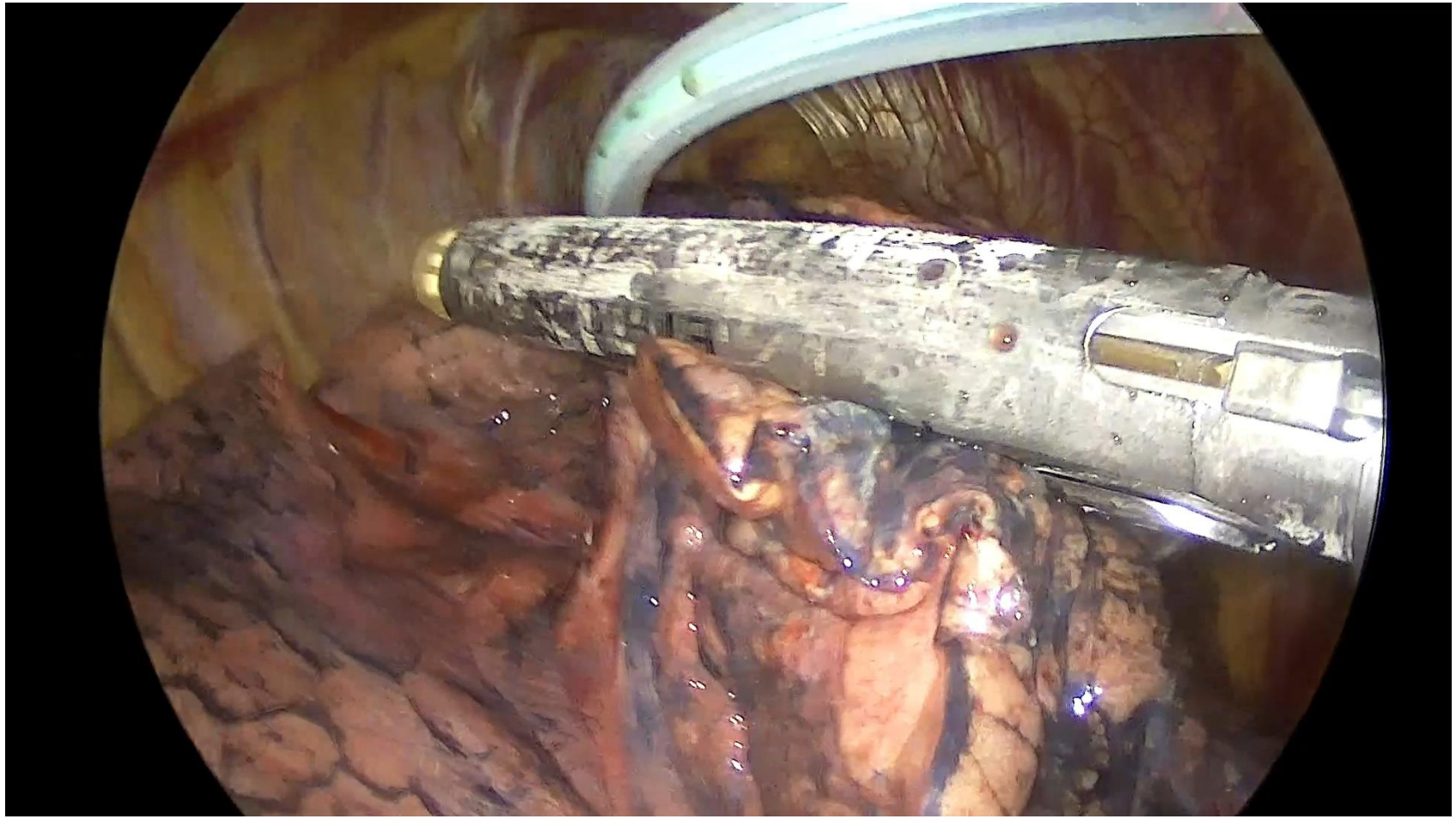
VATS wedge resection using ECHELON 3000 (60 mm)



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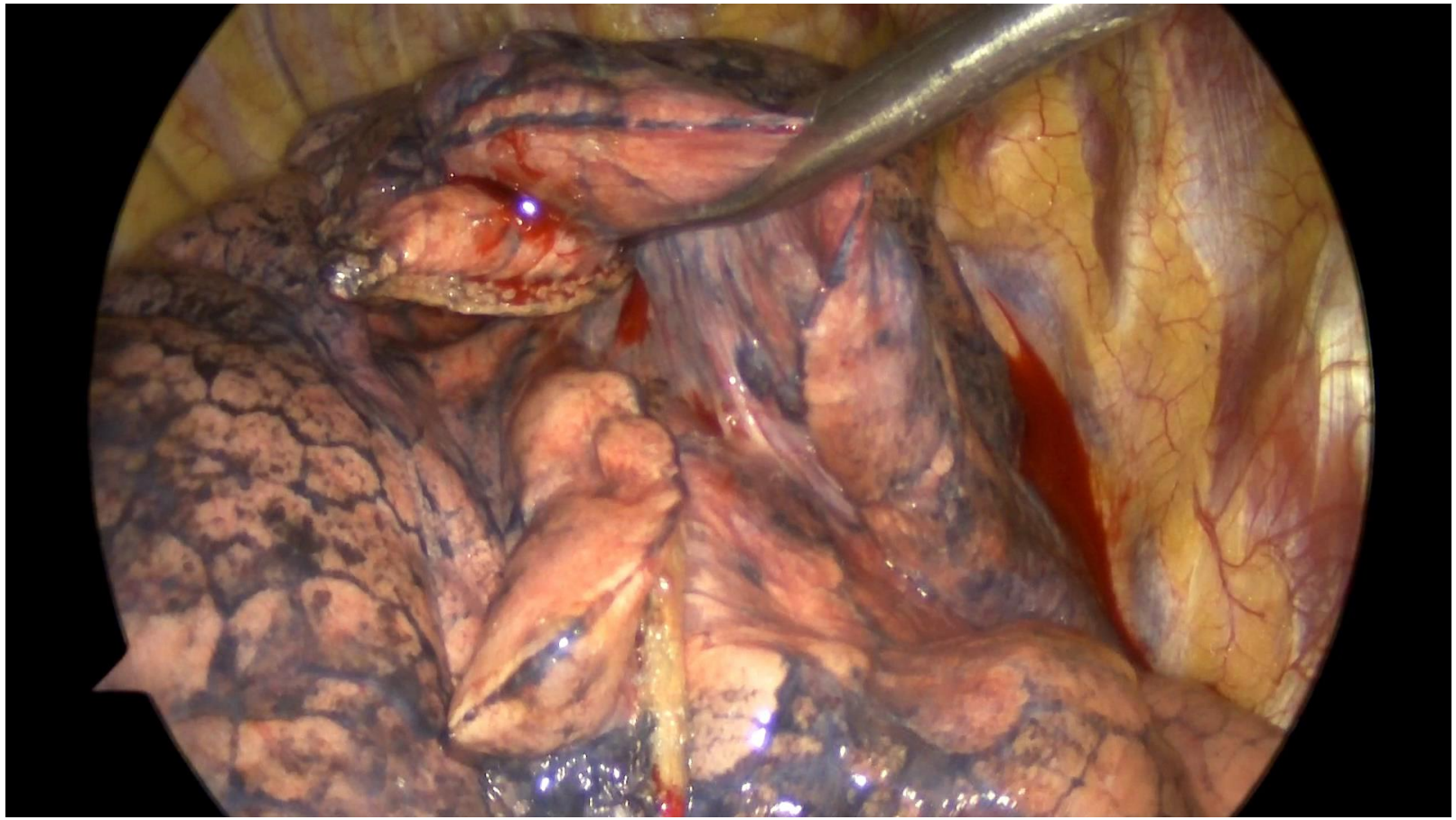

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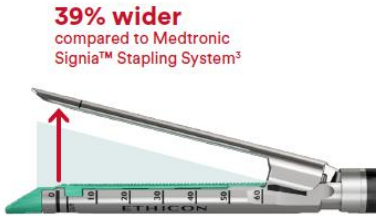
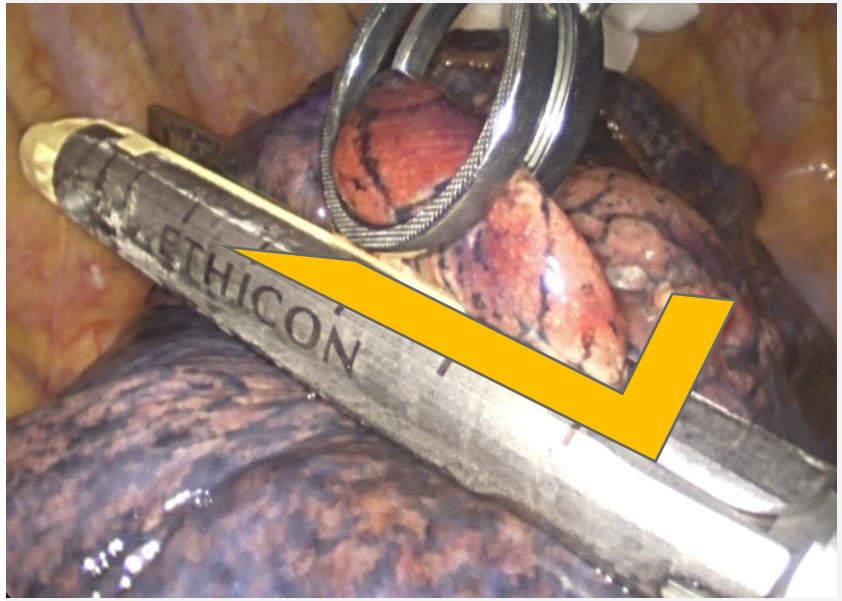
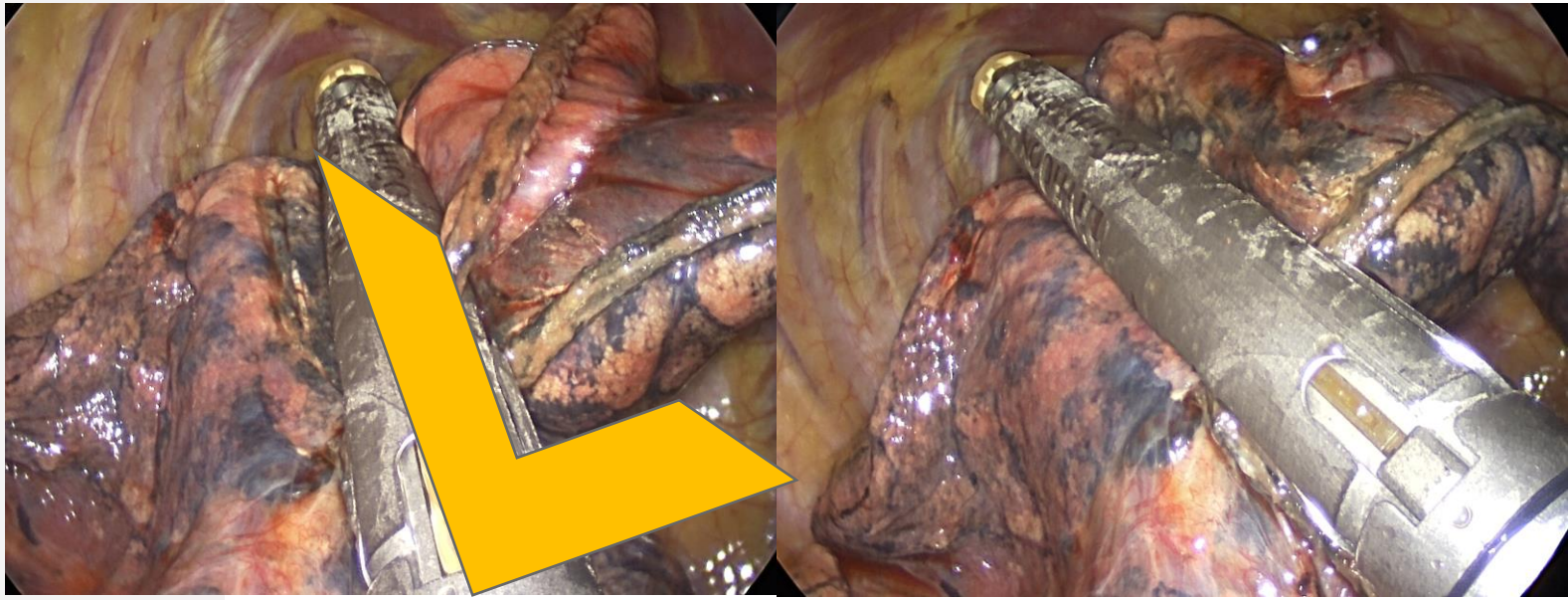
• ECHELON 3000 Device Comparison



Echelon+ aperture



Echelon 3000



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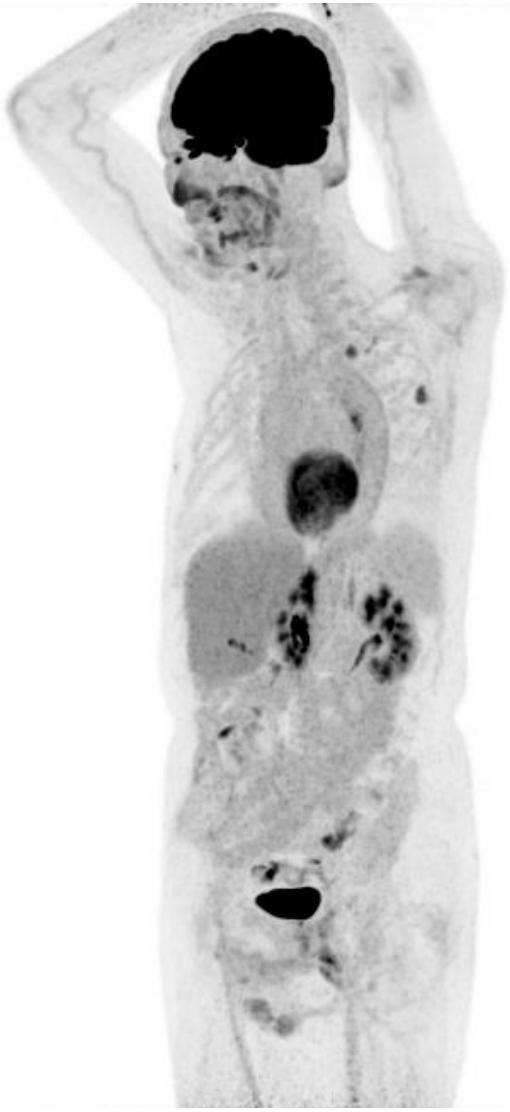
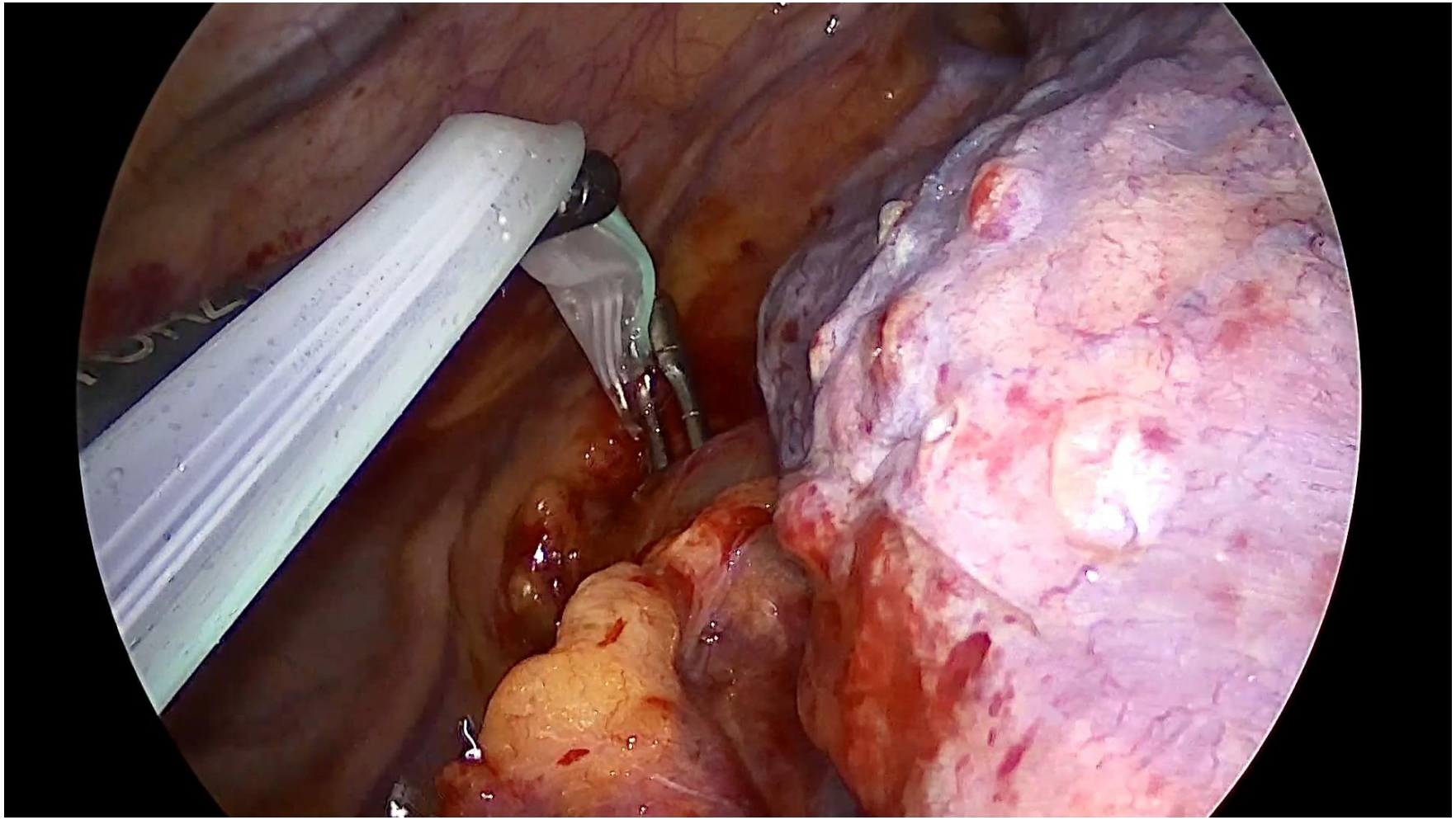
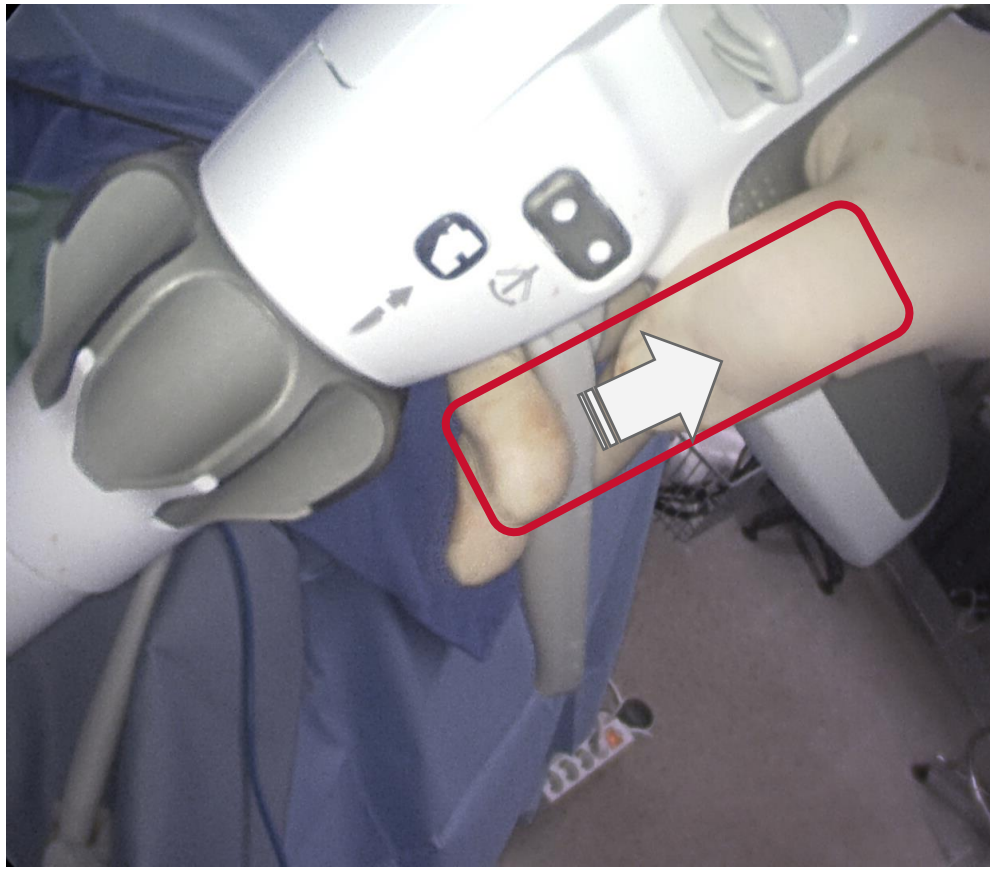
VATS Lobectomy using ECHELON 3000 (45 mm)

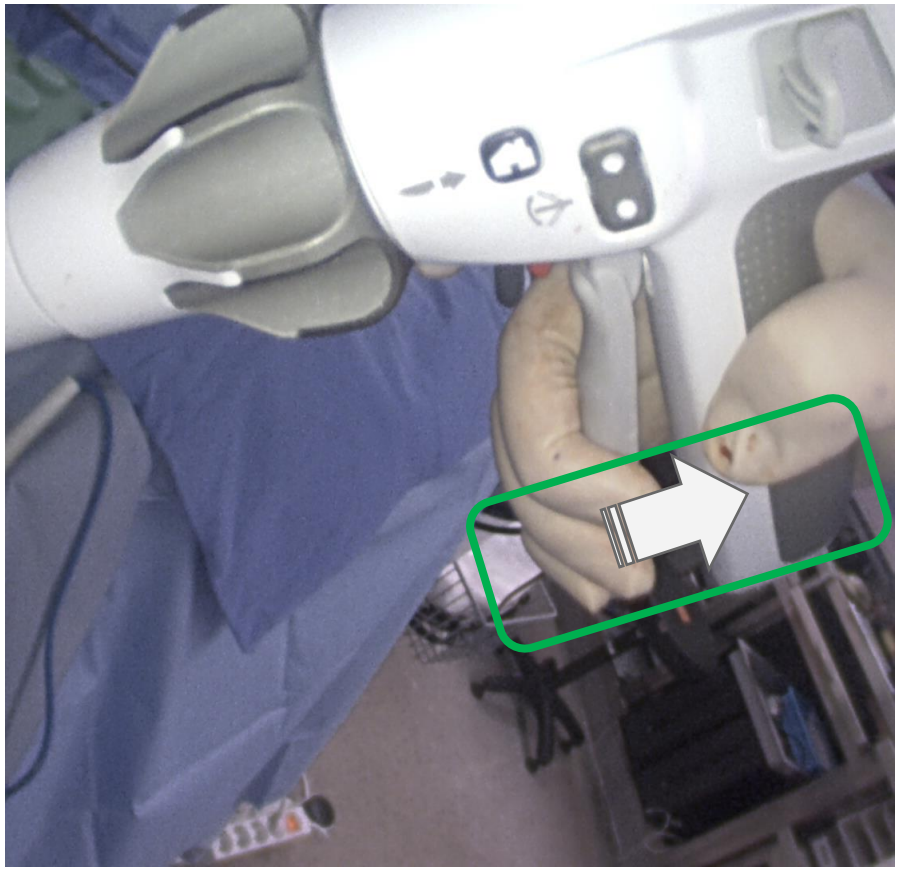


VATS Lobectomy using ECHELON 3000 (45 mm)



ECHELON 3000 Technical Tips 1





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ECHELON 3000 Technical Tips 1

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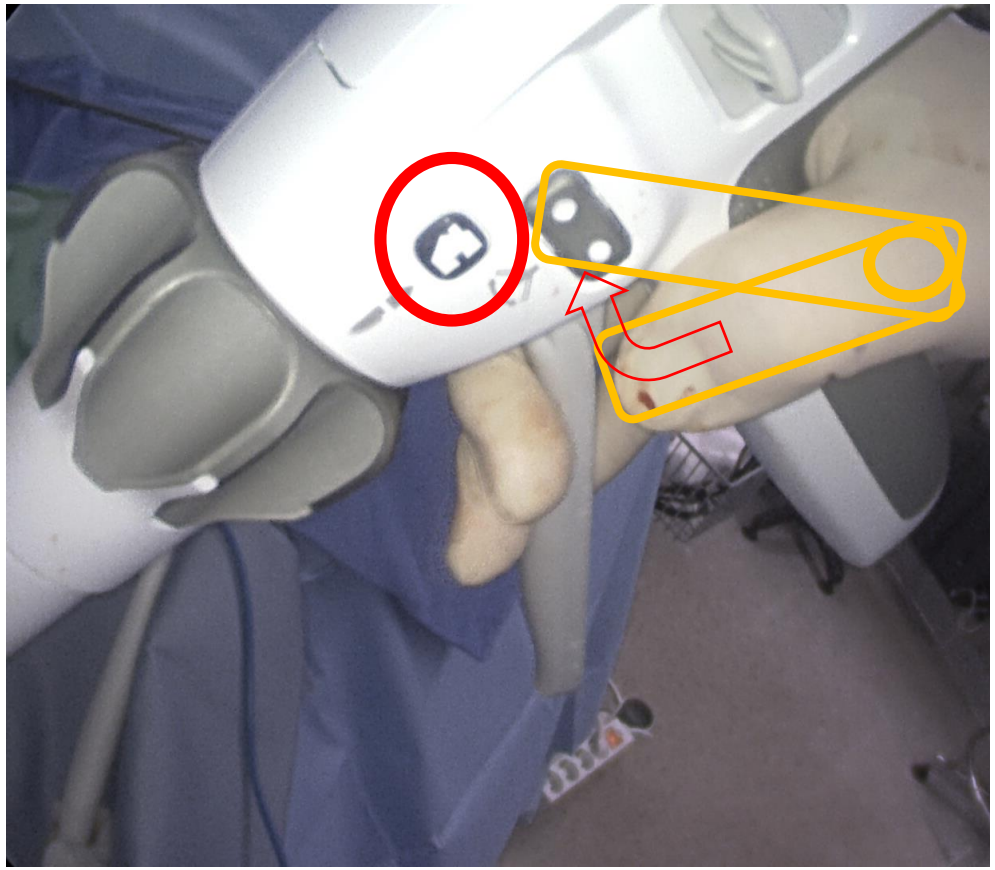
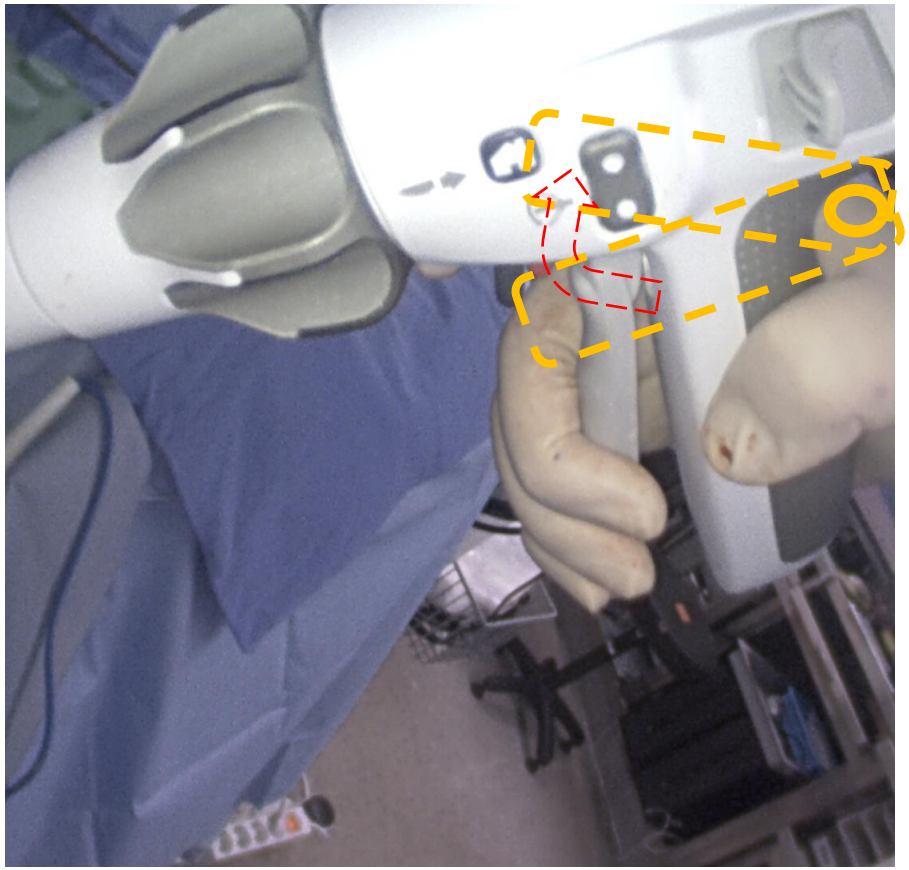
ECHELON 3000 Technical Tips 2





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Designed to address the unique needs of patients & surgeons

1. Enhanced **access & control** for precise placement on tissue

2. Greater intrathoracic, powered continuous articulation

3. Wider jaw aperture & Shorter joint length

→ **Improved access in the tight thoracic cavity and a wider jaw aperture to place thick, variable lung tissue more easily within the jaws**

→ **One handed operation, more comfortable device in performing thoracic surgery**

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Thank you for listening !

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