

Evaluation of the Utility of Intraoperative Nerve Monitoring, Water-Jet Dissector, and Fine Bipolar Forceps in Endoscopic Thyroid Surgery

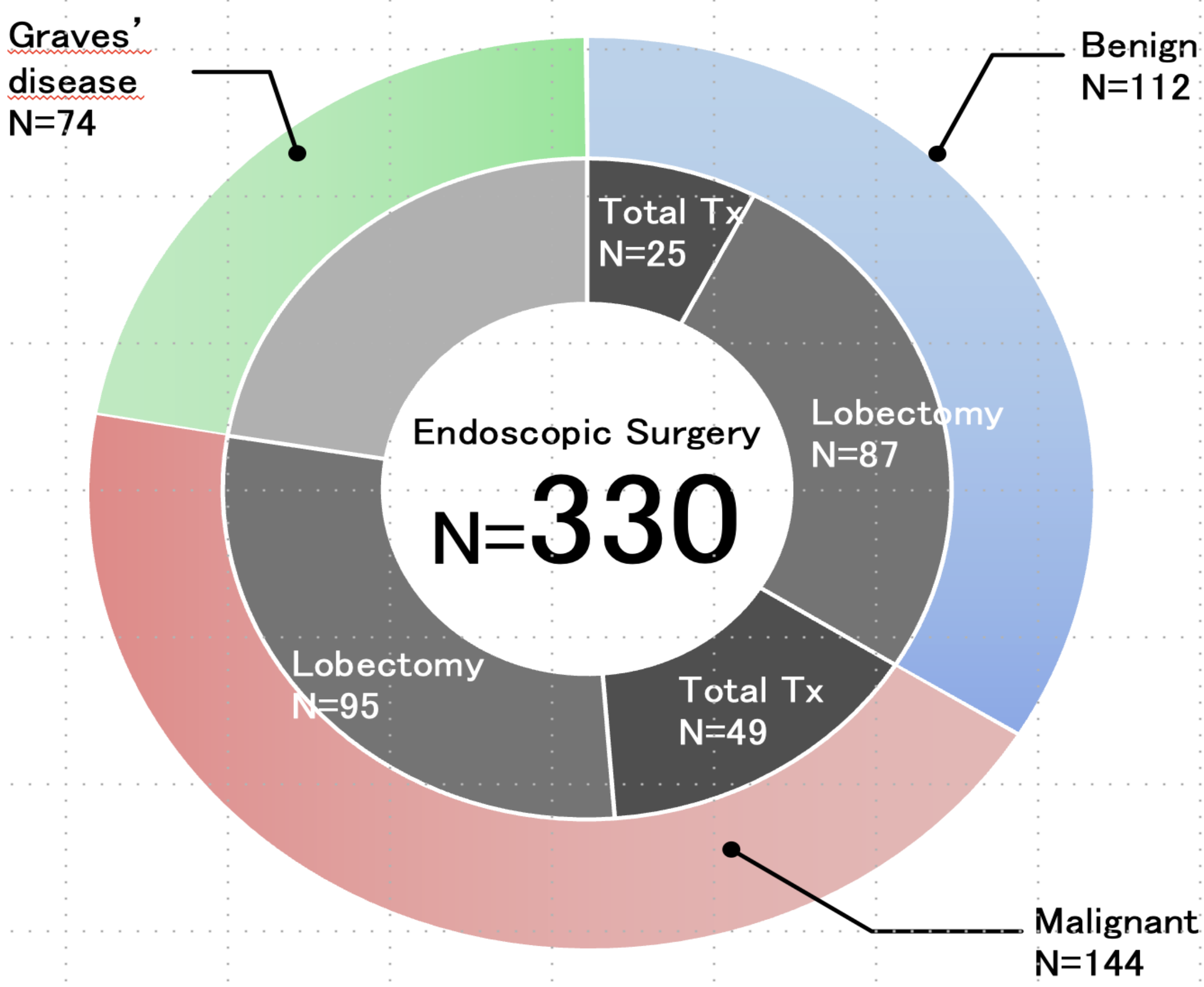
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Background

- Endoscopic surgery accounts for approximately 90% of all thyroid/parathyroid surgeries performed in our department.
- RLN injury rates reported in meta-analysis (Cozzi et al.): transient 3.15% / permanent 0.422%.
- Aim: Evaluate the utility of IONM, water-jet dissector, and fine bipolar forceps to improve safety.

Patients and Methods

- 330 endoscopic thyroid surgeries performed between July 2021 and December 2024 were classified by use or non-use of fine bipolar forceps, and operative time and incidence of RLN palsy were analyzed.



Surgical Technique

IONM (Intraoperative Nerve Monitoring)

Real-time EMG monitoring during dissection near RLN. Immediate feedback on nerve function.

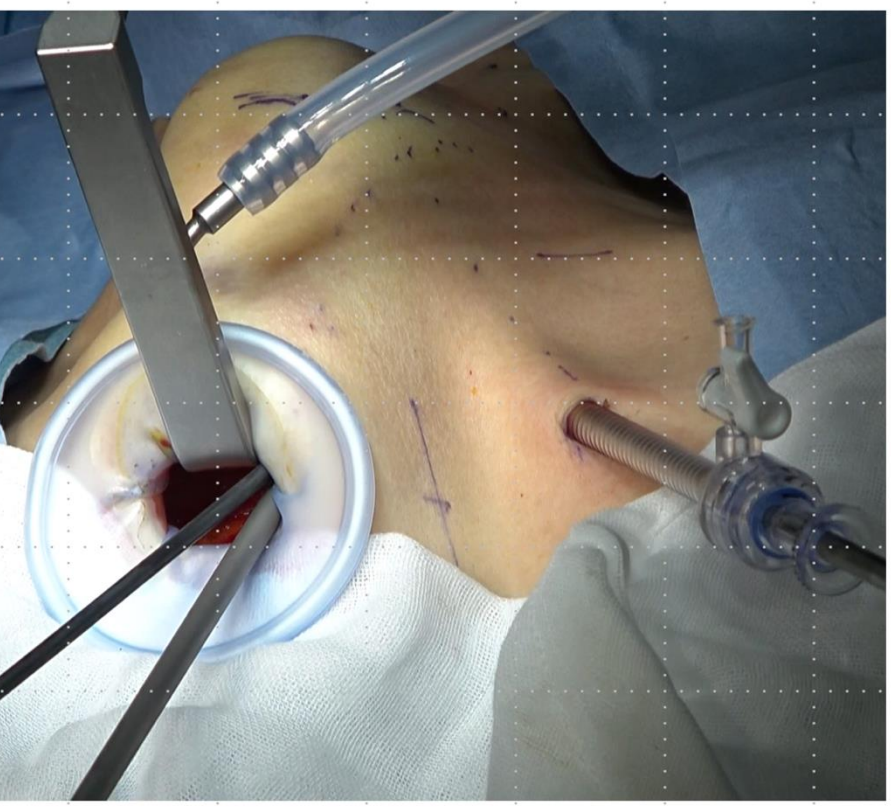
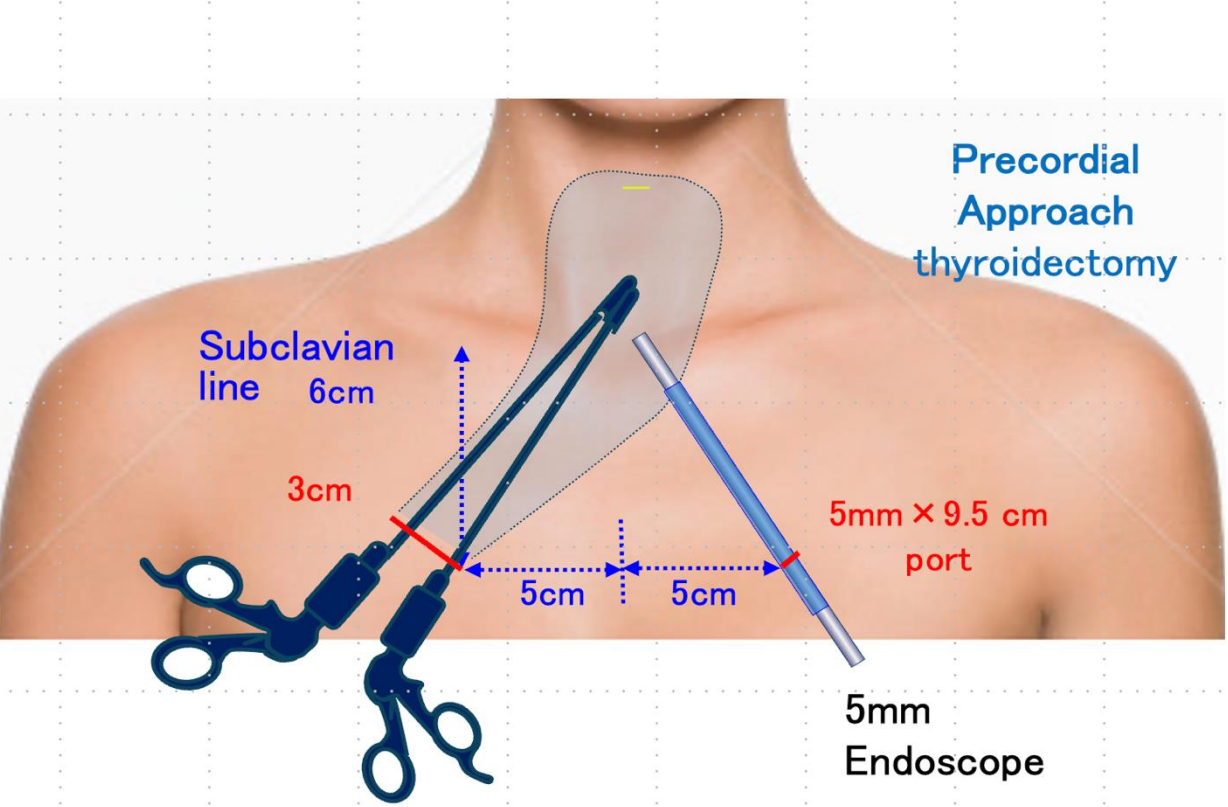
Water-Jet Dissector

High-pressure saline jet for tissue dissection. Avoids thermal injury to nerve.

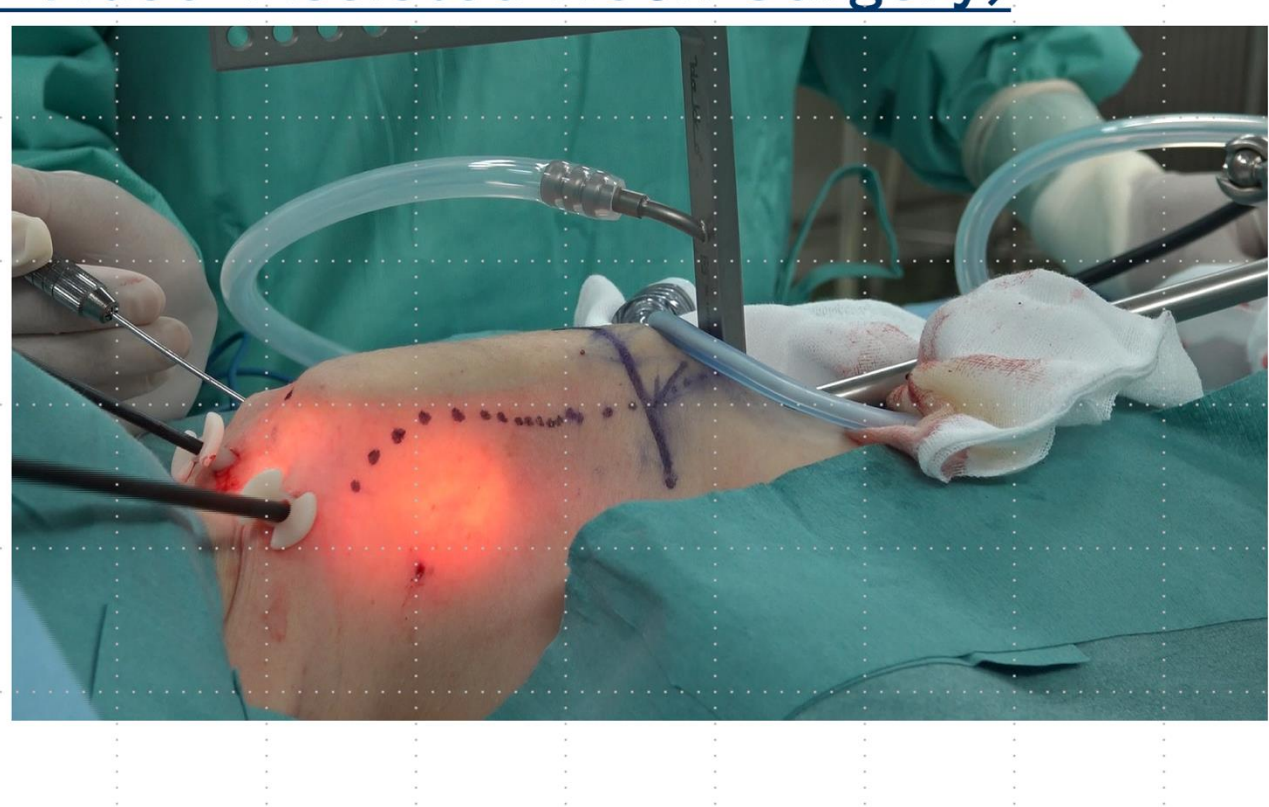
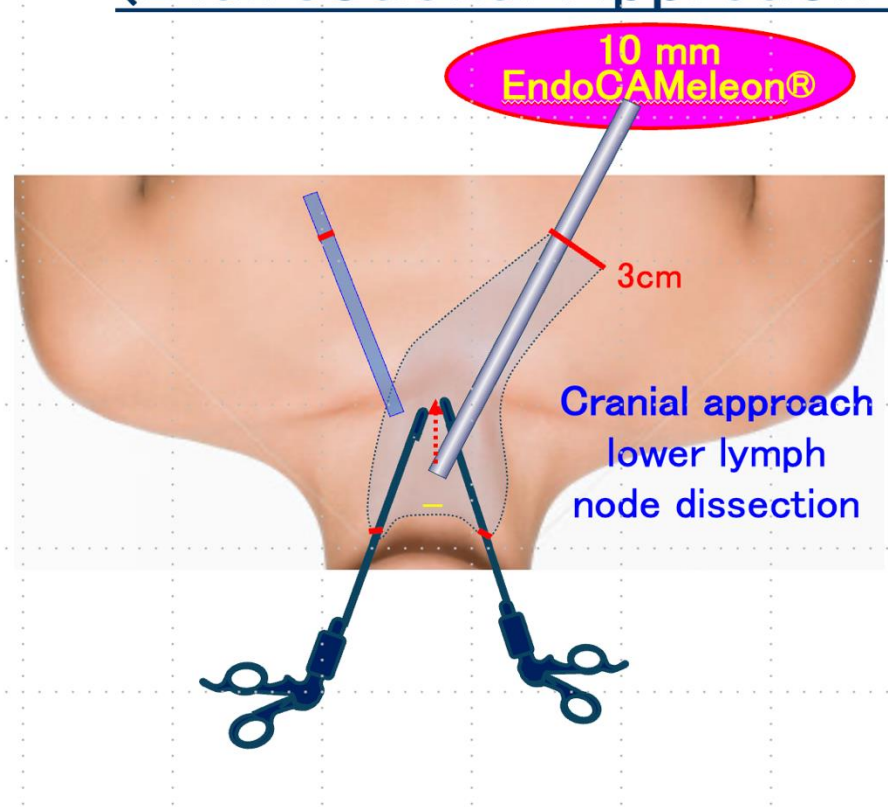
Fine Bipolar Forceps

Small tip for precise hemostasis. Minimal thermal spread near neurovascular structures.

Gasless Endoscopic Thyroidectomy via VANS (Modified)



Gasless Endoscopic Thyroidectomy via BAVANS (Bidirectional Approach of Video-Assisted Neck Surgery)



Results

Comparison: With vs. Without Fine Bipolar Forceps

	Dysphonia / RLN Palsy			Operative Time (min)		
	Bipolar With	Bipolar Without	p-value	Bipolar With	Bipolar Without	p-value
Malignant Lobectomy	1/30	3/65	1.0	316	272	0.12
Malignant Total Tx	0/17	7/32	0.080	217	225	0.58
Benign Lobectomy	0/22	1/65	1.0	177	158	0.23
Benign Total Tx	0/9	2/16	0.52	191	187	0.89
Graves' Disease	0/23	2/51	1.0	244	214	0.016
All Cases	1/100	15/230	0.047	-	-	-

- RLN injury rate significantly reduced with combined device use.
- With the use of bipolars, the operation time tended to be extended.

Discussion

- IONM enables immediate identification of nerve signal changes, allowing intraoperative technique modification.
- Water-jet dissection reduces direct nerve trauma by avoiding blunt dissection near the nerve.
- Fine bipolar forceps ensure hemostasis while minimizing thermal damage to surrounding structures.
- Balancing safety and time efficiency remains a key challenge.

Conclusion

- The combination of IONM, water-jet dissector, and fine bipolar forceps is effective and safe in endoscopic thyroid surgery.
- This technique significantly reduces RLN injury risk and is recommended for routine adoption.