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Study Summary

Texture and Color Enhancement Imaging versus White Light Imaging for the Detection of Colorectal Adenomas

Systematic Review and Meta-Analysis

Endosc Int Open. 2025 Jan 13;13:a24749676. doi: 10.1055/a-2474-9676.
Mitev S, Saeed H, Rasheed CF, et al.

Conclusion

TXI™ technology significantly improves detection of colorectal adenomas in patients undergoing colonoscopy for various indications. TXI technology has the potential to enhance the overall quality of the colonoscopy and aid in the prevention of colorectal cancer.

Objective

To assess whether texture and color enhancement imaging (TXI) technology increases the adenoma detection rate (ADR) and the number of adenomas per colonoscopy (APC) in comparison to conventional white light imaging (WLI).

Design

Systematic review and meta-analysis
(Evidence Level 2*, according to Oxford Center Evidence based Medicine [2011])

*Study design considered most reliable

Primary Outcome

ADR using TXI technology and WLI

Participant Characteristics

- PubMed, EMBASE, and the Cochrane Central Register of Control Trials were searched for studies comparing TXI technology to WLI in patients undergoing colonoscopy for any indication. Risk ratios (RRs) and mean differences (MDs) were computed using a random-effects model.
- This meta-analysis used data from previously published and publicly available articles.
- 1541 patients from three studies (two randomized control trials (RCTs) and one observational cohort study, were included). TXI technology was used in 775 patients (50.3%). Indications for colonoscopy varied, including positive fecal immunochemical test (FIT), surveillance, and diagnostic workup for abdominal symptoms.

Results

- TXI technology significantly increased ADR compared to WLI (57.8% versus 43.6%; RR 1.32; 95% confidence interval [CI] 1.20-1.46; $P < 0.001$; $I^2 = 0\%$). (See **Figure 1** on next page).
- TXI technology significantly increased APC compared to WLI (Mean Difference 0.50; 95% CI 0.37-0.64; $P < 0.001$; $I^2 = 0\%$). (See **Figure 2** on next page).
- TXI technology was more effective at detecting nonpolypoid/flat adenomas, proximal/right-sided adenomas, and adenomas ≥ 10 mm in size. (See **Figure 3** on page 3).
- Colonoscopy withdrawal times were shorter with TXI technology. (See **Figure 4** on page 3).

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Note

- This is the first systematic review and meta-analysis comparing the adenoma detection rate (ADR) and the number of adenomas per colonoscopy (APC) between TXI™ technology and conventional WLI in colonoscopy.
- The study has the following limitations:
  - **Inclusion of nonrandomized trial:** The nonrandomized study by Sakamoto et al. has a risk for bias given the potential for confounding and selection bias inherent in observational studies.
  - **Lack of Blinding:** Endoscopists could not be blinded due to the nature of the intervention. This may lead to performance and diagnostic bias.
  - **Procedure difference**: The imaging processor was the same in all studies but different colonoscope series with varying image qualities were used. Colonoscopy procedures within the included studies may have differences.

Figure 1: Results

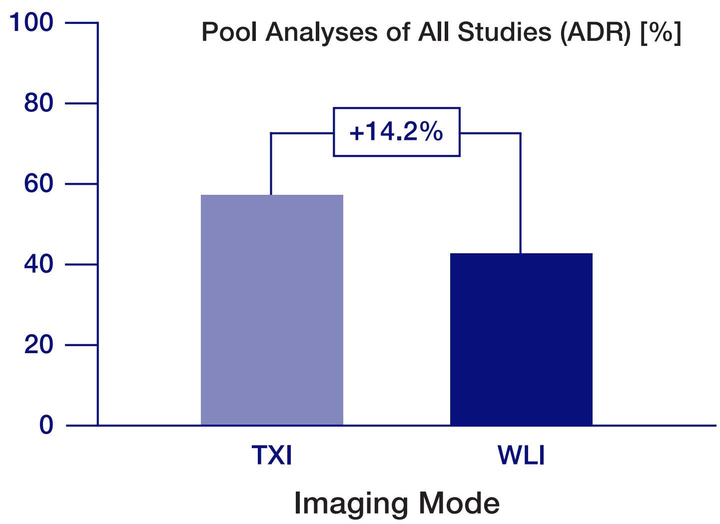

Figure 2:

	TXI			WLI				Mean difference
Study or subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, random, 95% CI
Antonelli 2023	1.36	1.79	375	0.89	1.35	372	36.5%	0.47 [0.24, 0.70]
Sakamoto 2023	1.5	1.18	237	1	0.78	233	57.9%	0.50 [0.32, 0.68]
Young 2024	1.71	2.67	163	0.94	2.67	161	5.6%	0.77 [0.19, 1.35]
Total (95% CI)			**775**			**766**	**100.0%**	**0.50 [0.37, 0.64]**

Heterogeneity: $Tau^2 = 0.00$, $Chi^2 = 0.89$, $df = 2$ ($P = 0.64$); $I^2 = 0\%$
Test for overall effect: $Z = 7.19$ ($P < 0.00001$)

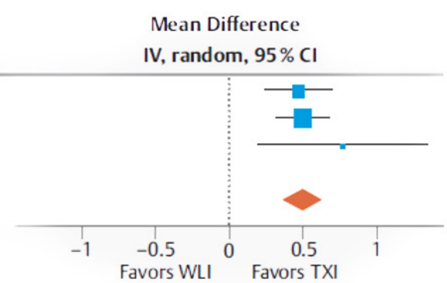

Figure 2: Forest plot of studies comparing adenomas per colonoscopy (APC).
CI = confidence interval; IV = Inverse variance; SD = standard deviation;
TXI = Texture and color enhancement imaging; WLI = White light imaging

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Figure 3:

Study or Subgroup	TXI Mean	TXI SD	TXI Total	WLI Mean	WLI SD	WLI Total	Weight	Mean Difference IV, Random, 95% CI
Antonelli 2023	0.58	0.97	375	0.42	0.83	372	42.9%	0.16 [0.03, 0.29]
Sakamoto 2023	1.06	1.03	237	0.69	0.83	233	35.0%	0.37 [0.20, 0.54]
Young 2024	0.58	1.18	163	0.24	1.18	161	22.1%	0.34 [0.08, 0.60]
Total (95% CI)			**775**			**766**	**100.0%**	**0.27 [0.12, 0.42]**

Heterogeneity: Tau² = 0.01; Chi² = 4.26, df = 2 (P = 0.12); I² = 53%
Test for overall effect: Z = 3.58 (P = 0.0003)

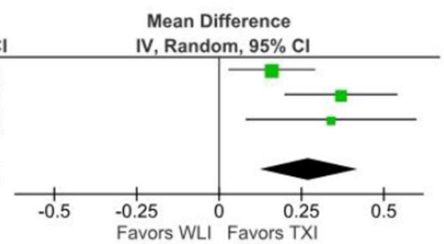

Figure 3: Forest plot of studies comparing nonpolypoid/flat adenomas per colonoscopy; CI = confidence interval; IV = Inverse variance; SD = standard deviation; TXI = Texture and color enhancement imaging; WLI = White light imaging

Figure 4:

Study or Subgroup	TXI Mean	TXI SD	TXI Total	WLI Mean	WLI SD	WLI Total	Weight	Mean Difference IV, Random, 95% CI
Antonelli 2023	7.7	0.74	375	8	1.63	372	91.6%	-0.30 [-0.48, -0.12]
Sakamoto 2023	8.6	3.1	235	9	3.5	230	8.4%	-0.40 [-1.00, 0.20]
Total (95% CI)			**610**			**602**	**100.0%**	**-0.31 [-0.48, -0.13]**

Heterogeneity: Tau² = 0.00; Chi² = 0.10, df = 1 (P = 0.76); I² = 0%
Test for overall effect: Z = 3.47 (P = 0.0005)

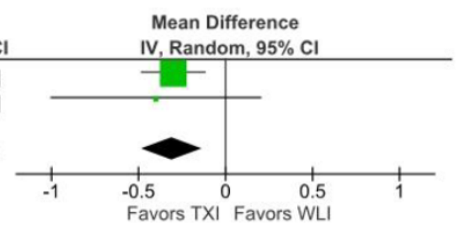

Figure 4: Forest plot of studies comparing withdrawal time; CI = confidence interval; IV = Inverse variance; SD = standard deviation; TXI = Texture and color enhancement imaging; WLI = White light imaging

TXI™ technology is not intended to replace histopathological sampling as a means of diagnosis.

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OLYMPUS AMERICA INC.
3500 Corporate Parkway, PO BOX 610, Center Valley, PA 18034

For more information, contact your Olympus sales representative, or call 800-848-9024.
www.medical.olympusamerica.com

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