

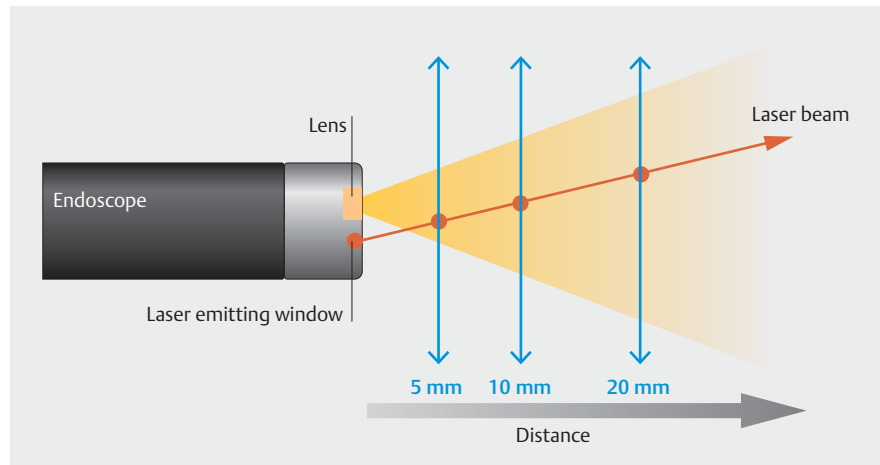
Measuring polyp size using a virtual scale endoscope: a video tutorial with clinical case demonstration



Accurate real-time endoscopic assessment of colorectal polyp size plays a key role for selecting adequate post-polypectomy surveillance intervals or when choosing appropriate polypectomy techniques [1]. While visual estimation is the most commonly used method of measurement, there is marked interobserver variability. Biopsy forceps and ruler snares can be used as references for polyp size estimation, but are limited by being external devices that lengthen the duration of the endoscopy and increase the procedural cost [2, 3].

The virtual scale endoscope (VSE; Fujifilm, Tokyo, Japan) (► **Fig. 1**) is a new endoscope developed to provide real-time polyp size measurement during colonoscopy [4, 5]. The VSE is equipped with a red laser beam that projects a laser dot onto the mucosa. This dot changes position according to the distance between the tip of the endoscope and the target polyp (► **Fig. 1**; ► **Video 1**). The laser dot must be positioned on the left center edge of the polyp. The software then detects the position of the laser dot through its reflection on the mucosa and displays the virtual scale on the right side (► **Fig. 2**; ► **Video 1**). Best size estimation is obtained when the endoscope is positioned in front of the polyp. A distance of 4–30 mm between the endoscope and the target lesion must be maintained for accurate estimation of polyp size (► **Fig. 2**; ► **Video 1**). One recent study has evaluated the feasibility of the VSE in an ex vivo experiment and a second ex vivo study has demonstrated that size measurement is more accurate when using the VSE compared with visual size estimation [4, 5].

We present a visually assisted instruction guide on how to use the VSE and demonstrate its application in ex vivo and in vivo examples (► **Video 1**). The video tutorial discusses the most important considerations to achieve optimal polyp size measurements when using the VSE.



► **Fig. 1** A visual representation of polyp size estimation using the distance between the endoscope tip and the polyp.



► **Video 1** Video tutorial on the use of the virtual scale endoscope including an ex vivo demonstration and its use in a clinical setting for two colorectal polyps.

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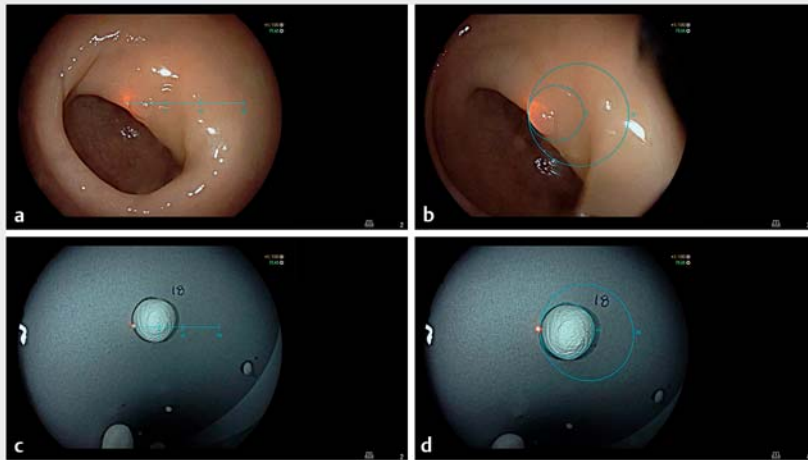
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Competing interests

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► **Fig. 2** Examples of polyp size estimation with the virtual scale endoscope for: **a** a small in vivo polyp using the linear scale; **b** a small in vivo polyp using the circular scale; **c** a large ex vivo polyp using the linear scale; **d** a large ex vivo polyp using the circular scale.

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