Establishing ground truth of polyp size, morphology, and volume using three-dimensional scanning

We explored the feasibility of three-dimensional (3D) scanning of colorectal polyps to obtain computer-aided design (CAD) 3D rendering information on polyp morphology, size, and volume. During the colonoscopy, a novel virtual scale endoscope (VSE; Scale eye, EW10-VM01; Fujifilm, Tokyo, Japan) with an integrated virtual scale function was used, which allows for polyp size measurement [1–3] (Video 1). Two detected polyps had their size measured during the colonoscopy using VSE (Fig. 1 a, d), then were removed from the colon as intact en bloc specimens with a healthy resection margin. The polyps were measured using a digital Vernier caliper (eSync with 32 feeler gauge with 0.01-mm intervals) directly after resection (Fig. 1 b, e). The polyps were then 3D scanned for volumetric information (Artec Space Spider; Artec 3D, Luxembourg) [4] (Fig. 1 c, f). The 3D scanner processes up to 1 million individual points per second at 7.5 frames per second with a resolution of 0.1 mm. Polyp 1 was measured as being 8 mm using the VSE, 8.88 mm using the caliper, and 9.68 mm in the 3D model. The total polyp volume was 291.8 mm³. Polyp 2 was measured as being 14 mm using the VSE, 15.16 mm using the caliper, and 15.20 mm in the 3D model. The total polyp volume was 968.1 mm³.

We found that it is possible to obtain spatial polyp information through 3D scanning. 3D scanning of polyps can capture their shape, geometries, and textures, translating them into data files in which size, volume, and shape becomes measurable. These 3D models can then be used in the context of AI development to provide ground truth data to train models to automatically recognize size, volume, and Paris classification.

Conflict of Interest

R. Djinbachian is supported by a “Fonds de Recherche du Québec Santé/Ministère de la Santé et des Services Sociaux” clinical research award. D. von Renteln is supported by a “Fonds de Recherche du Québec Santé” career development award, and has received research funding from ERBE Elektromedizin GmbH, Vention, Pendopharm, Fujifilm, and Penta; he has received consultancy or speaker’s fees from Boston Scientific Inc., ERBE Elektromedizin GmbH, and Pendopharm. M. Taghiakbari, F. Mubaid, C. Y. Rekkabi, and B. N. Noorah declare that they have no conflict of interest.
The authors

Roupen Djinbachian1,2, Mahsa Taghiakbari1,2, Firas Mubaid2, Chakib Yahia Rekkabi3, Nuzha Noorah2, Daniel von Renteln1,2

1 Gastroenterology, Centre Hospitalier de l’Université de Montréal, Montreal, Canada
2 Gastroenterology, Centre de Recherche du Centre Hospitalier de l’Université de Montréal, Montreal, Canada
3 Division of Internal Medicine, Centre Hospitalier de l’Université de Montréal, Montreal, Canada

Corresponding author

Daniel von Renteln, MD
Department of Medicine, Division of Gastroenterology, Centre de Recherche du CHUM (CRCHUM), rue St. Denis 900, H2X 0A9 Quebec, Canada
danielrenteln@gmail.com

Funding

Fujifilm Corporation
http://dx.doi.org/10.13039/501100002424
21.305

References


Bibliography

Endoscopy 2024; 56: 314–315
DOI 10.1055/a-2248-1385
ISSN 0013-726X
© 2023. The Author(s).
This is an open access article published by Thieme under the terms of the Creative Commons Attribution License, permitting unrestricted use, distribution, and reproduction so long as the original work is properly cited (https://creativecommons.org/licenses/by/4.0/)
Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

Citation Format

Endoscopy 2023; 55: E1260–E1261,
DOI 10.1055/a-2210-0635

Endoscopy E-Videos

E-Videos is an open access online section of the journal Endoscopy, reporting on interesting cases and new techniques in gastroenterological endoscopy. All papers include a high-quality video and are published with a Creative Commons CC-BY license. Endoscopy E-Videos qualify for HINARI discounts and waivers and eligibility is automatically checked during the submission process. We grant 100% waivers to articles whose corresponding authors are based in Group A countries and 50% waivers to those who are based in Group B countries as classified by Research4Life (see: https://www.research4life.org/access/eligibility/).

This section has its own submission website at https://mc.manuscriptcentral.com/e-videos