

Curriculum for endoscopic treatment of esophageal neoplasia and precursor lesions: ESGE Position Statement – with competency assessment tools



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Supplementary Material

Supplementary Material is available at
<https://doi.org/10.1055/a-2948-4729>**ABSTRACT**

Prior to the start of practical training, the trainee should be aware of different treatment modalities and their specific indications and limitations for patients with esophageal neoplasia and precursor lesions.

Before starting the esophageal cancer treatment curriculum, proficiency in management of adverse events such as bleeding, perforation, and strictures, is mandatory.

Competency in optical diagnosis of esophageal (pre)neoplastic lesions is a prerequisite to achieve proficiency in the endoscopic management of early esophageal neoplasia.

Proficiency in both endoscopic resection and endoscopic ablation is mandatory for being considered competent in the endoscopic management of early Barrett neoplasia.

Endoscopic resection in the esophagus should be learned through a structured training program consisting of lectures, live demonstrations, and hands-on training on models, followed by training in humans under strict expert supervision in a hands-on setting. Ideally, a minimum of 10 supervised cases should be done on ex vivo/in vivo models.

In order to maintain competence in the endoscopic management of early esophageal neoplasia, an annual caseload of at least 10 new cases per endoscopist with esophageal endoscopic resection and 10 new cases per endoscopist with endoscopic ablation is required

SOURCE AND SCOPE

This Position Statement is an official statement of the European Society of Gastrointestinal Endoscopy (ESGE). It provides Good Practice Statements that aim to help endoscopists improve their skills in endoscopic therapy for precancerous lesions and early esophageal cancer with appropriate training, for both Barrett esophagus-related neoplasia and esophageal squamous cell neoplasia. In addition, it aims to help in defining the prerequisites for the setting of both the trainee's and the trainer's working environment.

The Good Practice Statements presented are based on available evidence and consensus among endoscopists considered to be experts in the endoscopic therapy of esophageal neoplasia and its precursor lesions.

ABBREVIATIONS

APC	argon plasma coagulation
ASGE	American Society for Gastrointestinal Endoscopy
BE	Barrett esophagus
BERN	Barrett esophagus-related neoplasia
BORN	Barrett's Oesophagus-Related Neoplasia (training module)
CEIM	complete eradication of intestinal metaplasia
CEN	complete eradication of neoplasia
DOPS	direct observation of procedural skills
EAC	esophageal adenocarcinoma
EGD	esophagogastroduodenoscopy
EMR	endoscopic mucosal resection
ESCN	esophageal squamous cell neoplasia
ESD	endoscopic submucosal dissection
ESGE	European Society of Gastrointestinal Endoscopy
GI	gastrointestinal
GPS	Good Practice Statement
IQR	interquartile range
MDT	multidisciplinary team
(PET)CT	(positron emission tomography) computed tomography
PICO	population/patients, intervention, comparator, outcome
RFA	radiofrequency ablation

Introduction

Esophageal carcinoma is a malignant disease with significant global variations in incidence and mortality rates across countries and regions [1]. Although in general the prognosis of patients with esophageal cancer is poor [2], long-term survival strongly depends on the stage at which the disease is diagnosed. Patients diagnosed with T1 esophageal cancer can often be treated with curative endoscopic resection with excellent prognosis [3,4]. Especially for early esophageal adenocarcinoma (EAC) and its precursor lesions, endoscopic therapy is considered to be multimodal, consisting of a combination of endoscopic resection and ablation for appropriate indications [5,6]. Endoscopic techniques to treat early esophageal neoplasia and its precursor lesions are complex, requiring a high level of endoscopic skills and dedicated training.

Promoting quality in endoscopy through training curricula is of great importance for ESGE, to ensure effective treatment and optimal patient outcomes [7]. The present advanced curriculum aims to establish practical guidelines for the training of therapeutic endoscopists in endoscopic therapy for early esophageal neoplastic lesions, and to set out recommendations for the setting in which this training should be executed, both with regard to the local working environment of the trainee and to the centers of expertise where they receive training.

Methods

This curriculum was developed through a Delphi consensus method among European experts in endoscopic treatment of early esophageal neoplasia. As Chair of the ESGE Curricula Working Group, T.T. invited R.P. and B.W. to be the section chairs for the optical diagnosis and treatment of esophageal cancer and precursor lesions training curriculum. After a call for participants in November 2021, R.P. and B.W. selected the members, based on curriculum, optical diagnosis and endoscopic treatment experience, publications, and motivation. During a virtual kick-off meeting in March 2022, all members were introduced to the methodology, and subtopics for optical diagnosis and endoscopic treatment training were selected. A list of key questions considered to be relevant for this curriculum was formulated (see **Supplementary Material, Appendix 1s**). Based on these key questions, a narrative literature search was performed by the working group members. Given a lack of evidence for most topics in relation to endoscopy training, it was decided to formulate Good Practice Statements (GPSs) based on available literature and experience of the working group members. GPSs were made for each subtopic, and these were discussed during a second virtual meeting in September 2022. Following this discussion, the GPSs were adapted and put through the first Delphi voting round in December 2024. All individuals who applied but were not selected for the working group were invited to vote and provide written comments. Statements were graded using a 5-point Likert scale (1, strongly agree; 2, agree with some reservation; 3, neither agree nor disagree; 4, disagree; and 5, strongly disagree) via a web-based platform. Consensus was defined as $\geq 80\%$ agreement (sum of

agree with some reservation and strongly agree). Based on the outcomes of the first Delphi round, a third virtual meeting was organized for discussion on the statements. Attention was paid to possible new evidence in the literature, given the long interval between the start of the process and the finalization of the statements. GPSs were adapted if necessary, and put through a second Delphi round, which took place in June 2025. In total, two rounds of voting were required to reach consensus on all statements (**► Table 1**). Subsequently, the project leader prepared a manuscript which was shared with all working group members for feedback.

In order to enable a structured assessment of trainee competencies, a Competency Assessment Tool (CAT) was constructed for esophageal endoscopic mucosal resection (E-EMR-CAT) and for esophageal radiofrequency ablation (E-RFA-CAT), and added to the Position Statement. These can be found in the **Supplementary Material** for this document.

The ESGE Publication Working Group chair and the ESGE Governing Board reviewed the manuscript. In addition, two renowned external experts were invited to review the document. The document was circulated to all national society members and individual ESGE members for feedback. The final manuscript was approved by all authors.

Pre-training knowledge and skills

The treatment of premalignant lesions and early esophageal neoplasia includes endoscopic resection (endoscopic mucosal resection [EMR] and endoscopic submucosal dissection [ESD]) as well as ablation techniques, mostly performed by radiofrequency ablation (RFA). Considering these techniques, we suggest the following pre-training knowledge and (endoscopic) skills.

Pre-training knowledge

Formal studies on requirements for pre-training knowledge are lacking. However, in accordance with the ESGE curriculum on ESD, which suggests knowledge on the “theory of ESD” [8], we propose theoretical knowledge on indications and limitations of endoscopic treatment for esophageal precancerous and early cancerous lesions.

STATEMENT 1

Prior to the start of practical training, the trainee should be aware of different treatment modalities and their specific indications and limitations for patients with esophageal neoplasia and precursor lesions.

Level of agreement 100%

Success or failure of endoscopic treatment critically depends on the optical diagnosis of lesions. In addition, the trainee should understand the disease. This requires profound knowledge on the indications and limitations of various treatment options, the technicalities of the endoscopic treatment modalities, and the consequences of histopathological findings. The

► **Table 1** ESGE Curriculum for endoscopic treatment of esophageal neoplasia and precursor lesions: agreed Good Practice Statements.

Statement number	Statement
Pre-training knowledge and skills	
1	Prior to the start of practical training, the trainee should be aware of different treatment modalities and their specific indications and limitations for patients with esophageal neoplasia and precursor lesions.
2	Before starting the esophageal cancer treatment curriculum, proficiency in management of adverse events such as bleeding, perforation, and strictures, is mandatory.
Thresholds for competency	
3	Competency in optical diagnosis of esophageal (pre)neoplastic lesions is a prerequisite to achieve proficiency in the endoscopic management of early esophageal neoplasia.
4	Proficiency in both endoscopic resection and endoscopic ablation is mandatory for being considered competent in the endoscopic management of early Barrett neoplasia.
5	Once endoscopic Barrett eradication therapy has been initiated, endoscopic eradication rates of >80% for intestinal metaplasia and >90% for neoplasia within a treatment period of 18 months, while keeping perforation rate <1%, can be considered as an indicator of competency in providing effective and safe treatment for Barrett esophagus (BE)-related neoplasia.
6	In endoscopic submucosal dissection (ESD) for esophageal squamous cell neoplasia, en bloc resection rates >90%, R0 resection rates >85%, perforation rates <3%, together with the need for urgent surgery <1%, can be considered as indicators of competency.
Training, learning curves, and available training modules	
7	Endoscopic resection in the esophagus should be learned through a structured training program consisting of lectures, live demonstrations, and hands-on training on models, followed by training in humans under strict expert supervision in a hands-on setting. Ideally, a minimum of 10 supervised cases should be done on ex vivo/in vivo models.
8	In order to achieve proficiency in esophageal EMR, at least 30 resections are required. Of these, 10 might be carried out in models, and 10 should be done under direct expert supervision in a hands-on setting. For the remaining 10 resections, alternative supervision strategies might be chosen, such as supervision of integral videorecorded cases, or supervision through remote video connection.
9	In order to achieve proficiency in esophageal ESD, ESGE recommends at least 20 ESD procedures in animal models before human practice, with the goal of at least 8 en bloc complete resections in the last 10 training cases, with no perforation. (From: ESGE curriculum for ESD.)
10	During training in ESD, ESGE recommends that at least the first 10 procedures in humans should be done under the supervision of an ESD-proficient endoscopist (From: ESGE curriculum for ESD.)
11	Endoscopists should establish a prospective registry of cases to evaluate the progress of esophageal endoscopic resection training. The registry should include performance indicators of the procedure, such as en bloc resection rate, R0 resection rate, complications, procedural time, and final histology results, in addition to parameters such as technique used, lesion size, location, and endoscopic classification.
12	10 supervised cases of endoscopic ablation with RFA (5 balloon-based and 5 focal ablation procedures) should be sufficient to achieve proficiency, provided that the trainee has already reached proficiency in optical diagnosis and endoscopic resection. There is insufficient evidence about the learning curve for other ablation techniques.
Prerequisites for maintenance of competence	
13	In order to maintain competence in the endoscopic management of early esophageal neoplasia, an annual caseload of at least 10 new cases per endoscopist with esophageal endoscopic resection and 10 new cases per endoscopist with endoscopic ablation is required.

working group therefore proposes the study of key documents on:

1. Optical diagnosis of esophageal lesions [9, 10]
2. Indications for different endoscopic treatment options [6, 8]
3. General principles of EMR, ESD and ablation, including:
 - Different tools (e.g. cap-based devices, snares, knives, coagulation forceps, RFA devices, as well as tools for argon plasma coagulation (APC) and/or cryoballoon ablation)
 - Understanding of the settings of electrosurgical units.
4. Prevention and management of complications (intra-/post-procedural: in particular bleeding, perforation, but also strictures caused by endoscopic treatment)

5. Consequences of histopathology results, i.e., “curative” versus “noncurative” resections – as per current guidelines [6, 8, 11]
6. Management of advanced disease not amenable to endoscopic treatment (surgery, chemotherapy and/or radiotherapy, concepts of neoadjuvant/adjuvant therapy) according to national and international guidelines (e.g. [12, 13]).

In addition, the working group recommends that during pre-training or the very early training phase the trainee participates in regular multidisciplinary tumor board meetings.

► **Table 1** (Continuation)

Statement number	Statement
	Prerequisites for trainer's centers
14	For the purpose of serving as a center where endoscopic skills for the treatment of esophageal early neoplasia can be learned, a trainer's center should meet the following requirements: ▪ Availability of and proficiency in all endoscopic diagnostic modalities for early esophageal cancer, including (virtual) chromoendoscopy and zoom or near-focus high-resolution endoscopy ▪ Availability of and proficiency in endoscopic therapeutic modalities for early esophageal cancer, including EMR, ESD, and endoscopic ablation techniques ▪ Sufficient caseload to maintain proficiency of the trainer endoscopist, and to teach to the trainee ▪ Availability of dedicated pathologist with expertise in histopathology of biopsies and endoscopic resection specimens of early esophageal neoplasia ▪ Access to interventional radiology, esophageal surgery, and ICU care ▪ Availability of a multidisciplinary tumor board containing expertise in the field of esophageal surgery, medical oncology, radiotherapy, radiology, and pathology ▪ Prospective registration of all cases of early esophageal cancer managed endoscopically.
	Prerequisites for trainee's centers
15	The institution where the newly competent practitioner (trainee) will work should be able to provide the following facilities: ▪ Availability of high-resolution endoscopy equipment with zoom or near-focus modality, and (virtual) chromoendoscopy ▪ Availability of equipment for both endoscopic resection and ablation in the esophagus ▪ Possibility to perform endoscopic procedures under deep sedation and/or general anesthesia ▪ Access to dedicated pathologist with expertise in histopathology of biopsies and endoscopic resection specimens of early esophageal neoplasia ▪ Possibility to admit patients to the ward, access to interventional radiology, esophageal surgery, and ICU care ▪ Access to a multidisciplinary tumor board containing expertise in the field of esophageal surgery, medical oncology, radiology, radiotherapy, and pathology ▪ Agreement with the trainer's center for the management of complicated cases ▪ Prospective registration of all cases of early esophageal cancer managed endoscopically.
EMR, endoscopic mucosal resection; ESD endoscopic submucosal dissection; ESGE, European Society of Gastrointestinal Endoscopy; ICU, intensive care unit, RFA, radiofrequency ablation.	

Pre-training skills

Training includes endoscopic resection (EMR/ESD) and ablation techniques with associated strategies on complication prevention and management. Pre-training requirements should therefore include a thorough competence in upper gastrointestinal (GI) endoscopy.

The American Society for Gastrointestinal Endoscopy (ASGE) published a white paper on the assessment of competency in endoscopy evaluation tools for colonoscopy and EGD, which has later been validated [14, 15]. In the validation study, competence in scope-tip control (defined as 95% of endoscopists reaching a score above the predefined threshold of 3.5, with the maximum score being 4.0) was achieved after 350 esophagogastroduodenoscopies (EGDs) [15]. In a study on direct observation of procedural skills (DOPS) a global competency in diagnostic EGD (indicating competency in three domains: pre-procedure skills, technical skills [insertion, withdrawal, visuali-

zation], and post-procedure nontechnical skills [report writing, judgement, and decision making]) was observed after 225–249 procedures [16]. The British Society of Gastroenterology/Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland recommends the following accreditation criteria for EGD: performance of ≥ 250 procedures; attending accredited basic skills course; attainment of relevant minimal performance standards defined by the societies; achieving physically unassisted intubation into the second part of the duodenum and J-manuever in $\geq 95\%$ of procedures; and satisfactory performance in formative and summative DOPS assessments [17]. While these figures reflect basic skills (in particular rate of intubation of the duodenum), diagnostic competence can be estimated indirectly by the analysis of interval esophageal cancers within 3 years after index endoscopy [18]. In that study interval cancers were strongly associated with a lower experience in

EGD (defined as less than 5 years' practice and fewer than 1000 EGD procedures).

Required pre-training skills for ESD have been addressed in the ESGE paper on the ESD curriculum, which states that "training in ESD should be considered only by fully trained endoscopists" [19]. Proficiency in adverse event management is recommended before starting ESD training, and at least 4 years of endoscopy practice and performance of >1000 EGDs before entering the ESD curriculum is suggested [19].

The working group failed to identify data on necessary pre-training skills with respect to complication prevention and management – in particular bleeding, perforation, and stricture formation. However, since minor bleedings occur regularly during ESD and EMR, adequate treatment of intraprocedural bleeds and even small perforations is indispensable for a safe completion of ESD procedures. Likewise, delayed bleeding and stricture formation are recognized adverse events of both endoscopic resection and ablation and the trainee must possess the skills to treat these complications adequately. Evidence on how to acquire these skills is rare; a small study however has demonstrated a positive effect on skills after completion of a structured course in treatment of upper GI bleeding [20].

STATEMENT 2

Before starting the esophageal cancer treatment curriculum, proficiency in management of adverse events such as bleeding, perforation, and strictures, is mandatory.
Level of agreement 94%

Regarding endoscopic ablation, the working group could not identify papers addressing the desired pre-training skills.

In general, competency in endoscopy remains a poorly defined concept, and learning curves vary between individuals, complicating the formulation of recommendations regarding the number of procedures necessary to achieve the proficiency required before starting the esophageal neoplasia treatment curriculum. Even more, the working group recognizes the need for better methods for the assessment of minimum skills, other than numbers of procedures or years of experience. Nonetheless, in line with the ESGE curriculum on ESD [19], before starting training for endoscopic management of esophageal neoplasia, the working group suggests a minimum of 4 years of experience and performance of at least 1000 endoscopic procedures as a reference standard.

Thresholds for competency

General

Competency in the endoscopic treatment of esophageal neoplasia and precursor lesions should reflect optimal endoscopic pre- and post-therapeutic assessment, and ability to provide effectively and in timely fashion all necessary modalities per case, so as to maximize efficacy, safety, and durability while minimizing disease progression and recurrence.

STATEMENT 3

Competency in optical diagnosis of esophageal (pre)neoplastic lesions is a prerequisite to achieve proficiency in the endoscopic management of early esophageal neoplasia.

Level of agreement 100%

For Barrett esophagus-related neoplasia (BERN), an accurate preoperative diagnostic assessment can increase the number of detected lesions thus leading to a more appropriate and rigorous treatment through resection [21,22]. Likewise, during surveillance of flat dysplastic BE and during endoscopic follow-up after successful BE eradication, early detection of new or recurrent visible lesions is crucial for optimal management [5]. In this, the working group recommends adherence to the ESGE curriculum for optical diagnosis [9,10]. In addition, competence in the delineation of (pre)neoplastic BE lesions is crucial for optimal endoscopic management of early esophageal neoplasia.

For early esophageal squamous cell neoplasia (ESCN), an accurate characterization and demarcation of lesions optimizes appropriate treatment selection (e.g. endoscopic therapy vs. surgery) as well as complete and curative resection rates during endoscopic management [23,24]. As for BERN, the working group recommends adherence to the ESGE curriculum for optical diagnosis, in which a threshold of ≥80% accuracy for characterizing neoplasia in 20 esophageal lesions in ESCN patients is mentioned [9,10].

Barrett esophagus-related neoplasia (BERN)

STATEMENT 4

Proficiency in both endoscopic resection and endoscopic ablation is mandatory for being considered competent in the endoscopic management of early Barrett neoplasia.
Level of agreement 96%

A multimodal strategy of endoscopic resection for all visible lesions alongside RFA for all flat segments and APC for smaller areas of flat Barrett mucosa is widely adopted [5,25,26]. Radical endoscopic resection as monotherapy leads to increased stricture, bleeding, and perforation rates without increasing eradication rates compared to the multimodal treatment approach [27]. In some parts in the world, however, ablation is not available for clinical use.

The working group recommends that proficiency in endoscopic ablation without proficiency in endoscopic resection should be discouraged. In a large Dutch nationwide cohort of 1386 patients treated with RFA, endoscopic resection of a visible neoplastic lesion was performed prior to RFA in more than half of the patients [5]. In addition, during the ablation phase, endoscopic resection was needed in an additional 5% of patients for newly detected neoplastic lesions. Proficiency in

endoscopic resection, combined with competence in optical diagnosis will lead to a low threshold for endoscopic resection of subtle lesions prior to endoscopic BE ablation. In a study on the UK RFA registry, the effectiveness of endoscopic BE eradication therapy was compared for two time periods [28]. EMR for visible lesions prior to RFA increased significantly between the earlier and later time periods, while the need for rescue EMR after RFA decreased from 13% to 2%, in turn leading to significantly improved outcomes.

The majority of visible neoplastic BE lesions can be resected with EMR [5, 29, 30]. However, certain lesions require ESD [8]. Endoscopists taking care of patients with BERN should be familiar with the specific indications for ESD in this group of patients. The working group recommends that proficiency in EMR is a prerequisite, and that proficiency in ESD is desirable. In the case of lack of proficiency in ESD, an established collaboration with a recognized ESD center is necessary.

Regarding the technique of EMR of BE lesions, multiband EMR or cap-assisted EMR are equally effective; therefore either can be used to achieve competency [28, 31, 32].

STATEMENT 5

Once endoscopic Barrett eradication therapy has been initiated, endoscopic eradication rates of >80% for intestinal metaplasia and >90% for neoplasia within a treatment period of 18 months, while keeping perforation rate <1%, can be considered as an indicator of competency in providing effective and safe treatment for BE-related neoplasia

Level of agreement 94%

The multimodal treatment of BERN relies on endoscopic ablation of flat Barrett mucosa, usually applied at 2–4-month intervals, preceded or complemented by endoscopic resection of visible lesions. The number of RFA sessions needed to achieve complete eradication of intestinal metaplasia (CEIM), defined as at least 1 negative follow-up, range from 1 to 5 (median 2–3) in expert hands [5, 28]. In order to allow for adequate time for completion of RFA (and interval “rescue” treatment) and documentation of CEIM, a reasonable yet arbitrary 18-month window has been proposed [33]. Treatment cessations due to “failure” occur within 18 months (median 8 months) [5]. Based on available data, target rates for CEIM >80% and complete eradication of neoplasia (CEN) >90% are feasible and may serve as a threshold for competency [5, 30, 34]. High efficacy cannot be achieved at the expense of safety. Therefore, the proposed cutoffs should be accompanied by low number of serious adverse events, more specifically a perforation rate <1% [5, 26, 30]. In order to be able to evaluate rates of CEIM and CEN, duration of the course of treatment, and serious adverse events, a prospective registration of all cases is essential [6].

Endoscopic resection of visible lesions without subsequent ablation but with strict endoscopic follow-up can be a valid alternative in patients of advanced age or with comorbidities

who are unlikely to benefit from secondary prevention with ablation [6]. In addition, this strategy of endoscopic resection only could also be the preferred strategy in the rare cases where reaching CEIM is deemed to be unrealistic, for instance in very long BE segments where the site of a previous endoscopic resection is regenerated with cylindrical epithelium instead of neosquamous epithelium [35]. Logically, for these patients, Statement 5 is not applicable.

Data show that successful eradication of Barrett epithelium is associated with a durable response [5, 36]. In an expert setting, recurrence of dysplasia occurred in 1% per year while esophageal adenocarcinoma (EAC) not amenable to endoscopic therapy was seen in only 0.1% per year, over a median follow-up period of 43 months [5, 30, 36]. Similar results were published in the 10-year report from the UK RFA registry [37].

As hospital experience increases, with completion of 30–40 cases per year, a favorable difference in CEIM and CEN becomes evident, also accompanied by faster protocol completion (fewer RFA sessions until CEIM) and a need for fewer rescue EMRs [27, 38, 39]. Endoscopic diagnosis and treatment in high-volume “expert” centers grant access to high-definition endoscopy and chromoendoscopy, better documentation of the Prague C&M criteria and of visible lesions or other abnormalities, and experienced pathologists, along with optimal endoscopic treatment consisting of EMR for visible lesions plus RFA. This centralized model for BERN management seems to maximize efficacy while minimizing adverse events, dysplasia recurrence rates, or progression to an invasive phenotype [5, 37].

Esophageal squamous cell neoplasia (ESCN)

ESD should be considered the treatment of choice for most superficial esophageal squamous cell lesions [8]. ESD for both dysplasia and esophageal squamous cell cancer (ESCC) optimizes resection rate parameters with more en bloc and curative resections, and better 5-year recurrence-free survival rates compared to EMR [23, 24, 40]. The working group recommends against the use of endoscopic ablation in the treatment of ESCN, because of the risk of “hidden” recurrences and the lack of an adequate specimen for histopathology [41, 42].

STATEMENT 6

In endoscopic submucosal dissection for esophageal squamous cell neoplasia, en bloc resection rates >90%, R0 resection rates >85%, and perforation rates <3%, together with the need for urgent surgery <1% can be considered as indicators of competency.

Level of agreement 96%

The ESGE curriculum for endoscopic dissection training in Europe states a quality threshold for ESD in animal models of an en bloc complete resection rate above 80% and no perforations in the last 10 consecutive procedures before starting human procedures [19]. After initiating ESD on patients, ESGE recommends that the first 10 human ESD procedures, ideally per organ, should be done under supervision from an ESD-

proficient endoscopist. Ultimately, the goal of endoscopists performing ESD should be to achieve a higher than 90% en bloc resection rate, with a lower than 3% perforation rate. Ideally, R0 resection rates of at least 80%–85% should be the goal [19].

Based on available literature, the working group suggests that a minimum of 30 ESD cases for esophageal neoplasia are needed to achieve early proficiency [40,43]. As ESD volume increases with time, en bloc and R0 resection rates increase and so does the ability to manage longer and semi- or circumferential lesions. Especially, ESCC lesions with a left lateral localization, size >3 cm, or occupying at least half of the circumference make en bloc and R0 resection challenging. The ability to successfully manage such lesions by ESD increases with increasing expertise [43,44,45]. An additional marker of improvement in ESD skills is the time required for dissection per square centimeter, and it is inversely proportional to the number of cases a particular operator has performed [43].

Training, learning curves, and available training modules

Endoscopic resection

STATEMENT 7

Endoscopic resection in the esophagus should be learned through a structured training program consisting of lectures, live demonstrations, and hands-on training on models, followed by training in humans under strict expert supervision in a hands-on setting. Ideally, a minimum of 10 supervised cases should be done on ex vivo/in vivo models.

Level of agreement 100%

Models used for training can consist of ex vivo organs or living animals. In a questionnaire-based study, 91 endoscopists underwent training with a live porcine model for EMR and ESD (esophageal EMR, esophageal ESD and gastric ESD) [46]. The degree of similarity between the porcine model and humans was ranked quite high in terms of esophageal procedures, with median scores of 9.0 (interquartile range [IQR] 8.0–9.0), on a scale of 1–10, for esophageal multiband EMR and 8.5 (IQR 8.0–9.0) for esophageal ESD. Overall, the animal model as a learning tool had median scores of 9.0 (IQR 7.0–10.0) with regards to how procedures are performed, 9.0–9.5 (IQR 8.0–10.0) in usefulness for beginners, and 9.0–10.0 (IQR 5.0–10.0) regarding the animal model training as a prerequisite.

The chosen number of 10 cases to be done in ex vivo/in vivo models is arbitrary [47,48]. It reflects the experience of the working group members; scientific evidence is lacking.

In using live porcine models versus ex vivo models, ethical considerations should also play an important role. The working group recommends to reduce the use of living animals for purposes of training to a minimum and only in specially equipped facilities.

STATEMENT 8

In order to achieve proficiency in esophageal EMR, at least 30 resections are required. Of these, 10 might be carried out in models, and 10 should be done under direct expert supervision in a hands-on setting. For the remaining 10 resections, alternative supervision strategies might be chosen, such as supervision of integral videorecorded cases, or supervision through remote video connection.

Level of agreement 88%

Little evidence exists on how to shape an optimal EMR training program. Implementation of a structured training program in the Netherlands resulted in a high resection rate (92.5%) by trainee endoscopists [49]. Notwithstanding, the first 20 esophageal endoscopic resections were associated with a high perforation rate of 5%. These procedures were performed with the endoscopic cap resection (ER-cap) lift-and-snare technique, and not with the currently most widely used multiband mucosectomy technique which is associated with a low perforation rate <1% [50]. The exact amount of training in endoscopic resection required before the learning curve becomes horizontal remains unknown, and more than 20 cases are probably needed. In addition, it is strongly recommended that trainees participate in esophageal neoplasia multidisciplinary team (MDT) meetings. Assisting senior endoscopists performing esophageal EMR is encouraged, to help trainees understand the dynamics of the procedure and the properties of the equipment for endoscopic resection.

Data on the effectiveness of video-supervised cases are lacking. However, a recent new Dutch EMR training program has incorporated this step, and participants as well as trainers rated this as highly valuable (personal communication). For a condensed version of the Dutch training program, please refer to **Supplementary Materials, Appendix 2s**. The working group believes that this training program might serve as a blueprint for other countries.

STATEMENT 9

In order to achieve proficiency in esophageal ESD, ESGE recommends at least 20 ESD procedures in animal models before human practice, with the goal of at least 8 en bloc complete resections in the last 10 training cases, with no perforation. (From: ESGE curriculum for ESD [19].)

STATEMENT 10

During training in ESD, ESGE recommends that at least the first 10 procedures in humans should be done under the supervision of an ESD-proficient endoscopist. (From: ESGE curriculum for ESD [19].)

Statements 9 and 10 are derived from the ESGE Position Statement on the curriculum for endoscopic submucosal dissection training in Europe [19].

Several retrospective studies have analyzed case volumes within which several of the quality outcomes, such as complete/R0 resection rates, complication rates, procedural time etc., have achieved a favorable level.

Zhang et al. reported on the learning curve of a single Western endoscopist in the absence of a tutor and concluded that the operator achieved all proficiency benchmarks, including an optimal dissection speed only after ~250 cases [51]. Implementation of a structured training program should considerably shorten the learning curve of ESD for Western endoscopists.

In a multicenter retrospective analysis of 143 ESDs for Barrett neoplasia performed in three tertiary referral centers from 2008 to 2016, one of the endoscopists had performed 111 procedures [52]. This provided an opportunity to analyze the learning curve effect using the en bloc resection rate as a surrogate end point. The en bloc resection rate rose steadily over the first 30 procedures from 70% to 90%. Beyond this, a plateau was reached, and no significant steady improvement was further demonstrated. However, ESD in BE had been commenced after training on animal models under supervision, and after having performed over 50 rectal/gastric ESDs.

The working group appreciates that esophageal ESD is of higher complexity than gastric or rectal ESD, especially for lesions close to the esophagogastric junction where fibrosis (due to chronic reflux) is common, and movement artifacts (heart beating, breathing) can make the procedure challenging. The working group therefore strongly encourages achievement of a level of proficiency for gastric/rectal ESDs before embarking on esophageal ESD.

STATEMENT 11

Endoscopists should establish a prospective registry of cases to evaluate the progress of esophageal endoscopic resection training. The registry should include performance indicators of the procedure, such as en bloc resection rate, R0 resection rate, complications, procedural time, and final histology results, in addition to parameters such as technique used, lesion size, location, and endoscopic classification.

Level of agreement 100%

During training, prospective registration of endoscopic resection cases would enable evaluation of the safety and efficacy of treatment, and thereby could help in the assessment of the endoscopist's progressions during the training. Also after proficiency has been achieved, a prospective registration of cases is still useful for quality control, and potentially for auditing purposes. This is recommended for ESD [19] and, in our opinion, is also required for all cases treated endoscopically in order to demonstrate gaining and maintaining proficiency.

Registration of long-term outcomes (i.e., recurrence rates) might be valuable as well.

Endoscopic ablation

STATEMENT 12

Ten supervised cases of endoscopic ablation with RFA (5 balloon-based and 5 focal ablation procedures) should be sufficient to achieve proficiency, provided that the trainee has already reached proficiency in optical diagnosis and endoscopic resection. There is insufficient evidence about the learning curve for other ablation techniques.

Level of agreement 96%

There are four retrospective studies analyzing the required number of sessions performed by a single operator to achieve competency in RFA treatment. A US RFA registry analysis showed that there is a learning curve to achieve a stable rate of complete eradication of intestinal metaplasia (CEIM), which is achieved approximately after 30 cases performed by a single operator [39]. A UK registry study, on the other hand, showed that 18 supervised cases of endoscopic ablation may be required before competency in endoscopic treatment of Barrett dysplasia can be achieved [38]. RFA, however, is a less complex procedure than EMR or ESD. In the opinion of the working group, a lower number of supervised RFA cases (i.e., 10) should suffice if the trainee has already passed the training in optical diagnosis and endoscopic resection. It is of utmost importance to stress that training in RFA or other endoscopic ablation techniques is only indicated if the endoscopist is also trained in optical diagnosis and endoscopic resection, given the multimodality nature of BERN treatment. Because of the limited number of centers performing RFA ablations on regular basis, visiting fellowships to expert centers are strongly advised.

In general, there is a significant correlation between endoscopist RFA volume and the rate of achieving CEIM [53]. However, one study evaluated the learning curve and results of RFA by a single experienced endoscopist, who treated 70 patients over a 30-month period [54]. No learning curve was evident in this study with regards to procedure time, complications, or therapeutic outcomes.

Additional considerations regarding training

The working group recognizes the need for a comprehensive, structured training program for esophageal endoscopic resection and ablation, focusing on both early ESCN and BERN. The development of such a training program on either national or European level should be encouraged. The present curriculum provides the basis for developing such a course.

For now, most existing training courses found are single unit/center-based, or industry-sponsored, and they are not associated with any international curricula. Additionally, most focus on either endoscopic resection or ablation, and most con-

sider only BE, and not a combination of BE and ESCN. Thus, their scopes are less comprehensive than the present curriculum.

Regarding training in the management of BE-related neoplasia, a web-based training platform is currently available. BEST-Academia (<https://BEST-academia.eu>) is freely accessible, and designed to teach endoscopists how and in whom to perform safe and justified endoscopic treatment in patients with BE. The website provides information on the endoscopic management of BE in terms of imaging, treatment, and pathology. Regarding endoscopic treatment of BE-related neoplasia, specific webpages are dedicated to endoscopic resection as well as to RFA and cryoballoon ablation, containing slideshow presentations and videos in addition to case discussions. The BEST-Academia website also contains training materials for endoscopists on recognition and delineation of BE lesions via the Barrett's Oesophagus-Related Neoplasia (BORN) module, and for pathologists to assist them in improving their histopathological evaluation of biopsies and resection specimens. A Program Committee, consisting of international experts in this field, is responsible for the contents of BEST-Academia.

Based on the specific situation in the Netherlands, where BE care is only provided in 9 BE expert centers, a Dutch BE training program has been developed. The program consists of study of literature, moving through the BORN module on endoscopic recognition and delineation of early BE lesions (accessible for free through <https://BEST-academia.eu>), hands-on training for endoscopic resection and RFA, followed by supervised intervention of integrally videorecorded procedures by the trainees. As supplementary information to support the present ESGE curriculum document, this training program has been translated into English, and is available (**Supplementary Material, Appendix 2s**). The working group feels that this training program could serve as a blueprint for other centers or societies who wish to offer a structured training program.

To the best of our knowledge, dedicated comprehensive training programs for ESCN do not exist; their development is strongly encouraged.

Prerequisites for maintenance of competence

STATEMENT 13

In order to maintain competence in the endoscopic management of early esophageal neoplasia, an annual caseload of at least 10 new cases per endoscopist with esophageal endoscopic resection and 10 new cases per endoscopist with endoscopic ablation is required.

Level of agreement 94%

Several retrospective studies have analyzed case volumes within which several of the quality outcomes, such as complete/R0 resection rates, complication rates, procedural time, etc., have achieved a favorable level. In a review of studies based on nationwide large-scale databases, a lower hospital

volume (less than 18 per year) was associated with a higher occurrence of complications, including perforation and perforation-related disorders, in-hospital death, or the need for blood transfusion within 1 week after esophageal ESD [55]. Data from the German ESD registry suggests that with a case volume of >20 ESDs per year, acceptable results can be achieved [56]. The ESGE curriculum on ESD recommends an annual minimal caseload of 25 ESD procedures per endoscopist per year [19]. For endoscopists taking care of BE-related neoplasia, the recently revised ESGE guideline on the management of BE recommends a minimum of 10 new (with emphasis on “new”) patients with endoscopic treatment for high grade dysplasia or early carcinoma per BE expert endoscopist. Although the working group considers this threshold of 10 to be a bare minimum, higher numbers per endoscopists are believed to be unrealistic in areas with a low prevalence of esophageal early neoplasia.

Solid evidence on the minimum number of EMR or ESD procedures is lacking, and recommendations are mostly based on expert opinion. Logically, with regard to ESD, a continuous caseload of ESD procedures in other organs (e.g. the colorectum) will help to maintain ESD skills, which might lower the required number of organ-specific (esophageal) ESDs [57]. In addition, the working group acknowledges the value of the caseload per center in addition to the numbers per endoscopist, since endoscopists might benefit from a colleague when closely reviewing cases together.

As for ESD, a higher annual caseload of patients treated with RFA is associated with better outcomes [53]. Performing 30–40 RFA cases per year was associated with improved outcomes for efficacy with fewer RFA sessions needed, and a lower number of rescue EMRs [38,39]. The better outcomes in high-volume centers however probably do not solely reflect higher skill in the RFA procedure itself, but – more importantly – reflect better care for BERN overall, with better lesion detection skills resulting in an increased percentage of endoscopic resections of visual lesions before RFA is initiated [28].

Prerequisites for trainer's centers

No specific recommendations are currently available regarding the prerequisites for the trainer's or trainee's center in the treatment of early esophageal cancer. The only evidence-based data relates to the impact of the hospital volume on clinical outcomes and adverse events for esophageal surgery, (esophageal) ESD, and RFA. Other recommendations consist of expert opinions.

The trainer's center should be a so-called “expert” (or “experienced”) center, for which the best definition is the recognition by peers as an expert center, rather than a specific number of cases. The trainer's center should provide a structure with the possibility for the trainee to observe and practice a significant number of cases. This implies enough cases for the trainer to maintain proficiency, and for the trainee to gain knowledge and skills. Obviously, the bar for the trainer's center should be higher than that of the trainee's.

STATEMENT 14

For the purpose of serving as a center where endoscopic skills for the treatment of esophageal early neoplasia can be learned, a trainer's center should meet the following requirements:

- Availability of and proficiency in all endoscopic diagnostic modalities for early esophageal cancer, including (virtual) chromoendoscopy and zoom or near-focus high-resolution endoscopy
- Availability of and proficiency in endoscopic therapeutic modalities for early esophageal cancer, including EMR, ESD, and endoscopic ablation techniques
- Sufficient caseload to maintain proficiency of the trainer endoscopist, and to teach to the trainee
- Availability of dedicated pathologist with expertise in histopathology of biopsies and endoscopic resection specimens of early esophageal neoplasia
- Access to interventional radiology, esophageal surgery, and intensive care unit (ICU) care
- Availability of a multidisciplinary tumor board containing expertise in the field of esophageal surgery, medical oncology, radiotherapy, radiology, and pathology
- Prospective registration of all cases of early esophageal cancer managed endoscopically.

Level of agreement 96%

While the management of early ESCN essentially relies on ESD, the treatment of early EAC following the most recent guidelines may require in the same patient ESD, EMR, and ablative therapies [6,8]. Choosing the optimal treatment for a given patient (e.g. in the presence of a narrowed/scarred esophagus following initial endoscopic resection) requires having various therapeutic modalities available on site. As a result, the trainer's center should be able to provide training in ESD, EMR, and at least one ablative therapy, preferably RFA.

The endoscopic management of early esophageal cancer can lead to intraprocedural, early, or late adverse events, among which are bleeding, esophageal perforations, and esophageal strictures. The management of such adverse events through thermal or clip endoscopic hemostasis, esophageal stenting, or endoscopic dilation should be taught in the same timeframe as the resection and ablation procedures.

The added value of experienced pathologists, for diagnosis of dysplasia, analysis of endoscopic resection specimens, and accurate tumor staging, including recognition of poor histoprognostic features (poor differentiation, lymphovascular involvement) in guiding the management of early esophageal cancer following resection, has been shown by a number of studies and acknowledged by recent guidelines [6,8,58,59].

Complete endoscopic resection of early esophageal cancer can be considered "noncurative" because of a predicted high risk of lymph node metastases [8]. In such cases, adjuvant esophagectomy with lymph node dissection, adjuvant treatment with (chemo)radiotherapy, or a watchful waiting policy with

rigorous follow-up with endoscopy, endoscopic ultrasound, and positron emission tomography/computed tomography (PET/CT) should be discussed in multidisciplinary meetings [6]. The contribution of a multidisciplinary meeting dedicated to the management of early cancer has been underlined by recent publications [60,61]: indeed, the discussion of adjuvant therapy following endoscopic resection or therapeutic endoscopic strategies in challenging cases requires specific expertise from the GI endoscopist, the digestive surgeon, the pathologist, the radiation oncologist, and the medical oncologist.

Prerequisites for trainee's centers

By definition, the trainee's center is at the initial stage of implementing the management of early esophageal cancer in its practice, after the trainee has achieved the minimum requirement for training. In time, its goal should be to fulfill all the requirements of the trainer's center, but all of these elements cannot be expected to be present from the start in the trainee's center. Partnerships with the trainer's center should be encouraged, in particular for the management of complicated cases or treatment failures.

STATEMENT 15

The institution where the newly competent practitioner (trainee) will work should be able to provide the following facilities:

- Availability of high-resolution endoscopy equipment with zoom or near-focus modality, and (virtual) chromoendoscopy
- Availability of equipment for both endoscopic resection and ablation in the esophagus
- Possibility to perform endoscopic procedures under deep sedation and/or general anesthesia
- Access to dedicated pathologist with expertise in histopathology of biopsies and endoscopic resection specimens of early esophageal neoplasia
- Possibility to admit patients to the ward, access to interventional radiology, esophageal surgery, and ICU care
- Access to a multidisciplinary tumor board containing expertise in the field of esophageal surgery, medical oncology, radiology, radiotherapy, and pathology
- Agreement with the trainer's center for the management of complicated cases
- Prospective registration of all cases of early esophageal cancer managed endoscopically.

Level of agreement 96%

While the management of early SCC essentially relies on ESD [8], the treatment of early EAC following the most recent guideline may require in the same patient ESD, EMR, and ablative therapies [6]. Choosing the optimal treatment for a given patient requires proficiency in various therapeutic modalities.

Training in endoscopic ablation only without being trained in endoscopic resection should by all means be avoided; for this reason the trainee's center should be able to implement endoscopic resection, and at least one ablative therapy (preferably RFA).

The endoscopic management of early esophageal cancer can lead to intraprocedural, early, or late adverse events, among which are bleeding, esophageal perforations, and esophageal strictures. The management of such adverse events should be made possible in the trainee's center. Following esophageal ESD, rare cases of major post-endoscopic bleeding or esophageal perforations with signs of sepsis or respiratory distress might need to be managed in an ICU, and imaged by computed tomography (CT) as needed [8,55]. Therefore, the possibility to admit patients, to perform emergent CT, or to transfer patients to an ICU must be available in the trainee's center.

Esophageal surgery, radiation oncology, digestive oncology, expert pathology, and multidisciplinary meetings, although important for the management of complex or complicated cases, are rare and highly specialized resources that can be shared with the trainer's center. Partnerships should be encouraged from the start of the program in the trainee's center.

The caseload of the trainee's center cannot be a prerequisite, since it is likely to rapidly increase during and after the training. However, training is only warranted if it is anticipated that the trainee's center has the potential for a steady and sufficient number of referrals for endoscopic management of early esophageal lesions.

The trainee should keep in mind the importance of keeping a record of all cases, to monitor the caseload of his/her center, and make sure it is enough to maintain proficiency. While publications have indicated a correlation between the case volume and the outcome for ablative therapies [53], the ESD curriculum and the ESGE guideline on the endoscopic management of Barrett esophagus have emphasized the need for specific numbers of cases to gain or maintain proficiency, namely 25 ESD cases per year and 10 new dysplastic BE cases per year [6, 19].

Disclaimer

The legal disclaimer for ESGE guidelines as described in the 2020 publications policy update [62] applies to this Position Statement.

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Conflict of Interest

M. Barret has received honoraria for lectures from Medtronic (2021–2025). J.J. Bergman and his department have provided consultancy to and received research support from Olympus (2020–, ongoing), Cosmo (2026–, ongoing), and Medtronic (2020–, ongoing); he is Editor-in-Chief of Endoscopy. R. Bisschops has received grants/research support and speaker's fee/honoraria from Pentax, Fujifilm, Olympus, and Medtronic (2019–, present). M. Hollenbach is a Co-Editor of Endoscopy International Open, and is a member of the Editorial Board of Endoscopy. R. Maselli provides consultancy to Fujifilm (2023–, present). Y. Mori is a Co-Editor-in-Chief of Endoscopy. A. Parra-Blanco has provided training, lectures, and consultancy to CREO Medical (2023–, ongoing). R. Pouw has received speaker's fees from Fujifilm, Olympus, and Pentax; she has provided consultancy to MicroTech Europe, Cook Medical, and Boston Scientific; research support has been received from Boston Scientific and Moeller Medical; all, occasionally from 2023 onwards. S. Seewald has provided presentations and moderations for Olympus (from 2008) and moderation for Fuji (2025). D.J. Tate has provided consultancy and research support (2021–, present) to Olympus, Fujifilm, and Pentax. B.L.A.M. Weusten has received a speaker's fee and financial support for research from Pentax Medical (2020–2025) and financial support for research from Aqua Medical (2020–2024). E. Coron, P. Dewint, F.L. Dumoulin, P. Elbe, W. Januszewicz, V. Lorenzo-Zúñiga, A. Manolakis, T.C. Tham, and V. Yakovenko declare no competing interests.

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Supplementary material

European Society of Gastrointestinal Endoscopy (ESGE) Position Statement: Curriculum for endoscopic treatment of esophageal neoplasia and precursor lesions

Appendix 1s

Key questions

1. How should the thresholds for competency in endoscopic treatment of esophageal (pre)neoplastic lesions be defined
2. Regarding endoscopic treatment of esophageal (pre)neoplastic lesions,
 - a. What is known about the learning curves of various endoscopic treatment modalities
 - b. What is known from the literature on different training strategies
 - c. Are there any training modules available, and what is known on the validity of these modules
3. What should be the level of pre-training knowledge and skills before starting the curriculum for endoscopic treatment of esophageal neoplasia and pre-cursor lesions
4. What are the prerequisites for maintaining competence in endoscopic treatment of esophageal neoplasia and pre-cursor lesions
5. What are the prerequisites for sites for serving as a center where endoscopic skills for the treatment of esophageal early neoplasia can be learned
6. What are the prerequisites for the institution where the newly competent practitioner (trainee) will work

Esophageal EMR Competency Assessment Tool (E-EMR-CAT)

Competency Assessment Tool | Based on ESGE Treatment Curriculum (Weusten 2026)

Assessment modalities

Mode	Description
V	Assessable from adequately captured video
L	Requires live in-room observation

Competency Table

^c Indicates shared competency – similar across E-ESD-CAT, E-EMR-CAT, E-RFA-CAT

Domain 1: Global competencies (Pre-training)

#	Component	1 (Very Poor)	5 (Very Good)	Mode
1	Demonstrates knowledge of EMR indications, limitations, and when ESD referral is required	Unable to articulate indications; unaware of EMR vs. ESD criteria	Accurately describes EMR indications for BERN/ESCN; recognizes when lesion characteristics require ESD referral	L
2	Demonstrates proficiency in adverse event management (bleeding, perforation, stricture) prior to starting curriculum	Unable to manage basic complications	Competent in hemostasis techniques, clip/OTS clip deployment, and stricture management	L
3	Demonstrates competency in	Unable to characterize or	Accurately characterizes	L/V

	optical diagnosis and lesion delineation	delineate lesions	lesion type and achieves precise delineation with (virtual) chromoendoscopy	
4	Understands consequences of histopathology results and MDT pathway	Unaware of implications of histology findings	Correctly interprets curative vs. noncurative resection; understands MDT referral criteria	L

Domain 2: Cleaning & Inspection ^c

#	Component	1 (Very Poor)	5 (Very Good)	Mode
5	Achieves adequate mucosal visualization with cleaning (irrigation, mucolytics)	Key areas obscured; inadequate cleaning	Complete mucosal visualization; systematic cleaning approach	L/V
6	Selects and applies appropriate imaging modes (HD-WLE, [virtual] chromoendoscopy)	Incorrect or limited imaging modes	Appropriate multimodal imaging used deliberately for lesion characterization	L/V
7	Systematically inspects lesion and surrounding mucosa before intervention	Incomplete inspection; misses relevant findings	Thorough 360° inspection; documents all relevant features	L/V

Domain 3: Lesion assessment

#	Component	1 (Very Poor)	5 (Very Good)	Mode
8	Accurately delineates lesion margins using (virtual) chromoendoscopy	Margins poorly defined; significant over-/under-estimation	Precise margin delineation with appropriate enhancement technique	L/V

9	Assesses lesion size, morphology (Paris classification), and location	Incomplete assessment; inaccurate classification	Accurate size measurement; correct Paris classification; precise location documentation	L/V
10	Determines suitability for EMR vs. need for ESD referral	Inappropriate technique selection; attempts EMR on ESD-requiring lesions	Correctly identifies lesions suitable for EMR; refers appropriately when features suggest submucosal invasion or size/ shape requires ESD	L/V

Domain 4: Equipment Selection & Setup

#	Component	1 (Very Poor)	5 (Very Good)	Mode
11	Selects appropriate EMR technique (multiband mucosectomy vs. cap-assisted)	Inappropriate technique for lesion; unfamiliar with equipment	Selects technique appropriate to lesion size, location, and operator experience	L
12	Prepares and assembles EMR equipment correctly	Incorrect assembly; delays due to equipment issues	Efficient, correct equipment setup; checks function before deployment	L

Domain 5: Submucosal injection

#	Component	1 (Very Poor)	5 (Very Good)	Mode
13	Selects appropriate injection solution and performs injection when	Inappropriate solution; poor technique; injects when not required	Appropriate solution (with dye); correct depth; understands when injection	L/V

	indicated		is/is not needed (cap-EMR vs. multiband)	
14	Achieves adequate submucosal lift (if relevant)	Poor lift; rapid dissipation; intramuscular injection	Sustained lift; good tissue separation; no muscle injury	L/V

Domain 6: Resection technique

#	Component	1 (Very Poor)	5 (Very Good)	Mode
15	Achieves adequate suction/capture of target tissue	Inadequate tissue capture; off-target resection	Complete capture of target tissue within cap/band	L/V
16	Performs snare resection at correct depth and plane	Too superficial (incomplete) or too deep (muscle capture)	Clean resection through mucosa/submucosa; controlled depth	L/V
17	Achieves complete resection of the target lesion	Incomplete resection; positive lateral margins	Complete macroscopic resection of all visible lesion; checks margins with imaging	L/V
18	Manages piecemeal resection strategy when required	Disorganized piecemeal approach; leaves residual tissue between specimens	Systematic piecemeal strategy; overlapping resections; inspects base thoroughly for residual tissue	L/V

Domain 7: Specimen retrieval

#	Component	1 (Very Poor)	5 (Very Good)	Mode
19	Retrieves all specimens without loss	Specimens lost or left in situ	All specimens retrieved; accounts for number of pieces	L/V

20	Handles specimens appropriately to preserve orientation and labelling	Orientation lost; specimens mixed	Specimens oriented/pinned correctly	L
21	Prepares and submits specimens with appropriate pathology request	Inadequate fixation; incomplete request	Proper fixation; detailed pathology request with clinical context and specimen map	L

Domain 8: Documentation ^c

#	Component	1 (Very Poor)	5 (Very Good)	Mode
22	Captures adequate photo/video documentation of procedure	Inadequate or absent documentation	Comprehensive images: pre-resection, post-resection defect, specimen(s)	L
23	Completes structured procedural report with all required elements	Incomplete report; missing key data	Complete report: technique, complications, specimen details, follow-up plan	L

Domain 9: Post-resection assessment ^c

#	Component	1 (Very Poor)	5 (Very Good)	Mode
24	Recognizes muscle damage in resection defect	Fails to inspect defect; misses muscle injury	Recognizes damage to deep muscle layer adequately; acts correspondingly (no action, clips, suturing, stent placement)	L/V

25	Recognizes high stricture risk based on resection characteristics	Fails to identify stricture risk factors	Identifies high-risk features (circumferential extent, location, depth); communicates risk to patient and team	L
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Domain 10: Adverse event prevention & management

#	Component	1 (Very Poor)	5 (Very Good)	Mode
26	Manages intraprocedural bleeding promptly and effectively	Delayed recognition; ineffective hemostasis; excessive blood loss	Immediate recognition; appropriate technique (coagulation forceps/clips); rapid hemostasis	L/V
27	Applies stricture preventive measures when indicated	No preventive action despite high-risk resection	Appropriate prevention strategy (local steroid injection, topical/systemic steroids, pre-emptive dilation, patient counselling)	L
28	Plans post-procedural monitoring for delayed adverse events	No monitoring plan	Structured follow-up plan for delayed bleeding/perforation/stricture	L

Difficulty factors (from Curriculum)

Cases should be tagged with applicable difficulty factors:

- **Size >20 mm** (may require piecemeal or ESD referral)
- **Location:** EGJ or proximal esophagus
- **Prior treatment/scarring** (fibrosis from previous resection or ablation)
- **Circumferential extent** (stricture risk)

Quality indicators (KPIs) – Separate from CAT scoring

Indicator	Target	Reference
Complete macroscopic resection rate	>95%	Statement 5 (BERN context)
Perforation rate	<1%	Statement 5
CEIM rate (within multimodal treatment)	>80%	Statement 5
CEN rate (within multimodal treatment)	>90%	Statement 5

Score interpretation

Score	Interpretation	Recommendation
≥85%	Indirect supervision	Independent practice on routine cases
70%-84%	Targeted coaching	Review lowest-scoring domains
<70%	Direct supervision	Structured training; simulation

References

1. Weusten BLAM et al. Curriculum for endoscopic treatment of esophageal neoplasia and precursor lesions: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement – with competency assessment tools. Endoscopy 2026; 58: DOI 10.1055/a-2948-4729
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Abbreviations

- **EMR** endoscopic mucosal resection
 - **CAT** competency assessment tool
 - **ESGE** European Society of Gastrointestinal Endoscopy
 - **ESD** endoscopic submucosal dissection
 - **RFA** radiofrequency ablation
 - **BERN** Barrett esophagus-related neoplasia
 - **ESCN** esophageal squamous cell neoplasia
 - **OTS** over-the-scope
 - **MDT** multidisciplinary team
 - **HD-WLE** high-definition white-light endoscopy
 - **EGJ** esophagogastric junction
 - **KPI** key performance indicator
 - **CEIM** complete eradication of intestinal metaplasia
 - **CEN** complete eradication of neoplasia
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Esophageal RFA Competency Assessment Tool (E-RFA-CAT)

Competency Assessment Tool | Based on ESGE Treatment Curriculum (Weusten 2026)

Assessment Modalities

Mode	Description
V	Assessable from adequately captured video
L	Requires live in-room observation

Competency Table

^c Indicates shared competency – similar across E-ESD-CAT, E-EMR-CAT, E-RFA-CAT

Domain 1: Global Competencies (Pre-training)

#	Component	1 (Very Poor)	5 (Very Good)	Mode
1	Demonstrates knowledge of RFA indications, limitations, and patient selection for BERN	Unable to articulate indications; unaware of patient selection criteria	Accurately describes RFA indications for BERN; recognizes when repeat resection is required before ablation	L
2	Demonstrates competency in optical diagnosis and Barrett's delineation	Unable to characterize or delineate Barrett's extent	Accurately characterizes Barrett's segment and identifies residual/recurrent Barrett's epithelium	L
3	Understands consequences of histopathology	Unaware of implications of biopsy findings	Correctly interprets CEBE, CEIM, CEN	L

	results and MDT pathway	post-ablation	confirmation; understands when MDT referral is required for persistent dysplasia	
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Domain 2: Cleaning & Inspection ^c

#	Component	1 (Very Poor)	5 (Very Good)	Mode
4	Achieves adequate mucosal visualization with cleaning (irrigation, mucolytics)	Key areas obscured; inadequate cleaning	Complete mucosal visualization; systematic cleaning approach	L/V
5	Selects and applies appropriate imaging modes (HD-WLE, NBI/BLI, [virtual] chromoendoscopy)	Incorrect or limited imaging modes	Appropriate multimodal imaging used deliberately for lesion characterization	L/V
6	Systematically inspects lesion and surrounding mucosa before intervention	Incomplete inspection; misses relevant findings	Thorough 360° inspection; documents all relevant features	L/V

Domain 3: Pre-ablation assessment

#	Component	1 (Very Poor)	5 (Very Good)	Mode
7	Documents Barrett's segment using Prague C&M classification	No Prague classification; segment poorly described	Accurate C&M measurement; documents landmarks (diaphragmatic	L/V

			hiatus, GEJ, proximal extent)	
8	Identifies visible lesions requiring endoscopic resection before ablation	Proceeds to ablate nodular/raised lesions	Recognizes all visible lesions; defers ablation until endoscopic resection complete and healed	L/V
9	Confirms suitability and timing for ablation	Ablates too early post-EMR or with residual visible lesions	Confirms adequate healing post-endoscopic resection (≥6–8 weeks); verifies absence of visible lesions; assesses mucosal readiness	L

Domain 4: Equipment Selection & Setup

#	Component	1 (Very Poor)	5 (Very Good)	Mode
10	Selects appropriate RFA catheter for clinical scenario	Incorrect catheter selection (circumferential for small islands, focal for long-segment)	Selects circumferential vs. focal catheter appropriate to Barrett's extent and treatment phase; considers luminal stenosis from previous therapy	L
11	Prepares and assembles RFA equipment correctly	Incorrect assembly; generator connection errors; delays	Efficient, correct setup; verifies catheter-generator connection and energy settings	L

			before deployment	
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Domain 5: Circumferential ablation technique

#	Component	1 (Very Poor)	5 (Very Good)	Mode
12	Positions balloon catheter for complete Barrett's coverage	Skip areas; misaligned with Barrett's segment; GEJ not treated; > 1 cm overlap between adjacent ablations	Systematic proximal-to-distal placement; overlapping zones (<1 cm); includes GEJ and all Barrett's mucosa	L/V
13	Performs coagulum removal (cleaning step) between ablation passes	Omits cleaning step; incomplete debris removal	Thorough coagulum removal with soft cap; cleans all ablated mucosa before second pass	L/V

Domain 6: Focal ablation technique

#	Component	1 (Very Poor)	5 (Very Good)	Mode
14	Achieves adequate tissue contact for targeted ablation	Poor mucosal contact; catheter slippage; inadequate pressure	Firm, uniform tissue contact; maintains position during energy delivery	L/V
15	Applies systematic focal ablation strategy to cover all residual Barrett's	Random approach; misses islands; excessive overlap	Systematic ablation-by-ablation approach; no skip areas; inspects after	L/V

			each application	
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Domain 7: Treatment response assessment

#	Component	1 (Very Poor)	5 (Very Good)	Mode
16	Recognizes adequate ablation effect	Cannot distinguish adequate from inadequate ablation	Identifies confluent white coagulum; recognizes skip areas or undertreated zones; adjusts intraprocedurally	L/V
17	Plans treatment pathway based on residual Barrett's extent	No treatment plan; inappropriate session interval	Plans subsequent sessions at 2–4-month intervals; transitions from circumferential to focal appropriately; sets CEIM target within 18 months	L

Domain 8: Documentation ^c

#	Component	1 (Very Poor)	5 (Very Good)	Mode
18	Captures adequate photo/video documentation of procedure	Inadequate or absent documentation	Comprehensive images: pre-ablation Barrett's segment, post-ablation treatment zone, residual areas	L
19	Completes structured procedural report with all	Incomplete report; missing key data	Complete report: technique, settings used, complications,	L

	required elements		follow-up plan	
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Domain 9: Post-treatment assessment

#	Component	1 (Very Poor)	5 (Very Good)	Mode
20	Recognizes RFA-induced deep laceration	Fails to inspect ablation bed; misses lacerations	Recognizes (deep) lacerations adequately; acts correspondingly (no action, clips, suturing, stent placement)	L/V
21	Recognizes high stricture risk based on ablation characteristics	Fails to identify stricture risk factors	Identifies high-risk features (circumferential extent, location, depth); communicates risk to patient with clear instructions about when to seek help	L

Domain 10: Adverse event management

#	Component	1 (Very Poor)	5 (Very Good)	Mode
22	Manages intraprocedural bleeding promptly and effectively	Delayed recognition; ineffective hemostasis; excessive blood loss	Immediate recognition; appropriate technique (coagulation forceps/clips); rapid hemostasis	L/V
23	Plans post-procedural	No monitoring	Structured follow-up plan for delayed	L

	monitoring for delayed adverse events	plan	bleeding/perforation/stricture	
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Difficulty factors (from Curriculum)

Cases should be tagged with applicable difficulty factors:

- **Long-segment Barrett's (>5 cm)** (more sessions required; lower CEIM rates)
- **Prior treatment/scarring** (fibrosis from previous resection; higher stricture risk)
- **Circumferential extent** (stricture risk with near-circumferential ablation)

Quality indicators (KPIs) – Separate from CAT scoring

Indicator	Target	Reference
CEIM rate (within multimodal treatment)	>80%	Statement 5
CEN rate (within multimodal treatment)	>90%	Statement 5
Stricture rate	<10%	Statement 5
CE-IM within 18 months of first treatment	Target	Statement 5

Score interpretation

Score	Interpretation	Recommendation
≥85%	Indirect supervision	Independent practice on routine cases
70%–84%	Targeted coaching	Review lowest-scoring domains
<70%	Direct supervision	Structured training; simulation

References

1. Weusten BLAM et al. Curriculum for endoscopic treatment of esophageal neoplasia and precursor lesions: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement – with competency assessment tools. *Endoscopy* 2026; 58: DOI 10.1055/a-2948-4729
2. Weusten BLAM, Bisschops R, Dinis-Ribeiro M et al. Diagnosis and management of Barrett esophagus: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. *Endoscopy* 2023; 55: 1124–1146
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Abbreviations

- **RFA** radiofrequency ablation
 - **CAT** competency assessment tool
 - **ESGE** European Society of Gastrointestinal Endoscopy
 - **ESD** endoscopic submucosal dissection
 - **EMR** endoscopic mucosal resection
 - **BERN** Barrett esophagus-related neoplasia
 - **CEBE** complete eradication of visible Barrett epithelium
 - **CEIM** complete eradication of intestinal metaplasia
 - **CEN** complete eradication of neoplasia
 - **MDT** multidisciplinary team
 - **HD-WLE** high-definition white-light endoscopy
 - **NBI** narrow band imaging
 - **BLI** blue-light imaging
 - **C&M** circumferential and maximum extent (Prague classification)
 - **GEJ** gastroesophageal junction
 - **KPI** key performance indicator
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Appendix 2s

Dutch Barrett Neoplasia Training Program

This Dutch Barrett Neoplasia Training Program has been developed by the current Dutch Barrett Expert Centers. The purpose of this training program is to train new endoscopists in already established BE expert centers in a way that – after completion of the program – these new BE experts form a homogeneous group in terms of skills, knowledge and treatment strategies. The established BE expert endoscopists from the associated hospitals have all approved the program. These specialists will also serve as trainers in this training program (see Part 2).

Part 1: Self-Study

This component consists of completing various online modules via www.best-academia.nl, supplemented with selected literature.

- Participants will complete a validated online module on the diagnosis of Barrett neoplasia (BORN module, available at <http://best-academia.eu/imaging/>)
- Participants will review four presentations on the treatment of Barrett's neoplasia, available at <http://best-academia.eu/library/treatment-files/>
- Participants will watch five instructional videos on the treatment of Barrett's neoplasia, each accompanied by expert commentary from endoscopists working in one of the Barrett Expert Centers.
- Additionally, participants are required to study the following mandatory literature:
 - van Vilsteren FG, et al. *Learning endoscopic resection in the esophagus*. Endoscopy. 2015 Nov;47(11):972-9. doi: 10.1055/s-0034-1392558. (Includes videos)
 - [UpToDate article: Barrett's Esophagus – Treatment with Radiofrequency Ablation](#)
 - A list of optional readings is also available.

Part 2: Practical Training

This component consists of two parts:

- In addition to local hands-on training provided by the local BE expert endoscopist, participant will complete three half-day clinical observations at three different Barrett Expert Centers. These sessions will focus on the practical aspects of diagnosing and treating Barrett's esophagus, under the supervision of an expert endoscopist at each center.
- Participants who have not yet gained experience with RFA (Radiofrequency Ablation) will be required to attend the "Basic RFA Course" organized by Medtronic. This will be arranged through the local Medtronic representative.

Part 3: Quality Assurance and Peer Review

Each participant will record a total of 13 videos of procedures they have personally performed. These should include:

- 10 videos of endoscopic resections
- 1 video of a circumferential RFA procedure
- 2 videos of focal RFA procedures

These videos will first be reviewed by two fellow participants, who will provide substantive feedback. They will then be assessed by an expert endoscopist from one of the Barrett Expertise Centers. As part of this component, participants are also expected to review and provide feedback on several videos submitted by their peers.

Accreditation will be requested for the completion of this training program.

Continuing Education

Participation in 2–3 Annual Barrett Expertise Center Meetings

Three times per year, a meeting will be organized for endoscopists, pathologists, and/or nurses from the Barrett Expertise Centers. These meetings will include discussions of ongoing scientific research, case presentations from each center, and several short lectures on current topics in imaging and therapy of Barrett's esophagus and related neoplasia.

Additionally, one of the annual meetings will serve as a dedicated continuing education session aimed at maintaining consistency and cohesion across the centers. This session will include evaluation of treatment volumes per center, as well as analysis of clinical outcomes as recorded in the national database.