Standards in Gastrointestinal Endoscopy Training

Comprehensive guide to global standardization in Gastrointestinal & Endoscopy Training

Department of Medicine
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اور جو لوگوں کو فائدہ پہنچاتا ہے وہ روئے زمین پر قائم رہتا ہے (الرعد: ۱۷)

Which is for the good of mankind remains in the earth

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This manual will serve as educational tool for young physicians of Pakistan.

The module has been adopted from WGO, OMED, JAG BSG and UHS guidelines for training.

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Foreward

This document was prepared with extensive efforts of OMED team. The objectives was to provide guidelines for standard practice and training of Gastrointestinal Endoscopy globly. There are no standard guidelines in Pakistaan for Training of GI Endoscoy. This document was modified in local perspective without compormising international standard.

The document is linked with documents prepared for MD Training Programme in gastroenterology by UHS. So reader is suggested to read this document along with Document – I *(MD Training Programme for Gastroenterology)* This document will be called Document II *(Standards in Gastrointestinal Endoscopy Training)* Document III *(Log Book of Training Program)* and Document IV *(Comprised detail UHS Guidelines, regulations and syllabus of MD Gastroenterology)*

This is just a humble effort to improve GI Training in Pakistan. This need improvement by future authors.

Prof. Muhammad Umar **Prof. Hamama-tul-Bushra Khaar**

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I. INTRODUCTION

Gastrointestinal endoscopy is an extensive and complex specialty, that includes a variety of organs (gastrointestinal tract, hepatobiliary, pancreatic), and requires broad based knowledge and competency in procedural skills. Therefore, training programs must provide an adequate, intellectual environment for acquiring the knowledge, clinical judgment, skills, attitudes, and values of professionalism essential to becoming an expert practitioner in this discipline. This document will focus on the procedural training. However, this must be coordinated with appropriate cognitive and clinical training in digestive diseases, usually as part of an advanced internal medicine or pediatrics program (fellowship), or general surgery program. This curriculum is not designed for training of paramedical practitioners (nurses, nurse practitioners, physician assistants, etc.).

This curriculum is a living document and framework for developing an individual plan for study and growth. It should be tailored to meet the needs of the trainees and enhance the strengths and special qualities of the training program. It will continuously evolve as new knowledge, methods of learning, and technologies become available.

II. DEFINITION OF ENDOSCOPY

Endoscopy is an examination inside the body with an instrument (endoscope) that provides for viewing of the targeted structures. In digestive endoscopy, this generally includes the capability to access the tissue for biopsy and therapeutic maneuvers.

III. ELIGIBILITY FOR GASTROINTESTINAL ENDOSCOPY TRAINING

1. Medical degree.
2. Appropriate post-graduate training based on local standards. This is usually 2 to 5 years after the medical degree and part of an internal medicine or pediatric gastroenterology program (fellowship) or general surgery program, and/or advanced digestive surgery program (fellowship).

IV. TRAINING INSTITUTIONS

Endoscopy training should only take place at medical institutions that are accredited for internal medicine and gastroenterology, or at gastroenterological units belonging to a medical school. These institutions must have sufficient faculty members relative to the number of trainees and should have modern facilities and sufficient space and equipment to carry out the overall educational program; adequate clinical support services on a 24-hour basis; and interaction with peers from other specialties and subspecialties. The training institution must provide adequate financial resources to support faculty members and trainees and should provide the following facilities and resources for the trainee.

Facilities and resources

- Trainees are to be supervised by adequately experienced and certified trainers. There should be a sufficient number of new patients (about 150 per year, to ensure adequate exposure to in-patients and outpatients) and follow-up patients to allow trainees to learn about a wide range of digestive diseases.

- There should be adequate in-patient and ambulatory care facilities to provide care for acute and chronic gastrointestinal problems.
- The institution must have a fully-equipped and staffed procedure laboratory, including state-of-the-art diagnostic and therapeutic endoscopy instruments (diagnostic and therapeutic upper and lower gastrointestinal endoscopy) and motility equipment.
- The institution may also have, or have access to: —Radiography (diagnostic and interventional), ultrasound, nuclear medicine, CT/MRI scanning, and biopsy equipment —Laboratory: specialized serological, parasitological, biochemistry, hematology, microbiology and histopathology —Basic tests for gastrointestinal function —A full-service emergency room, general and surgical unit, Oncological unit —an intensive-care unit for critically ill patients with gastrointestinal and hepatic disorders
- Computers should be available for recording results and creating a database.
- A well-stocked library, with online capabilities for computer-assisted literature searches, is essential.

V. FACULTY

A. Training Director

The training director should be a designated, qualified and expert medical or surgical endoscopist and teacher substantially committed to the program. Responsibilities include:

1. Regular audit of each trainee's knowledge, skills, logs and records of numerical procedural experience (including indications, findings and complications) and success in achieving defined objective performance indicators.
2. Incorporate endoscopic teaching resources (textbooks, atlases, electronic media and the internet).
3. Assess and revise training methodology and quality.
4. Review with the trainee evaluation forms from trainers.
5. Solicit feedback from the trainee regarding the trainers and the program.

B. Medical Staff Trainers

Staff endoscopic trainers should be experts in endoscopy and committed teachers who are patient, able to provide verbal and physical instruction, and participate in the evaluation process. Staff endoscopists should serve as appropriate role models for the trainees by actively participating in the clinical practice of gastroenterology, their own continuing education, regional and national scientific societies, research activities, presentation and publication of scientific studies, and scholarly reviews. A ratio of 1 trainer to 1.5 trainees is optimal.

VI. CIRICULUM PROGRAM STRUCTURE

Endoscopic Procedural Skill

There are two widely accepted modules of Endoscopic procedural training modules

Module I

It comprises of following four levels.

Level 1

- Esophagogastroduodenoscopy: 100
- Treatment of nonvariceal bleeding: 20 (10 cases of active bleeding)
- Treatment of variceal hemorrhage: 30 (five cases of active bleeding)

- Esophageal dilation: 15
- Flexible sigmoidoscopy: 40
- Colonoscopy: 100
- Polypectomy: 20
- Placement of a percutaneous endoscopic gastrostomy (PEG): 10
- Liver biopsy: 20
- Abdominal puncture: 50
- Foreign-body removal: 02

Level 2

This is reached after completion of the training program and will depend on the interests, skills and future career goals of the trainee as well as on the assessment of the trainee's performance and capacity by the supervisor and program director and the infrastructure and needs of the institution concerned.

- Endoscopic retrograde cholangiopancreatography (ERCP), sphincterotomy, stone extraction
- Stenting

The numbers of supervised and independent procedures required here have yet to be defined.

***Level 3* – Extra Training for senior and academic gastroenterologists and professionals**

- EUS
- Capsule endoscopy
- Notes
- Diagnostic Laparoscopy
- Argon Plasma Coagulation
- Motility Lab Studies
- Mucosectomy

***Level 4* - Elective training and Research in Gastrointestinal Endoscopy**

- Maximum of one year of elective training.
- Emphasis should be according to the trainee's plans or Faculty advices or institution needs. It could be afforded in an International GIE training unit.
- Trainees are strongly encouraged to undertake a period of supervised research in Endoscopy techniques.
- This training preferably in the centre of excellence internationally, may be a specific field only or research in the Endoscopy specific techniques coordinated by intra-institutional arrangements or International Organization or Societies.

Module 2

It comprise of two levels (Level 1 & Level 2)

Level 1

Encompasses procedures that every practicing digestive endoscopist should be able to perform including: esophagogastroduodenoscopy, flexible sigmoidoscopy, colonoscopy with biopsy, hemostasis and polypectomy, esophageal dilation, percutaneous endoscopic gastrostomy, wireless capsule endoscopy, balloon enteroscopy and enteral stenting. This training requires a minimum of 18 months.

Level 2

Reached after completion of the Level 1 training program and will depend on the interests, skills and future career goals of the trainee, and the program director's assessment of the trainee's competence. Level 2 procedures require advanced training and skills and include any or all of the following: endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy, lithotripsy, endoscopic ultrasound (EUS) with fine needle aspiration and biopsy, endoscopic mucosal resection, stent placement, etc. Level 2 training requires a minimum of 12 months. Trainees in ERCP must have an understanding of radiation safety, fluoroscopy, normal radiological anatomy, and radiographic interpretation. Those studying EUS must comprehend cross-sectional human anatomy, fundamentals of ultrasonography and the essentials of oncology related to the staging of digestive cancers. Trainees in endoscopic mucosal resection and ablation must comprehend human gross anatomy and the requisites of oncology related to growth and staging of neoplasms. Table 1 shows recommend minimum threshold numbers for Level 1 procedures and Table 2 shows numbers for Level 2 procedures recommended by the American Society for Gastrointestinal Endoscopy. Thresholds for balloon enteroscopy appear to be 10 – 50 procedures, capsule endoscopy 10 - 25 procedures and enteral stenting 10 cases.

Note: *For third world underdeveloped countries detail structuring of level of training will be more useful rather than two levels only. This is because of different level of healthcare facilities, expertise and need of the individual country healthcare delivery system.*

Non-patient activities

- Carrying out independent study, developing a scholarly approach to education by reading current textbooks and monographs, the relevant scientific literature, and syllabus materials.
- Attending seminars, continuing medical education courses, and annual scientific meetings organized by the main societies in the field of digestive endoscopy.
- Attending a weekly clinical conference, becoming actively involved in the planning, organization and presentation of content in these conferences.
- Recommended conferences may include pathology, radiography conferences in addition to clinical conferences in gastroenterology and endoscopy.
- Attending basic science, journal club, and research conferences held regularly (monthly). Learning critical reading skills detecting biases, assessing control validity, application of statistics, being able to generalize the results of scientific studies and related attributes. Trainees must have the ability to interweave basic and clinical material in a cohesive manner, and to present and defend concepts in an open forum.
- Attending monthly conferences related to radiology, pathology, and surgery services.
- Participating in lectures and discussions through the period of training to cover a core curriculum of physiology, pathophysiology and clinical pharmacology.
- Having opportunities to carry out a formal study, learning how to work on research design including statistics, epidemiology, etc. so that the trainee can conduct clinical research and present the study at a national or international meeting and publish a paper dealing with the study.

VII. TRAINING

Endoscopic trainees gain their skills by a process of hands-on instruction under the direction of expert endoscopic trainers over a prolonged period of time. This generally occurs in the setting of a gastroenterology fellowship or surgical residency. Cognitive learning in digestive medicine from readings, conferences, and supervised clinical practice is an essential part of the process. Training is a sequence of progressive technical expertise and confidence. This may begin with instruction in handling the instruments ex-vivo, observing procedures, using training simulators, incrementally performing simple diagnostic procedures (flexible sigmoidoscopy, esophagogastroduodenoscopy) under close supervision and gradually moving to more complex therapeutic maneuvers and procedures. Development of skills will vary among trainees and for an individual trainee among different procedures. The trainee should ultimately be deemed competent to perform procedures independently.

A. General Objectives of Endoscopic Training

1. Pre-procedure Management

The trainee must be able to effectively communicate with the patient and family regarding the indications, contraindications, technical aspects, risks, benefits, alternatives and expected outcomes of the procedure. There must be an appropriately directed pre-procedure history and physical examination, and clinical and automated monitoring.

2. Procedure Management and Physician Behavior

Maintenance of patient comfort, dignity and privacy is fundamental and skills are best taught by example, supplemented with feedback and constructive criticism. Communication and feedback between the endoscopist, assistant and patient are essential for patient comfort and safety. However, these skills may need to be developed in the early trainee focused on the technical aspects of the procedure. Techniques of conscious sedation must also be mastered. A positive teaching environment shall be maintained in the procedure room at all times, and interruptions kept to a minimum. Individual teaching styles vary, but the trainer must foster an affirmative, professional learning environment by offering constructive comments.

3. Post-procedure Management

Communication of findings, therapeutic results, and plans for follow-up must be emphasized to the trainee as a basic component of the procedure. This involves discussions with the patient, family and effective communication to the referring health professional. Complete, succinct and accurate procedure reporting with accepted standard nomenclature and minimum standard terminology (MST) is required.

B. Specific Objectives of Endoscopic Training

Requisite Skills and Indicators

On completing their training, trainees are required to have achieved the levels of consultative and technical skills that will allow them to practice independently. They should also feel confident to diagnose and treat simple and complicated cases of digestive disease.

The training program should impart to the trainee the ability to:

a. Properly recommend procedures based on consultative evaluation
b. Know the indications, contraindications and alternatives to the procedure.
c. Obtain informed consent form the patient or responsible person.
d. Administer appropriate sedation, analgesia and/or anesthesia according to local standards.
e. Provide pre-procedure assessment, and intra- and post-procedure monitoring.
f. Understand and use the instruments, accessories and associated technologies (fluoroscopy, electro-diathermy, ionized argon coagulation, etc.)
g. Perform procedures safely, thoroughly and efficiently.
h. Know not to blindly or forcibly advance an endoscope.
i. Interpret endoscopic findings to be incorporated into the diagnostic and therapeutic plan.
j. Recognize and diminish procedural risk factors, and identify and manage complications.
k. Understand limitations of the procedures, their own abilities, and when to seek assistance.
l. Communicate effectively with the patient and family, medical providers and unit staff.
m. Generate a clear and succinct procedure report using minimal standard terminology and incorporate pertinent images.
n. Clean, disinfect and store the endoscopes.
o. Critically appraise the endoscopic medical literature and new technologies.

Teaching and Training Strategies

a. Phamptoms
b. Animal models
c. Computational programs
d. E-learning
e. Videos
f. Virtual reality
g. Atlas
h. Simulational training

The following scheme is proposed as on adequate learning process

a. Observation
b. Simulator/ex-vivo model
c. Hand-on

Duration of Training

It is variable between 3-5years according to need and level of training aimed at the flexibility provided in the training program depends on and needs to take into account the candidate's future career goals, which could be listed as follows:

- Working in private practice or in a district general hospital
- Working as a consultant gastroenterologist in a teaching hospital
- Working as an academic gastroenterologist

All three of these options would still be compatible with a specific interest area such as interventional gastroenterology, hepatology, etc. on the part of the now fully trained gastroenterologist. Although special standardization is mandatory for each program.

C. Evaluation of Trainee Competence

- Assessment and Appraisal
- Established Committee to evaluate trainee's competence, theoretical and practical endoscopies.
- A portfolio containing the detailed endoscopy performance of the trainee is desirable.
- Superiors and peers opinion about the trainee is a valuable information as well as the collaboration personnel's opinion.
- Regular Written records detailing the progress of each trainee.
- Defined program of feedback to the trainee.

Elements of Competence to Be Evaluated

1 Understanding and commitment to all elements of professionalism.
2 Knowledge of history-taking, including family, genetic, psychosocial and environmental histories.
3 Ability to perform a comprehensive and accurate physical examination.
4 To design and obtain the informed consent for every single procedure its benefit and complications probabilities and its solutions.
5 To arrive at an appropriate differential diagnosis, to outline a logical plan for specific and targeted investigation pertaining to the patient's complaints and to formulate a plan for management and follow up endoscopic treatment of the patient.
6 The complete knowledge of the endoscopic instruments, accessories and devices.
7 Ability for sedation and monitoring of patients. Adequate indications, contraindications, complications and antidotes.
8 Endoscopy performance following the state of the art abilities, following the trainer's directions and The QC indications of pre and post exam.
9 Ability to present the results of an endoscopic consultation, verbally, in writing and images documents such as photos or videos. To defend the clinical/ endoscopical assessment, differential diagnosis, diagnostic and management plan.
10 Procedural skills appropriate to the level of training in Gastrointestinal Endoscopy and gastrointestinal bleeding. Knowledge of the very new instruments and its usefulness, new devices or new applications.
11 Clips edition capability.
12 Adequate communication with the referral physician.
13 Medicolegal Issues should be considered in Modern Endoscopic learning curriculum.
14 Ability to produce protocols, clinical endoscopical investigation and research. To express the results verbally in endoscopic seminars or congresses and in writing as Endoscopic Journal papers.
15 The ability to understand the platform concept of different endoscopical /surgical solutions according to the complexity of the case and the availability of endoscopic instruments and different endoscopic accesses.

D. Methods of Evaluation

1 Observation during procedures, rounds and conferences.
2 Formal evaluation forms from each faculty member who comes in contact with the trainee.
3 Formal assessment of clinical and endoscopic skills using patient-based examination.
4 Log-Books (Training Record Book) and objective evaluation forms for all endoscopic procedures and the levels of skill. These are provided to and maintained by the trainee

at all times during the training period. This will be reviewed at annual assessments and at the final assessment.

5 Assessment of each candidate at least annually and a final assessment at the end of the period of training.

6 Oral assessment among candidate, supervisors and program director. An external consultant may contribute. Review will include:
   a. The Log book.
   b. Certificate of satisfactory completion of training.
   c. Evidence of research work performed, presented and published.
   d. Feed-back information from the trainee, regarding the experience.

Quality Assurance, Accreditation, Audits

By: Universities, Local Societies for GIE & Third Party Quality Assurance
There are 3 types of training centres and training programmes.

A. Those that could be accredited for Full Training Capacity. Theoretical and practical-basic and advanced GIE and Clinical research should be available.

B. Accredited for partial GIE training capacity (75%). Theoretical and practical. Clinical studies. (Limited Laboratory Techniques and GIE resources). Level-I Skill Training.

C. Accredited only for limited training capacity (25%). Practical purposes. Clinical Workshop and level I skill training.

D. Complementary GIE capacity could be on private clinics basis or selected investigation and research laboratories. It could be the case of clinical institutions with a great load of diagnostic cases. Providers could also help in the recognition of the instruments and the prevention of potential harms.

E. Accurate audit is a necessity of everyday clinical practice to assess and improve the outcome of jointly managed clinical problems, reduce mortality and improve quality of life for the patient.

F. Regular multidisciplinary audit meetings, (M & M) including physicians, surgeons, pathologists and radiologists should be essential part of all units providing GIE services.

A standard Performa can be prepared as per guidelines provided by ASGE document.

VIII. SPECIFIC TOPICS AND PROCEDURES

A. SEDATION AND MONITORING

The objective is to teach the trainee to provide maximal patient safety and comfort, maintain the best possible visualization and control of the working field to optimize success for each type of endoscopic procedure.

Indicators

The trainee must be able to:

a. Provide adequate pre-procedure patient education regarding the sedation and analgesia aspects of the examination.
b. Obtain appropriate pre-procedure clinical assessment (history and physical).
c. Know the definitions, physiology, clinical characteristics, and medical-legal implications of minimal (anxiolysis) sedation, moderate sedation and analgesia (conscious sedation), deep sedation and analgesia, and general anesthesia.
d. Appreciate that sedation is a continuum, that deeper than planned levels may occur, and know appropriate management for over sedation.
e. Understand the pharmacology of all drugs used for sedation and analgesia, including mechanisms of action, correct dosing intervals, possible drug interactions, and use of reversal agents. This should include benzodiazepines, opioids, propofol and adjunctive a gents (phenothiazines) used alone or in combination, and flumazenil and naloxone.
f. Be aware of the pharmacology, indications, contraindications, and utility of topical pharyngeal anesthesia.
g. Know basic cardiopulmonary physiology and pharyngeal anatomy.
h. Comprehend the physiology, indications, contraindications and use of supplemental oxygen.
i. Realize principles of pulse oximetry including physiologic and non-physiologic causes of abnormal readings (vasoconstriction, alveolar hypoventilation, ventilation-perfusion mismatch.)
j. Appreciate principles of capnography as an adjunct to pulse oximetry.
k. Understand electrocardiographic monitoring, arrhythmias and appropriate management.
l. Establish and maintain a patent airway which may include a head tilt or jaw thrust maneuver, nasopharyngeal or oropharyngeal airway insertion, and bag mask ventilation.
m. Be familiar with clinical monitoring parameters and standards of intra-procedure documentation.
n. Appreciate post-procedure complications of sedation and analgesia, and effective management.
o. Know standards of post-procedure monitoring and pre-discharge assessment.
p. Understand risks of sedatives and analgesics in pregnant women including the safety classification of each medication and indications for consultation with an anesthesiologist.
q. Be aware that pediatric endoscopy may require special training and experience in sedation and monitoring.

B. ESOPHAGOGASTRODUODENOSCOPY

1. Pre-procedure Management

The trainee must know that patient must fast for solids and opaque liquids for at least 6 to 8 hours (often after midnight the night before) and for clear liquids 2 to 3 hours prior to the procedure. Anticoagulants and anti-platelet drugs must be appropriately discontinued prior to the procedure and prophylactic antibiotics given to persons with cirrhosis and ascites.

2. Basic Techniques

a. Esophageal Intubation. Instruction in intubation of the esophagus should emphasize direct visualization which is consistent with the fundamental principal that the endoscope should never be advanced blindly or forcefully. Trainees should be familiar with pharyngeal and laryngeal anatomy and that intubation may be difficult due to patient-related factors such as inadequate sedation, prominent cervical vertebrae, a Zenker's diverticulum or a tumor. Intubation should be taught in the left lateral and supine positions.

b. Pyloric Intubation. It is best to intubate the pylorus when it is well seen. The duodenal bulb immediately past the pylorus is easily overlooked and must examined vigilantly.

c. Retroflexion in the Stomach. Retroflexion should be routinely performed to view the angulus, fundus, and cardia en face maneuvers.

d. Identification of normal and abnormal findings. Interpretation of normal and abnormal endoscopic findings is fundamental and requires a comprehensive and repeated exposure to endoscopic findings. Learning is optimized with correlation to clinical, pathologic and, radiologic findings, and confirmation with atlases.

e. Alternative endoscopes. Side-viewing duodenoscopes are useful to view the proximal duodenal bulb, second portion of the duodenum, and the ampulla and its surrounding structures. Small caliber pediatric endoscopes may be useful for strictures. Ultrathin endoscopes with diameters as small as 5 mm may be used for trans-nasal unsedated endoscopy and tight stenoses. However, there is only one way tip deflection, limited illumination and channel diameter and thus it is not commonly used. Therapeutic endoscopes with larger channels or double channel endoscopes are useful for severe active upper gastrointestinal bleeding and double channel instruments are also employed with 2 instruments for mucosal resection.

f. Push enteroscopy. Pediatric colonoscopes or push enteroscopes can dependably be advanced into the proximal jejunum. This requires continual straightening of the endoscope and suctioning of air.

g. Fluoroscopy. This is useful to facilitate guidewire placement in cases where a critical stricture is encountered. Fluoroscopic principles, techniques and safety should be taught.

3. Biopsy and Therapeutic Techniques

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a. Biopsy. Forceps biopsy techniques are fundamental and easily performed

b. Non-variceal hemostasis.

i. *Injection Therapy.* Injection of epinephrine, saline or sclerosing agents are used to attain hemostasis by inducing vasoconstriction, mechanical tamponade or tissue destruction with coagulation. The trainee should be familiar with the injection substances currently available, indications and possible complications.

Injection should be around and into a visible vessel and is a safe and effective way to control immediate bleeding. However, this is often used as an adjunct to thermal coagulation for more enduring hemostasis.

ii. *Electrocautery***.** Knowledge of the bipolar and multipolar polar probes, and the heat probe are essential. The trainee must also be familiar with the operation of the generator. Technical aspects should be taught including coaptive coagulation with mechanical compression of a visible vessel coupled with a longer medium energy application is the standard that will compress and coagulate the artery. Other techniques with less tissue damage should also be stressed. Adjuvant injection of saline or epinephrine may compress and constrict the artery and thicken the wall to minimize risks of inducing acute bleeding and/or perforation. Monopolar devices function by transmitting energy through wall of the structure, may cause deep thermal energy with perforation, and should be avoided for routine use.

iii. *Endoscopic clips***.** A variety of clips are available for endoscopic use with the advantage of causing less tissue injury than coagulation or sclerosent injection. Clips are applied in a manner similar to positioning a biopsy forceps and then deployed by the technician. These are useful for acute and non-fibrotic lesions such as a bleeding polypectomy site, Mallory-Weiss trear, or a Dieulafoy lesion.

iv. *Endoscopic Ligation.* Endoscopic band ligation has been used for Dieulafoy's lesion in a manner similar to that used fore esophageal varices described below.

v. *Ionized argon coagulation.* This is a monopolar non-contact technology that spays ionized argon gas which coagulates the tissue to a relatively consistant depth. It has many uses in the digestive tract including coagulation of bleeding ulcers and vascular lesions (angiodysplasia, gastric antral vascular ectasias).

c. Variceal Hemostasis.

i. *Sclerotherapy.* The trainee should be familiar with the sclerosant agents, recommended concentrations and volumes to inject, and associated risks and limitations of treatment. It is important to understand the pathophysiological effects in that intravariceal injection induces thrombus formation, while para-variceal injection produces submucosal fibrosis and obliteration of feeding vessels. Repeated sclerotherapy treatments induce a more rapid obliteration of varices with a significant risk of complications.

ii. *Ligation.* Esophageal variceal ligation is an essential procedure and the trainee should be thoroughly familiar with the technique. The device causes some limitation of visualization and renders intubation somewhat more challenging. The trainee should be able to recognize stigmata variceal bleeding and aim for these areas for ligation. Bands should be applied from distal to proximal. The instrument is placed over the lesion, it is suction fully into cap red obliteration of the filed, and the band deployed in a efficient manner.

d. Foreign body removal: It is a common indication of endoscopy. Small, round objects may be allowed to pass except for button batteries which require immediate removal. Urgent endoscopic intervention is required for food impactions with inability to swallow saliva which may cause aspiration and perforation. Airway protection is essential and general anesthesia with endotracheal intubation may be required. Esophageal overtubes may also be used to provide some airway protection and minimize risks of mucosal lacerations from sharp objects. A variety

of grasping devices, snares, baskets, and suction caps are available. Pushing food into the stomach may cause perforations.

e. Esophageal dilation. Symptomatic esophageal strictures may be dilated with bougies or through the scope balloons. Instruction should include all aspects of Maloney and wire-guided bougies, and balloons. Wire guided dilators require endoscopy and sometime fluoroscopy to pass the wire. The endoscope is removed and the dilators inserted. The rule of 3's should be followed with bougies, which is to pass no more than 3 dilators of sequentially lager caliber after resistance is felt on insertion. One exception is for Schatzki rings where a single large caliber bougie is passed to disrupt the ring. Balloons are often available with step-wise enlargement with continued inflation. Adjuvant steroid injection may be used for recurrent stenoses.

f. Percuatneous endoscopic gastrostomy (PEG) and jejunostomy insertion and removal.

i. Techniques for routine PEG placement are well established. Prophylactic antibiotics are given and endoscopy performed. The stomach is insufflated, transillumination of the abdominal wall assured, and digital abdominal pressure noted to show direct indentation in the stomach. A safe track maneuver is performed by aspiration on a fluid filled syringe that is inserted through the selected puncture site with verification of the needle seen to enter the stomach simultaneously with air in the syringe. This minimizes the risk of entrapped bowel between the stomach and abdominal wall. A trocar is inserted and ensnared endoscopically, a wire passed through the trocar and ensnared, and the endoscope and wire pulled out through the mouth while maintaining position of the wire on the abdomen. A 1 cm long horizontal incision is made at the puncture site. The feeding tube is secured to, or passed over, the wire and pulled or pushed through the mouth and out through the incision site. The feeding tube is trimmed and an external fixation device attached. Removal is dependant on the device. Compliations and management must be understood. This is appropriate for a more experienced trainee.

ii. Small bowel feedings via a jejunal extension tube placed through a PEG (PEG-J) or direct percutaneous endoscopic jejunostomy (D-PEJ) are also possible options for enteral feeding. The usual indications are aspiration, gastric retention, or in diseases where enteral feeding is favored such as pancreatitis. Placement of a jejunal extension through a PEG is challenging due to frequent displacement. The tip of a J tube passed through a PEG may be grasped and pulled into the jejunum alongside the endoscope and multiple wire-guided methods are described. Trainees should choose 1 or 2 of these methods and learn the subtleties which will allow successful placement in a variety of situations. D-PEJ is performed much like a PEG but in the jejunum using a colonoscope or enteroscope. There are also caveats to this procedure and removal should be with endoscopic assistance.

4. Advanced Diagnostic and Therapeutic Techniques

a. Optical Enhancement.

i. *Chromoendoscopy.* The trainee should be familiar with these techniques. Dyes or contrast agents are sprayed on the mucosal surface to enhance detection of subtle lesions. Lugol's is an iodine based solution that stains the squamous esophageal epithelium brown and is used to help detect small caners and subtle

Barrett's esophagus. Indigo-carmine is a contrast agent that enhances the contours and topography of flat lesions anywhere in the gastrointestinal tract. Methylene blue is dye and contrast agent. Non-dysplastic Barrett's stains blue but high-grade dysplasia and cancer stain poorly and this may help target biopsies. Chromoendoscopy is rarely performed because it is imperfect, messy and time consuming, and has largely been supplanted by light-altering technologies built in to endoscopes which yield similar effects.

ii. *Narrow band imaging.* This technology mechanically alters the wavelength of light produced by the endoscope and causes increase contrast between squamous and columnar mucosa which enhances detection of Barrett's esophagus. Vascular structures appear green and mucosal irregularities may be highlighted. Similar multiband technologies are available that electronically alter the transmitted light. These technologies work with the push of a button and add little if any time to procedures and may enhance accuracy.

iii. *High resolution and magnification endoscopes.* These instruments show more mucosal detail and magnify lesions. They are often coupled with light altering technologies. It remains to be determined if they add substantially to the quality of endoscopy.

b. Endoscopic Mucosal Resection (EMR). EMR entails submucosal injection of saline or other substances to separate the mucosa from the submucosa. The mucosal bleb containing the lesions is then resected with a snare or needle knife device. Another approach is to use a variceal ligation device to suction the lesion into the cap, apply the bad and resect above the newly placed band. These techniques are used for large adenomas, Barrett's epithelium with high-grade dysplasia, and superficial early cancers throughout the digestive tract with cure rates similar to surgery and less morbidity. EMR is safe and effective for unroofing and removal of a variety of subepithelial lesions. Trainees should understand the indications, techniques, and outcomes of EMR which is generally a Level 2 procedure.

c. Esophageal and Enteral Stent Placement. Self-expandable metallic stents (SEMS) are for palliative treatment throughout the digestive tract. This allows for palliative maintenance of luminal patentcy and closure of fistulas. Removable expandable plastic esophageal stents are available for benign indications. SEMS designed for gastric or small intestinal use are also available and can provide palliation of obstruction in selected patients. Level 1 trainee should know the indications, technique, and outcomes of expandable stents with exposure to the techniques if possible. Placement of SEMS in esophageal, gastric or duodenal malignant strictures may be appropriate for select trainees if expert trainers and appropriate procedure numbers are available. The procedures are done with fluoroscopic guidance in the esophagus, and endoscopic and fluoroscopy guidance in the stomach and duodenum.

C. CAPSULE ENDOSCOPY

D. BALLOON ENTEROSCOPY

This procedure entails an enteroscope and an overtube which contains a balloon that can be inflated with an automated pump. There is a double balloon variety with a balloon also affixed to the enteroscope and a single balloon model with no balloon on the enteroscope. The technique is to advance the enteroscope into the jejunum in an antegrade

fashion or into the distal ileum in a retrograde fashion. The enteroscope is advanced as far as possible and the balloon inflated or the tip of the enteroscope hooked in the small bowel and the overtube is then maximally advanced. The overtube balloon is then inflated and the entire apparatus retracted causing the small bowel to compress and pleat over the apparatus. The balloon on the endoscope is deflated, or the tip straightened, and it is advanced as far as possible and the procedure is repeated. Withdrawal is opposite to insertion. It is possible to get all the way through the small bowel with a double balloon system, although not commonly for only on direction. The maximum depth of penetration of the single balloon system remains to be determined. Biopsy, injection, hemostasis, polypectomy, ablation and stricture diation can be performed with these instruments. Fluoroscopy may be helpful. Level 1 trainees should know the indications, techniques, and outcomes balloon enteroscopy with exposure to the techniques if possible. Performance of this procedure may be appropriate for select trainees if expert trainers and appropriate procedure numbers are available.

E. COLONOSCOPY

1. Pre-procedure Management

a. *Bowel Preparation.* This is crucial for optimal visualization, successful procedure completion, and effective training. The trainee should be familiar with various types of preparations, pharmacology, efficacy, benefits, risks, tolerance and alternatives. The type bowel preparation should be tailored to the individual situation considering safety, efficacy and patient tolerance. Polyethylene glycol-electrolyte (PEG) solutions have been commonly used for many years and is very effective if all 4 liters are consumed as directed, however many patients cannot tolerate the taste or volume. Sodium phosphate preparations are well tolerated and very effective but cases of acute renal failure are reported, particularly in diabetics. There is a variety of other preparations available. It is important that they be taken as directed and that patients maintain adequate hydration.

b. *Patient preparation.* The trainee must know that patient must fast for solids and opaque liquids for at least 6 to 8 hours (often after midnight the night before) and for clear liquids 2 to 3 hours prior to the procedure. Anticoagulants and anti-platelet drugs must be appropriately discontinued prior to the procedure.

2. Basic Techniques

a. *Minimize looping.* The trainee should be taught the principles of loop formation, seemingly paradoxical tip motion and the rationale for loop reduction techniques prior to performing colonoscopy. Instruction in clockwise torque with scope retraction to reduce loops is fundamental.

b. *Change in body position.* The trainee should be taught that repositioning the patient from left lateral decubitus supine is useful when looping occurs as the instrument is advanced around the hepatic flexure as facilitates cecal intubation. and may allow for easier and more precise application of abdominal pressure. The right lateral decubitus position may be a last resort to achieve cecal intubation.

c. *Trans-abdominal pressure.* Transabdominal pressure to prevent looping and facilitate endoscope advancement is a key maneuver. Non-specific pressure may be applied over a region of the abdomen to minimize looping. Specific pressure may be applied to any region to induce movement of the colon proximal to the colonoscope to move toward and over the colonoscope. Pressure is then maintained and the

instrument advanced. The endoscopist can have pressure points rapidly changed through out the insertion phase as required.

d. *Rectal examination and retroflexion.* A visual perianal and digital rectal examination is essential prior to introduction of the colonoscope to lubricate the anal canal, assess the rectal vault for obstructing lesions and the prostate. Retroflexion of the colonoscope in the rectum should be done to properly examine the distal rectum and anal verge and is successful in over 95% of cases. This may be difficult with small rectal vaults and radiation proctopathy and perforations rarely occur.

e. *Terminal ileum intubation*. Ileal intubation can be achieved in up to 95% of cases without complications when done by experienced colonoscopists. This should be taught as part of the colonoscopy educational programs

3. Advanced Techniques for Challenging Procedures

Cecal intubation can be achieved in up to 97% of patients by experts. However, colonic redundancy, mobility, angulation, severe diverticulosis, fixed segments and strictures may pose significan challanges.

a. *Alternative Endoscopes.* Pediatric colonoscopes have a smaller diameter, a more flexible insertion tube and more acute tip deflexion to help negotiate angulations and stenoses. Likewise, gastroscopes may easily traverse angulated strictures with a 60% cecal intubation rate. Push enteroscopes are longer, more flexible and have more acute tip deflection and may be useful. Balloon enteroscopes have been employed for highly mobile and redundant colons. Variable stiffness colonoscopes are widely available and many experts find them useful although the benefit is difficult to prove in randomized trails.

b. *Fluoroscopy and Non-Radiographic Imaging.* There is not need for routine fluoroscopy during colonoscopy, however in may be a useful adjuvant in unusual cases. There is an electromagnetic imaging device to show colonoscope movement, but this is not widely available or necessary in most cases.

4. Identification of Lesions

a. *Polyps*. Polyp detection rate is an established quality indicator for colonoscopy and commonly tracked for quality assurance. Trainees should be instructed to perform meticulous unhurried examinations with clearance of residual stool, flattening and inversion of folds with the endoscope and adequate distention. In western countries, polyps should be detected in about 25% of men and 15% of women.

- Size determination. Accurate polyp size determination is critical for risk stratification and recommending polyp surveillance intervals. Experienced endoscopists tend to underestimate polyp sizes by 25 - 35% and the error increases proportional to polyp size. Polyps size may be assessed by comparison to an open biopsy forceps but this may not improve accuracy. Polyps can be measured after removal and retrieval, but shrinkage may occur following resection. Use of models with polyps of known sizes and comparison to open forceps may be beneficial in training.

b. *Tattooing.* India ink or other specified substances may be injected into the submucosa for permanent marking of lesions for subsequent endoscopic, laparoscopic or open surgical identification. Injection of a total 5 ml or less into more than one station of the luminal circumference eliminates the possibility of tattooing only the mesenteric aspect which can be missed at surgery. Tangential

injection is performed while retracting the needle catheter until a submucosal bleb is noted. Rare cases of mild chronic inflammation are reported after tattooing.

c. *Clipping.* Endoscopically placed metal clips may be used as markers, for hemostasis, including post-polypectomy, and closure of perforations. They are radio opaque and most fall off within several weeks.

d. *Chromoendoscopy.* Methylene blue or indigo carmine may be sprayed on mucosal lesions to highlight the structures. This may be particularly useful for flat spreading lesions. Chromoendoscopy is rarely performed because it is imperfect, messy and time consuming, and has largely been supplanted by light-altering technologies built in to endoscopes which yield similar effects.

e. *Narrow band imaging.* This technology mechanically alters the wavelength of light produced by the endoscope and causes increase in contrast for identification of mucosal and submucosal structures. Vascular structures appear green and mucosal irregularities may be highlighted. Similar multiband technologies are available that electronically alter the transmitted light. These technologies work with the push of a button and add little if any time to procedures and may enhance accuracy.

f. *High resolution and magnification endoscopes.* These instruments show more mucosal detail and magnify lesions. They are often coupled with light altering technologies. It remains to be determined if they add substantially to the quality of endoscopy.

5. Biopsy Techniques

Forceps biopsy techniques are fundamental and easily performed.

6. Basic Polypectomy

Surveillance for and removal of adenomatous polyps to prevent colorectal cancer is the basic reason for colonoscopic screeing and surveillance strategies.

a. *Instruments*. The trainee should learn principals of electrodiathermy and be exposed to multiple snare designs.

b. *Techniques of routine polypectomy.* Monopolar snare polypectomy is the usual method for removal of colorectal polyps. The trainee should be exposed to all aspects of polypectomy prior to attempting the procedure. Fundamental aspects including snare design, polyp positioning and cautery settings should be emphasized. Simulators and models may be useful.

c. *Diminutive polyp excision.* All snare and biopsy techniques should be taught. Mini-snares are frequently used for removal of small polyps. Biopsy techniques may not remove all polyp tissue and hot (monopolar) forceps are associated with increased risks of perforation and serositis from trans-mural burns.

7. Advanced Polypectomy

Resection of large polyps may be. Grossly malignant appearing sessile polyps, lesions spanning more than 1 haustral fold, those over 1/3-1/2 of the luminal circumference, and polyps with broad bases are apt to require multiple colonoscopies for removal consultation for surgical resection should be considered.

a. *Large pedunculated polyps*. Trainees should be instructed that polyps with broad stalks (1.5 cm or larger) in diameter pose significant bleeding risks after polypectomy. Polyps with stalks less than or equal to 1 cm can usually be resected using standard cautery technique. Methods to reduce bleeding risks should be taught including epinephrine injection into the stalk, endoscopically-placed detachable loop techniques and methods to remove a stuck snare.

b. *Large Sessile Polyps.* The trainee should be taught that polyps larger than 1.5 cm should preferentially be removed techniques to form a safe plane for mucosal resection or in a piecemeal fashion to minimize perforation risk. The injectate may be saline with or without epinephrine and/or a contrast dye. Hypertonic saline, dextrose, or sodium hyaluronate may provide longer lasting mucosal elevation and facilitate resection. The association of non-lifting with invasive cancer should be reinforced.

8. Tissue Retrieval

Trainees should be instructed in techniques of polyp tissue retrieval. Small snare-resected polyps may be suctioned through the biopsy channel into a suction trap and large and multiple polyps may be recovered with snares, nets and baskets.

9. Hemostasis.

a. *Post-Polypectomy Bleeding.* The trainee should be instructed in treatment of post-polypectomy bleeding as part of the initial instruction before performing clinical procedures. Oozing from polypectomy sites may spontaneously stop or respond to epinephrine injection. Brisk arterial bleeding from a resected stalk requires immediate snaring for tourniquet effect for 10-15 minutes if possible. If this is not possible, epinephrine (1:10,000) should be immediately injected into the stalk. Other techniques include clipping, detachable loop placement, band ligation, and thermal probe or ionized argon coagulation can be applied. Simulators may be useful to familiarize the trainee with these uncommon occurrences. Prophylactic injection, loop placement or clipping may be beneficial.

b. *Angiectasias (angiodysplasia).* Thermal probe (multipolar, heater probes) and ionized argon coagulation application at low to medium power to cauterize and not cavitate should be taught. Large lesions should be initially treated circumferentially before cauterizing the central arteriole. Injection to thicken the right colon for tamponade and to minimize transmural burns and perforation may be performed. There should also be instruction in treatment of chronic radiation proctopathy in this fashion.

c. *Lower gastrointestinal bleeding.* Trainees should learn that a rapid large volume polyethylene glycol bowel preparation should be performed to facilitate visualization of the bleeding lesion. Therapy may include injection, cautery and/or clipping for many lesions including diverticula. Polypectomy is appropriate for bleeding.

10. Colonic Decompression

a. Acute pseudo-obstruction (Ogilvie's Syndrome). Trainees should be instructed that colonic decompression is appropriate if the cecal diameter on radiographs is acutely increased to 12 cm or more and conservative treatments fail. Unprepared colonoscopy is done with minimal insufflation and continual suctioning. Decompression tube placement may reduce the high recurrence rate, but this has not been verified in a randomized trial. Guidewire techniques may more productive than pulling the tube with the colonoscope. Fluoroscopy may be beneficial. Commercial kits are available. Neostigmine is an alternative that should be taught with emphasis on potential cardiovascular side effects.

b. Volvulus and bascule. Instruction on colonoscopic decompression for sigmoid volvulus and cecal bascule should be provided. There should be careful inspection for ischemia which is an indication for emergency surgery. Otherwise, colonoscopic

decompression can temporize to allow for bowel preparation and elective surgery. Percutaneous endoscopic cecostomy may be performed much like a PEG for recurrent bascules in poor surgical candidates.

11. Colonic Stricture Dilation

Balloon dilation of colonic stenoses is an alternative to surgery. The technique is similar to upper tract dilation. Careful examination of the entire stricture with biopsy and visualization of the proximal colon must be done to look for cancer. There are few data on long term outcomes.

12. Palliation of Colorectal Tumors

Ablation of malignant luminal obstruction with thermal coagulation (multipolar probes, ionized argon coagulation) and/or placement of self-expanding metal stents (SEMS) are effective in selected cases to allow for bowel preparation and one stage surgery or for palliation. Bleeding from malignant lesions may also be coagulated. Instruction in these methods may be appropriate for some trainees if skilled trainers and adequate case volume is available.

13. Simulators for Colonoscopy

Plastic sigmoid and full colon models are readily available and relatively inexpensive. These devices may be useful to help familiarizing the new trainee with basic maneuvers. However, the benefits of these models are limited. There are computerized real-time, colonoscopy simulation models. These devices use an endoscope simulator with the ability to mimic the feel of the maneuvers and simulate responses of the bowel. Other models use porcine colons for training in therapeutic techniques.

F. ENDOSCOPIC RETROGRADE CHOLANGIOPANCRETOGRAPHY

G. ENDOSCOPIC ULTRASOUND

(Will be dealt in separate manual)

SUMMARY

General Recommendations on Training for Gastrointestinal Endoscopy

Facilities

1. The training unit should be furnished with modern endoscopy equipment. Fluoroscopy, not necessarily in the Endoscopy Unit, should be available for selected cases. High quality video-endoscopic equipment is essential, with televisual display and image recording facilities.

2. Training units should be staffed with adequate numbers of Endoscopy Assistants and clerical and secretarial personnel along the lines laid down different society's guidelines.

3. Cleaning of equipment must be undertaken as laid down by the BSG/ASGE and all trainees should have practical experience of cleaning scopes.

4. Facilities for sedation, monitoring, resuscitation and recovery must be provided as recommended by the BSG/ASGE.

5. Where fluoroscopy is used, all trainees should have knowledge and understanding of the legal requirements placed upon them as referrer, practitioner and operator.

Training

1. Any practitioner who is to undertake gastrointestinal endoscopy should receive formal training in the principles and practice of safe endoscopy. Training should include the indications for, as well as the contraindications to each type of endoscopic procedure.

2. In order to maintain competence, it is not recommended that training should be provided for practitioners who are not going to have a regular sessional commitment to endoscopy

3. Training in endoscopy should only take place in approved units only.

4. Endoscopy training should be provided as part of a multi-disciplinary gastroenterology service with co-operation between physician, surgeon, radiologist and pathologist. Joint ward rounds and meetings involving histology, radiology and surgery are desirable to achieve high standards of patient care. General practitioners, nurses and other non-medical endoscopists who undertake training in gastrointestinal endoscopy must do so in approved units only.

5. The requirements for competence in each endoscopic modality may be revised from time to time. Trained practitioners in gastrointestinal endoscopy are expected to maintain their knowledge and skills through a commitment to continuing medical education and professional development.

6. Training should include formal instruction in the technique of conscious sedation as well as the management of sedation related complications and their avoidance.

7. Trainees should have training in the causes, recognition and management of endoscopy related complications as well as instructions in how these complications can be avoided.

8. All forms of therapeutic endoscopy should be taught only after adequate skills for diagnostic procedures have been acquired. Procedures should be carried out initially only under supervision and subsequently independently as competence is achieved.

9. Trainees should be able to undertake obtaining informed consent from patients with a wide range of educational achievement and from a variety of ethnic and racial backgrounds.

10. Trainees should be able to communicate their endoscopic findings and the implication of the findings to the patients, their relatives and care givers. They must be able to provide a high standard of written reporting for records and communication to other doctors.

11. Trainees should have specific training in the 'giving of bad news and in the handling of any endoscopic complications.

12. Trainees should have knowledge of and understand the background to current surveillance protocols for gastrointestinal diseases.

Assessment and appraisal

1. Trainees are required to maintain an accurate logbook of their experience, using the content and layout recommended and supplied by the appropriate College. These should be supplemented by an audit of the trainee's endoscopic work, usually generated from the endoscopy unit reporting system. A written record of the number and variety of procedures carried out under supervision and independently should be kept for inspection. Use of the assessment forms included in this document, or similar forms, is recommended.

2. The use of a portfolio of assessed cases should be used instead of a simple logbook.

3. Trainers should have attended a 'Training the Trainers' course specific to Endoscopic skills training when these are available and use a standardized formal assessment of endoscopic skills.

Educational Supervision

1. Trainers are required to provide appraisal during training and assessments that contribute to the evidence of competence of the trainee is recommended to provide a portfolio of assessed cases.

2. Trainers must provide adequate on-site supervision for trainees at all times, as defined in the curriculum. This may require additional resources.

3. Satisfactory assessments from trainers, and completed log books which demonstrate that the trainee meets the criteria of competence are required for a trainee to be assessed as competent in a particular procedure.

ANNEXURE # I

CURRICULUM FOR TRAINING IN ENDOSCOPY

1. GENERAL ENDOSCOPIC TRAINING

OBJECTIVE: TO PROVIDE TRAINEES WITH THE KNOWLEDGE AND SKILLS TO UNDERTAKE ENDOSCOPIC PROCEDURES SAFELY

SUBJECT MATTER	KNOWLEDGE	SKILLS	ATTITUDES
Equipment	Structure and function of an endoscope, light source, processor & accessories including diathermy and thermal methods for coagulation	Able to clean and disinfect equipment in accordance with BSG guidelines and use equipment in accordance with manufacturers instructions	Willing to undertake endoscopy cleaning as necessary and use the equipment appropriately
Consent	Medical & legal issues concerning consent and provision of information	Able to consent patient in accordance with BSG guidelines	Willing to obtain consent for Endoscopic procedures
Sedation and monitoring	Sedative and analgesic drugs and their additive effects, patient observation and oxygen saturation	Able to safely and effectively sedate a patient for endoscopy and monitor before and after the procedure	Willing to participate in safe Endoscopic practice.

2. UPPER GASTROINTESTINAL ENDOSCOPY

OBJECTIVE: TO PROVIDE TRAINEES WITH THE KNOWLEDGE AND SKILLS TO UNDERTAKE DIAGNOSTIC & THERAPEUTIC UPPER GASTROINTESTINAL ENDOSCOPY

SUBJECT MATTER	KNOWLEDGE	SKILLS	ATTITUDES
Diagnostic gastroscopy	Indications, contra indications, complications, patient preparation and documentation	Able to undertake OGD, take biopsies, interpret findings and take necessary action	Willing to undertake endoscopy in such a way as to minimize risk and discomfort to patients and obtain help when needed
Endoscopic therapy of esophageal strictures	Methods for dilation of esophageal stricture and insertion of prosthetic tube or expandable metal stents	Able to dilate esophageal strictures and insert appropriate prosthetic devices	Willing to undertake therapeutic procedures safely and with minimum patient discomfort
Thermal therapy of gastro esophageal tumors, ulcers and vascular malformations	Laser and thermal methods for tumor ablation and control of bleeding lesions	Able to use thermal and laser methods during upper GI endoscopy	Willing to undertake therapy to reduce tumor bulk and stop or prevent bleeding and willing to obtain help when needed
Direct injection/ banding techniques for bleeding lesions & tumor therapy	Endoscopic sclerotherapy/ banding of varices and injection of vasoconstrictor agents for arterial bleeding lesions, alcohol injection for tumor lysis	Able to perform injection sclerotherapy, band ligation and adrenaline and alcohol injection as appropriate	Willing to undertake therapy to stop or prevent bleeding, eradicate varices, reduce tumor bulk safely and obtain help when needed

3. LOWER GASTROINTESTINAL ENDOSCOPY

OBJECTIVE: TO PROVIDE TRAINEES WITH THE KNOWLEDGE AND SKILLS TO UNDERTAKE LOWER GASTROINTESTINAL ENDOSCOPY

SUBJECT MATTER	KNOWLEDGE	SKILLS	ATTITUDES
Diagnostic total colonoscopy	Indications, contraindications, complications and their management, patient preparation and documentation	Able to undertake procedure and reach cecum in >90% of cases where indicated. Take biopsies, undertake polypectomy & take other necessary action as required.	Willing to undertake colonoscopy in such a way as to minimize risk and discomfort to patients and obtain help when needed
Flexible sigmoidoscopy	Indications, contraindications, complications and their management, patient preparation and documentation	Able to undertake procedure, take biopsies, undertake polypectomy & take other necessary action as required	Willing to undertake flexible sigmoidoscopy in such a way as to minimize risk and discomfort to patients, and obtain help when needed
Colonoscopic therapy of tumors and strictures	Laser and thermal methods for tumor ablation and use of prosthesis & dilatation	Able to control tumor growth and recanalise colon as necessary	Willing to undertake therapy in such a way as to minimize risk and discomfort to patients and obtain help when needed.

4. ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY

OBJCTIVE: TO PROVIDE TRAINEES WITH THE KNOWLEDGE AND SKILLS TO UNDERTAKE ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY [ERCP]

SUBJECT MATTER	KNOWLEDGE	SKILLS	ATTITUDES
ERCP	Indications, contraindications, complications and their management, patient preparation and documentation. Endoscopies sphincterotomy and its complications, insertion and replacement of biliary stents, combined endoscopic and radiological procedures	Able to undertake ERCP and cannulate pancreatic and bile ducts in >90% of procedures when deemed competent. Able to undertake sphincterotomy and stent insertion ommensurate with their experience Able to identify the papilla in >95% of patients who have not undergone gastric surgery.	Willing to undertake ERCP in such a way as to minimize risk and discomfort to patients and obtain help when needed.

5. SMALL BOWEL ENTEROSCOPY

OBJECTIVE: TO PROVIDE TRAINEES WITH THE KNOWLEDGE AND SKILLS TO UNDERTAKE SMALL BOWEL ENTEROSCOPY

SUBJECT MATTER	KNOWLEDGE	SKILLS	ATTITUDES
Small bowel enteroscopy	Indications, contraindications, complications and their management, patient preparation and documentation	Able to recommend use of or undertake enteroscopy in suitable patients. Able to treat vascular lesions and polyps appropriately	Willing to refer patients to a colleague or specialist unit as necessary

6. ENDOSCOPIC ULTRASOUND

OBJECTIVE: TO PROVIDE TRAINEES WITH THE KNOWLEDGE AND SKILLS TO UNDERTAKE ENDOSCOPIC ULTRASOUND

SUBJECT MATTER	KNOWLEDGE	SKILLS	ATTITUDES
Endoscopic Ultrasound	Indications, contraindications, complications and their management. Uses of radial and linear array type scopes and range of therapy and biopsy possible with the latter.	Able to recommend use of or undertake endoscopic ultrasound in appropriate patients.	Willing to refer patients to a colleague or specialist unit as necessary

Adopted from Joint Advisory Group on Endoscopy Training (JAG)

ANNEXURE II
ENDOSCOPY TRAINEE ASSESSMENT SHEET

DATE …….. TRAINER…….…… TRAINEE……

	Case 1	Case 2	Case 3	Case 4	Case 5
Procedure Type					
Observed (o) / Assisted (a) / Independent (i)					
Understanding Indication					
Consent: Procedural explanation					
Consent: Risk explanation					
Administration of Sedation					
Equipment Check (pre-Endoscopy)					
Intubation skills					
OGD ❖ **Scope handling**					
❖ **Oesoph Intubation**					
❖ **Duodenal Intubation**					
COLON ❖ **Scope handling**					
❖ **Torque steering**					
❖ **Loop Recognition**					
❖ **Loop Resolution**					
Cecal (c) Ileal (I) Intubation					
ERCP ❖ **Scope handling**					
❖ **Oesoph Intubation**					
❖ **Duodenal Intubation**					
❖ **Papilla Identification**					
Desired duct achieved (b/p)					
Mucosal Visualization					
Diagnostic ability					
Selection of Accessories and Use					
Therapeutic Abilities					
Flush Channels after Scope					
Recognition & Management of Complications					
Report Writing					
Appropriate FU/treatment Recommendations					
Communication with Patient/Relative					
Communication/Relations with Staff					
Use of Safe X-ray screening					
Image Interpretation					
Diagnosis/Comment					
Procedure Type (see list)					
Observed (o) / Assisted (a) / Independent (i)					

Procedure List**: OGD=O, Dilat=D, StentInsertion=SIO, VaricesBand=VB, VaricesInject=VI, Bleed Inj=BI, Bleed Thermal=BT, F.Sigy=FS, Colon=C, Polypectomy=P ERCP=E, StoneExt=SE, StentInsertion=SIE, Other=OT**

Assessment of skill**:** Inadequate requires constant supervision=1**,** Adequate but needs Focused training=2, Competent=3

ANNEXURE III
SUMMATIVE PROCEDURAL ASSESSMENT - (FINAL)

DATE …….. TRAINER……..…… TRAINEE……..

	Competent*	Needs focused training	Inadequate requires constant supervision
GASTROSCOPY + Diagnostic			
GASTROSCOPY			
+ Dilatation			
+ Variceal Therapy			
+ Bleeding Therapy			
+ Stent Insertion			
+ PEG Insertion			
+ Tumor Debulking			
COLONOSCOPY			
+ Polypectomy			
+ EMR			
+ Laser			
ERCP + Diagnostic			
+ Stent Insertion			
+ Stone Removal			
+ Other ( )			
SMALL BOWEL ENTEROSCOPY			
ENDOSCOPIC ULTRASOUND			
Radial + Esophagus/Stomach + Hepato-pancreato-biliary			
Linear + Diagnostic + Therapeutic			

*** See JAG & SAC Guidelines**

COMMENTS:

_____

_____

_____

Signature Assessor: _____ Signature Trainee**:**_____

Table 1

ASGE[a] Guidelines for Endoscopic Training in Routine Procedures: Minimum Threshold for Assessing Competence

PROCEDURE	REQUIRED NUMBER[b]
Esophagogastroduodenoscopy	130
Including treatment of nonvariceal bleeding (10 actively bleeding)	25
Including treatment of variceal bleeding (5 actively bleeding)	20
Esophageal dilation (guidewire and through the scope)	20
Colonoscopy	140
Including snare polypectomy and hemostasis	30
Percutaneous endoscopic gastrostomy[c]	15
Capsule endoscopy (small bowel)	25

[a] American Society for Gastrointestinal Endoscopy

[b] Required number represents the threshold number of procedures that must be performed before competency can be assessed. The number represents a minimum, and it is understood that most trainees will require more (never less) than the stated number to meet the competency based on existing data.

[c] Refers to the gastric component of the PEG tube placement.

NOTE: The information in this table represents the current recommendations of the American Society for Gastrointestinal Endoscopy which undergoes frequent revision. Please check www.asge.org for the most current information.

Modified from Principles of Training in Gastrointestinal Endoscopy, Gastrointest Endosc 1999;49:845-53.

Table 2

ASGE[a] Guidelines for Endoscopic Training in Advanced Procedures: Minimum Threshold for Assessing Competence

PROCEDURE	REQUIRED NUMBER[b]
Endoscopic retrograde cholangiopancreatography	200
Endoscopic ultrasound (pancreatic & non-pancreatic)[c]	150
Pancreatobiliary	75
Fine needle aspiration	25 pancreatic, 25 non-pancreatic
Endoscopic ultrasound (non-pancreatic luminal lesions only)	100
Tumor staging	50

[a] American Society for Gastrointestinal Endoscopy
[b] Required number represents the threshold number of procedures that must be performed before competency can be assessed. The number represents a minimum, and it is understood that most trainees will require more (never less) than the stated number to meet the competency based on existing data.
[c]Excludes celiac plexus neurolysis

Modified from Principles of Training in Gastrointestinal Endoscopy, Gastrointest Endosc 1999;49:845-53.

NOTE: The information in this table represents the current recommendations of the American Society for Gastrointestinal Endoscopy which undergoes frequent revision. Please check www.asge.org for the most current information.

Table 3: Suggested Objective Performance Criteria for the Evaluation of Technical Skills in Gastrointestinal Endoscopy

PROCEDURE	PERFORMANCE CRITERIA
EGD	Esophageal intubation Pyloric intubation Cardia retroflexion
Colonoscopy	Splenic flexure intubation Cecal intubation Ileal intubation (desirable skill) Rectal retroflexion
Balloon enteroscopy	Ligament of Trietz identification Estimated organ (jejunum, ileum) visualization compared to instructor Estimated depth of insertion compared to instructor
Capsule endoscopy	Esophageal visualization Gastric visualization Duodenal visualization Major papilla visualization Ileocecal valve visualization Colonic visualization
ERCP	Desired duct cannulation Desired duct opacification Stent placement Sphincterotomy Stone extraction
Endoscopic ultrasound	Esophageal intubation Pyloric intubation Imaging of desired organ or lesion Successful lesion biopsy Tumor staging concurrent with: Surgical findings EUS findings of trainer Accuracy similar to reported literature
All procedures	Accurate recognition of normal and abnormal findings Appropriate endoscopic/medical treatment in response to endoscopic findings Complications
Polypectomy Esophageal dilation Esophageal motility Hemostasis PEG Pneumatic dilation Tumor ablation Esophageal and enteral stents	Successful performance

Modified from Principles of Training in Gastrointestinal Endoscopy, Gastrointest Endosc 1999;49:845-53.

Table 4
TIME LINE IN GI ENDOSCOPY TRAINING

YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Extra training
Basic Subject Knowledge Clinical Patient Care Observer Status	Skill Level I	Skill level II	Skill Level III	Skill Level IV	?
Evaluation by MCQ's SEQ's,	**Assisted status Log book**	**Independent status** **Appraisal** **Log book**	**Independent status** **Log book** **Final evaluation**	**Independent status** **Research Publication**	

(UHS PAKISTAN)

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