



COSECSA Surgical Endoscopy Curriculum

December 2020

TABLE OF CONTENTS:

Table of Contents:.....	2
Foreword:.....	3
Introduction:.....	3
About COSECSA:	3
COSECSA at Glance	3
Our Vision.....	4
Our Mission	4
Our Mandate	4
Membership Programme (MCS ECSA)	5
Fellowship Programme FCS (ECSA).....	5
Admission requirements:	5
Contact Information:.....	6
Academic regulations comprising of admission requirements	7
i. Admission requirements for the program	7
ii. Student assessment policy.....	8
iii. Evaluation and teaching	9
iv. Grading system	11
v. Examination regulations	12
vi. Program evaluation	15
vii. Course distribution table	17
viii. Duration and structure	17
ix. Course outlines.....	18
x. Appendices.....	36

Introduction

The 18 months sub-specialty training deals with the endoscopic management of disease of the gastrointestinal tract. This includes diseases of the esophagus, stomach, pancreas, liver, gall bladder and biliary tract, small and large intestine, rectum and anus.

Sub-Specialty will be accredited the Pan-African Academy of Christian Surgeons and by the College of Surgeons of East, Central and Southern Africa. Surgical Endoscopy/ Surgical gastroenterology is recognized by the Kenya MPDC (Minimum requirement - 6 months training and 12 months supervision).

About COSECSA:

COSECSA is the largest Surgical Training Institution in Sub-Saharan Africa. COSECSA delivers a common surgical training programme with a common examination and an internationally recognized surgical qualification. Admission to the college is open to all registered medical practitioners who comply with the professional requirements for Admission.

2: COSECSA AT GLANCE

- COSECSA offers a unique in-service training and an innovative e-learning platform. COSECSA's training programme is unique in that it is primarily undertaken in a trainee's country of origin. Research has proven that locally led and delivered training improves surgeon retention with up to 95% of the COSECSA graduates remaining in the region post-qualification
- COSECSA has 125 accredited hospitals based in rural and urban areas.
- COSECSA has 303 accredited trainers including 46 Master trainers.
- COSECSA has graduated 448 specialist surgeons since 2004
- COSECSA currently has 700+ trainees enrolled in training programmes.
- Research shows that COSECSA graduates experience significant career advancement.
- COSECSA has a Bespoke Surgical Electronic Log-book that is used universally.
- COSECSA has a Court of Examiners
- COSECSA has a School for Surgeons E Learning platform
- COSECSA holds an International Scientific Conference annually
- COSECSA short courses are organised throughout the region
- COSECSA has an IRB registered with UN department of Health and Human Resources
- COSECSA has been in operation for 20 years.
- The COSECSA Headquarters is based in Arusha, Tanzania.

COSECSA's vision is to enhance surgical services within the Sub-Saharan region by increasing both the number of appropriately trained, well qualified surgeons and surgically trained general medical officers.

To achieve this vision, we have set the following objectives:

- To promote the honour and dignity of the surgical and allied health professions and to ensure that the highest ethical standards in the practice of surgery are maintained throughout the region.
- To organise a common training programme in recognised institutions and to organise examinations of candidates for admission to the College in the various disciplines of surgery.
- To promote and encourage postgraduate education and research in surgery which is relevant to the region.
- To organise workshops, seminars, lectures, and conferences which regularly bring together Members and Fellows of the College to advance the science and practice of surgery in the region.

In order to achieve these objectives, COSECSA has adopted a plan of action that aims to:

- Set up Surgical Specialty Training in General Surgery, Urology, Orthopaedic Surgery, Neurosurgery, Paediatric Surgery, Paediatric Othropaedics Surgery, Cadiothoracic surgery, Otorhinolaryngology (ENT), Plastic Surgery and Surgical endoscopy.
- Establish a Surgical Skills Centre in each constituent country.
- Offer short term exchange programmes for trainees in selected countries.
- Offer Scholarships in Specialist Training within the ECSA region.

OUR VISION

To be the reference surgical body in the region of East, Central and South Africa and beyond

OUR MISSION

The mission of the College of Surgeons is to promote excellence in Surgical Care, Training and Research

OUR MANDATE

1. To promote the honor and dignity of the surgical profession and patients by ensuring that the highest ethical standards in the training and practice of surgery are maintained throughout the region.
2. To promote and encourage postgraduate education, training and research in surgery which is relevant to the region and is focused in increase the number of surgeons and surgically trained health professionals.
3. To advance the science and practice of surgery in the region.

Membership Programme (MCS ECSA)

This is a certificate of competence in surgery at General Medical Officer Grade (2 years training). The membership examination is designed to assess understanding of the basic principles of surgery and a broad knowledge of surgery in general. Trainees register to work in institutions accredited by COSECSA and attend compulsory courses.

Fellowship Programme FCS (ECSA)

A specialty qualification in General Surgery, Orthopaedics, Urology, Paediatric Surgery, Otorhinolaryngology, Plastic Surgery, Cardiothoracic Surgery (all 5 years training), Neurosurgery (6 years training) and a sub-specialty qualification in Orthopaedic Surgery (Paediatric Orthopaedic Surgery – 2 Years) and Surgical endoscopy 1 and ½ years.

The goal of the College of Surgeons of East, Central and Southern Africa (COSECSA) is to train national physicians to produce superb clinical surgeons, able to practice in environments that may be resource poor or rich, with an understanding of modern surgical, scientific practice and a commitment to place the needs of their patients above their own. Mission hospitals are an integral part of the healthcare system in multiple countries, utilizing a multinational, volunteer service faculty, and are committed to building capacity in surgery in the nations of Africa. The comprehensive three year curriculum is designed to cover the breadth of plastic & reconstructive surgery as practiced in Africa, responsive to local needs and disease spectra.

The multinational nature of COSECSA demands that the curriculum be sufficiently flexible to reflect local patterns of disease and referral, as well as regional board requirements (COSECSA and WACS). The rapid advancement of the medical environment in many parts of Africa demands that the curriculum include advanced technological and medical techniques as appropriate.

Admission requirements:

All candidates must:

1. Have full registration with the Medical Council of the country in which the candidate is working before the start of training.
2. Be registered with the College and have satisfactorily completed two years of basic surgical training in recognized posts in institutions accredited by COSECSA.

Contact Information:

The College of Surgeons of East, Central and Southern Africa (COSECSA)

157 Olorien,
Njiro Road ECSA-HC
P.O. Box 1009
Arusha, Tanzania.

Tel: +255 27 254 9362

Or: +255 27 254 9365

Fax: +255 27 254 9324

Or: +255 72 254 9392

Email: info@cosecsa.org

Website: www.cosecsa.org

1. ACADEMIC REGULATIONS FOR THE PROGRAMS

1.1 Admission requirements for the program

All applicants must:

- Be a Fellow of College of Surgeons of East, Central and Southern Africa (FCS-ECSA) or MMed General Surgery graduate or its equivalent
- Have graduated medical school from an institution recognized by the College of Surgeons of East, Central and Southern Africa (COSECSA)
- Have a valid license to practice medicine in the applicant's country of origin
- Be proficient in written and spoken English
- Agree to abide by the rules and regulations as written in this manual

1.2 Student assessment policy

Residents will meet individually with the Program Director every quarter to review their case log and overall performance. This will be based on competency assessment as per the American Board of Surgery and American Society of Gastrointestinal Endoscopy (ASGE), Pan African Academy of Christian Surgeons (PAACS) and COSECSA.

Global evaluation will be done using a modified version of the COSECSA and PAACS residency evaluation tools.

Knowledge and clinical acumen on patient care will be evaluated using a modified version of the COSECSA and PAACS residency evaluation tools.

Competency progress evaluation will be done using the GAGES (Global Assessment of Gastrointestinal and Endoscopic Skills) forms for clinical performances. These are validated tools and scores have been published that correlate with clinical competence. (See Appendix) This will build an assessment habit into all procedures for the trainee. These can be done electronically via an app or assessment forms on paper (see Appendix).

Leadership and other soft skills will be assessed with a modified version of COSECSA and PAACS residency evaluation tool.

All entering fellows will have modified American Board of Surgery Flexible Endoscopy Curriculum/Fundamentals of Endoscopic Surgery (ABS FEC/FES) as a residency requirement. The fellow must take and pass a FES exam (both cognitive MCQ and a simulator-based technical exam of the five deconstructed endoscopic tasks: navigation, loop reduction, retroflexion, lesion recognition, and targeting) before they are eligible to graduate. PAACS will develop endoscopy specific MCQ, and the fellow will answer the study questions available in the free online didactic curriculum at the end of each module. There will be completion and testing of a Module every eight weeks. Tenwek will use the proficiency-oriented desktop simulation training strategies that have been published for

the FES skills test and have the trainee perform the tasks at halfway point in fellowship and at end, mandating a proficiency level performance by end of fellowship.

Endoscopic procedure abilities assessed will be judged according to the Global Assessment of Gastrointestinal Endoscopic Skills (GACES) and the Modified Zwischenberger Model for self-assessment (see Appendix) and the Fellows will sit for the COSECSA Surgical Endoscopy written and clinical examinations at the end of the one year of training

UNIT OBJECTIVES

The course is targeted towards surgeons who want to manage diseases of the GI tract endoscopically.

A. CORE COMPETENCIES

Trainees will rotate in the endoscopy unit and get proficiency in the following procedures:

i. Diagnostic and Therapeutic Upper GI endoscopy procedures, including indications and risks.

- Treatment of hemorrhage in upper GI
- Band ligation of esophageal varices
- Dilation and Stenting - for esophageal and colon tumors as indicated
- Placement of Endoscopic percutaneous gastrostomy tubes (PEG)

ii. Diagnostic and Therapeutic Lower GI endoscopy procedures, including indications and risks.

- Treatment of hemorrhage in lower GI
- Tattooing
- Polypectomy
- Endoscopic Mucosal Resection

iii. Equipment setup, scope cleaning and maintenance

B. SECONDARY COMPETENCIES

Trainees will demonstrate knowledge and indications for the following advanced procedures:

- Endoscopic Retrograde Cholangiopancreatography (ERCP)
- Radio Frequency Ablation
- Argon Plasma Coagulation
- Endoscopic ultrasound
- Endoscopic Mucosal Resection
- Endoscopic Submucosal Dissection

C. BASIC SCIENCES AND PRINCIPLES OF SURGICAL ENDOSCOPY

Overview:

1. **Anatomy** - Gross and histological anatomy of the GI tract and the abdomen
2. **Physiology/Pathophysiology** - of the GI tract
3. **Pharmacology** - of common drugs used in GI surgical disorders.
4. **Fluid** - Electrolyte and acid base disturbance - general aspects, imbalance in GI surgical patients
5. **Nutritional considerations in GI surgical patients**
6. **Wound healing** - Principles, phases, types of healing, influencing factors on wound healing, wound dehiscence and management.
7. **Principles and disorders of hemostasis.**

D. KNOWLEDGE ON THE PRINCIPLES AND PRACTICE OF CLINICAL RESEARCH

Introduction to principles and practice of research:

The trainees will be enrolled into an online course titled “The Introductions to the Principals and Practice of Research” that is offered by the host institution as a remote site for the National Institutes of Health. Trainees will also take part in research projects and will be expected to publish at least one manuscript.

The trainee will be expected to take the exam at the end of this course and obtain certification. This certification shall be stored as part of the records and demonstration of acquisition of proficiency in basics of research methods and design.

All trainees will also work on a supervised research project of their choice during the fellowship training on an endoscopic or gastrointestinal related topic.

E. NON-ACADEMIC PROGRAMMING

Mentorship programs will encourage:

- An understanding of health and disease that involves the whole person
- Provision of patient care that is compassionate, appropriate, and effective.
- A strong ethical and administrative foundation for the practice of endoscopy and endoscopic surgery. Fellows will have a working knowledge of the administrative aspects of the endoscopy theater.

1.3: Evaluation and teaching

Program Personnel and Resources:

1. Role of Program Director:

- a. Requisite plastic surgery experience and certification/licensure (or board eligible)
- b. Oversee and ensure quality of didactic and clinical education curriculum
- c. Oversee and approve participation of all program faculty
- d. Monitor resident supervision
- e. Implement and monitor fellow duty hours according to hospital policy
- f. Oversee the fellows case logs and fulfillment of required cases
- g. Document regular review of morbidity and mortality experience
- h. Ensure fellows and faculty attendance at conferences

Requirements of participated faculty: (Requisite completion of specialty training)

- Competent gastrointestinal endoscopists will work in concert with and take direction from the training site's program director as per agreed curriculum.
- Trainees' duties, responsibilities and schedules will be balanced to ensure quality safety and maximum academic gain and will be provided by the COSECSA Accredited Trainer.

Teaching Rounds and Outpatient Clinic

Teaching will be divided into several aspects:

1. **Didactic teaching:** A two-hour session TWICE a week on Tuesday and Thursday each week to review specific topics, listed below, over the one-year period. (The days can vary as per site needs)
2. **Clinical rounds:** Major ward rounds as per the current hospital template to review inpatient progress, make plans for patient care, and have the residents present their work.
3. **Endoscopy consultation service:** Provide inpatient and outpatient consultations regarding endoscopy as needed, with consultant backup, in addition to open-access endoscopy ordering systems already in place. We will strive for all patients to have a consult note or a history and physical in the record prior to endoscopy time out.
4. **Endoscopy room procedures:** Observation, then assisted cases, then supervised independent cases. Attention will be paid to ensuring that there is exposure to the expected variety of cases.
5. **Use of simulation and online content:** As has been shown both in group settings both with faculty and independently. We will have weekly "skills lab/simulation skills sessions" for this. We can also utilize content from platforms like GI Leap from ASGE and FES from SAGES. A FES simulation skill box will be constructed and utilized.
6. **Bi-monthly morbidity and mortality meetings:** One meeting will be joint with the general surgery team. The other will be solely for the endoscopy trainees.

7. **Attend journal club discussions:** Journal club session will be held every month. These will be held twice weekly to discuss endoscopy related material. The journal clubs are led by the resident and moderated by the faculty.

8. **Night Call** for endoscopy on the emergent and urgent endoscopy procedures that present. This will always be done in tandem with the faculty. Graduated responsibility models will be used to decide on how much independence can be granted (based on competency assessments and evaluation reports).

Weekly Training Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
7-8am	Major ward rounds	Didactic teaching	Major ward rounds	Didactic teaching	Major ward rounds
8-9am	Major ward rounds	Endoscopy M&M alternating weekly with journal club	Devotions	Didactic teaching	Simulation Skills session
9am- 5pm	Endoscopy Suite teaching	Endoscopy clinic review of patients and teaching **dedicated review of outpatient clinic patients	*Advanced Endo exposure- ERCP etc. (bi-weekly) Endoscopy suite teaching	Endoscopy Suite teaching	Endoscopy Suite teaching and clinic review
Evening call frequency to be determined	Endo call			Endo Call	

1.4: Grading system- Marks, grades

The pass mark for plastic and reconstructive surgery exams has been set at 50 marks.

Quarterly continuous assessment will also be graded as follows:

- 5= Above expectation
- 4=Meets expectation
- 3=Borderline
- 2=Below expectation
- 1= critical deficiency.

Students who gets 1 in any of the components will be require specific arrangements for remediation.

1.5: Examination regulations including disciplinary action and mode of appeal

a. *Examination preparations:*

- Candidates should submit the examination fee by the end of July in the year of their exam. Examination fees can be paid online, by bank transfer to the COSECSA Secretariat bank account in Arusha, Tanzania or to the COSECSA Country Representative.
- On receipt of the examination fee, candidates will be informed of the precise times, dates and places for the exams.
- By applying to the examination a candidate agrees to be bound by the rules and regulations of the College.
- If a candidate withdraws from an exam not less than 12 weeks before the exam is due, then the fee can be transferred to the next exam date. Fees will not normally be returned if the candidate withdraws permanently, unless due to special circumstances as determined by the College Council.
- Candidates must pass the examination within four years of their first attempt. After this they will not be allowed to re-sit. A total of four attempts only will be allowed.
- Candidates who pass the written examination but fail the oral and clinical examinations, may attempt the oral and clinical examinations for a maximum of two more years without having to rewrite the written examination, all within a period of four years in total.

1.6: Moderation of examination papers and the role of the Internal and external examiners

b. *Examination moderation*

The standards of the examination will be set by the Examinations and Credentials Committee of the College, which will recommend to Council those standards required by both examiners and candidates.

c. *Selection process of external examiners*

A panel of examiners will be chosen by the Examinations and Credentials Committee from amongst Fellows of the College for each examination. A register of examiners will be kept by the chairman of the Examinations and Credentials Committee. An examination board will be constituted for each diet of examinations, comprising the chairman of the examination committee, two members from each examination panel and at least one external examiner who will be appointed by Council on recommendation of ECC.

d. *Administration and invigilation of the examinations*

The role of the external examiner(s) is to:

- Moderate the written question papers
- Assist with the examination of candidates

- Provide external independent assessment of the examination Report on the conduct of the examination to the College Council

e. Examination irregularities and how they will be handled

Invigilators during examination shall prior to commencement of examination advise all candidates on the consequences of examination irregularities or malpractice. Upon noticing, or a strong suspicion of, any malpractice must immediately consult with co-invigilators and also advise the candidate that such an incident has been noted. All evidence relating to the incident must be confiscated, photographed etc. as appropriate to the case.

Within eight hours, the incident must be reported in writing to the panel head, plastic surgery and the ECC, with all relevant evidence. Both invigilators and the concerned student are expected to make independent written reports.

A committee selected from members of the ECC and ESRC shall make a final decision on the case and inform council. Disciplinary action for examination irregularity, malpractice is exclusion from the programme.

f. Appeals and how they will be addressed

Trainees wishing to make appeals either for examination malpractice/irregularities or marking may do so in writing to the College Registrar. The appeal must contain enough detail to warrant the appeal being considered. Any appeal must be made within a week of release of the official examination results or release of an irregularity/malpractice decision. If found to have merit the case shall be referred to the ECC for deliberation.

g. Examination format

The standards of the examination will be set by the examination committee. A panel of examiners will be chosen by the examination committee from amongst Fellows of the College for the examination.

A register of examiners will be kept by the chairman of the examination committee. An examination board will be constituted for each diet of examinations, comprising the chairman of the examination committee, two members from each examination panel and at least one external examiner.

The role of the external examiner(s) is to:

- Moderate the written question papers
- Assist with the examination of candidates
- Assist with any pass/fail vivas
- Provide external independent assessment of the examination
- Report on the conduct of the examination to the examination committee

The exam comprises written, clinical and oral parts

The written FCS (ECSA) exam will comprise two, three (3), hour papers and an OSCE.

- The first paper will consist of single best answer multiple choice questions
- The second paper will consist of extended matching and/or short answer questions

Written examinations may be held in any of the countries of the region where the trainee is located. In exceptional circumstances the examination committee may approve an examination site outside the region. The written examinations are held simultaneously on the first Wednesday of September, at a recognised examination centre with impartial invigilation.

The examination papers will be set by members of the examination committee and independently moderated by an external examiner. They will be sent to COSECSA administration office in Arusha by first day of March and will be stored confidentially there. One copy per candidate will then be sent by courier or secure delivery to a named country representative at all sites that are holding examinations 2-3 days before they are held.

After the examination, COSECSA Country Representatives in the exam host country will make photocopies of the candidates' completed exam scripts for safekeeping, and send the originals by courier or secure delivery to the relevant panel chairman. Marking of the examination paper will be coordinated by the panel chairman.

A clinical OSCE examination which will take place at the same time and at the same site as the oral. This will comprise six 20 minute stations. Candidates have to pass the clinical and oral sections of the examination in order to pass overall. If a candidate scores a mean of 49% in one section and has over 50% in the other section then he or she will be given a pass/fail viva. The chairman of the examination panel will select two examiners, excluding those who had failed the candidate, together with an external examiner, to conduct this viva. The chairman of the examination panel will endeavour to minimise the chance of a candidate being examined by an examiner from his or her own country.

The panel of examiners will give the results to the examination board who will meet on the day of examination. The board will then approve the results on behalf of Council and publish them. For each candidate who fails the exam, the panel will allocate a Fellow of the College (usually a member of the panel) who will communicate with the candidate and offer advice as may be indicated. Details of marks will not be given. If a candidate fails his clinical and oral examination then he may attempt the clinical and oral examination for a maximum of two more years without having to rewrite the written examination.

Appeals against results must be made in writing to the Council within 60 days of the completion of the examination. The President of the College will then appoint an impartial committee to investigate the appeal, and require a written report to be filed by the Chairmen of the examinations panel and board. The Appeals committee will then take all considerations and its own findings into account and recommend a decision which will remain final and binding.

E-Log Book

Student surgical operations shall be recorded real time on a surgical electronic logbook containing a chronological list of all diagnostic, operative procedures and follow ups, performed during training. All procedures must be electronically countersigned by the supervising consultant.

A satisfactory mark of 50%, or more, is required for the logbook in order to sit the final examinations.

Successful completion of the logbook, as stipulated in College operational manuals, will be required before sitting for the end of year examinations.

1.7: Graduation requirements

Examination pass mark

The examination pass mark shall be 50%

Only those passing the written paper shall be called for the clinical examination.

Those failing the examination (written, clinical or both), in a given year may resist the examination when next offered.

Completion of total of 18 months of training and supervision.

- Submission of a well-kept counter signed and approved e-log book with case minimums as per curriculum
- A progressive assessment report of training

1.8: Classification of degrees

All trainees who complete training will be awarded a PASS and conferred a diploma with the status of Fellow of the College of Surgeons of East, Central and Southern Africa in Surgical Endoscopy. FCS-SE.

1.9: Regulations for thesis/ dissertation project

There is no thesis or dissertation project

2.0: Evaluation of academic staff

Trainer evaluation.

Similar to the above, a training evaluation of all aspects of the training process shall be undertaken through structured questionnaires. Assessments shall be carried out by student as well as peer review. In the case of students, these shall be presented to student prior to the final examination.

Programme evaluation.

Overall programme evaluation shall be undertaken annually with a curriculum review five yearly. The latter shall take into consideration individual course assessments, reference materials, teaching facilities, trainers and examiners.

3.0: Title of the program: FCS Surgical Endoscopy

3.1: Specific Objectives of each program offered

UNIT OBJECTIVES

Demonstrate knowledge of anatomy and clinical knowledge that is pertinent to the diagnosis and management of diseases of the gastrointestinal tract and the practice of diagnostics and therapeutic endoscopy.

3.2: List of courses offered for the program

a) Lectures for each unit

In accordance with the Commission for University Education (CUE) requirement for rationalization of time allocation for the various rotations (or courses), COSECSA has unitized these rotations in accordance with the emphasis given to the following criteria:

Unit	Hours
1 unit of study	16 hours of lectures
	32 hours of tutorials
	48 hours of practical work/SDL
	1 week of clinical rotation

b) Elective courses and the load- There are no planned elective courses. These can be arranged with specific institutions as needed

c) Other courses which may be taken to meet the graduation requirements:

External endoscopic courses in specific areas like:

1. Oesophageal Neoplasia Master Class (ONM)
2. London Live Endoscopy courses
3. Endoscopic Ultrasound Master Class by the World Endoscopy Organization

d) Total lecture hours / course unit/credit hours required for graduation:

Each resident is required to complete a minimum of 48 months (320 units) of clinical neurosurgery training prior to graduation.

3.3: Lecture hours per academic year:

Each resident is required to complete a minimum of 12 months (11 units) prior to graduation.

Course Code	Competencies	Basic Sciences	Principles of surgical endoscopy	Number of units
SE1/DTUGI	Diagnostic and therapeutic Upper Gi procedures	Oesophagus Stomach and Duodenum Small Intestine	Module 2- 4 Module 12	1 Unit
SE2/DTLGI	Diagnostic and therapeutic Lower Gi procedures	Colon, rectum and anal canal	Module 5-7	1 Unit
SE3	Equipment setup and maintenance		Module 1	1 Unit
SE4/ERCP	Endoscopic Retrograde Cholangio Pancreatography	Billiary system Liver Pancreas	Module 8	1 Unit
SE5/ AET	Ablative techniques- Radiofrequency ablation and Argon Plasma Coagulation		Module 12	1 Unit
SE6	Endoscopic Mucosal Resection and Endoscopic Submucosal Dissection		Module 10	1 unit
SE7/BS1	Anatomy, physiology and Pharmacology of the GI tract			1 unit
SE8/BS2	Fluids, electrolyte and acid base disturbance and		Module 11	1 unit

	Nutritional considerations			
SE9/BS3	Wound healing and principles of hemostasis		Module 9	1 unit
SE10	Research Methodology			1 unit
SE 11	ENOTTS- Non technical skills in endoscopy			1 unit

NB: Number of hours per unit is indicated per unit as per the previous table

3.4: Course Outline

- a) **Title of the Course:** The following curriculum components are guided by and satisfy all the training requirements of the Surgical Endoscopy Curriculum.
- b) **Purpose of the Course:** To prepare fellows to be competent in advanced, diagnostic and therapeutic endoscopic techniques.
- c) **Course Objectives: Objectives of the Program**

The course seeks to achieve the following objectives:

1. Competence in endoscopic techniques
2. Understand the basic sciences and principles of surgical endoscopy as well as the gastrointestinal system.
3. Knowledge on the principles and practice of clinical research
4. Training and strengthening of non-Technical/ non-academic skills

- d) **Course description: (All possible topics to be covered under the course):**

BASIC SCIENCES

Each candidate is expected to acquire a thorough knowledge of the organs of the GI tract as regards anatomy, physiology, pathology of various diseases congenital/acquired/traumatic vascular/ neoplastic and their detailed principles of management both medical and surgical. For the management of malignant diseases, the candidates are supposed to be acquainted with general oncological principles, various

investigative approaches and different modalities of adjuvant treatment employed (e.g. chemotherapy, radiotherapy, immunotherapy etc.).

1. **Oesophagus:**

Primary Competencies

- Anatomical detail
- Physiology of swallowing
- Esophageal manometry
- Zenker's diverticulum
- Esophageal trauma
- Rupture (spontaneous or iatrogenic)
- Corrosive burns (detection, evaluation and management)
- Esophageal motility disorders
- Gastroesophageal reflux disease
- Achalasia
- Esophageal cancer (adeno & squamous)
- Various esophageal operations (oesophagogastrostomy)

Secondary Competencies:

- Endoscopic ultrasound and other diagnostic techniques
- Barrett's esophagus and Oesophageal Neoplasia/ Dysplasia diagnosis and treatment
- Per Oral Endoscopic Myotomy (POEM)
- Endoscopic Submucosal Dissection (ESD)
- Endoscopic Mucosal Resection (EMR)

Recommended reading: Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th Edition. Chapter 43- 47. Additional reading: Chapter 13, 20, 25, 27, 29

2. **Stomach and Duodenum:**

Primary Competencies:

- Anatomical details
- Physiology of gastric secretions
- Gastroduodenal motility
- Diaphragmatic hernia (congenital and acquired)

- Volvulus
- Foreign bodies (bezoars)
- Stomach trauma
- H. pylori in gastric diseases
- Peptic ulcer
- Zollinger-Ellison syndrome
- Gastric tumours

Secondary Competencies:

- Gastric surgery (pyloric stenosis in children and adults)
- Post-gastrectomy syndromes and complications

Recommended reading: Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th Edition. Chapter 48- 54 and 25- 27. Additional reading: Chapter 2, 3, 14, 20 and 32

3. **Biliary System:**

Primary Competencies:

- Detailed anatomy
- Bile physiology
- Enterohepatic circulation
- Acute cholecystitis
- Chronic cholecystitis
- Acalculus cholecystitis
- Gallstones-pathogenesis and presentation
- CBD stones
- CBD stricture
- Cholangitis
- Sphincter of Oddi (SOD) dysfunction and biliary dyskinesia
- Post cholecystectomy syndromes
- Carcinoma of gall bladder
- Cholangiocarcinoma
- Parasitic infestations of biliary tree

Secondary competencies:

- Cholecystectomy (open and laparoscopic)
- CBD exploration and drainage
- Primary sclerosing cholangitis endoscopic biliary interventions and stenting
- Hemobilia
- Choledochal cyst
- Polyps of GB

Recommended reading: Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th Edition. Chapter 21 and 62- 70 Additional reading: Chapter 9- 12, 14

4. Liver:

Primary Competencies:

- Segmental anatomy
- Liver function and tests

Secondary competencies:

- Liver abscess cysts
- Benign and malignant tumours cirrhosis
- Viral hepatitis
- Radiological imaging modalities
- Percutaneous transhepatic biliary drainage and cholangiography
- Liver biopsy
- Portal hypertension (cirrhotic and non-cirrhotic causes)

Recommended reading: Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th Edition. Chapter 71-97. Additional reading: Chapter 10, 11

5. Pancreas:

Primary Competencies:

- Anatomy
- Physiology

- Pancreatic ductal anomalies
- Acute pancreatitis
- Chronic pancreatitis

Secondary competencies:

- Tropical and alcoholic
- Endocrine tumours
- Exocrine tumours of pancreas
- Cystic neoplasms
- Pseudocysts of pancreas

Recommended reading: Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th Edition. Chapter 55- 61. Additional reading: Chapter 9

6. Small Intestine:

Primary Competencies:

- Mesenteric vascular anatomy
- Intestinal physiology
- Crohn's and other inflammatory bowel diseases

Secondary Competencies:

- Enteral feeding
- Home/parenteral nutrition

Recommended reading: Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th Edition. Chapter 98- 114. Additional reading: Chapter 4, 5

7. Colon, Rectum and Anal Canal:

Primary Competencies:

- Anatomy
- Physiology
- Colonic motility
- Physiology of defaecation and anal continence
- Constipation
- Anal incontinence

- Haemorrhoids
- Fissure
- Fistulae and anal stricture
- Polyps and other benign tumors
- Hereditary and familial polyposis syndrome
- Ulcerative colitis and Crohn's ameobic colitis
- Ischaemic colitis
- Diverticulitis
- Lower GI haemorrhage
- Carcinoma of the colon, rectum, anal canal

Secondary competencies:

- Hirschsprung's disease
- Anorectal malformations
- Rectal prolapse
- Pseudo obstruction

Recommended reading: Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th Edition. Chapter 115- 129. Additional reading: Chapter 6, 7

PRINCIPLES OF SURGICAL ENDOSCOPY

There will be based on validated curriculum from the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) and the American Board of Surgery (ABS) with additional content for context specific GI pathology.

- Fundamentals of Endoscopic Surgery (FES) didactic content:

www.fesprogram.org

MODULE 1: TECHNOLOGY:

- Characteristics of Endoscopes
- Equipment Setup
- Troubleshooting
- Equipment Care

Reading Material

The SAGES Manual

2nd Ed.: Ch. 47 / 3rd Ed.: Vol. 1, Ch. 37 – Flexible endoscopes: characteristics, troubleshooting, and equipment care

2nd Ed.: Ch. 48 / 3rd Ed.: Vol. 1, Ch. 38 – Endoscope handling

Principles of Flexible Endoscopy for Surgeons

Ch. 2 – Basic components of flexible endoscopes

Ch. 3 – Setup and care of endoscopes

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 1 – The endoscopy unit and staff

Ch. 2 – Endoscopic equipment

MODULE 2: PATIENT PREPARATION:

- Informed Consent
- Anesthesia Risk Assessment
- Bowel Preparation
- Prophylactic Antibiotic Therapy
- Management of Anticoagulation

Reading Material

The SAGES Manual

2nd Ed.: Ch. 49 / 3rd Ed.: Vol. 1, Ch. 39 – Monitoring, sedation, and recovery

Principles of Flexible Endoscopy for Surgeons

Ch. 4 – Pre-procedural considerations

Ch. 5 – Intra-procedural considerations

Ch. 6 – Post-procedural considerations

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 3 – Patient care, risks and safety

MODULE 3: SEDATION & ANALGESIA:

- Monitoring

- Moderate Sedation
- Medications
- Recovery
- Alternative Sedation
- Small Caliber Endoscopy

Reading Material

The SAGES Manual

2nd Ed.: Ch. 49 / 3rd Ed.: Vol. 1, Ch. 39 – Monitoring, sedation, and recovery

Principles of Flexible Endoscopy for Surgeons

Ch. 4 – Pre-procedural considerations

Ch. 5 – Intra-procedural considerations

Ch. 6 – Post-procedural considerations

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 3 – Patient care, risks and safety

MODULE 4: UPPER GASTROINTESTINAL ENDOSCOPY:

- Indications
- Preparation
- Diagnostic EGD
- Complications

Reading material:

The SAGES Manual

2nd Ed.: Ch. 50 / 3rd Ed.: Vol. 1, Ch. 41 – Diagnostic upper gastrointestinal endoscopy

2nd Ed.: Ch. 58 – Complications of upper gastrointestinal endoscopy

Principles of Flexible Endoscopy for Surgeons

Ch. 16 – Techniques of upper endoscopy

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 4 – Upper endoscopy: diagnostic techniques

Successful Training in Gastrointestinal Endoscopy

Ch. 4 – Esophagogastroduodenoscopy (EGD)

MODULE 5: LOWER GASTROINTESTINAL ENDOSCOPY:

- Indications
- Preparation

Reading material

The SAGES Manual

2nd Ed.: Ch. 70 / 3rd Ed.: Vol. 1, Ch. 45 – Diagnostic colonoscopy

2nd Ed.: Ch. 71 / 3rd Ed.: Vol. 1, Ch. 46 – Therapeutic colonoscopy and its complications
Principles of Flexible Endoscopy for Surgeons
Ch. 17 – Techniques and tips for lower endoscopy
Ch. 7 – Endoscopic tools/techniques for tissue sampling
Ch. 9 – Endoscopic tools and techniques for tissue removal and ablation
Practical Gastrointestinal Endoscopy, Sixth Ed.
Ch. 6 – Colonoscopy and flexible sigmoidoscopy
Ch. 7 – Therapeutic colonoscopy
Successful Training in Gastrointestinal Endoscopy
Ch. 5 – Colonoscopy

MODULE 6: PERFORMING LOWER GI PROCEDURES:

- Diagnostic Colonoscopy
- Rigid Endoscopy
- Lower GI Endoscopy
- Important Considerations

Reading materials:

The SAGES Manual
2nd Ed.: Ch. 70 / 3rd Ed.: Vol. 1, Ch. 45 – Diagnostic colonoscopy
2nd Ed.: Ch. 71 / 3rd Ed.: Vol. 1, Ch. 46 – Therapeutic colonoscopy and its complications
Principles of Flexible Endoscopy for Surgeons
Ch. 17 – Techniques and tips for lower endoscopy
Ch. 7 – Endoscopic tools/techniques for tissue sampling
Ch. 9 – Endoscopic tools and techniques for tissue removal and ablation
Practical Gastrointestinal Endoscopy, Sixth Ed.
Ch. 6 – Colonoscopy and flexible sigmoidoscopy
Ch. 7 – Therapeutic colonoscopy
Successful Training in Gastrointestinal Endoscopy
Ch. 5 – Colonoscopy

MODULE 7: LOWER GI ANATOMY, PATHOLOGY, AND COMPLICATIONS:

- Pathology Recognition
- Complications

Reading material

The SAGES Manual
2nd Ed.: Ch. 65 / 3rd Ed.: Vol. 2, Ch. 30 – Complications of endoscopic retrograde cholangiopancreatography (ERCP)
Principles of Flexible Endoscopy for Surgeons
Ch. 20 – Management of endoscopic complications
Practical Gastrointestinal Endoscopy, Sixth Ed.

Covered within the procedure specific chapters
Successful Training in Gastrointestinal Endoscopy

MODULE 8: DIDACTIC ERCP:

- Indications
- Preparation
- Performance of ERCP
- Complications
- Pathology Recognition

Reading material

The SAGES Manual, Second Ed.

2nd Ed.: Ch. 61 / 3rd Ed.: Vol. 2, Ch. 28 – Endoscopic retrograde
cholangiopancreatography

2nd Ed.: Ch. 62 – Surgically altered anatomy and special considerations

2nd Ed.: Ch. 63 – Cannulation and cholangiopancreatography

2nd Ed.: Ch. 64 / 3rd Ed.: Vol. 2, Ch. 29 – Therapeutic ERCP

2nd Ed.: Ch. 65 / 3rd Ed.: Vol. 2, Ch. 30 – Complications of ERCP

Principles of Flexible Endoscopy for Surgeons

Ch. 19 – Techniques of ERCP

Successful Training in Gastrointestinal Endoscopy

Ch. 25 – ERCP management of complicated stone disease of the bile duct and
pancreas

Ch. 26 – ERCP management of malignancy: tissue sampling, metal stent
placement, and ampullectomy

MODULE 9: HEMOSTASIS:

- Non-thermal Techniques
- Thermal Techniques

Reading material:

The SAGES Manual

2nd Ed.: Ch. 53 – Variceal banding

2nd Ed.: Ch. 54 – Sclerotherapy

2nd Ed.: Ch. 55 – Control of nonvariceal upper gastrointestinal bleeding

Principles of Flexible Endoscopy for Surgeons

Ch. 8 – Tools and techniques for gastrointestinal hemostasis

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 5 – Therapeutic upper endoscopy – Page 74

Successful Training in Gastrointestinal Endoscopy

Ch. 11 – Principles of electrosurgery

Ch. 15 – GI hemostasis

MODULE 10: TISSUE REMOVAL

- Resective Techniques
- Sampling Techniques

Reading material:

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 5 – Therapeutic upper endoscopy

MODULE 11: ENTERAL ACCESS:

- Preparation
- Indications
- PEG
- Procedures with PEJ
- Replacement
- Complications

Reading Material

The SAGES Manual

2nd Ed.: Ch. 57 / 3rd Ed.: Vol. 1, Ch. 42 – Percutaneous endoscopic feeding tube placement

Principles of Flexible Endoscopy for Surgeons

Ch. 11 – Endoscopic techniques for enteral access

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 5 – Therapeutic upper endoscopy

Successful Training in Gastrointestinal Endoscopy

Ch. 29 – Enteral access techniques: percutaneous endoscopic gastrostomy and jejunostomy

MODULE 12: ENDOSCOPIC THERAPIES:

- Dilation
- Foreign Body Removal
- Intraoperative Endoscopy
- Tumor Localization
- Stent placement
- Endoscopic Mucosal resection (EMR)
- Endoscopic Submucosal dissection (ESD)
- Ablative techniques
- Per Oral Endoscopic Myotomy (POEM)
- Endoscopic Ultrasound

Reading material:

The SAGES Manual

2nd Ed.: Ch. 52 – Therapeutic upper gastrointestinal endoscopy

Principles of Flexible Endoscopy for Surgeons

Ch. 10 – Endoscopic tools and techniques for strictures and stenosis

Ch. 15 – Intraoperative endoscopy

Practical Gastrointestinal Endoscopy, Sixth Ed.

Ch. 5 – Therapeutic upper endoscopy

a. Page 61

b. Page 66

c. Page 70

Successful Training in Gastrointestinal Endoscopy

Ch. 16 – Luminal dilation techniques

Ch. 17 – Foreign body extraction

Endoscopic Mucosal Resection, Massimo Conio MD, Peter D. Siersema

Endoscopic Submucosal Dissection: Principles and Practice

- e) **Teaching methodology:** Based on the Commission for University Education requirement for rationalization of time allocation, we have unitized the following clinical rotations and conference schedule accordingly. For reference, 1 unit of study equates to the following...
- 16 hours of lecture, or
 - 32 hours of tutorials, or
 - 48 hours of clinical work or self-directed learning
- f) **Instructional materials/ equipment:** Computers, Internet connection, desks, chairs, bookshelves resource center, projector
- g) **Course assessment: Continuous assessment (%) and University examination (%)**
Continuous assessment will be 25% and College examinations will be 75%.

ASSESSMENT OF ENDOSCOPIC COMPETENCY

This will be based on competency assessment as per the American Board of Surgery and American Society of Gastrointestinal Endoscopy (ASGE), Pan African Academy of Christian Surgeons (PAACS) and COSECSA.

1. Evaluations will be done quarterly:

Initial assessment	Quarterly assessment	Mid-year assessment	Quarterly assessment	Quarterly assessment	Post program
-----------------------	-------------------------	------------------------	-------------------------	-------------------------	-----------------

at start	· Procedure competency assessment Clinical acumen assessment	· Procedure competency assessment Clinical acumen assessment	· Procedure competency assessment Clinical acumen assessment	· Procedure competency assessment Clinical acumen assessment	assessment
-----------------	---	---	---	---	-------------------

2. Global evaluation will be done using a modified version of the COSECSA and PAACS residency evaluation tools.

3. Knowledge and clinical acumen on patient care will be evaluated using a modified version of the COSECSA and PAACS residency evaluation tools.

4. Competency progress evaluation will be done using the GAGES (Global Assessment of Gastrointestinal and Endoscopic Skills) forms for clinical performances. These are validated tools and scores have been published that correlate with clinical competence. (See Attachments) This will build an assessment habit into all procedures for the trainee. These can be done electronically via an app (New Innovations/Armis if an option at Tenwek), or assessment forms on paper (see Attachment).

5. Leadership and other soft skills will be assessed with a modified version of COSECSA and PAACS residency evaluation tool.

6. The fellows will get assigned to ongoing research projects and given assistance in supervision and publishing the research work

7. All entering fellows will have modified American Board of Surgery Flexible Endoscopy Curriculum/Fundamentals of Endoscopic Surgery (ABS FEC/FES) as a residency requirement. The fellow must take and pass a FES exam (both cognitive MCQ and a simulator-based technical exam of the five deconstructed endoscopic tasks: navigation, loop reduction, retroflexion, lesion recognition, and targeting) before they are eligible to graduate. PAACS will develop endoscopy specific MCQ, and the fellow will answer the study questions available in the free online didactic curriculum at the end of each module. There will be completion and testing of a Module every eight weeks. Tenwek will use the proficiency-oriented desktop simulation training strategies that have been published for the FES skills test and have the trainee perform the tasks at halfway point in fellowship and at end, mandating a proficiency level performance by end of fellowship.

MINIMUM ENDOSCOPIC PROCEDURE REQUIREMENTS

Competency is primarily determined by procedure competency assessments, not by participating in or performing a predetermined number of procedures. However

procedural volume is important because it exposes trainees to a range of anatomic variants, pathological findings, solutions to technical challenges and management of adverse events that equip them for future practice. We accept the American Society for Gastrointestinal Endoscopy (ASGE) “minimum number of endoscopic procedures/skills” guidelines (See Attachments) but recognize that they should be modified to suit African contexts. In particular:

- **EGD:** In addition to performing at least **130** EGDs, the trainee should demonstrate the ability to safely reach the 2nd portion duodenum in at least 90% of their exams (minimum of 20 consecutive procedures without stricture or post-operative anatomic change).
- **Colonoscopy:** We have decreased the minimum number of exams to **150**, recognizing that colonoscopy is less commonly performed in most African contexts. However, we also recognize that colonoscopy skills are increasingly important for Africa, and that the ability to achieve complete colonoscopy should be a distinguishing attribute of fellowship graduates. Fellows should demonstrate the ability to independently achieve cecal intubation in at least 80% of their exams (minimum of 20 consecutive procedures without stricture or post-operative anatomic change).
- **Control of hemorrhage:** Trainees should perform endoscopic interventions to control GI hemorrhage in at least **20** cases, including at a minimum injection techniques and band ligation, and including at least **10** cases of active hemorrhage.
- **Polypectomy:** Trainees should perform at least **20 snare polypectomies**, including both sessile and pedunculated polyps, and including submucosal injection techniques to facilitate safe resection of sessile lesions in at least 5 cases.
- **ERCP:** Competence to independently perform ERCP is an optional component of the fellowship program at the discretion of the program director and determined in part by local expertise and case volume. A minimum volume of **100** cases is required, and the trainee should demonstrate the ability to independently and safely achieve deep biliary cannulation in at least 80% of their exams (minimum of **20 consecutive procedures** without surgically altered anatomy), and should have independently and safely performed at least **10 biliary** sphincterotomies, **5 biliary stone extractions**, **5 biliary stent placements** and **5 prophylactic pancreatic stent** placements.

Procedure	Required number
Esophagogastroduodenoscopy	130
Including treatment of nonvariceal hemorrhage	(10 actively bleeding)
25	
Including treatment of variceal hemorrhage	(5 actively bleeding) 20
Esophageal dilation (guidewire and through the scope)	20
Colonoscopy	150
Including snare polypectomy and hemostasis	30
Percutaneous endoscopic gastrostomy placement	15
Esophageal stenting	30
Sedation	20
Endoscopic Mucosal Resections	30
Endoscopic retrograde cholangiopancreatography	100
Endoscopic ultrasound	150
Endoscopic Submucosal dissection	50

All procedures

- Recognizes normal and abnormal findings
- Develops appropriate endoscopic/medical treatment in response to these findings
- Obtains appropriate informed consent
- Inserts the endoscope using proper technique and detects and identifies all significant pathology
- Conducts thorough examination of the entire organ and correctly identify landmarks
- Completes examination within a reasonable time and prepares accurate report
- Recognizes and manages any complications expeditiously
- Plans correct management and disposition and discusses findings with patient and other physicians
- Conducts proper follow-up, review of pathology, case outcome

Adapted from ASGE Publication: Principles of Training in Gastrointestinal Endoscopy, GIE vol.

h) Textbooks

- *Sleisenger and Fordtran's* Gastrointestinal and Liver Disease, 10th Edition
- Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice, 20th ed.
- The SAGES Manual 2nd Ed

i) Textbooks for further reading:

- Lee SW, Ross HM, Rivadeneira D, Steele SR, Feingold D, eds. *Advanced Colonoscopy and Endoluminal Surgery*. Switzerland: Springer International; 2017.
- Marks JM, Dunkin BJ. *Principles of Flexible Endoscopy for Surgeons*. New York, NY: Springer; 2013.
- Pfenninger JL, Fowler GC, eds. *Pfenninger and Fowler's Procedures for Primary Care*. 3rd ed. Philadelphia, PA: Mosby Elsevier; 2011:685-698
- Practical Gastrointestinal Endoscopy, Sixth Ed.
- Successful Training in Gastrointestinal Endoscopy

External Educational Conferences

1. Educational conferences that are held in even years (CMDA-CMDE) by the Christian Medical and Dental Associations will be offered to senior fellows in good standing and funded by COSECSA as financial resources permit.
2. Educational and surgical conferences held by WACS, COSECSA, regional surgical societies and Regional Gastrointestinal Societies will be offered to fellows as decided upon by the COSECSA Program Director and COSECSA administration.
3. Additional regional or international conferences will be available at Program Director's discretion (Digestive Disease Weekly by the American Society of Gastrointestinal Endoscopy and the Society of American Gastrointestinal Endoscopic Surgeons annual meetings.)

Record Keeping

1. Fellows are expected to complete all medical records (inpatient, outpatient and COSECSA records) including operative reports in a timely and continuously updated fashion.
 - a. Complete and detailed history and physicals should be done on all patients.
 - b. Operative reports should be in sufficient detail to reconstruct the operation and serve as a teaching exercise in the order and plan of the operation. Specific detail as to findings or deviation from normal technique should be documented.
 - c. Discharge summaries should provide sufficient detail to serve as a tool in patient care and in retrospective reviews.
 - d. Communication with referring physicians should be maintained.
2. Each fellow must keep a record of all his operations, including operations where he first-assisted the surgeon or where he taught a junior fellow or resident. The record of each fellow should be kept on the appropriate COSECSA form or in the computerized

database. A cumulative summary for each fellow must also be kept. The information is used to fill out the required case logs for COSECSA and to construct a cumulative summary for COSECSA which must be submitted with the case experience to COSECSA at the end of the fellowship prior to examinations.

3. The credit roles are as follows:
 - a. The fellow may take credit as surgeon for each coded procedure within a particular operation, and more than one procedure can be logged in a multi-procedure operation. On same patient/same day/same operation a senior fellow may take credit as surgeon while another fellow takes credit as a First Assistant, or a senior fellow may take credit as a Teaching Assistant while a more junior fellow takes credit as a surgeon.
4. The fellow is also responsible for keeping track of the following records (delegating as necessary and appropriate)
 - a. List of all teaching conferences to include date, subject, presenter and reading assignments
 - b. A summary of the morbidity and mortality conferences: all deaths and complications must be listed—Search for root causes and system defects to be corrected
 - c. Wound infection rates by classification of case
 - d. Return-to-operating room rates

Graduated clinical responsibilities, emergency call, and learning

- During their training, fellows are given clinical responsibilities for ward patients in a graduated fashion, commensurate with their level of training, knowledge, clinical skills, and proven performance under pressure. In general, a given patient should be cared for by the same trainee from admission to discharge and where possible, during any follow-up clinic visits. These responsibilities are assigned by the Program Director.
- Until fellows are deemed capable of acting on their own to evaluate and manage emergency cases, they will take emergency call as deemed appropriate by the program director or supervising faculty. A faculty endoscopist will always be on emergency call to backup a fellow and his team. Generally, the fellow is responsible to make up the call schedule.

- Fellows, are directly supervised by attending endoscopists for at least 75% of their operations, for emergency call, and for patient care on the wards. The complexity of surgical cases that fellows perform under supervision and responsibility for ward care is increased during the years of training until fellows can demonstrate they are capable of safely performing the most difficult operations and manage the most complex patients preoperatively and postoperatively with minimal supervision.

Miscellaneous Benefits

Societal Memberships/Journal Access

Every resident will be provided membership in the Surgical Society of Kenya. Furthermore, trainees will be provided an international membership in both the American Society of Gastrointestinal Endoscopy which allows full-online access to their associated journals and online educational materials.

Modified Zeischenberger Proposed Model for Teaching and Assessment in the Operating Room (Level designated based on supervision provided for the majority of the key portions of the case)			
Stage of Supervision		Attending Behaviors	Resident Behaviors Commensurate with this level of Supervision
Level 1		Does majority of key portions as the surgeon narrates the case (i.e. thinks out loud). Demonstrates key concepts, anatomy & skills	Opens and closes First-assists and observes
<i>Clues to advancement</i>			<i>When first assisting, begins to actively assist (i.e. anticipates the surgeon's needs)</i>
Level 2		Shifts between surgeon and first-assist roles. When first assisting, leads the resident in surgeon role (active first assist) Optimizes the field/exposure Demonstrates the plane or structure Coaches for specific technical skills Coaches regarding the next steps Continues to identify anatomical landmarks for resident	The above, plus: Shifts between surgeon and first-assist roles Knows all the component technical skills Demonstrates an increasing ability to perform different key parts of the operation with attending assistance
<i>Clues to advancement</i>			<i>Can execute the majority of the steps of procedure with active assistance</i>
Level 3		Assists and follows the lead of the resident (passive assist) Coaching regarding polishing and refinement of skills Follows the resident's lead throughout the operation	The above, plus: Can "setup" and accomplish the next step for the entire case with increasing efficiency Recognizes critical transition point issues
<i>Clues to advancement</i>			<i>Can transition between all steps with passive assist from faculty</i>
Level 4		Largely provides no unsolicited advice Assisted by a junior resident or an attending acting like a junior resident Monitors progress and patient safety*	The above, plus: Can work with inexperienced first assistant Can safely complete a case without faculty Can recover from most errors Recognizes when to seek help/advice
*Implicit in all of these stages is the responsibility that the attending has to ensure optimal patient safety and outcomes. To that end, they may at any time correct behaviors that may lead to errors or, if an error has already occurred, to "take over" and correct the error			

*Levels 1 and 2 correspond to "assists" in the operative Milestones. Levels 3 and 4 correspond to "performs."

Fig. 2 Global Assessment of Gastrointestinal Endoscopic Skills-colonoscopy

GAGES - COLONOSCOPY SCORESHEET	
GLOBAL ASSESSMENT OF GASTROINTESTINAL ENDOSCOPIC SKILLS	
SCOPE NAVIGATION	SCORE <input type="checkbox"/>
Reflects navigation of the GI tract using tip deflection, advancement/withdrawal and torque	
5	Expertly able to manipulate the scope in the GI tract autonomously
4	
3	Requires verbal guidance to completely navigate the lower GI tract
2	
1	Not able to achieve goals despite detailed verbal guidance requiring takeover
USE OF STRATEGIES	SCORE <input type="checkbox"/>
Examines use of patient positions, abdominal pressure, insufflation, suction and loop reduction to comfortably compete the procedure	
5	Expert use of appropriate strategies for advancement of the scope while optimizing patient comfort
4	
3	Use of some strategies appropriately, but requires moderate verbal guidance
2	
1	Unable to utilize appropriate strategies for scope advancement despite verbal assistance
ABILITY TO KEEP A CLEAR ENDOSCOPIC FIELD	SCORE <input type="checkbox"/>
Utilization of insufflation, suction and/or irrigation to maximize mucosal evaluation	
5	Used insufflation, suction, and irrigation optimally to maintain clear view of endoscopic field
4	
3	Requires moderate prompting to maintain clear view
2	
1	Inability to maintain view despite extensive verbal cues
INSTRUMENTATION (if applicable; leave blank if not applicable)	SCORE <input type="checkbox"/>
Random biopsy: targeting is assessed by asking the endoscopist to take another biopsy from the identical site. Targeted instrumentation: evaluation is based on ability to direct the instrument to the target.	
5	Expertly directs instrument to desired target
4	
3	Requires some guidance and/or multiple attempts to direct instrument to target
2	
1	Unable to direct instrument to target despite coaching
QUALITY OF EXAMINATION	SCORE <input type="checkbox"/>
Reflects attention to patient comfort, efficiency, and completeness of mucosal evaluation	
5	Expertly completes the exam efficiently and comfortably
4	
3	Requires moderate assistance to accomplish a complete and comfortable exam
2	
1	Could not perform a satisfactory exam despite verbal and manual assistance requiring takeover of the procedure

Fig. 1 Global Assessment of Gastrointestinal Endoscopic Skills-upper endoscopy

GAGES - UPPER GI ENDOSCOPY SCORESHEET **GLOBAL ASSESSMENT OF GASTROINTESTINAL ENDOSCOPIC SKILLS**

INTUBATION OF THE ESOPHAGUS		SCORE <input type="checkbox"/>
<small>Reflects patient management, understanding of anatomy and sedation</small>		
5	Able to independently (successfully) intubate esophagus without patient discomfort	
4		
3	Requires detailed prompting and cues	
2		
1	Unable to properly intubate requiring take over	
SCOPE NAVIGATION		SCORE <input type="checkbox"/>
<small>Reflects navigation of the GI tract using tip deflection, advancement/withdrawal and torque</small>		
5	Expertly able to manipulated the scope in the upper GI tract autonomously.	
4		
3	Requires verbal guidance to completely navigate the upper GI tract	
2		
1	Not able to achieve goals despite detailed verbal cues, requiring take over	
ABILITY TO KEEP A CLEAR ENDOSCOPIC FIELD		SCORE <input type="checkbox"/>
<small>Utilization of insufflation, suction and/or irrigation to maximize mucosal evaluation</small>		
5	Uses insufflation, suction, and irrigation optimally to maintain clear view of endoscopic field	
4		
3	Requires moderate prompting to maintain clear view	
2		
1	Inability to maintain view despite extensive verbal cues	
INSTRUMENTATION (if applicable; leave blank if not applicable)		SCORE <input type="checkbox"/>
<small>Random biopsy: targeting is assessed by asking the endoscopist to take another biopsy from the identical site. Targeted instrumentation: evaluation is based on ability to direct the instrument to the target.</small>		
5	Expertly directs instrument to desired target	
4		
3	Requires some guidance and/or multiple attempts to direct instrument to target	
2		
1	Unable to direct instrument to target despite coaching	
QUALITY OF EXAMINATION		SCORE <input type="checkbox"/>
<small>Reflects attention to patient comfort, efficiency, and completeness of mucosal evaluation</small>		
5	Expertly completes the exam efficiently and comfortably	
4		
3	Requires moderate assistance to accomplish a complete and comfortable exam	
2		
1	Could not perform a satisfactory exam despite verbal and manual assistance requiring takeover of the procedure	

Global Assessment of Gastrointestinal Endoscopic Skills (GAGES): a valid measurement tool for technical skills in flexible endoscopy

Melina C. Vassiliou · Pepa A. Kaneva · Benjamin K. Poulouse · Brian J. Dunkin · Jeffrey M. Marks · Riadh Sadik · Gideon Sroka · Mehran Anvari · Klaus Thaler · Gina L. Adrales · Jeffrey W. Hazey · Jenifer R. Lightdale · Vic Velanovich · Lee L. Swanstrom · John D. Mellinger · Gerald M. Fried

Received: 24 April 2009 / Accepted: 12 November 2009 / Published online: 29 January 2010
© Springer Science+Business Media, LLC 2010

Abstract

Background Simulators may improve the efficiency, safety, and quality of endoscopic training. However, no objective, reliable, and valid tool exists to assess clinical endoscopic skills. Such a tool to measure the outcomes of educational strategies is a necessity. This multicenter, multidisciplinary trial aimed to develop instruments for evaluating basic flexible endoscopic skills and to demonstrate their reliability and validity.

Methods The Global Assessment of Gastrointestinal Endoscopic Skills (GAGES) Upper Endoscopy (GAGES-UE) and Colonoscopy (GAGES-C) are rating scales developed by expert endoscopists. The GAGES scale was completed by the attending endoscopist (A) and an observer (O) in self-assessment (S) during procedures to establish interrater reliability (IRR, using the intraclass correlation

coefficient [ICC]) and internal consistency (IC, using Cronbach's alpha). Instrumentation was evaluated when possible and correlated with total scores. Construct and external validity were examined by comparing novice (NOV) and experienced (EXP) endoscopists (Student's *t*-test). Correlations were calculated for GAGES-UE and GAGES-C with participants who had performed both.

Results For the 139 completed evaluations (60 NOV, 79 EXP), IRR (A vs. O) was 0.96 for GAGES-UE and 0.97 for GAGES-C. The IRR between S and A was 0.78 for GAGES-UE and 0.89 for GAGES-C. The IC was 0.89 for GAGES-UE, and 0.95 for GAGES-C. There were mean differences between the NOV and the EXP endoscopists for GAGE-UE (14.4 ± 3.7 vs. 18.5 ± 1.6 ; $p < 0.001$) and GAGE-C (11.8 ± 3.8 vs. 18.8 ± 1.3 ; $p < 0.001$). Good correlation was found between the scores for the GAGE-UE and the

M. C. Vassiliou (✉) · P. A. Kaneva · G. Sroka · G. M. Fried
McGill University Health Centre, Montreal, QC, Canada
e-mail: melinavassiliou@gmail.com

B. K. Poulouse
Vanderbilt University, Nashville, TN, USA

B. J. Dunkin
Methodist Hospital, Houston, TX, USA

J. M. Marks
Case Medical Center, Cleveland, OH, USA

R. Sadik
Sahlgrenska Hospital, Gothenburg, Sweden

M. Anvari
McMaster University, Hamilton, ON, Canada

K. Thaler
University of Missouri, Columbus, MO, USA

G. L. Adrales
Dartmouth-Hitchcock Medical Center, Lebanon, NH, USA

J. W. Hazey
Ohio State University, Columbus, OH, USA

J. R. Lightdale
Children's Hospital Boston, Boston, MA, USA

V. Velanovich
Henry Ford Hospital, Detroit, MI, USA

L. L. Swanstrom
Legacy Health, Portland, OR, USA

J. D. Mellinger
Medical College of Georgia, Augusta, GA, USA



Preparing for the American Board of Surgery Flexible Endoscopy Curriculum: Development of multi-institutional proficiency-based training standards and pilot testing of a simulation-based mastery learning curriculum for the Endoscopy Training System

Brenton R. Franklin^{a,*}, Sarah B. Placek^a, Aimee K. Gardner^b, James R. Korndorffer Jr.^c, Mercy D. Wagner^a, Jonathan P. Pearl^d, E. Matthew Ritter^a

^a The Department of Surgery at the Uniformed Services University and the Walter Reed National Military Medical Center, Bethesda, MD, USA

^b Baylor College of Medicine, 1 Baylor Plaza, Houston, TX 77030, USA

^c Department of Surgery, Tulane University School of Medicine, 1430 Tulane Ave, New Orleans, LA 70112, USA

^d Department of Surgery, University of Maryland, 22 S. Greene Street, Baltimore, MD 21201, USA

ARTICLE INFO

Article history:

Received 20 July 2017

Received in revised form

9 September 2017

Accepted 16 September 2017

Keywords:

Endoscopy

Simulation

Mastery learning

Endoscopic surgery

Standard setting

ABSTRACT

Background: The Fundamentals of Endoscopic Surgery (FES) exam is required for American Board of Surgery certification. The purpose of this study was to develop performance standards for a simulation-based mastery learning (SBML) curriculum for the FES performance exam using the Endoscopy Training System (ETS).

Methods: Experienced endoscopists from multiple institutions and specialties performed each ETS task (scope manipulation (SM), tool targeting (TT), retroflexion (RF), loop management (LM), and mucosal inspection (MI)) with scores used to develop performance standards for a SBML training curriculum. Trainees completed the curriculum to determine feasibility, and effect on FES performance.

Results: Task specific training standards were determined (SM-121sec, TT-243sec, RF-159sec, LM-261sec, MI-180–480sec, 7 polyps). Trainees required 29.5 ± 3.7 training trials over 2.75 ± 0.5 training sessions to complete the SBML curriculum. Despite high baseline FES performance, scores improved (pre 73.4 ± 7 , post 78.1 ± 5.2 ; effect size = 0.76, $p > 0.1$), but this was not statistically discernable.

Conclusions: This SBML curriculum was feasible and improved FES scores in a group of high performers. This curriculum should be applied to novice endoscopists to determine effectiveness for FES exam preparation.

Published by Elsevier Inc.

1. Introduction

Endoscopy is a large component of many general and colorectal surgeons' practices, and the need for proficiency continues to increase in more rural general surgery practices.^{1,2} Standardized training and assessment for endoscopy is in its early stages, and only recently was the Fundamentals of Endoscopic Surgery (FES)

exam developed as a way to identify individuals with a level of competency required to safely perform basic endoscopy.^{3–5} The need to ensure that surgeons are proficient in basic endoscopic skills prior to entering independent practice has been recognized by the American Board of Surgery, who will now require FES certification for board eligibility starting with the graduating residents of 2018 as part of the Flexible Endoscopy Curriculum.⁶

Abbreviations: FES, Fundamentals of Endoscopic Surgery; FLS, Fundamentals of Laparoscopic Surgery; SAGES, Society of American Gastrointestinal and Endoscopic Surgeons; USU, Uniformed Services University of the Health Sciences; SBML, Simulation Based Mastery Learning; VR, Virtual Reality; ETS, Endoscopy Training System; SD, Standard Deviation; MIS, Foregut Minimally Invasive Surgery; CR, Colorectal Surgery; GI, Gastroenterology; GAGES, Gastrointestinal Global Assessment of Gastrointestinal Endoscopic Skills.


* Corresponding author. 8901 Rockville Pike, Bethesda, MD 20889, USA.

E-mail address: brentonfranklin@gmail.com (B.R. Franklin).

<https://doi.org/10.1016/j.amjsurg.2017.09.010>

0002-9610/Published by Elsevier Inc.

Simulation-based mastery learning for endoscopy using the endoscopy training system: a strategy to improve endoscopic skills and prepare for the fundamentals of endoscopic surgery (FES) manual skills exam

E. Matthew Ritter¹  · Zachary A. Taylor¹ · Kathryn R. Wolf¹ · Brenton R. Franklin¹ · Sarah B. Placek¹ · James R. Korndorffer Jr.² · Aimee K. Gardner³

Received: 1 April 2017 / Accepted: 22 June 2017 / Published online: 11 July 2017
© Springer Science + Business Media, LLC (outside the USA) 2017

Abstract

Introduction The fundamentals of endoscopic surgery (FES) program has considerable validity evidence for its use in measuring the knowledge, skills, and abilities required for competency in endoscopy. Beginning in 2018, the American Board of Surgery will require all candidates to have taken and passed the written and performance exams in the FES program. Recent work has shown that the current ACGME/ABS required case volume may not be enough to ensure trainees pass the FES skills exam. The aim of this study was to investigate the feasibility of a simulation-based mastery-learning curriculum delivered on a novel physical simulation platform to prepare trainees to pass the FES manual skills exam.

Methods The newly developed endoscopy training system (ETS) was used as the training platform. Seventeen PGY 1 (10) and PGY 2 (7) general surgery residents completed a pre-training assessment consisting of all 5 FES tasks on the GI Mentor II. Subjects then trained to previously determined expert performance benchmarks on each of 5 ETS tasks. Once training benchmarks were reached for all tasks,

a post-training assessment was performed with all 5 FES tasks.

Results Two subjects were lost to follow-up and never returned for training or post-training assessment. One additional subject failed to complete any portion of the curriculum, but did return for post-training assessment. The group had minimal endoscopy experience (median 0, range 0–67) and minimal prior simulation experience. Three trainees (17.6%) achieved a passing score on the pre-training FES assessment. Training consisted of an average of 48 ± 26 repetitions on the ETS platform distributed over 5.1 ± 2 training sessions. Seventy-one percent achieved proficiency on all 5 ETS tasks. There was dramatic improvement demonstrated on the mean post-training FES assessment when compared to pre-training (74.0 ± 8 vs. 50.4 ± 16 , $p < 0.0001$, effect size = 2.4). The number of ETS tasks trained to proficiency correlated moderately with the score on the post-training assessment ($r = 0.57$, $p = 0.028$). Fourteen (100%) subjects who trained to proficiency on at least one ETS task passed the post-training FES manual skills exam.

Conclusions This simulation-based mastery learning curriculum using the ETS is feasible for training novices and allows for the acquisition of the technical skills required to pass the FES manual skills exam. This curriculum should be strongly considered by programs wishing to ensure that trainees are prepared for the FES exam.

Presented at the SAGES 2017 Annual Meeting, March 22–25, 2017, Houston, Texas.

✉ E. Matthew Ritter
eritter@usuhs.edu

¹ Department of Surgery at the Uniformed Services University of the Health Sciences and the Walter Reed National Military Medical Center, and National Capital Region Simulation Consortium, 4301 Jones Bridge Road A-3020 C, Bethesda, MD 20814, USA

² Department of Surgery, Tulane University School of Medicine, New Orleans, LA, USA

³ Baylor College of Medicine, Houston, TX, USA

Keywords Simulation · FES · Mastery learning · Flexible endoscopy · Colonoscopy · Education

The assessment components of the fundamentals of endoscopic surgery (FES) program have considerable published validity evidence to support their use in



THE AMERICAN BOARD OF SURGERY

FLEXIBLE ENDOSCOPY CURRICULUM FOR GENERAL SURGERY RESIDENTS

Table of Contents

(click to go to section)

ABS Flexible Endoscopy Curriculum.....	2
LEVEL 1 (PGY-1 or -2)	4
LEVEL II (PGY-1 or -2).....	5
LEVEL III (PGY-2 or -3)	6
LEVEL IV (PGY-3 or -4)	8
LEVEL V (PGY-4 or -5)	9
Appendices - Resources	
APPENDIX A – Suggested Cognitive and Technical Resources by Level.....	10
APPENDIX B – Additional Recommended Readings	22
APPENDIX C – GAGES Scoresheets	26

The American Board of Surgery gratefully acknowledges the contributions of the following organizations to this curriculum: Society of American Gastrointestinal and Endoscopic Surgeons, American Society of Colon and Rectal Surgeons, American Society for Metabolic and Bariatric Surgery, and Society for Surgery of the Alimentary Tract.

© 2014 The American Board of Surgery Inc.

Note: SCORE resources in Appendix A updated in May 2017

Guidelines for privileging, credentialing, and proctoring to perform GI endoscopy



Prepared by: ASGE STANDARDS OF PRACTICE COMMITTEE

Ashley L. Faulx, MD, FASGE, Jenifer R. Lightdale, MD, MPH, FASGE, NASPGHAN representative, Ruben D. Acosta, MD, Deepak Agrawal, MD, MPH, David H. Bruining, MD, Vinay Chandrasekhara, MD, Mohamad A. Eloubeidi, MD, MHS, FASGE, Suryakanth R. Gurudu, MD, FASGE, Loralee Kelsey, BSN, RN, CGRN, SGNA representative, Mouen A. Khashab, MD, Shivangi Kothari, MD, V. Raman Muthusamy, MD, FASGE, Bashir J. Qumseya, MD, MPH, Aasma Shaukat, MD, MPH, FASGE, Amy Wang, MD, FASGE, Sachin B. Wani, MD, Julie Yang, MD, John M. DeWitt, MD, FASGE, Chair

This document was reviewed and approved by the Governing Board of the American Society for Gastrointestinal Endoscopy.

This is 1 of a series of statements discussing the use of GI endoscopy in common clinical situations. The Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy (ASGE) prepared this text. In preparing this guideline, a search of the medical literature was performed by using PubMed. Additional references were obtained from the bibliographies of the identified articles and from recommendations of expert consultants. When few or no data exist from well-designed prospective trials, emphasis is placed on results from large series and reports from recognized experts. Guidelines for appropriate use of endoscopy are based on a critical review of the available data and expert consensus at the time the guidelines are drafted. Further controlled clinical studies may be needed to clarify aspects of this guideline. This guideline may be revised as necessary to account for changes in technology, new data, or other aspects of clinical practice. The recommendations are based on reviewed studies and are graded on the quality of the supporting evidence (Table 1).¹ The strength of individual recommendations is based on both the aggregate evidence quality and an assessment of the anticipated benefits and harms. Weaker recommendations are indicated by phrases such as “we suggest,” whereas stronger recommendations are typically stated as “we recommend.”

STATEMENT ON CREDENTIALING, RE-CREDENTIALING, AND GRANTING PRIVILEGES FOR GI ENDOSCOPY

A primary mission of the ASGE is to promote high-quality patient care and safety in the field of GI endoscopy.

The purpose of this statement is to provide a suitable framework for determining the competency of practicing endoscopists and for the granting of privileges to perform endoscopic procedures. Guidelines for the granting of privileges for newly developed endoscopic procedures are also provided. As such, this document provides principles and practical guidelines to assist credentialing organizations in creating policy for the granting and renewal of endoscopic privileges.

The principles set out in this document are intended to apply universally to all endoscopists, although some modifications for pediatric procedures are detailed in a separate ASGE guideline.² This guideline replaces a previously published document on principles for competency and privileging by nonphysician endoscopists.³

DEFINITION OF TERMS

A number of terms related to competency and privileging of procedures are summarized in Table 2. Generally speaking, training in endoscopic techniques must be adequate for each major category of endoscopy for which privileges are requested. The need to seek and attain competency in new procedures may periodically arise for endoscopists over the course of their career. New procedures should be taught by preceptors using a validated curriculum. The preceptor should be responsible for setting objectives, demonstrating procedural techniques, overseeing the instruction and practice of skills, evaluating the preceptee, and documenting competency of the preceptee for future credentialing. Whenever possible, competence should be determined based on objective criteria and direct observation. Performance of an arbitrary number of procedures does not guarantee competency, because of differences in individual learning curves. However, minimal threshold numbers may be set below



GAGES - UPPER GI ENDOSCOPY SCORESHEET

GLOBAL ASSessment of GASTROINTESTINAL ENDOSCOPIC SKILLS

INTUBATION OF THE ESOPHAGUS

SCORE ☐

Reflects patient management, understanding of anatomy and sedation

- 5 Able to independently (successfully) intubate esophagus without patient discomfort
- 4
- 3 Requires detailed prompting and cues
- 2
- 1 Unable to properly intubate requiring take over

SCOPE NAVIGATION

SCORE ☐

Reflects navigation of the GI tract using tip deflection, advancement/withdrawal and torque

- 5 Expertly able to manipulate the scope in the upper GI tract autonomously.
- 4
- 3 Requires verbal guidance to completely navigate the upper GI tract
- 2
- 1 Not able to achieve goals despite detailed verbal cues, requiring take over

ABILITY TO KEEP A CLEAR ENDOSCOPIC FIELD

SCORE ☐

Utilization of insufflation, suction and/or irrigation to maximize mucosal evaluation

- 5 Uses insufflation, suction, and irrigation optimally to maintain clear view of endoscopic field
- 4
- 3 Requires moderate prompting to maintain clear view
- 2
- 1 Inability to maintain view despite extensive verbal cues

INSTRUMENTATION (if applicable; leave blank if not applicable)

SCORE ☐

Random biopsy: targeting is assessed by asking the endoscopist to take another biopsy from the identical site. Targeted instrumentation: evaluation is based on ability to direct the instrument to the target.

- 5 Expertly directs instrument to desired target
- 4
- 3 Requires some guidance and/or multiple attempts to direct instrument to target
- 2
- 1 Unable to direct instrument to target despite coaching

QUALITY OF EXAMINATION

SCORE ☐

Reflects attention to patient comfort, efficiency, and completeness of mucosal evaluation

- 5 Expertly completes the exam efficiently and comfortably
- 4
- 3 Requires moderate assistance to accomplish a complete and comfortable exam
- 2
- 1 Could not perform a satisfactory exam despite verbal and manual assistance requiring takeover of the procedure

