

## Curriculum Development for Upper Endoscopy Training in Surgical Education

### Genel Cerrahi Uzmanlık Eğitiminde Üst Endoskopi Eğitim Programı Geliştirilmesi

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#### ABSTRACT

Gastrointestinal endoscopy is used for many treatment procedures, beyond the diagnosis of the diseases of the system it is applied to. Thanks to these treatment applications, achalasia, gastrointestinal fistulas, pancreatic pseudocysts, early gastric cancer and neuroendocrine tumors can be treated endoscopically. In our country, gastroenterologists are the most common performers of digestive system endoscopy, but internal medicine and general surgery specialists also perform endoscopy. Although professional organizations and the Ministry of Health continue to make arrangements, endoscopy education has not been standardized in our country, yet. This program includes a curriculum aimed at standardization of endoscopy education for general surgery residents.

**Keywords:** Upper endoscopy, curriculum development, surgical training.

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#### ÖZET

Günümüzde gastrointestinal endoskopi, uygulandığı sistemin hastalıklarının teşhisinden öte, çok sayıda tedavi işlemi için kullanılmaktadır. Bu tedavi uygulamaları sayesinde, akalazya, gastrointesinal fistüller, pankreatik psödokistler, erken gastrik kanser ve nöroendokrin tümörler endoskopik olarak tedavi edilebilmekte, özofagus varislerinin sklerozan madde enjeksiyonu veya lastik bant ile tedavisi, darlıkların dilatasyonu, yabancı cisimlerin çıkarılması, polipektomiler, erken mide kanserlerinin endoskopik tedavileri, bunlardan sadece bazılarıdır. Ülkemizde, sindirim sistemi endoskopisinin en sık uygulayıcıları gastroenterologlar olmakla birlikte, dahiliye ve genel cerrahi uzmanları da endoskopi yapmaktadırlar. Meslek kuruluşları ve Sağlık Bakanlığı'nın çalışmaları olsa da, ülkemizde endoskopi eğitimi halen standardize edilememiştir. Bu program, genel cerrahi uzmanlık eğitimi alan araştırma görevlilerinin, üst endoskopi yapabilir hale gelmeleri amacıyla standardizasyon amaçlayan bir müfredat içermektedir.

**Anahtar Sözcükler:** Üst endoskopi, program geliştirme, cerrahi eğitim.

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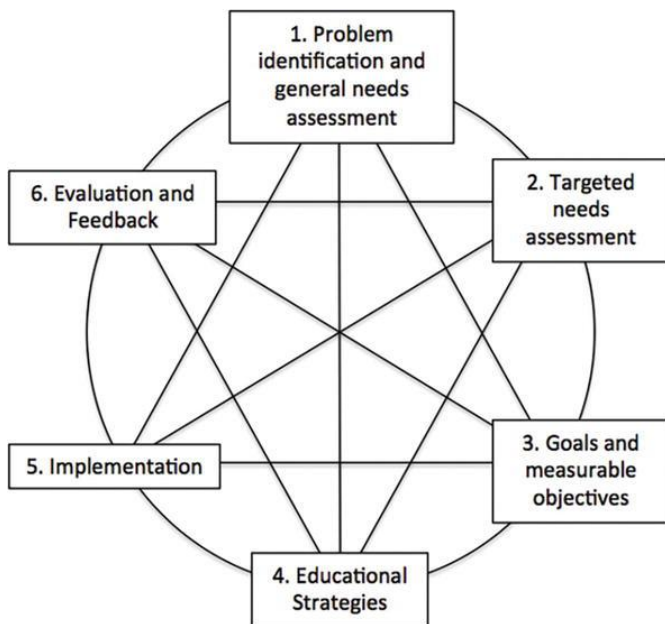
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**INTRODUCTION**

As in almost all areas of pre and postgraduate medical education in our country, endoscopy education does not have principles and standards for years. The Turkish Surgical Association and the Ministry of Health are working to ensure that regulations can be made in this regard. In addition, there are principles determined by the American Society for Gastrointestinal Endoscopic Surgeons (ASGE) and the American Society of Gastrointestinal Endoscopic Surgeons (SAGES) to maintain certain standards for endoscopic interventions (1, 2). For a thorough endoscopy training; indications and contraindications of endoscopy, alternatives in diagnosis and treatment, preparation of the patient for the endoscopic procedure, sedation, analgesia and follow-up procedures, application of endoscopy, adequate and accurate evaluation of the findings in terms of diagnosis and treatment, possible complications and their treatment should be included in curriculum as well as the limits of the endoscopic procedures. Regular meetings should be held to discuss critical endoscopic cases, complications and deaths. Training sets containing clinical summary, endoscopic photographs, video and CD recordings, radiological and pathological documents should be prepared. The performance of the trainees should be recorded and evaluated from time to time.

Designed for General Surgery residents, this model is a training program in which diagnostic and therapeutic endoscopic interventions for the upper gastrointestinal system will be taught. The program will last for two weeks (10 working days) and will be repeated 10 times during an academic year. The number of participants in each program is also limited to 10 students.

The advantage of developing curriculum according to a model has the advantage of giving it as a whole and presented in a way that reflects a certain understanding and logic (3). However, the important thing for the medical educator is not to apply a named model, but to know which model is suitable for the country and institutional opportunities. The development of this program will be based on the Kern Model. But, the needs of the people and the society should be taken into consideration in order for the program to be implemented to meet these needs. So, country's health policy and student feedback should also be decisive.



**Figure 1:** Six-step program development approach – Adapted from Kern (4)

**Targeted Needs Assessment**

Today, gastrointestinal endoscopy is used for many treatment procedures, as well as diagnosis of the diseases of the system it is applied to. Thanks to these treatment applications, achalasia, gastrointestinal fistulas, pancreatic pseudocysts, early gastric cancer and neuroendocrine tumors can be treated endoscopically. are just some of them (1).

An important factor that requires surgeons to receive endoscopy training is the country needs. Gastrointestinal system diseases, which constitute a high percentage of patients, await diagnosis and treatment for a long time due to the relatively small number of endoscopists. Most of the gastrointestinal system diseases that require endoscopy are treated by surgeons. Likewise, in countries where health services can be provided at a good level, endoscopy training is a compulsory part of surgical training. Every surgeon trained in endoscopy will have the chance to offer more technological and refined healthcare to the patient population.

**Goals and Objectives**

In our country, gastroenterologists are the most common performers of digestive system endoscopy, but internal medicine and general surgery specialists also perform endoscopy. Medical professionals who will perform endoscopy must receive the necessary training under the control of an experienced trainer in adequate centers, both as part of their specialty training and in the form of post-graduate training. At the end of the training, they should receive sufficient information about the endoscopic anatomy of the organs, the technical features of endoscopes and biopsy, cytology, imaging and electrocauterization accessories. Before starting endoscopic procedures, patients should be prepared, premedicated, and monitoring of sedated patients should be learned. Systematic correlation between endoscopic, radiological and pathological findings should be adopted as a natural part of any endoscopic procedure. When the endoscopy procedure is finished, the habit of transferring the findings to the forms should be acquired.

Education in the learning and application of endoscopic procedures should begin with diagnostic upper gastrointestinal endoscopy. Then, flexible sigmoidoscopy, colonoscopy, mucosal biopsy, polypectomy, dilatation of peptic strictures of the esophagus, percutaneous liver biopsy and PEG should be taught as standard procedures, consecutively (1). At least 100 diagnostic upper endoscopy, 100 colonoscopy, 20 endoscopic polypectomy, 20 non-variceal, 15 hemostasis of bleeding from varicose, 30 esophageal dilatation, 25 flexible sigmoidoscopy, 10 percutaneous endoscopic gastrostomy should be performed, to be certified (5).

Such programs aim to provide general surgeons with the competence to perform endoscopic procedures of the gastrointestinal system, to help them acquire skills in applying innovations, and to prevent delays in the diagnosis and treatment of gastrointestinal system diseases throughout the country.

**Learning Objectives**

Upon completing the program, each participant will achieve the following objectives:

|    | <b>Title</b>  | <b>Objectives</b>   |
|----|---|---|
| 1  | History, developmental stages and today of endoscopy  | Counts the developmental steps of endoscopy<br>Counts and explains the usage areas of endoscopy   |
| 2  | Structure, components and management of the ideal endoscopy unit  | Explain the structure, components and management of the endoscopy unit.   |
| 3  | Technology of endoscopy systems   | Briefly explains the technology of all equipment  |
| 4  | Maintenance, cleaning, disinfection and sterilization   | Explains the maintenance, cleaning, disinfection and sterilization standards of the devices   |
| 5  | Indications and contraindications for endoscopic procedures   | Selects the appropriate patient for endoscopy procedures  |
| 6  | Patient preparation before endoscopy <ul style="list-style-type: none"> <li>• Patient information</li> <li>• Informed consent</li> <li>• Drugs used</li> <li>• Prophylactic antibiotic</li> </ul> | Informs the patient correctly and obtains his/her consent<br>Explains how to prepare the patient for endoscopy<br>Uses drugs correctly<br>Makes prophylactic antibiotic application correctly |
| 7  | Conscious sedation, analgesia, monitoring, sedation risks and precautions, post-procedure exit  | Explain the risks and precautions of conscious sedation, analgesia, monitoring and sedation in endoscopy<br>Applies post-process exit criteria  |
| 8  | Anticoagulants  | Explains and applies anticoagulant regulation in endoscopy patients   |
| 9  | Upper GI endoscopy - basics   | Explains and applies the anatomical and technical knowledge and skill steps required for upper GIS endoscopy  |
| 10 | Basic pathologic lesions and biopsy procedures that may be encountered during upper GI endoscopy  | Recognizes the basic pathologic lesions that may be encountered during upper GI endoscopy, explains and applies biopsy methods.   |
| 11 | Causes of upper GI bleeding and endoscopic control methods  | Explain the causes of upper GI bleeding and endoscopic control methods  |
| 12 | Dilatation in upper GIS strictures  | Can dilate upper GIS strictures   |
| 13 | Percutaneous Endoscopic Gastrostomy (PEG) and Percutaneous Endoscopic Jejunostomy (PEJ)   | Explain the indications and complications of PEG and PEJ<br>Applies PEG and PEJ   |

**Program Features and Configuration**

The program must be limited to 10 participants and the participants must be General Surgery residents. Training should be given in a fully equipped Endoscopy Unit with at least two endoscopy simulators and two separate towers, each equipped with upper and lower endoscopy equipment. During the procedures, two assistant health personnel should work together with the trainer. Theoretical lectures should be held in the meeting room, there should be a projection device and a large-screen LCD television for presentations.

In order for the participants to gain knowledge, skills and attitude goals, it is recommended that 13 course subjects are mainly taken in the morning hours, and sequential practical applications are made within the scope of the same subject headings in order to reach the skill and attitude goals. Exams should be administered on the last day of the training, and 30 minutes should be allocated for feedback at the end of each day, including the exam day. A sample work schedule including ten working days is presented in Tables 1 and 2.

**Table 1:** First week

|               | Monday   | Tuesday                         | Wednesday                       | Thursday                      | Friday                        |
|---------------|----------|---------------------------------|---------------------------------|-------------------------------|-------------------------------|
| 08.00 – 08.45 | Lesson 1 |                                 |                                 |                               |                               |
| 09.00 – 09.45 | Lesson 2 | Lesson 9                        | Lesson 11                       |                               | Discussion                    |
| 10.00 – 10.45 | Lesson 3 |                                 |                                 | Lesson 13                     |                               |
| 11.00 – 11.45 | Lesson 4 | Lesson 10                       | Lesson 12                       |                               | Discussion                    |
| 12.00 – 13.00 | Lunch    |                                 |                                 |                               |                               |
| 13.00 – 13.45 | Lesson 5 |                                 |                                 |                               |                               |
| 14.00 – 14.45 | Lesson 6 | Hands on practice 1 (simulator) | Hands on practice 2 (simulator) | Hands on practice 1 (patient) | Hands on practice 2 (patient) |
| 15.00 – 15.45 | Lesson 7 |                                 |                                 |                               |                               |
| 16.00 – 16.45 | Lesson 8 |                                 |                                 |                               |                               |
| 16.45 – 17.15 | Feedback | Feedback                        | Feedback                        | Feedback                      | Feedback                      |

**Table 2:** Second week

|               | Monday                          | Tuesday                         | Wednesday                     | Thursday                       | Friday        |
|---------------|---------------------------------|---------------------------------|-------------------------------|--------------------------------|---------------|
| 08.00 – 08.45 |                                 |                                 |                               |                                |               |
| 09.00 – 09.45 | Hands on practice 3 (simulator) | Hands on practice 4 (simulator) |                               |                                | Test          |
| 10.00 – 10.45 | Hands on practice 3 (patient)   | Hands on practice 4 (patient)   | Hands on practice 7 (patient) | Hands on practice 9 (patient)  |               |
| 11.00 – 11.45 |                                 |                                 |                               |                                | Hands on exam |
| 12.00 – 13.00 | Lunch                           |                                 |                               |                                |               |
| 13.00 – 13.45 |                                 |                                 |                               |                                |               |
| 14.00 – 14.45 | Hands on practice 5 (patient)   | Hands on practice 6 (patient)   | Hands on practice 8 (patient) | Hands on practice 10 (patient) | Hands on exam |
| 15.00 – 15.45 |                                 |                                 |                               |                                |               |
| 16.00 – 16.45 |                                 |                                 |                               |                                |               |
| 16.45 – 17.15 | Feedback                        | Feedback                        | Feedback                      | Feedback                       | Feedback      |

**Assessment-Evaluation**

Evaluation of whether the information objectives have been achieved or not should be done with a multiple-choice test consisting of at least 50 questions. For skills and attitudes, participants will be evaluated according to the procedures they will perform with simulator and endoscopy by the trainers. A grade above 70 percent in both phases of the exam is essential for certification.

**Course Scope**

*LESSON 1:* History, developmental stages and today of endoscopy

**Purpose:** To give information about the beginning, historical development and steps of endoscopic procedures.

**Learning objectives:**

- Counts the developmental steps of endoscopy.
- Lists the current usage areas of endoscopy.
- Explains current endoscopy usage areas.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector device

**Content:** Endoscopic interventions dating back to Hippocrates, who is known to use rectal speculum in his examinations, have found widespread use in urological, then gynecological, and then other surgical branches. This journey, which started with rigid scopes, gained both diagnostic and therapeutic features with the use of bendable instruments, and gained a revolutionary feature with the addition of image systems. In this course, endoscopy instruments and techniques from the earliest times to the present are introduced with visuals.

**LESSON 2: Structure, components and management of the ideal endoscopy unit**

**Purpose:** To give information about the construction, equipment and operating principles of an endoscopy unit that complies with the standards and can ensure patient/healthcare worker safety.

**Learning objectives:**

**Knows the architectural configuration of the endoscopy unit,**

Creates the list of workers, equipment and materials that make up the endoscopy unit,

Can manage the endoscopy unit.

Can list the needs of the endoscopy unit.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector device

**Content:** The width of the endoscopy units and the device and material capacity may vary depending on the hospital or practice environment, the scope of the procedures to be performed, and the available space, personnel and financial resources. Ideally, endoscopy units of equipped hospitals have an assistant physician, nurse, or trained technician for the endoscopist, three nurses for other procedures, one to three secretaries, and an X-ray technician (6). The American Society for Gastrointestinal Endoscopy (ASGE) determines and publishes the standardization and application principles of endoscopy, with the work of various committees (1).

**LESSON 3: Technology of endoscopy systems**

**Purpose:** To introduce the working principles and technical features of endoscopes and auxiliary equipment.

**Learning objectives:**

- Briefly explains the technology of all equipment to be used.
- Recognizes possible technical malfunctions, can explain why.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** At the early stages of endoscopy, rigid endoscopes were of great importance and constituted the first step of further developments (7). Today, fiberoptic and electronic endoscopes have largely replaced the rigid ones and their usage area has reached a very wide extent. The image of flexible endoscopes is based on a fiberoptic or electronic (video) system (8). In fiberoptic endoscopes, the image is transmitted to the viewing area of the endoscope through glass fibers adhered to each other. The main addition to a conventional flexible fiberoptic endoscope is the light source on which the endoscope is mounted. The light that provides illumination in these instruments consists of a cold light source with a halogen or xenon lamp and is transmitted into the organ by fiberoptic fibers in the endoscope. Endoscopes usually have dual paths placed to transmit light. Again, from the mucosa to the eye, the image is transmitted by fiberoptic fibers. Fiberoptic endoscopes contain more than 20 thousand plastic-coated glass fibers. These frangible fibers are damaged over time by x-rays, water intake, biting or excessive bending. Fiberendoscopes have a lens at each end. By adjusting the focusing of the upper end of these lenses, image clarity can be achieved.

**LESSON 4: Maintenance, cleaning, disinfection and sterilization**

**Purpose:** To teach disinfection and sterilization standards of devices used in endoscopy unit.

**Learning objectives:**

Explains the maintenance principles of devices.

Cleans the devices.

Explains the disinfection and sterilization standards of the devices.

Does the maintenance, cleaning, disinfection and sterilization in accordance with the standards.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** During endoscopy of the gastrointestinal tract, there are various risks of infection. It is possible to transfer some viral and bacterial infections from patient to patient or from staff to patient. During endoscopy, infectious agents can pass from the digestive tract to the blood. Therefore, serious infection prevention measures should be taken in endoscopy units.

**LESSON 5:** Indications and contraindications for endoscopic procedures

**Purpose:** To provide information that will enable the creation of flow charts about which patient should be operated on when, which patient should not be operated on, or when it should not be done.

**Learning objectives:**

- Selects the appropriate patient for endoscopy procedures.
- Defines suitable and unsuitable times for endoscopy procedures.
- Recognizes the patient who is not suitable for endoscopy.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** Patients who will undergo endoscopy should be seen by the physician who will perform the procedure before the intervention. The patient's complaints, previous procedures and previous interventions should be questioned. Today, all endoscopic procedures should be performed under sedation. After a preliminary examination by the anesthetist, routine blood tests are requested and preoperative consultation is completed. One of the most important points in patients who are approved for anesthesia, whether upper or lower gastrointestinal system endoscopy will be performed, is to question whether they have a fasting period of at least six hours.

**LESSON 6:** Patient preparation before endoscopy

- Patient information
- Informed consent
- Drugs used
- Prophylactic antibiotic

**Purpose:** To inform the patient properly, to obtain informed consent, to reveal the drugs to be used and the principles of antibiotic prophylaxis in patients who will undergo the endoscopic intervention.

**Learning objectives:**

- Informs the patient correctly and obtains his/her consent.
- Explains how to prepare the patient for endoscopy.
- Knows what drugs he will need to take.
- Makes prophylactic antibiotic application correctly.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** Patients have the right to know what is going to be done with their bodies and to allow or deny this. The physician is obliged to inform the patient sufficiently and in a way that the patient can understand about the procedure and obtain the patient's consent for the procedure to be performed. Informed consent is official permission to perform diagnostic and therapeutic procedures on his or her own body. Printed consent forms are used in most health institutions and organizations. Although these forms provide ease of use, they may not be suitable for every patient's situation. In addition, there is a risk that these forms will be signed like any other document without adequately informing the patient. Therefore, there should be blanks in the forms to reflect the patients' own special conditions and to be filled by the patients. In informed consent, the nature of the procedure to be performed, how it will be done, its necessity and the benefits it will provide to the patient, the risks of the procedure, the harm that will occur if he/she does not want to have this procedure, alternative diagnosis and treatment options should be explained in a language that the patient can understand.

**LESSON 7:** Conscious sedation, analgesia, monitoring, risks and precautions

**Purpose:** To obtain information about supportive health practices other than endoscopy during the procedure.

**Learning objectives:**

- Explains conscious sedation and analgesia methods in endoscopy.
- Applies sedation and analgesia methods,
- Can monitor the patient,
- Explain the risks and precautions of sedation.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** Patient comfort is an important issue during endoscopy. In general, there are negative judgments for endoscopic applications in people's memory. Informing the patient adequately and accurately about the procedure reduces prejudices and conditioning; facilitates the patient's compliance with the procedure. With good communication, a significant proportion of upper endoscopic procedures do not require sedation. However, sedation is required, especially when performing long-lasting and therapeutic endoscopic procedures. Sedation in endoscopy is preferred by most endoscopists because it reduces or eliminates the patient's pain, creates short-term amnesia in the patient, eliminates the patient's anxiety and increases compliance. The indications for sedation and anesthesia applied during endoscopy and the methods applied for this procedure depend on many different variables such as the training received by the clinician, the medical and socio-cultural status of the patient, and the experience of the endoscopy center. However, every endoscopist should know how to provide sedation and anesthesia with drugs and monitoring methods whose reliability has been proven by international criteria, and should use them in necessary cases.

For most endoscopic procedures, mild to moderate sedation is sufficient (10). These patients; wake up easily, respiratory reflexes are not lost and cardiovascular functions are not impaired. As the depth of sedation increases, care should be taken in terms of sedation complications. The most effective way of monitoring the patient during sedation is to monitor the level of consciousness. It is essential that the patient does not lose consciousness during the procedure. If the patient is responsive to verbal and tactile stimuli, sedation is at the desired level.

**LESSON 8:** Anticoagulants

**Purpose:** To determine the time and procedural determinant roles of anticoagulants in endoscopic procedures.

**Learning objectives:**

- Describes anticoagulant regulation in endoscopy patients
- Explains the principles of anticoagulant use
- Knows the limitations of the procedure in patients using anticoagulants.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** Endoscopic procedures can be divided into two groups as low-risk and high-risk procedures according to the bleeding risk. The general opinion recommends the continuation of anticoagulants for procedures with low bleeding risk and discontinuation for procedures with high bleeding risk (11). In fact, for this distinction, the anticoagulant used by the patient should be defined and the risk of thromboembolism that may develop in the patient as a result of discontinuation of anti-coagulant therapy should be determined. Thromboembolism risk can be classified as low and high thromboembolism risk groups according to the patient's comorbid diseases. In order to ensure normal platelet aggregation during the intervention, all kinds of anticoagulants should be discontinued 5-7 days in advance.

**LESSON 9:** Fundamentals of upper GI endoscopy

**Purpose:** To describe the endoscopic anatomy of the upper GIS and to explain the technical steps of upper endoscopy, respectively.

**Learning objectives:**

- Explains the anatomical information required for upper GI endoscopy,
- Explains and applies the technical knowledge and skill steps of upper GI endoscopy.

Applies the steps of upper GI endoscopy in correct order.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** The upper GIS begins with the entrance from the lips and continues as the oral cavity, esophagus, stomach and duodenum. Upper gastrointestinal endoscopy includes imaging of the oropharynx, esophagus, stomach, and proximal duodenum. A healthy and adequate imaging and appropriate documentation are the prerequisites for effective therapeutic interventions. The normal course of upper gastrointestinal endoscopy consists of the following steps (12).

1. Oral intubation.
2. Examination of the oropharynx.
3. Examination of the esophagus.
4. Examination of the esophagogastric junction.
5. Examination of the stomach and retroflexion (J maneuver).
6. Passage from the pylorus.
7. Examination of the duodenum.
8. Tissue sampling (if needed).
9. Therapeutic procedures (when necessary).

**LESSON 10:** Basic pathologic lesions and biopsy procedures that may be encountered during upper GI endoscopy

**Purpose:** To identify common disease states in upper GI endoscopy and to summarize diagnostic procedures.

**Learning objectives:**

- Recognizes the basic pathologic lesions
- Can choose and apply sampling methods
- Can take appropriate samples

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** Gastrointestinal system endoscopy and sampling is a basic method for the diagnosis and evaluation of digestive system diseases. Appropriate collection and transport of specimens is needed for accurate pathological diagnosis. Endoscopy is an ideal tool for collecting selected tissue and fluid samples for further analysis. Provided that a few very simple rules are followed, undesirable risks such as bleeding or perforation are minimal. Biopsy samples are most often taken for the detection of *H. pylori* by upper gastrointestinal system endoscopy. In addition, biopsies are taken from abnormal-appearing mucosal areas. Endoscopic samples can then be evaluated for histological, microbiological or other investigations such as polymerase chain reaction (PCR). In addition, tissue and fluid sampling can be performed for polypoid lesions, lesions suspected of malignancy, and lesions secondary to infection. The most commonly used specimen collection methods with upper gastrointestinal endoscopy are biopsy, brush cytology, and fluid sampling.

**LESSON 11:** Causes of upper GI bleeding and endoscopic control methods

**Purpose:** To understand the signs and symptoms of upper GI bleeding, diagnostic methods and treatment options.

**Learning objectives:**

- Recognizes the causes of upper GI bleeding,
- Explains endoscopic control methods for upper GI bleeding.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** Bleeding originating from the mouth to the ligament of Treitz (duodenojejunal junction) in the digestive system is called upper gastrointestinal bleeding. Its incidence is between 50–150/100,000 (13). Peptic ulcers and erosions in the stomach and duodenum are responsible for 75% of upper gastrointestinal bleeding. 85% of upper gastrointestinal system (GIS) bleeding can be controlled by endoscopic methods. Despite significant improvements in endoscopic and supportive treatments, mortality is around 10%, especially in advanced age (14). Gastroesophageal variceal bleeding carries a relatively high risk of recurrence and mortality. 1/3 of the patients who are hospitalized with upper GI bleeding and followed up have other comorbid diseases and 1/4 of these cases are over 70 years of age.

**LESSON 12:** Dilatation in upper GI strictures

**Purpose:** To diagnose benign and malignant upper GIS strictures and to discuss conservative treatment alternatives.

**Learning objectives:**

- Can diagnose upper GIS strictures.
- Can dilate in upper GIS strictures.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** GIS strictures are divided into two main groups as malignant and benign. Peptic stenosis, Schatzki ring, webs, iatrogenic strictures (such as strictures developing after radiotherapy, anastomotic strictures) and strictures developing after caustic substance removal are called to be benign (15). Malignant strictures, on the other hand, occur due to cancer or tumors of neighboring organs that press the gastrointestinal system. These are organic strictures. There are also non-organic or functional strictures. In strictures that do not require resection, bougie or balloon dilatation methods are discussed.

**LESSON 13:** Percutaneous Endoscopic Gastrostomy (PEG) and Percutaneous Endoscopic Jejunostomy (PEJ)

**Purpose:** To recognize attempts to meet the calorie and energy needs of patients with insufficient oral intake by physiological means.

**Learning objectives:**

- Knows PEG and PEJ indications,
- Explain the complications of PEG and PEJ,
- Can perform PEG and PEJ.

**Course duration and schedule:** Forty-five minutes

**Learning methods:** Narration with visual accompaniment.

**Training equipment to be used:** Projector.

**Content:** Nutritional support therapy for patients who are malnourished or at risk of developing malnutrition is a widely accepted practice. As a result of many researches and experimental and clinical studies conducted in the field of nutrition since the last quarter of the twentieth century and the beginning of the 21st century, consensus algorithms and guidelines prepared by reputable organizations in the field of nutrition (ASPEN, ESPEN, etc.) have been published (16, 17). According to these guidelines; the first route of choice in nutritional support should be the enteral route. Parenteral nutrition, on the other hand, is the second route to be chosen when enteral nutrition cannot be applied or patients' needs cannot be provided at the calculated level in long-term support. For enteral nutritional support, a pathway of access to the digestive tract must be provided. Today, percutaneous endoscopic gastrostomy (PEG) and percutaneous endoscopic jejunostomy (PEJ) are accepted as the gold standard methods for enteral nutrition (18). In this section, the history of PEG and PEJ, indications, contraindications, application techniques, complications, correct management of these complications and patient follow-up after the procedure are given in detail.

**PRACTICE WITH THE SIMULATOR 1 - 4**

**Purpose:** Mechanical simulators are simple and inexpensive instruments developed for endoscopic practice. It was first developed for rigid endoscopes in the late 1960s. Later, rubber colon and upper gastrointestinal tract models were developed for flexible endoscopes. Computer simulators are devices developed for procedures such as esophagogastrroduodenoscopy, colonoscopy, ERCP, flexible sigmoidoscopy. It is aimed for the participant to adapt to these devices before the actual endoscopy unit.

**Learning objectives:**

- Achieves the goals defined in the simulator modules.

**Course duration and schedule:** Four hours

**Learning methods:** Demonstration, coaching, learning by experience.

**Training materials to be used:** Mechanical and computer simulators

**Content:** Upper gastrointestinal endoscopy practice.

**PRACTICE WITH ENDOSCOPE 1-10**

**Purpose:** Participants who reach their knowledge goals and enter the practice of endoscopy with simulators, start basic endoscopic interventions on real patients, under the supervision of an instructor in endoscopy units.

**Learning objectives:**

- Can perform basic endoscopic procedures.
- Provides appropriate monitoring of the patient
- Gives the patient the appropriate position
- Performs the upper GI endoscopy stages in order
- Performs diagnostic procedures and maneuvers
- Implements therapeutic interventions.

**Course duration and time planning:** It is determined by the joint decision of the instructor and the participants.

**Learning methods:** Demonstration, coaching, learning by experience, hands-on.

**Training equipment to be used:** Endoscopy towers

**Content:** The basic steps and basic interventions of upper GI endoscopy will be applied on patients.

**Assessment-Evaluation**

In order to determine whether the participants have achieved the knowledge goals, a test with at least 50 multiple-choice questions must be applied and at least 35 questions must be answered correctly (70 points out of 100 points).

During the practice phase, the checklist prepared for each participant will be filled in for each stage of the procedures (Table 3). As for skill and attitude goals, measurement will not be based only on theoretical and practical exams, that is, it will not be only result-oriented, but the whole process will also be evaluated. For this purpose, student portfolios will be prepared from the first day of education, and records containing the studies that the student has done under the supervision of an instructor throughout the education process, which constitute evidence of learning and development with the learning objectives, will be evaluated. In the creation of the portfolio, there will be not only the works recorded by the student, but also the notes kept by the instructors throughout the learning process. As a result of the evaluation of this portfolio, the required grade for certification is 70 and above.

**Table 3:** Evaluation chart for practical performance

| Steps of the procedure                                     | Done |
|--|------|
| 1. He/she introduced himself to the patient                |      |
| 2. Explained the patient's indication for intervention     |      |
| 3. Gave the patient the correct position                   |      |
| 4. Monitored the patient                                   |      |
| 5. Saw that the patient's vital signs were stable          |      |
| 6. Sedated the patient                                     |      |
| 7. Started the endoscopy procedure                         |      |
| 8. Evaluated the oral cavity                               |      |
| 9. Showed rima glottis and directed towards the esophagus  |      |
| 10. Told the patient to swallow                            |      |
| 11. Evaluated Esophagus                                    |      |
| 12. Evaluated the esophagus-stomach junction               |      |
| 13. Evaluated the stomach                                  |      |
| 14. Evaluated hiatus by retroflexion                       |      |
| 15. Evaluated the pylorus                                  |      |
| 16. Crossed the pylorus                                    |      |
| 17. Evaluated the Bulbus                                   |      |
| 18. Evaluated the second part of the duodenum              |      |
| 19. Described the lesions                                  |      |
| 20. Took tissue sample with the appropriate technique      |      |
| 21. Revisited the entire tract before ending the procedure |      |
| 22. Took pictures at each stage separately                 |      |
| 23. Finished the procedure                                 |      |
| 24. Made sure that the patient's vital signs are stable    |      |
| 25. Wrote a detailed report about the procedure            |      |

**CONCLUSION**

In surgical education, as in every branch of medicine, standardization of pre and postgraduate medical education is still an important problem, sometimes a deficiency. Endoscopic training, which is the gold standard in the diagnosis and treatment of gastrointestinal diseases, which constitute an important part of surgical practice, also needs to provide similar principles and standards. Studies are carried out by the Turkish Surgical Association and the Ministry of Health in order to make regulations on endoscopy certification. More comprehensive studies are being conducted by the American Society for Gastrointestinal Endoscopic Surgeons (ASGE) and the American Society of Gastrointestinal Endoscopic Surgeons (SAGES) and the principles are being tried to be established. Endoscopy training must include; knowledge of indications and contraindications of endoscopy, alternatives in diagnosis and treatment, preparation of the patient for the endoscopic procedure, sedation, analgesia and follow-up procedures, application of endoscopy, adequate and accurate evaluation of the findings in terms of diagnosis and treatment, possible complications and their treatment as well as the limits of the endoscopic procedures. During the training period, all procedures, findings and complications should be recorded. Regular meetings should be held to discuss critical endoscopic cases, complications, and deaths. Training sets containing clinical summary, endoscopic photographs, video and CD recordings, radiological and pathological documents should be prepared.

The performance of the trainees should be recorded and evaluated from time to time. Endoscopic investigations should be part of education.

The development of similar training programs and standardization of intervention will lead to more successful results, especially in the diagnosis and treatment of gastrointestinal surgical diseases.

**Conflict of interest**

No conflict of interest was declared by the authors.

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