***Tutor guide***

**M4 2024-2025**

**Second term**

**Contents:**

1- Characters of O.6.U. graduates**:** 2- Teaching strategy in O.6.U.

1. -Guide lines (why P.B.L. ―Problem Based Learning‖) (what the student & tutor will do this term) , (modules in this term & their general objectives)
2. Schedule for lectures , practicals , cases ( small group teaching) , skill lab , & exams
3. Rubrics for grading assignments and presentations
4. Portfolio items
5. Cases with objectives
6. 8- Tutor guide for the cases
7. 9- N.A.R.S.
* **Characters of O.6.U. graduates:**
	1. Work to maintain normal health, provide primary health care and deal with common health problems in the society
	2. Be aware of the importance of a good doctor patient relationship and work to establish and maintain it. 3- Follow rules of medical ethics.
	3. Show appropriate attitudes and professionalism.
	4. Demonstrate appropriate communication, clinical and practical skills.
	5. Be prepared for lifelong learning.
	6. Be able to engage in post- graduate and research studies.
	7. Acquire basic administrative capabilities

**\*\* ملخص إستارتيجية التعليم والتعلم بالكلية\*\***

1.استراتيجية التعلم الذاتي:

أسلوب من أساليب التعلم المتطورة التى تمكن الطالب من تحصيل المعارف والمها ارت معتمداً على

 قدارته الذاتية من مصادر التعلم المختلفة ، فيعلم نفسه بنفسه وفقاً لقدارته ولسرعته فى التعلم.

2ـ استراتيجيه التعلم التفاعلي:

تعتمد استراتيجية التعليم التفاعلي على إسلوب التفاعل بين الطالب والمحاضر والمادة العلمية ويمكن تطبيق هذا المفهوم من خلال عدة وسائل منها التعليم التعاوني والتعليم الإلكتروني.

 أ- التعلم التعاوني:

من خلال عمل الطلاب معا فى مجموعات صغيرة العدد للعمل على حل المشكلات أو د ارسة حالة والمشاركة فى حملات التوعية في تفاعل إيجابي متبادل يشعر فيه كل فرد أنه مسئول عن تعلمه وتعلم الاخر .

ب-التعليم الالكتروني:

وسيمة تدعم العملية التعليمية وتحولها من طور التلقين إلى طور الإبداع والتفاعل وتنمية المها ارت، حيث تعتمد عمى تطبيقات الحاسبات الإلكترونية وشبكات الإتصال والوسائط المتعددة في نقل

 المهاارت والمعارف وتضم تطبيقات عبر الموقع الالكترونى وغرف التدريس الإفتراضية.

3ـ التدريب

* التدريب الإكلينيكى
* التدريب الميدانى
* القوافل الطبية
* التدريب الصيفى بالمستشفى
* التدريب بمركز التدريب الطبى المستمر ووحدة الابحاث الطبية المتقدمة
* التدريب بالمستشفيات بالخارج

 **\*\*اساليب وطرق التعليم والتعلم**

|  |  |  |
| --- | --- | --- |
|  **أساليب أخرى لمتدريس التفاعمى**  | **لاساليب الغير تقميدية**  | **الاساليب التقميدية**  |
| البحوث وتقديم العروض العملية ) انشطة اخرى: المشاركة فى القوافل الطبية وحملات التوعية(  | حل المشكلات  | المحاضرات باستخدام الداتا شو  |
| & Tutorial السيمينا ارت |
| الرسومات التوضيحية وعمل بوسترات للابحاث | نماذج ومحاكاة  | الدروس المعملية والإكمينيكية ) مستشفى الكلية ـ مستشفى طب القصر العينى الكس ترابيزة سكترا التعليم باستخدام الحالات التعليم التكاملي التفاعلي |
|  Skill lab مشاهدة |
| التعلم الالكتروني  | لعب الادوار  |
| الزيا ارت الميدانية )الوحدات الصحية – المصل واللقاح – المحرقة بالمستشفى – وحدة التعقيم(  | د راسة الحالة  |
| التدريب الصيفى بمستشفى الجامعة وبالخارج  | المناقشة فى مجموعات صغيرة  |

**وللتأكد من تحقيق مخرجات التعلم المستهدفة:ـ**

يتم تقييم مستوى الطلاب بطرق متعددة تشمل:

* الامتحانات الدورية
* الامتحانات التحريرية
* حل المشكلات ودراسة الحالة
* الامتحانات العممية والاكلينيكية وتطبيق نظام) OSPE - OSCE

#  عميد الكلية أ.د/عمرو نديم

* **PBL Philosophy:**

In a world where available information is growing exponentially, we believe that the most important thing a student needs to know is how to learn. So the main learning goals of the PBL are a framework for looking at concepts, skills, and abilities and help guide the creation of personalized student curriculum. PBL offers unique environments where students can flourish as individuals within a community of learners.

* **PBL Process:**

The core of the PBL process is the tutorials that will be held once weekly beside the practical sessions and the interactive lectures. In each tutorial there will be a case scenario that is delivered to the students, where they collaborate together through the seven jumps process to point out the possible problems present in the case and to find out the intended learning objectives need to be known through this case. In the second tutorial, they will discuss the objectives of the case after self study, and a new case will be delivered. In PBL process the role for lectures aim at clarification of complicated areas of information or to integrate different areas of information. Practical sessions and clinical skill lab are included as educational activities in BPL. They act as tools for the students to gain the needed psychomotor skills and to attain the professional attitude and behavior.

* **Student role:**

-The student is the center of the learning process in PBL. Students will depend on themselves in finding out the learning objectives by brain storming in the case study session. Then they will go home and study and search in the **texts or hand outs** for the information of the objectives they got. Then the following session they should try to present the information they gazered and summarized to their students in an easy palatable way. In BPL the students have to work hard, prepare themselves well for every tutorial group meeting, collaborate with their colleagues and practice team work. They also will have their reflection about the process, their colleagues and the tutor.

* **Tutors role:**
* The tutor will work as a facilitator more than traditional teacher who delivers all the information to the students. Tutors role is to stimulate and motivate the students to learn and to search for the information and knowledge. During the case they will guide the students and redirect them towards the intended learning objectives. The tutors share in the assessment process. Moreover, he share with the students the responsibility of setting the roles of the tutorial session.
* Tutor will divide the students into groups to work with each other.
* The tutor will receive guide information for the objectives in each case from the departments at least one week before the case is to be discussed, he should read them and then in the discussion of the case he should see if the students had fulfilled all the needed items so as to approve their work or they need to search more for certain items and get them so as to complete their work completely or they got more or un needed items they should discard them. By the end of the cases of the module students will have their hand out covering all items needed in the objectives they searched for
* All staff members should have their official mails done by the beginning of the academic year so as good communication may be applicable and to facilitate uploading of their lectures every Wednesday of each week
* In each session one of the students will be the reader (the one who reads the case) and another one will be the writer (the one who writes the objectives on the board after brain storming of the students with the tutor and collect them after that)
* In session ( 1 )
* One case will be red by the students
* They make brain storming with each other and with the tutor to reach the objectives the case is talking about. They will go home to search for them and make presentation about them the coming session according to rubrics given in this guide.
* Weeks for reading of the cases and discussion of the objectives are written above each case.
* The presentation have certain rubrics the tutor try that the students should stick more and more to them each time they make the presentation
* **STUDENTS SHOULD ATTEND THE CLINICAL DISCUSSION OF THE CASE**
* At the end of each module portfolio marks will be given according to :
* The attendance in the case sessions and the clinical case discussion
* **The presentation they showed along the module and their share in the discussions and preparation of the work needed (see professional behavior sheet included)**
* **The assignment they will be given which includes presentation and they should comply completely to the presentation and assignment rubrics (included in the guide)**
* **(the mark is given by the tutor and program heads after revising the assignments and discussing the students in them in the date of one of the case sessions scheduled with the students. This is to complete the mark of the portfolio for this module as shown in the assesment schedule included)**
* After the students finish the presentation in each session they will read the following case and brain storm to get the objectives that they will go home to prepare them as presentation in the coming case session and so on all the sessions
* If the case is long its presentation by the students may take two weeks not one week to ensure that the students presented the objectives in the case in a good way
* All students are to make their Emails in the first week and try to enter the learning management system on the moodle ([https://med@o6u.edu.eg/moodle)](https://med@o6u.edu.eg/moodle) so as to be able to have the on line information uploaded weekly and lectures , videos and on line formative exams as well as the grades

* **Scoring Rubric for**
* **Scoring Rubric for Presentations:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category**  | **Scoring Criteria**  | **Total Points**  | **Score**  |
| **Organization (15 %)**  | Were the main ideas presented in a clear manner?  | 5  |   |
| Information is presented in a logical sequence.  | 5  |   |
| Presentation appropriately cites requisite number of references.  | 5  |   |
| **Content (45 %)**  | * The Introduction is attention-getting,
* It lays out the problem well,
* It establishes a framework for the rest of the presentation.
 | 5  |   |
| Technical terms are well-defined in language that is appropriate for the target audience.  | 5  |   |
| The Presentation contains accurate information.  | 10  |   |
| The material included is relevant to the overall message/purpose.  | 10  |   |
| Appropriate amount of material is prepared, and the points made reflect well their relative importance.  | 10  |   |
| There is an obvious conclusion summarizing the presentation.  | 5  |   |
| **Presentation (40 %)**  | Speaker maintains good eye contact with the audience and is appropriately animated (e.g., gestures, moving around, etc.).  | 5  |   |
| Speaker uses a clear, audible voice.  | 5  |   |
| Delivery is poised, controlled, and smooth.  | 5  |   |
| Good language skills and pronunciation are used.  | 5  |   |
| Visual aids are well prepared, informative, effective, and not distracting.  | 5  |   |
| Length of presentation is within the assigned time limits.  | 5  |   |
| Information was well communicated.  | 10  |   |
| **Score %**  | **Total Points**  | **100%**  |  |

* **Presentations:**

# Professional Behavior of student in the case checklist

**Students Name: ....................................**

**Date: ...................................................... End of module (Summative): ........................... Module title: .....................................................................**

**Student’s Signature :............................ Tutor’s Name:.....................................................**

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria**  | **Scale:**  |  | **Comments**  |
| 1 and 2 is unsatisfactory, 3, 4 and 5 is satisfactory performance  |  |
| **Preparation:** Is well prepared with relevant information, uses a variety of references and summarizes key points  | **1 2 3 4 5** |  |   |
| **Critical thinking:** | Identifies problem, analyzes problem,   |  |  |   |
| suggests possible reasons for the problem, helps group to formulate learning objectives  |
| **1 2 3 4 5** |  |
| **Participation:** | y, talks on turn and   |  |  |   |
| Participates activel listens attentively to others | **1 2 3 4 5**  |  |
| **Communication Skill & Group Skills:** Respects tutor and colleagues, communicates well uses appropriate language, accepts feedback and responds appropriately.  Contributes to group learning, shares information with others, demonstrates sensitivity to views and feeling of others, takes on assigned tasks willingly  |  |  |   |
| **1 2 3 4 5** |  |
| **Presentation skills:** Presents the information relevant to the learning objectivse of the case, explains clearly the reasoning process with regard to solving the problem  |  |  |   |
| **1 2 3 4 5** |  |
|   |  | **SATISFACTORY**  |  | **UNSATISFACTORY**  |

**-****The students portfolio (October 6 university - faculty of medicine - 2024 - 2025):**

* Portfolio will be formed and submitted electronically
* **The student binder for the portfolio should contain the followings:**
* **Binder should contain the names of the group of the students, and contact information ( telephone , - emails ) , their leader and names and emails of their tutor (s),**
* Students should form the tasks needed and collect the presentations the group will do along the sessions of the cases and put them in the binder of the portfolio, with the cases , CV and the needed assignments , prochures , or links for the channels as will be announced

-Students should attend the clinical discussion case that will be held with the members of the departments sharing in the module

* Any community medical work the student completed under supervision of a staff presenting the followings:
* Name of staff & position
* Date
* Site
* Results
* ObstacleS
* Conferences attended by him if present
* Visits done to clinical departments to see relevant experiments if present.
* **PORTFOLIO SHOULD BE SUBMITTED IN FULL BY FIRST WEEK OF MAY.**
* **Portfolio scoring (Rubrics for evaluating portfolios):**
* **Each student should be rated as one of the followings :**
* Out standing & he will be given 95% to 100% of the portfolio mark
* Acceptable & he will be given 70% to 75% of the portfolio mark
* Marginal & he will be given 60% to 65% of the portfolio mark
* Unacceptable & he will be given less than 60% of the portfolio mark

**Schedule is available separately**

 **Portfolio tasks and blue prints**

**Sm409 task portfolio :**

Attend two clinics concerning neurology

**Sm409 blue print :**

**The Blue Print for The Module SM-409**

**(2024-2025)**

| **Topic**  | **Marks****(113)** | **Midterm****(43)** | **End term****(70)**  |
| --- | --- | --- | --- |
| Introduction to neurology, Neuroanatomy & Neurophysiology | **6** |  |  |
| Neurological History and clinical examination | **3** |  |  |
| Stroke (TIA, Ischemic stroke & Hemorrhagic stroke)  | **7** |  |  |
| Head Injuries (Introduction & Scalp Injuries)  | **2** |  |  |
| Skull Injuries (Fractures) & Intracranial Injuries  | **2** |  |  |
| Hydrocephalus | **3** |  |  |
| Epilepsy + Status epilepticus  | **4** |  |  |
| Antiepileptic drugs | **4** |  |  |
| Headache  | **2** |  |  |
| Movement disorders  | **4** |  |  |
| Peripheral neuropathy  | **4** |  |  |
| Peripheral nerve injuries 1 | **4** |  |  |
| Peripheral nerve injuries 2 | **4** |  |  |
| Muscle disorders 1 (Muscle dystrophies & Inflammatory muscle diseases & Neuromuscular disorders “myasthenia gravis”)  | **4** |  |  |
| Muscle disorders (Neuromuscular disorders “ “botulism & tetanus”)  | **4** |  |  |
| Spinal cord diseases (Paraplegia & Spinal cord syndromes)  | **4** |  |  |
| Spinal cord diseases (Traumatic spinal lesions)  | **4** |  |  |
| Demyelinating diseases  | **4** |  |  |
| Dementia & cognitive impairment | **4** |  |  |
| CNS infections (Meningitis & encephalitis) | **4** |  |  |
| CNS infections (Bacterial infections)  | **2** |  |  |
| CNS infections (Viral infections)  | **2** |  |  |
| CNS infections (Parasitic infections)  | **2** |  |  |
| Brain Tumors (Pathological types)  | **4** |  |  |
| Brain Tumors (Clinical presentations)  | **4** |  |  |
| Motor neuron disease and its types  | **4** |  |  |
| What is mental health? Classification of psychiatric disorders | **4** |  |  |
| Mood disorders; clinical manifestation and management | **4** |  |  |
| Somatoform disorders | **4** |  |  |
| Substance use disorders | **4** |  |  |
| Extrapyramidal symptoms | **2** |  |  |
| Total | **113** | **43** | **70** |

## Cases

**Cases for the Fourth year students ( second term ) :**

 **Case (1 )** Solitary thyroid nodule

 **(Case scenario:**

*Female patient 33 years old presented with single painless swelling in front of the right side of the neck of 5 months duration. The swelling moves with swallowing. The patient has no previous history of neck surgery or radiation exposure. She has average body built. Radiologically it proved to be single nodule from right thyroid lobe.*

*Objectives :*

1. *Definition of (STN)*
2. *Differential diagnosis*
3. *How to proceed for diagnosis*
4. *How to manage each separately Case (2):*

**Case 2: Parathyroid adenoma and hypercalcemia. (Surgery + medicine)**

*Male patient presented with recurrent bony aches, pathological fracture in the neck of femur and recurrent renal stones with ovoid right side neck swelling 2 × 2 cm moves with swallowing.*

*Objectives :*

1. *What is the definition of hypercalcemia*
2. *What are the common causes of hypercalcemia?*
3. *What is parathyroid adenoma?*
4. *What are common clinical presentations of parathyroid adenoma?*
5. *How to proceed for diagnosis?*
6. *What are the common complications of parathyroid adenoma?*
7. *How to proceed for management of parathyroid adenoma?*

*Case (3):*

**Case 3:** **Female breast carcinoma . (Surgery + pathology)**

**Case scenario:**

*Female patient aged 48 years clinically examined for her breasts. It revealed ill-defined left breast lump 2×2 cm located deep at 3 o’clock. Further examination revealed 2 beans like hard separated swellings each 1 × 1 cm behind anterior axillary fold.*

*Mammography revealed multiple dots of calcifications scattered within the breast. General assessment revealed nothing specific.*

*Objective :*

1. *What does carcinoma in-situ mean?*
2. *What are the pathological types?*
3. *How it could be detected clinically?*
4. *To define the roles of investigations to diagnose*
5. *Treatment options for breast carcinoma in-situ*

**Tutor guide Endocrine module**

**Tutor guide lines:**

Case (1)

 Solitary thyroid nodule

* It is clinically detected single thyroid nodule

 It may be 1- True solitary nodule

 2- Dominant nodule in otherwise multi-nodular goiter

 Differential diagnosis:

* 1. Simple nodule
	2. Toxic nodule
	3. Neoplastic nodule (adenoma or carcinoma)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  *Simple*  | *toxic* |  *adenoma*  | *carcinoma* |
| Symptoms | Neck swelling | Neck swelling+ Toxic  symptoms (mention) | Neck swelling | Neck swelling rapid growth, pain  +pressure symptoms |
| General signs |  Nothing  | C.V.S ,  C.N.S,……(mention) |  Nothing |  Metastases +  |
| Local signs | Solitary or dominant nodule  | Solitary or dominant nodule + pulsation+ thrill |  Solitary  | Solitary nodule(hard& fixed) + ↑L.N. |
| Investigations 1- Lab. | Normal T3 &T4 &TSH |  ↑T3 &T4 ↓TSH |  Normal T3, T4 &TSH |  Normal T3, T4 & TSH |
| 2- neck U/S | Cystic or solidSolitary or dominant | Cystic or solidSolitary or dominant |  Solid | Solid + micro-vascular or capsular invasion +↑L.N.  |
| 3.Thyroid scan (Tc99) | Normal uptake |  Hot nodule ↑uptake | Normal or ↓ uptake |  cold nodule ↓uptake  |
| 4. FNAC  | Follicular cells |  Not done |  Adenoma |  Malignant cells |

 Treatment of solitary thyroid nodule:

* 1. Toxic nodule  total lobectomy
	2. Simple nodule  lobectomy
	3. Adenoma  total lobectomy 4- Carcinoma  total thyroidectomy

**Tutor guide case (2 ) endocrine module Tutor guide lines:**

**Case (2):**

 Parathyroid glands

* Four glands located behind the thyroid (2 sup. and 2 inf.)
* Length 6 millimeters - Width 3 millimeters - Thickness 2 millimeters
* Often accidentally removed
* Normal function obtained with at least 2 glands
* Functions:

1) secretes PTH Responsible for calcium homeostasis through the

Kidney, intestine and Bone 2) Increases calcium :

* + - * Intestinal absorption o Increases Renal absorption of calcium/and excretion of phosphorus
			* Bone reabsorption (Osteolysis) mobilizes Ca from bone to ECF

3) PTH stimulates osteoblasts and osteoclasts but clastic activity > blastic

 Causes of hypercalcemia:

* 80% of all cases are caused by Malignancy or Primary

Hyperpathyroidism

* V Vitamins (excess vitamin D)
* I Immobilization
* T Thyrotoxicosis
* A Addison’s disease
* M Milk-alkali syndrome
* I Inflammatory disorders
* N Neoplasm
* S Sarcoidosis Types of Hyperparathyroidism
1. Primary
2. Secondary: renal cause  decreased ca  hyperparath.
3. Tertiary

Primary Hyperparathyroidism

 Causes:

* + Parathyroid adenoma – 80%
	+ Parathyroid hyperplasia – 15%
	+ Parathyroid carcinoma – 1-2%

Bone effects: due to Ca mobilization from bones

* + Osteitis fibrosa cystica
	+ Subperiosteal resorption of bone (phalanges)
	+ A salt-and-pepper appearance (in the skull)
	+ Bone cyst or brown tumors (jaw)
	+ Osteoporosis

 Clinical presentation:

 I- Renal (stones) II- Bones

 III- Gastrointestinal (GOANS) IV- Neurological-muscular I- Renal:

* + - polyuria and polydipsia
		- urinary stones
		- nephrocalcinosis
		- hypercalciuria
		- renal insufficiency
1. Bones:
	* Bone aches
	* Pathologic fractures
	* Bone cysts
	* Osteoporosis
	* Arthralgias
	* Subperiosteal skeletal resorption
2. Neurological: (Psychic moans)

 - Confusion- Depression - Lethargy- Psychosis – Fatigue- Paresthesias

1. GIT: vomiting – constipation - Peptic ulcer - Chronic pancreatitis

Investigations:

 I- LAB.

* Hypercalcemia (>10.6 mg/dL)
* Serum phosphorus is low (<2.5 mg/dl)
* hyperchloremic metabolic acidosis
* PTH is elevated
* Alkaline phosphatase increased

 II- Radiological:

* Neck ultrasound  detects parathyroid mass
* Sestamibi scan: 85-95% accurate in localizing adenoma in primary HPT
* C.T. or MRI for ectopic parathyroid glands

Treatment:

 Criteria for surgical treatment

 One or more of the following:

* Serum calcium > 11 mg/dl.
* Osteitis fibrosa cystica.
* Renal Stones
* Decreased renal function.
* Peptic ulcer.
* Pancreatitis.
* Serious psychiatric disease.

Type of surgery:

* Remove the gland with parathyroid adenoma
* In hyperplasia: removal of 3 and ½ gland leaving ½ gland marked with stitch.

**Tutor guide case (3) endocrine module**

**Case (3)**

**Tutor guide lines:**

1. **the pathological types: duct – lobular – paget’s**
2. **Age distribution**
3. **Etiology and Predisposing factors: hormonal- genetics**
4. **Microscopic picture of different types of cancer breast**
5. **Gross examination of cancer: schirrus – encephaloid – inflammatory – paget’s disease**
6. **Different lines of spread: local, lymphatic, blood**
7. **staging and determine early or late**
8. **diagnosis: clinical: manifestations of cancer locally**

**Radiological: mammography - ultrasound - MRI**

**Pathological: BIOPSY procedures**

1. **different treatment options regarding the stage: early cancer – late cancer**
2. **adjuvant and neo-adjuvant treatment: types and indications:**

**Radiation – chemotherapy – hormonal treatment**

1. **Putting prognostic index for the case.**

**Cases for the module Ped 407 ( pediatrics )**

### Pediatric case for module 407

The mother of an eight years old boy presented to the pediatric clinic complaining that her son is refusing to go to school since 2 weeks. He always loved his class and teachers, and gets A+ in all exams. The mother notice this change after his returned from 3 days school camp in the red sea. Going through the history taking, the mother mentioned that the boy can't control his bladder and usually wets his bladder ever since he was born (toilet training was a complete failure). He had frequent medical consultations, labs, x-rays, and even some tests on the bladder, with no improvement. The mother was also advised to see a psychiatrist.

#### What is your plan for managing this child

**Objectives and Tutor guide:**

1. Define enuresis
2. Typpes of enuresis: a- According to onset: primary Or secondary b- According to timing: nocturnal, diurnal, Or all day
3. Common causes of each type of enuresis
4. How to diagnose
5. Outline management of the condition in a step-wise order..

**Cases for the module SM 409 ( Neurology )**

1. **Neurological case**

(Ataxia)

A 11 year old girl born of second degree consanguineous marriage presented with history of swaying while walking for past two years. There was associated difficulty in squatting and climbing down stairs. There was no history of tripping over walking, wasting of muscles; tingling or paraesthesia in the lower limbs. Over one year it slowly progressed to gait instability. She did not have any feeding difficulties. There were no abnormalities in hearing or vision. There was no significant past or family history except for pes cavus in father. Examination revealed high arched palate, saddle gap in the feet, pes cavus and kyphoscoliosis. Vitals were normal. She had Microcephaly with subnormal intelligence. Cranial nerves and fundus were normal. She had wide based gait with ataxia; dysmetria, dysdiadochokinesia and positive Romberg’s sign.

Objectives

1. Anatomy and function of cerebellum
2. Definition of ataxias
3. Classification of ataxias
4. Clinical manifestation of ataxia
5. Work up and treatment of ataxia

**Introduction**

The cerebellum is a vital component in the human brain as it plays a role in motor movement regulation and balance control. The cerebellum coordinates gait and maintains posture, controls muscle tone and voluntary muscle activity but is unable to initiate muscle contraction. Damage to this area in humans results in a loss in the ability to control fine movements, maintain posture, and motor learning.

**Structure (Anatomy of cerebellum)**

The cerebellum, which is the largest part of the hindbrain, is located in the posterior cranial fossa, behind the fourth ventricle, the pons, and the medulla oblongata. Tentorium cerebelli, an extension of the dura matter, separates the cerebellum from the cerebrum. It is composed of two hemispheres joined by the vermis and is sub-divided into three lobes – anterior, posterior, and flocculonodular, which are separated by two transverse fissures. The V-shaped primary fissure separates the anterior and posterior lobe, while the posterolateral fissure separates the posterior and flocculonodular lobes. A deep horizontal fissure found within the posterior lobe separates the superior and inferior surfaces of the cerebellum. The cerebellum is neuron-rich, containing 80% of the brain’s neurons organized in a dense cellular layer.

The cerebellar cortex is a sheet-like structure, made of a single sheet less than 1mm thick, and accordion-like folds fused at the midline (Essen 2018). Each fold is composed of an inner white matter core that is covered by gray matter. The gray matter of the cortex divides into three layers: an external - the molecular layer; a middle - the Purkinje cell layer; and an internal - the granular layer. The molecular layer contains two types of neurons: the outer stellate cell and the inner basket cell.

The Purkinje layer consists of Purkinje cells, which are large Golgi type I neurons. Their dendrites reach the molecular layer and have multiple branches. The axons are long, pass through the granular layer, enter the white matter, acquire a myelin sheath, and terminate in the intracerebellar nuclei. Their collateral branches make synaptic contacts with the basket and stellate cells of the granular layer. Climbing and mossy fibers provide the primary input to the cerebellar cortex. Mossy fibers use glutamate, while the climbing fibers use aspartate as their main excitatory neurotransmitter to provide excitatory signals to the Purkinje cells. The climbing fibers are named so because they travel in the cortex like vine branches on a tree. They represent the terminal ending of the olivocerebellar tracts. The mossy fibers are the terminal branches of all other cerebellar afferent tracts. Each mossy fiber may stimulate thousands of Purkinje cells via multiple branching.

**Function of cerebellum**

The cortex of the vermis coordinates the movements of the trunk, including the neck, shoulders, thorax, abdomen, and hips. Control of the distal extremity muscles is by the intermediate zone of the cerebellar hemispheres, located adjacent to the vermis. The remaining lateral area of each cerebellar hemisphere provides the planning of sequential movements of the entire body along with involvement in the conscious assessment of movement errors.

Nuclei: The cerebellum consists of an outer layer of highly convoluted gray matter (cerebellar cortex) surrounding a highly branched body of white matter known as the arbor vitae (Latin for “tree of life”), which in turn surrounds the 3 pairs of deep cerebellar nuclei embedded in the central cerebellar white matter (corpus medullaris). From medial to lateral, the deep nuclei are the fastigial, interposed (consisting of globose and emboliform nuclei), and dentate nuclei, which is the largest nuclei. Fibers from the dentate, emboliform, and globose nuclei leave the cerebellum through the superior cerebellar peduncle. Fibers from the fastigial nucleus exit through the inferior cerebellar peduncle.

**Blood Supply and Lymphatics of cerebellum**

The cerebellum receives vascular supply from three main arteries that originate from the vertebrobasilar anterior system: the superior cerebellar artery (SCA), the anterior inferior cerebellar artery (AICA), and the posterior inferior cerebellar artery (PICA).

The SCA branching varies based on embryology; it can branch either from the junction point of the basilar artery and posterior cerebral artery and pass below the oculomotor nerve, or directly from the posterior cerebral artery and pass above the oculomotor nerve. In the majority of subjects, the SCA encircles the brainstem below the oculomotor nerve and above the trigeminal nerve. The SCA splits into two branches: medial and lateral. The medial branch of the SCA further splits into two branches; one supplies the mesencephalon and inferior and superior colliculi while the second supplies the superior portion of the vermis and the superomedial cerebellar cortex. The lateral branch of the SCA supplies the superolateral cerebellar cortex. Blood vessels have deeper penetration in the vermis that makes it more echogenic on fetal ultrasound.

The AICA branches off the basilar trunk in almost all subjects. It passes the abducens nerve and meets with the facial and vestibulocochlear nerves at the cerebellopontine angle. It then divides into two branches: one supplies the anterior inferior cerebellum while the other supplies the flocculus, choroid plexus, and the middle cerebellar peduncle.

PICA is the largest vertebral artery branch. It passes between the cerebellum and the medulla and supplies the cerebellar nuclei, inferior surface of the vermis, and the undersurface area of the cerebellar hemisphere. Medulla oblongata and the choroid plexus of the fourth ventricle are supplied by PICA, which may give rise to posterior spinal arteries in some anatomical variations. The cerebellum is drained by veins that empty into the great cerebral vein or adjacent venous sinuses.

Nerves

The cerebellum attaches to the brainstem by three groups of nerve fibers called the superior, middle, and inferior cerebellar peduncles, through which efferent and afferent fibers pass to connect with the rest of the nervous system. The following tables summarize how the cerebellum connects with the cerebrum , the brainstem ,and the spinal cord .

• Table 1: Connection of cerebellum with the cerebrum

• Table 2: Connection of cerebellum with the brainstem

• Table 3: Connection of cerebellum with the spinal cord

**Clinical Significance**

The cerebellum receives afferent information about voluntary muscle movements from the cerebral cortex and from the muscles, tendons, and joints.

It also receives information concerning balance from the vestibular nuclei.

Each cerebellar hemisphere controls the same side of the body, thus if damaged the symptoms will occur *ipsilaterally.*

Several signs and symptoms arise as a consequence of cerebellar dysfunction:

1-Hypotonia, the muscles lose resistance to palpation due to diminished influence of the cerebellum on gamma motor neurons.

2- The patient walks with a wide or broad-based gait and leans toward the affected side. When mild, only tandem gait may be impaired

3- Disturbances of voluntary movements, called ataxia, involve tremors with fine movements, such as writing or buttoning the clothes.

4- *Finger to nose test* is performed to examine the coordination of the muscle movements. When a patient is asked to touch the tip of the nose with the index finger, the movements are not properly coordinated, and tremor is observed at the end of the movement, called *intention tremor.*

5- A similar test can be performed on the lower limbs by asking the patient to place the heel of one foot against the shin of the opposite leg *(foot to heel to leg).*

6- Ataxia of ocular muscles results in nystagmus, a rhythmical oscillation of the eyes. To provoke nystagmus, the patient should rotate eyes horizontally.

7- Similarly, ataxia of the larynx muscles results in dysarthria. Speech is slurred and syllables are separated from one another.

8- Dysdiadochokinesia is the lack of ability to perform rapidly alternating movements. One can ask the patient to quickly supinate and pronate both forearms simultaneously. Movements will be slow and incomplete on the side of the cerebellar lesion.

9- Dysmetria—an inability to perform acute finger-to-nose movements accurately with past pointing or a similar inability on heel/shin testing.

Cerebellar syndromes involve vermis and hemispheres. In **vermis syndrome**, muscle incoordination involves the head and trunk. Patients cannot maintain a straight posture and may fall. The most common cause of vermis syndrome is a medulloblastoma of the vermis in children. The **cerebellar syndrome** involves the incoordination of muscles of the limbs unilateral to the hemisphere lesion. Dysarthria and nystagmus are also common findings. Disorders of the lateral part of the cerebellar hemispheres produce delays in initiating movements. The most common cause of cerebellar dysfunction is alcohol poisoning, but also trauma, multiple sclerosis, tumors, thrombosis of the cerebellar arteries may occur.

Occlusion of PICA cause Wallenberg syndrome, which includes the following signs and symptoms: dysphagia and dysarthria resulting from paralysis of the ipsilateral palatal and laryngeal muscles; analgesia of the ipsilateral side of the face; vertigo, nausea, vomiting, and nystagmus; ipsilateral Horner syndrome; ipsilateral limb ataxia and contralateral loss of sensations of pain and temperature.

Some data indicate that cerebellum dysfunction may correlate with disorders like autism and schizophrenia.

**Laboratory Studies**

Genetic counseling is available for prenatal diagnosis of Friedreich ataxia (FA) for parents with one affected child. Population screening for carriers of the defective gene is not practical. A specific trinucleotide repeat expansion assay is available commercially in the United States and should be performed in all suspected cases of FA.

Total levels of Fe in bulk extracts were not significantly higher than normal, and the concentrations of Zn also remained in the normal range. Cu levels, however, were significantly lower in FA.

No evidence of CSF abnormality exists in patients with FA.

**Imaging Studies**

*Magnetic resonance imaging (MRI)* is the study of choice in the evaluation of the atrophic changes seen in Friedreich ataxia (FA). MRI of the brain and spinal cord in patients with FA consistently shows atrophy of the cervical spinal cord with minimal evidence of cerebellar atrophy.

*Transcranial sonography* provides a quick-to-apply and inexpensive in vivo assessment of both cerebellar and noncerebellar abnormalities in FA, in particular highlighting dentate hyperechogenicity as a core feature.

*A mass spectroscopy* assay to sensitively measure mature frataxin is being developed as per the recent 2018 FARA biomarker meeting.

**Other Tests**

*Echocardiography* reveals symmetric, concentric ventricular hypertrophy, although some have asymmetric septal hypertrophy.

Approximately 65% of patients with Friedreich ataxia (FA) have abnormal ECG findings. The most common findings are T-wave inversion, particularly in the inferior standard and lateral chest leads, and ventricular hypertrophy.

*Nerve conduction velocity (NCV)* study findings in FA usually are normal or display only mildly reduced velocities. Sensory nerve action potentials (SNAP) are absent in greater than 90% of patients with FA. The remaining 10% display reduced-amplitude SNAPs.

*Brainstem auditory evoked responses* are typically abnormal in FA, displaying absent waves III and IV with preservation of wave I. This is suggestive of involvement of central auditory pathways.

*Visual evoked potentials* are abnormal in two thirds of patients with FA. Absent or delayed latency and reduced amplitude of the p100 wave are seen.

*Somatosensory evoked potentials (SSEP)* reveal delayed central conduction time), dispersed potentials at the sensory cortex, as well as abnormal central motor conduction.

**Medical Care**

The results of treating ataxia in Friedreich ataxia (FA) have generally been disappointing. No therapeutic measures are known to alter the natural history of the neurological disease. Standard treatment is administered for heart failure, arrhythmias, and diabetes mellitus.

**Definition and Types of Ataxias**

Ataxia implies incoordination and results from disorders of:

• cerebellum and its associated pathways.

• loss of proprioceptive sensory input in peripheral nerve disorders and in spinal cord lesions affecting the posterior columns (sensory ataxia). So, two types of ataxias:

1. Cerebellar ataxia
2. Sensory ataxia

***Signs of cerebellar disease***

As previous

*Differential diagnoses of acquired cerebellar ataxia*

• Toxic: alcohol.

• Drugs: phenytoin; lithium.

• Vascular: ischaemic stroke; haemorrhage.

• Inflammatory: demyelination (MS, ADEM).

•Neoplastic: metastases (breast, bronchus); primary brain tumours (in children, pilocytic astrocytoma and medulloblastoma);

• Paraneoplastic syndrome, associated with: small cell lung cancer; ovarian cancer, breast cancer, testicular cancer , Hodgkin’s lymphoma , neuroblastoma , and thymoma.

* Infectious/post-infectious: viral cerebellitis (measles); SSPE; HIV; Miller Fisher syndrome (ataxia, areflexia, ophthalmoplegia + GQ1b antibody).
* Structural: Arnold–Chiari malformation; AVM.
* Degenerative: Friedrich ataxia, adult onset cerebellar ataxia
* Nutritional: vitamin E deficiency, thiamine (B1deficiency), e.g. in Wernicke’s encephalopathy.
* Endocrine: thyroid.

***Sensory ataxia***

Clinical features : any marked loss of proprioception will result in sensory ataxia.

• Signs of a neuropathy with loss of joint position sense.

• Pseudoathetosis of fingers when arms outstretched and eyes closed.

• Upper limb position sense loss is tested by attempting to bring both horizontally outstretched index fingers together in the midline with eyes closed.

• Heel/shin testing deteriorates with eye closure.

• Positive Romberg’s sign.

Differential diagnoses of sensory ataxia

• CIDP.

• Refsum’s disease (due to defect in phytanic acid metabolism. Other features include deafness, retinitis pigmentosa).

• Spinal cord disorders (affecting posterior columns):

• demyelination (MS).

• B12 deficiency.

1. **Intervertebral disc**

A 49 year old male patient married and has 3 offsprings, the youngest one has 5 years, working as manual worker in a food company with no special habits of medical impotence. Presented to neurosurgery clinic complaining of low back pain and severe left sciatica that was progressive in course over the last 4 weeks and not improved on medical treatment. On examination, patient was fully conscious, with left partial foot drop, positive straight leg raising at left side at 20 degrees and hyporeflexia of left ankle jerk. MRI Lumbosacral spine showing L5-S1 disc herniation.

objectives

1. Anatomy and function of the intervertebral disc.
2. Clinical features of lumbar disc prolapse
3. Invstigations of lumbar disc prolapse
4. Treatment of lumbar disc prolapse
5. **a Case of encephalitis**

**A 45-year-old female is brought to the emergency department by her family. She has had fever and headache for the past week, along with increasing confusion and irritability over the last two days. On examination, she is febrile (39°C), disoriented, and minimally responsive to verbal commands. Neck stiffness is present, but no focal neurological deficits are observed.**

**A lumbar puncture is performed, and cerebrospinal fluid (CSF) analysis shows:**

**•WBC count: 120/mm³ (lymphocytic predominance)**

**•Protein: 85 mg/dL**

**•Glucose: 65 mg/dL (serum glucose: 120 mg/dL)**

**MRI brain reveals hyperintense lesions in the right temporal lobe.**

**CSF polymerase chain reaction (PCR) confirms Herpes Simplex Virus-1 (HSV-1) as the causative organism. The patient is started on intravenous acyclovir, and supportive management is initiated.**

Objectives

**1. Describe the clinical presentation and common etiologies of encephalitis.**

**2.Explain the diagnostic approach to a patient with suspected encephalitis.**

**3.Discuss the treatment of HSV encephalitis and its prognosis.**

**Answer 1 :**

Encephalitis presents with a combination of fever, headache, altered mental status (confusion, disorientation, or personality changes), and sometimes seizures or focal neurological deficits. In severe cases, patients may develop coma or die without treatment. The most common cause of sporadic encephalitis worldwide is Herpes Simplex Virus (HSV-1), particularly in immunocompetent adults. Other viral etiologies include varicella-zoster virus, enteroviruses, arboviruses (e.g., West Nile Virus), and rabies. Non-infectious causes include autoimmune encephalitis (e.g., anti-NMDA receptor encephalitis).

**Answer 2:**

Diagnosis involves a thorough clinical evaluation, neuroimaging (preferably MRI), and laboratory investigations. Lumbar puncture is critical to assess CSF, with typical findings in viral encephalitis showing lymphocytic pleocytosis, elevated protein, and normal glucose. PCR is the gold standard for identifying viral DNA, such as HSV-1. MRI helps localize brain involvement, with temporal lobe lesions being highly specific for HSV encephalitis. Electroencephalogram (EEG) may show diffuse slowing or periodic discharges in temporal regions.

**Answer 3:**

HSV encephalitis requires prompt initiation of intravenous acyclovir, which inhibits viral replication and reduces mortality significantly. Treatment should not be delayed while awaiting confirmatory PCR results. Supportive care includes managing seizures, controlling intracranial pressure, and monitoring for complications. Prognosis depends on early diagnosis and treatment; untreated HSV encephalitis has a mortality rate of 70%, but with appropriate treatment, mortality decreases to 10-20%. Neurological sequelae, such as memory impairment, may persist in survivors.

1. **Case of Obsessive-Compulsive Disorder (OCD)**

A 28-year-old male presents to the outpatient clinic with complaints of intrusive, repetitive thoughts and ritualistic behaviors over the past 2 years. He reports frequent, distressing thoughts about contamination and germs, which compel him to wash his hands excessively—up to 50 times a day. These behaviors interfere with his work and relationships. He is aware that his fears are irrational but feels unable to control them.

He describes a history of perfectionism and obsessive tendencies since childhood, but his symptoms have worsened significantly in the past year, leading to difficulty in completing daily tasks. There is no history of substance use or other psychiatric disorders. On examination, the patient appears anxious but has no hallucinations, delusions, or cognitive impairment.

The diagnosis of Obsessive-Compulsive Disorder (OCD) is made based on DSM-5 criteria, and the patient is started on a selective serotonin reuptake inhibitor (SSRI) and referred for cognitive-behavioral therapy (CBT).

Objectives

1.Describe the clinical features and subtypes of Obsessive Compulsive Disorder (OCD).

2.Discuss the etiology and risk factors for OCD.

3.Outline the treatment options for OCD.

Answer 1:

OCD is characterized by the presence of obsessions, compulsions, or both:

• Obsessions: Recurrent, intrusive, and unwanted thoughts, urges, or images that cause marked anxiety or distress. Examples include fears of contamination, doubts, or intrusive thoughts about harm.

•Compulsions: Repetitive behaviors or mental acts performed in response to obsessions to reduce distress or prevent a feared outcome (e.g., excessive handwashing, checking, or counting).

Subtypes of OCD include:

•Contamination and cleaning: Fear of germs or dirt leading to excessive cleaning.

•Checking: Repeated checking to prevent harm (e.g., ensuring doors are locked).

•Symmetry and ordering: Needing things to be perfectly arranged.

•Hoarding: Difficulty discarding items due to fear of losing something important.

•Intrusive thoughts: Distressing thoughts of harming others or taboo topics (e.g., sexual or religious themes).

OCD often causes significant impairment in social, occupational, and personal functioning.

Answer 2:

The exact etiology of OCD is unclear, but it is believed to involve genetic, neurobiological, and environmental factors:

•Genetic: A family history of OCD increases the risk.

•Neurobiological: Dysfunction in the cortico-striato-thalamo-cortical (CSTC) circuit and abnormal serotonin signaling are implicated.

•Environmental: Stressful or traumatic events may trigger or worsen symptoms.

•Psychological: Perfectionism and high levels of conscientiousness are associated with OCD.

Answer 3 :

Treatment for OCD includes:

•Pharmacotherapy:

•Selective serotonin reuptake inhibitors (SSRIs), such as fluoxetine, sertraline, or fluvoxamine, are the first-line medications.

•Clomipramine (a tricyclic antidepressant) is an option for treatment-resistant cases.

•Psychotherapy:

•Cognitive-behavioral therapy (CBT), specifically exposure and response prevention (ERP), is highly effective.

•Combination Therapy: SSRIs and CBT together yield better results for severe cases.

•Other Interventions: Deep brain stimulation or transcranial magnetic stimulation (TMS) may be considered for refractory cases.

**D)Extradural hematoma**

 A 23-year-old, previously healthy man was involved in a motor vehicle collision. He lost consciousness at the scene but recovered by the time emergency medical services arrived. The patient was alert and awake (GCS : M6 V5 E4 ) in the ambulance but lost consciousness again soon after arriving at the emergency department. His breath smells of alcohol. Blood pressure is 130/90 mm Hg, pulse is 68/min, and respirations are 12/min. A bruise is noted over the left temple area. The left pupil is mildly dilated. Brain imaging would most likely reveal blood accumulating between which of the following tissues?

Objectives

1. Aponeurosis and outer periosteum
2. Arachnoid mater and pia mater
3. Bone and dura mater
4. Dura mater and arachnoid mater
5. Pia mater and brain surface

**Objectives**

The students have to know:

1. how to manage poly trauma patients in ER
2. Identifying how to assess conscious level of the patients (Glasgow coma score)
3. Differentiate between Extradural, Subdural hematoma and Subarachnoid hemorrhage
4. Clinical picture of epidural (extradural) haematoma and the injured vessel
5. Investigations of polytrauma patients, focusing on brain image finding in extradural haematoma
6. How to manage a patient with extradural haematoma

**Tutor guide**

The correct answer is (c)

Explanation:

 First of all any ploy trauma patient must be stabilized primarily in form of ABCDE.and should be investigated after stabilization of vital data for cervical spine , Lumbosacral spine , chest and pelvis x ray or ct accordingly and pelvi-abdominal US if needed .

Epidural hematoma characteristically results in transient loss of consciousness at the time of impact follow, by a lucid period in which the patient regains consciousness. However, the eventual expansion of the hematoma results in elevated intracranial pressure (ICP) and can lead to brain herniation, coma, and death. Signs of elevated ICP include altered mental status, nausea/vomiting, and Cushing reflex (ie, bradycardia, irregular breathing, hypertension). An ipsilateral dilated pupil can also occur due to uncal herniation and oculomotor nerve compression.

The diagnosis is confirmed with a noncontrast CT scan demonstrating a hyperdense, biconvex (lens-shaped; mass between the brain and skull. Epidural hematomas do not cross suture lines due to the tight adherence the dura to the calvarium at these points.

**Comparison between Extradural, Subdural hematoma and Subarachnoid hemorrhage**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Extradural** | **Subdural hematoma** | **Subarachnoid hemorrhage** |
| **Vessel typically involved** | Middle meningeal artery | Bridging cortical veins | Aneurysm or arteriovenous malformation of anterior or posterior communicating arteries or MCA Or post traumatic |
| **Location** | Between skull & dura mater | Between dura mater & arachnoid mater | Between arachnoid mater & pia mater |
| **Clinical manifestation** | Lucid interval, followed by loss of consciousness | **Acute:** coma at onset **Chronic:** gradual onset of headache and confusion | Severe headache ("worst headache of my life"), nuchal rigidity |
| Presentation on CT scan | Biconvex hematoma | Crescent-shaped hematoma | Blood in the basal cisterns |

MCA= middle cerebral artery.

Management of extradural haematoma either conservative or surgical , and the patient is admitted in the ward or ICU according to conscious level and haematoma size

****

**Other incorrect choices**:

(Choice A) The epicranial aponeurosis (galea aponeurotica) and outer periosteum cover the exterior surface cranial bones. Intracranial hemorrhages are located inside the cranial vault.

(Choice B) Subarachnoid hemorrhage results in blood accumulation between the arachnoid mater and pia mater. It most often occurs due to rupture of berry aneurysms or arteriovenous malformations of the anterior communicating, posterior communicating, or middle cerebral arteries. Patients typically have severe headach and nuchal rigidity.

(Choice D) Subdural hematoma (SDH) is located between the dura mater and arachnoid mater and results fr tearing of the bridging cortical veins. It typically presents in older patients with profoundly depressed mental status at onset (acute SDH) or an insidious onset of headache and confusion (chronic SDH)

(Choice E) The pia mater is closely adherent to the brain surface and does not form a space for accumulatioi blood.

Educational objective: Epidural hematoma is an accumulation of blood between the bone and dura mater. It typically occurs due to a tear of the middle meningeal artery associated with fracture of the pterion region of the skull (often involving the temporal bone). Patients characteristically have transient loss of consciousness followed by a lucid interval before increasing intracranial pressure leads to neurologic deterioration.

Competency Area I: The graduate as a health care provider

* 1. Adopt an empathic and holistic approach to the patients and their problems.
	2. Assess the mental state of the patient.
	3. Perform appropriately timed full physical examination of patients appropriate to the age, gender, and clinical presentation of the patient while being culturally sensitive.
	4. Prioritize issues to be addressed in a patient encounter.
	5. Select the appropriate investigations and interpret their results taking into consideration cost/ effectiveness factors.
	6. Recognize and respond to the complexity, uncertainty, and ambiguity inherent in medical practice. 1.8. 1.8. Apply knowledge of the clinical and biomedical sciences relevant to the clinical problem at hand.
	7. Retrieve, analyze, and evaluate relevant and current data from literature, using information technologies and library resources, in order to help solve a clinical problem based on evidence (EBM).
	8. Integrate the results of history, physical and laboratory test findings into a meaningful diagnostic formulation.
	9. Perform diagnostic and intervention procedures in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances.
	10. Adopt strategies and apply measures that promote patient safety.
	11. Establish patient-centered management plans in partnership with the patient, his/her family and other health professionals as appropriate, using Evidence Based Medicine in management decisions.
	12. Respect patients’ rights and involve them and /or their families/careers in management decisions. 1.15. Provide the appropriate care in cases of emergency, including cardio-pulmonary resuscitation, immediate life support measures and basic first aid procedures.
	13. Apply the appropriate pharmacological and non-pharmacological approaches to alleviate pain and provide palliative care for seriously ill people, aiming to relieve their suffering and improve their quality of life.
	14. Contribute to the care of patients and their families at the end of life, including management of symptoms, practical issues of law and certification.

Competency Area II: The graduate as a health promoter

* 1. Identify the basic determinants of health and principles of health improvement.
	2. Recognize the economic, psychological, social, and cultural factors that interfere with wellbeing.
	3. Discuss the role of nutrition and physical activity in health.
	4. Identify the major health risks in his/her community, including demographic, occupational and environmental risks; endemic diseases, and prevalent chronic diseases.
	5. Describe the principles of disease prevention, and empower communities, specific groups or individuals by raising their awareness and building their capacity.
	6. Recognize the epidemiology of common diseases within his/her community, and apply the systematic approaches useful in reducing the incidence and prevalence of those diseases.
	7. Provide care for specific groups including pregnant women, newborns and infants, adolescents and the elderly.
	8. Identify vulnerable individuals that may be suffering from abuse or neglect and take the proper actions to safeguard their welfare.
	9. Adopt suitable measures for infection control.

Competency Area III: The graduate as a professional

* 1. Exhibit appropriate professional behaviors and relationships in all aspects of practice, demonstrating honesty, integrity, commitment, compassion, and respect.
	2. Adhere to the professional standards and laws governing the practice, and abide by the national code of ethics issued by the Egyptian Medical Syndicate.
	3. Respect the different cultural beliefs and values in the community they serve.
	4. Treat all patients equally, and avoid stigmatizing any category regardless of their social, cultural, ethnic backgrounds, or their disabilities.
	5. Ensure confidentiality and privacy of patients’ information.
	6. Recognize basics of medico-legal aspects of practice, malpractice and avoid common medical errors.
	7. Recognize and manage conflicts of interest.
	8. Refer patients to appropriate health facility at the appropriate stage.
	9. Identify and report any unprofessional and unethical behaviors or physical or mental conditions related to himself, colleagues or any other person that might jeopardize patients’ safety.

Competency Area IV: The graduate as a scholar and scientist

* 1. Describe the normal structure of the body and its major organ systems and explain their functions.
	2. Explain the molecular, biochemical, and cellular mechanisms that are important in maintaining the body’s homeostasis.
	3. Recognize and describe main developmental changes in humans and the effect of growth, development and aging on the individual and his family.
	4. Explain normal human behavior and apply theoretical frameworks of psychology to interpret the varied responses of individuals, groups and societies to disease.
	5. Identify various causes (genetic, developmental, metabolic, toxic, microbiologic, autoimmune, neoplastic, degenerative, and traumatic) of illness/disease and explain the ways in which they operate on the body (pathogenesis).
	6. Describe altered structure and function of the body and its major organ systems that are seen in various diseases and conditions.
	7. Describe drug actions: therapeutics and pharmacokinetics; side effects and interactions, including multiple treatments, long term conditions and non-prescribed medication; and effects on the population.
	8. Demonstrate basic sciences specific practical skills and procedures relevant to future practice, recognizing their scientific basis, and interpret common diagnostic modalities, including: imaging, electrocardiograms, laboratory assays, pathologic studies, and functional assessment tests.

Competency Area V: The graduate as a member of the health team and the health care system

* 1. Recognize the important role played by other health care professions in patients’ management.
	2. Respect colleagues and other health care professionals and work cooperatively with them, negotiating overlapping and shared responsibilities and engaging in shared decision-making for effective patient management.
	3. Implement strategies to promote understanding, manage differences, and resolve conflicts in a manner that supports collaborative work.
	4. Apply leadership skills to enhance team functioning, the learning environment, and/or the health care delivery system.
	5. Communicate effectively using a written health record, electronic medical record, or other digital technology.
	6. Evaluate his/her work and that of others using constructive feedback.
	7. Recognize own personal and professional limits and seek help from colleagues and supervisors when necessary.
	8. Apply fundamental knowledge of health economics to ensure the efficiency and effectiveness of the health care system.
	9. Use health informatics to improve the quality of patient care.
	10. Document clinical encounters in an accurate, complete, timely, and accessible manner, in compliance with regulatory and legal requirements.
	11. Improve the health service provision by applying a process of continuous quality improvement.
	12. Demonstrate accountability to patients, society, and the profession.

Competency Area VI: The graduate as a lifelong learner and researcher

* 1. Regularly reflect on and assess his/her performance using various performance indicators and information sources.
	2. Develop, implement, monitor, and revise a personal learning plan to enhance professional practice
	3. Identify opportunities and use various resources for learning.
	4. Engage in inter-professional activities and collaborative learning to continuously improve personal practice and contribute to collective improvements in practice.
	5. Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that address them.
	6. Effectively manage learning time and resources and set priorities.
	7. Demonstrate an understanding of the scientific principles of research including its ethical aspects and scholarly inquiry and Contribute to the work of a research study.
	8. Critically appraise research studies and scientific papers in terms of integrity, reliability, and applicability.
	9. Analyze and use numerical data including the use of basic statistical methods.
	10. Summarize and present to professional and lay audiences