

**University of Tikrit**

**College of Nursing**

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***Health Assessment***

**Year Two/semester One**

**General Nursing Program**

# **STUDENT GUIDELINES**

## **Introduction**

Welcome to the Second Year-Semester One in the General Nursing Program:

**Course : Health Assessment** : is one of the Nursing course for the general nursing curriculum. The syllabus attached is designed to provide each student with an explanation to the course content. Unite objective are required reading materials for the course.

## **Instructions for use of Student's Course Books**

- Each Class Session identifies the content that will be covered in that class and the activities expected by the students.
- During the Class Session, ask for explanations of term that are not clear.
- You are advised to participate in class room discussion.
- You are advised to complete she study Questions given at the end of each unit that will help you to fully understand the course material.
- You are advised to complete the laboratory requirements for this cour.

## **Health Assessment**

**1. Course Title:** Health Assessment

**2. Course Number:** (201)

**3. Credit Hours:** Total of (4) Credits:

Theory (2) Credits

Lab. (2) Credits

**4. Course Calendar:** Total (6) hours weekly of (15) weeks:

Theory (2) hrs.

Lab. (4) hrs.

**5. Placement:** Second year/ First semester

**6. Instructors:** Mr. Mohammed Yahya Ahmed, MSC. Nursing  
Education.

### **7. Course Description:**

This course is designed to assist the students to focus on the client's holistic assessment that emphasize on physical status as well as psychosocial and cultural aspects. In addition, the course provides the theoretical basis for assessing human level of wellness, personal strengths and physiological alteration through using interview data, nursing observation, results of diagnostic studies and physical examination data.

### **8. Course Goals:**

**At the end of this course the students will be able to:**

- Describe the components of the health history
- Apply interviewing skills and techniques to conduct a successful interview.
- Evaluate the persons' general health status.

- Utilize various tools and techniques to measure and collect information (interview, observing, listening, physical examination, reviewing records and reviewing results of diagnostic test.
- Explain the sequence of systematic approach of physical examination of body system.
- Demonstrate the basic techniques of physical examination.
- Describe the physical examination techniques of inspection, palpation, percussion, and auscultation
- Identify common instruments used during physical examination.

## **9. Course Outline:**

### **The Theoretical Content**

#### **Part 1: Introduction and Overview to Health Assessment:**

- 1.1. Collecting data.( subjective and objective )
- 1.2. Assessment, interview and health history.
- 1.3. Functional health patterns.( katz Index of Independence)
- 1.4. Role of the nurse
- 1.5. Self-preparation
- 1.6. Patient preparation
- 1.7. Equipment preparation
- 1.8. Environmental preparation.
- 1.9. Physical Examination
  - 1.9.1: Inspection
  - 1.9.2. Palpation
  - 1.9.3. Percussion
  - 1.9.4. Auscultation
- 1.10. General appearance.
  - 1.10.1. Personal hygiene
  - 1.10.2. Grooming
  - 1.10.3. Dressing
  - 1.10.4. Posture and gesture.
  - 1.10.5 Speech pattern.
  - 1.10.6. Orientation.

**Part II: Midterm Examination**

**Part III:** Integumentary System ( skin, hair, nails)

**Part IV:** Head and neck

**Part V:** Respiratory assessment

**Part VI:** Cardiovascular System

**Part VII:** Peripheral Assessment

**Part VIII:** Abdominal Assessment

**Part IX:** Neurological System

**Part X:** Musculoskeletal System

**Part XI:** Reproductive System

**Part XII:** Laboratory Test

**Part XIII:** Midterm Examination

**The Laboratory Content**

- Collecting data through interview. (6) hrs.
- Demonstration of Physical examination. (7) hrs.
- Demonstration & re-demonstration of (40) hrs.  
Physical examination of each system.
- Video CD Films. (7) hrs.

**10. Learning Resources:**

Video CD and video cassette, stethoscope, sphygmomanometer, otoscope, ophthalmoscope, pen light, tape measurement, scale, tongue depressors, tuning fork, snellen chart, hammer, paper tissues, cotton balls, thermometer, white board, handouts & overhead projector.

## 11. Teaching / Learning Strategies:

Lecture, group discussion, spots, demonstration & small lab. groups,

### 1. Students Evaluation:

	1 <sup>st</sup> theory exam.	15%
	2 <sup>nd</sup> theory exam.	15%
Lab. exam.	20%	
Final theory exam.	20%	
	Final lab exam.	30%
<hr/>		
Total	100%	

### 13. References:

- Fuller Jill & Schaller- Ayers Jennifer, Health Assessment: A Nursing Approach, 2<sup>nd</sup> ed., Philadelphia, J.B. Lippincott company, 1994.
- Springhouse, New Photo Book Assessing Patients, Springhouse Corporation, 1996.
- Smeltzer, S. C., et.al, Textbook of Medical Surgical Nursing, 10<sup>th</sup> ed, Philadelphia, Lippincott William and William and Wilkins, 2004.
- Weber Jnet and Jane Kelley, Health Assessment in Nursing, 2<sup>nd</sup> ed., Philadelphia, Lippincott William & Wilkins, 2003.

### Project ( written paper)

Choose one of the following topics for the subject of the paper:

- 1.
- 2.
- 3.
- 4.
- 5.

### Guidelines for writing the paper

- Write a 100- 150 word paper explaining one of the above concept. Give illustration where required.
- Contents of the student course book is not allowed to used.
- Use at least three references from the library.
- You are free to use any other resources for completion of this paper.
- A list of references should be provided as policy.
- Type the report, Font style: Time New Roman, size,14.
- Use A4 Plain paper to print the report.
- Copy- paste strategy will never accepted.

- The paper is due as per the teacher's request.

### **Criteria for evaluation of Written Paper**

<b>SN</b>	<b>Criteria</b>	<b>Marks</b>
1.	Introduction	1
2.	Contents with illustration	5
3.	Conclusion	1
4.	Title page	1
5.	References/Resources used	1
6.	Organization ,Neatness, Language	1
<b>Total</b>		<b>10</b>

### **Curriculum Committee Members**

- Ass .Prof: Dr. Radhwan Hussain Ibrahim .Dean, Chairperson
- Mr. Mohammed Yahya Ahmed, MSC. Nursing Education.
- Rami Ramadhan, MSC. Fundamentals of nursing

### **Prepared by:**

- Mr. Mohammed Yahya Ahmed, MSC. Nursing Education.

**Date prepared:** May,2013

## **Health Assessment**

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### **Learning Objectives**

**At the end of this chapter, the student should be able to:**

1. Identify the sources of data
2. Compare between the different types of interview.
3. Differentiate between open and closed ended questions for data collection.
4. describe the communication techniques for health assessment.
5. Describe the nursing roles in conducting the health assessment.
6. discuss the four techniques of physical examination.
7. describe katz Index of Independence.
8. describe the assessment of general appearance.



# Data collection

## Types of Data

Data can be objective or subjective.

1. **Objective data**( Signs) are detectable by an observer or can be tested against an accepted standards. They can be seen, heard, felt, smelled, or measured.

For example, a discoloration of skin, a blood pressure reading, the act of crying, , swollen joint, or a hand tremor.

- Objective data can be collected by physical examination, diagnostic and laboratory test results, pertinent nursing and medical literature

2. **Subjective data** ( Symptoms) are apparent only to the person affected and can be described or verified only by that person.

Itching, pain, and feeling worried are examples of subjective data.

- Subjective data can collected from the client, family, significant others, health care team members, and health records

## Sources of Data

1. **Primary( direct source)** : the patient; is always the best source of data. the client can usually provide subjective data that no one else can offer.

2. **Secondary( indirect source):**

significant others, health personnel, medical records.

## Methods of Data Collection

1. **Observation:** is a conscious, deliberate skill that is developed only through effort and with an organized approach.

To observe is to gather data by using the five senses. Although nurses observe mainly through sight, all of the senses are engaged during observation.

Observation has two aspects.

- a. noticing the stimuli, and
- b. selecting, organizing, and interpreting the data.

For example, a nurse who observes that a client's face is flushed must relate that observation to, for example, body temperatures, activity, environment temperature, and blood pressure.

## 2. Interviewing

The interview is a process in which understanding of a situation is gained through the collection of information from the individual who is then helped to make decisions about his health status. the interview should be conducted skillfully, with an atmosphere of support in which rapport between nurse and the patient facilitates self-exploration.

The amount of self-exploration depends on the purpose of the interview. These types of interviewing illustrate different purposes.

1. **Structured Interview:** this is conducted to obtain specific information and it is seen as appropriate in crisis. All questions are decided in advance, in accordance with the specific information to be gained. the nurse controls the space the of interview.

## **2. Semi-Structured Interview.**

In this interview only some questions are decided in advance. this is used not only to gain specific information but also to explore feeling or to promote patient's participation.

## **3. Unstructured Interview.**

This can be valuable to explore patient' feeling.

In this type, questions are not determined in advance, but allows to arise during the interview.

Some possible purposes are to:

- gather data.
- give information.
- Identify problems of mutual concern.
- Provide support, and
- To provide counseling or therapy.

## **Phases of Interview**

### **1. Introductory Phase:**

Be aware about the following:

- \* Keep the beginning short to decrease your stress and anxious as well as the person.
- \* Address the person, using his/her surname, shake hands if that seems comfortable, introduce yourself, give the reason of interview.

## **2. Working Phase:**

The working phase is the data gathering phase. Verbal skills for this phase include your questions to the patient and your response to what the patient is said. (open-ended and closed-ended questions).

## **3. Closing the interview**

The interview should end gracefully. An abrupt or awkward closing can destroy rapport and leave the person with negative impression of the whole interview. To ease into the closing, ask the person:

"Is there anything else you would like to mention?"

"Are there any questions you would like to ask?"

"Are there any other areas I should have asked about?"

,"Is there anything else you'd like to say today"? .this allows the patient to the choice of terminating the interview or not.

### **The essential steps of interview are:**

**1. Set the stage:** the interview begins by attending to the setting factors (the furniture, the lighting, and the environment), by putting the patient at ease and offering openings to begin the conversation. The nurse facilitates the process by being empathetic, warm, encouraging and respectful.

**2. Build on the work started:** Questioning can help the patient to explore the problem, to decide what the problem is, and to make decisions about acting on it.

**3. Summarize of interview:** at the end of interview or at a logical point on an interview, many effective nurse communicators find it useful to summarize what the client has said. Summarizing means verbally capturing the essence of what the client presented including pertinent facts, feelings, discrepancies, and untouched areas.

## **Communicating Techniques**

To elicit the information you need, you may use various communication techniques. For instance, you may ask open-ended questions, closed questions, and directive questions. You'll also use common language, silence, facilitation, confirmation, restatement, reflection, clarification, confrontation, interpretation, summary, and conclusion.

### **Open-ended questions**

- Open-ended questions—such as "What brings you to the hospital today?" or "Can you tell me about your chest pain?"—tend to elicit a good deal of information. So you should use them as much as possible.
- Unlike closed questions, open-ended ones give the patient a chance to provide descriptive answers at his own pace. As he does, you can evaluate his alertness and his mental abilities.
- However, open-ended questions also allow the patient to digress and avoid discussing relevant information. So you may need to gently refocus the patient's attention.

### **Examples include:**

- "How have you been managing since your husband died?"
- "What is it like having a teenager in the house?"
- "Can you tell me more about that?"
- "That must have been difficult." (State this in a caring, questioning manner, and pause for a response.)

## **Closed questions**

- If you need information quickly, use closed questions—such as "Has your chest pain gone away?" because they require only one- or two-word answers. Closed questions may also cause less anxiety for patients with poor verbal skills.
- However, when you use these questions, you may get only a limited amount of information and may convey to the patient that you aren't interested in his plight.

### **Examples include:**

- "What do you have for breakfast?"
- "When did the pain start?"
- "Are you sleeping well?"

## **Directive questions**

You can help the patient focus on one subject by asking him questions, such as "When I press here, does it hurt?" and "How painful is this?"

You'll use such questions when you need specific information. But you should use them cautiously because they may make the patient feel rushed, and he may not share information or fully develop his thoughts.

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**Katz Index of Independency**

The Katz Index of Independence in Activities of Daily Living, commonly referred to as the Katz ADL, is the most appropriate instrument to assess functional status as a measurement of the client's ability to perform activities of daily living independently. The Index ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding. Clients are scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicates moderate impairment, and 2 or less indicates severe functional impairment.

**Target Population:** The instrument is most effectively used among older adults in a variety of care settings, when baseline measurements, taken when the client is well, are compared to periodic or subsequent measures.

The Katz ADL Index is very useful in creating a common language about patient function for all practitioners involved in overall care planning and discharge planning.



### Kats Index of Independency in Activities of Daily Living

<b>ACTIVITIES</b> <b>Points (1 or 0)</b>	<b>INDEPENDENCE:</b> <b>(1 POINT)</b> <b>NO supervision,</b> <b>direction or personal</b> <b>assistance</b>	<b>DEPENDENCE:</b> <b>(0 POINTS)</b> <b>WITH supervision,</b> <b>direction, personal</b> <b>assistance or total care</b>
<b>BATHING</b> Points:_____	(1 POINT) Bathes self completely or needs help in bathing only a single part of the body such as the back, genital area or disabled extremity.	(0 POINTS) Needs help with bathing more than one part of the body, getting in or out of the tub or shower. Requires total bathing.
<b>DRESSING</b> Points:_____	(1 POINT) Gets clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	(0 POINTS) Needs help with dressing self or needs to be completely dressed.
<b>TOILETING</b> Points:_____	(1 POINT) Goes to toilet, gets on and off, arranges clothes, cleans genital area without help.	(0 POINTS) Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
<b>TRANSFERRING</b> Points:_____	(1 POINT) Moves in and out of bed or chair unassisted.	(0 POINTS) Needs help in moving from bed to chair or

	Mechanical transferring aides are acceptable.	requires a complete transfer.
CONTINENCE Points:_____	(1 POINT) Exercises complete self control over urination and defecation.	(0 POINTS) Is partially or totally incontinent of bowel or bladder.
FEEDING Points:_____	(1 POINT) Gets food from plate into mouth without help. Preparation of food may be done by another person.	(0 POINTS) Needs partial or total help with feeding or requires parenteral feeding.

TOTAL POINTS = \_\_\_\_\_ 6 = High (*patient independent*) 0 = Low (*patient very dependent*)

### **Barthel Index**

The Barthel Index consists of 10 items that measure a person's daily functioning specifically the activities of daily living and mobility. The items include feeding, moving from wheelchair to bed and return, grooming, transferring to and from a toilet, bathing, walking on level surface, going up and down stairs, dressing, continence of bowels and bladder.

### **How is the Barthel Index used?**

The assessment can be used to determine a baseline level of functioning and can be used to monitor improvement in activities of daily living over time. The person receives a score based on whether they have received help while doing the task. The scores for each of the items are summed to create a total score. The higher the score the more "independent" the person. Independence means that the person needs no assistance at any part of the task. If a person does about 50% independently then the "middle" score would apply.

**Example form:**

<b>Patient Name:</b> _____ <b>Rater:</b> _____ <b>Date:</b> ____ / ____ / ____ : ____	
Activity	Score
<b>Feeding</b> 0 = unable 5 = needs help cutting, spreading butter, etc., or requires modified diet 10 = independent	0    5    10
<b>Bathing</b> 0 = dependent 5 = independent (or in shower)	0        5
<b>Grooming</b> 0 = needs to help with personal care 5 = independent face/hair/teeth/shaving (implements provided)	0        5
<b>Dressing</b> 0 = dependent	0    5    10

5 = needs help but can do about half unaided 10 = independent (including buttons, zips, laces, etc.)	
<b>Bowels</b> 0 = incontinent (or needs to be given enemas) 5 = occasional accident 10 = continent	0    5    10
<b>Bladder</b> 0 = incontinent, or catheterized and unable to manage alone 5 = occasional accident 10 = continent	0    5    10
<b>Toilet Use</b> 0 = dependent 5 = needs some help, but can do something alone 10 = independent (on and off, dressing, wiping)	0    5    10
<b>Transfers (bed to chair and back)</b> 0 = unable, no sitting balance 5 = major help (one or two people, physical), can sit 10 = minor help (verbal or physical) 15 = independent	0    5    10 15
<b>Mobility (on level surfaces)</b> 0 = immobile or < 50 yards 5 = wheelchair independent, including corners, > 50 yards 10 = walks with help of one person (verbal or physical) > 50 yards 15 = independent (but may use any aid; for example, stick) > 50 yards	0    5    10 15

<b>Stairs</b> 0 = unable 5 = needs help (verbal, physical, carrying aid) 10 = independent	0    5    10
<b>TOTAL (0 - 100)</b>	_____

### **The Role of the Nurse in Health Assessment**

1. prepare patient, environment, and equipment needed for assessment.
2. explain the assessment procedure and expected patient's feeling during examination to patient or family.
3. ensure that all needed format and documentation papers are included in patient's file.
4. keep privacy for the patient.
5. the nurse obtains the patient's health history and performs a physical assessment, which can be carried out in a variety of settings, including, the acute care setting, clinic or outpatient office, school, long-term care facility, or the home.
6. A growing list of nursing diagnoses is used by nurses to identify and categorize patient problems that nurses have the knowledge, skills, and responsibility to treat independently .
7. Reporting and documenting the procedure with it's finding.
8. Orient the patient about the result of assessment including normal and abnormal findings, and the actions that should be carried out to correct the abnormalities.

## **Guidelines In conducting health assessment**

### **a. Preparing the patient**

to ensure an accurate assessment and physical examination. The patient must be properly prepared physically and psychologically. To prepare the patient properly, the nurse will:

- 1.prepare for patient's physical comfort, by allowing the opportunity to empty the bowel and bladder.
2. keep privacy while the patient changes into a gown and gives patient time to understand, assisting if necessary.
- 3.help the patient assume proper positions during examination so that body parts are accessible and the patient stay comfortable.
- 4.thoroughly explain what will be done, what the patient should expect to feel, and how the patient can cooperate.
- 5.encourage patient to ask questions and mention discomfort felt during examination.
6. have a witness or third person present in the examination room during examination of genitalia when patient and nurse are of opposite genders.
7. pace or time examination process according to the patient's physical and emotional tolerance.

### **b. Preparing equipment.**

The nurse uses a variety of equipment throughout the assessment process.

## **Equipment and supplies needed for performing a physical examination**

<b>Equipment</b>	<b>Function</b>
Incontinent sheet	Protect bed linen from getting soiled
drapes	Ensure privacy for the client.
gloves	Prevent cross infection.
Gown for patient	For easy access of different body parts.
Paper towel	Dry hands and arms and to wipe equipment.
Percussion hammer	Test various reflexes of the body.
Height/ weight scale	For measure body weight and height.
Specimen containers	Collect specific sample for laboratory evaluation.
Sphygmomanometer and cuff	Measure blood pressure.
stethoscope	Auscultator different body sounds
Tape measure	Measure body parts. e.g abdominal girth.
thermometer	Measure body temperature
Tongue depressor	Facilitate visualizing pharynx and tonsils.
Wrist watch with second hands	Record time of examination as needed.
Cotton applicators	Examine superficial sensation of the skin including corneal reflex.
Eye chart ( snellen chart)	Test visual acuity
flashlight	Facilitate visualization for Ear, Nose, and Throat and to check corneal reflex.
Lubricant	Lubricate instrument used in rectal and vaginal examination.
Otoscope	Examine outer ear and the tympanic membrane
Laryngeal mirror	Metal instrument with mirror to inspect pharynx and

	oral cavity
Penlight	Flashlight to test pupillary reaction to light and assess third, fourth, and sixth (oculomotor, trochlear, and abducens) cranial nerves
ophthalmoscope	Examine fundus of the eye.
Sterile safety pin	Examine deep sensation of the skin.
Tuning fork	Test hearing acuity
Vaginal speculum	Facilitate vaginal examination
proctoscope	Facilitate rectal examination
spirometer	Facilitate breathing examination

### **C: Preparing the environment**

to promote patient comfort and ensure an efficient examination, the examination room should have the following features.

1. privacy for the patient.
2. curtains or dividers to enclose the patient's bed.
3. a warm comfortable temperature.
4. proper examination clothing for the patient.
5. adequate lighting.
6. control of outside noises.
7. precautions to prevent interruptions by visitors or other health care personnel.
8. a bed or table set at examiner's waist level.

## **Physical Examination Examination Techniques**

### **Purposes of Physical Examination**



The physical examination provides the database from which all interventions are planned. The complete assessment data are used to:

- Ascertain the client's level of health and physiological function.
- Identify factors placing the client at risk for problems.
- Determine areas of preventive nursing.
- Confirm alterations, disease, or inability to perform the activities of daily living.
- Identify the need for additional testing or examination.
- Evaluate the outcomes of treatment and therapy.

The nurse depends on his/her own senses and uses them in five examination techniques that enable nurse to collect a broad range of physical data about the patients. these are:

1. Inspection (Using Sight)
2. Palpation ( Using touch)
3. Percussion (Using hearing and touch).
4. Auscultation (Using hearing)
5. Olfaction ( Using Smell).

## **Inspection**

- Take the health history and perform the physical examination.
- Inspection is the visual examination, i.e. , assessing using the sense of sight.

- The nurse inspects with the naked eye and with a lighted instrument such as an otoscope(used to view ear).
- Nurses frequently use this technique to assess color, rashes, scars, body shape, facial expressions that may reflect emotions, and body structures.

Inspection is an active process, not a passive one

The nurse must know what to look for and where

. Still, inspection needs to be systematic. When inspect a patient should, for instance, proceed from head to toe, observing first for general characteristics, then for specific ones.

## **Palpation**

Palpation is the examination of the body using the sense of touch. The pads of the fingers are used because their concentration of nerve endings makes them highly sensitive to tactile discrimination.

### **Palpation is used to determine:**

- Texture; e.g., of the hair
- Temperature, e.g., of the skin area
- Vibration , e.g., of a joint.
- Position, size, consistency ,and mobility of organs or masses.
- Distension, e.g., of urinary bladder.
- Presence and rate of peripheral pulses.
- Tenderness of pain.

There are two main types of palpation:

**1. Light (Superficial) palpation:** should always precedes deep palpation. its use to detect tenderness, pain, texture—etc.

**2. Deep palpation:** is a technique used more commonly by nurse practitioners and clinical specialists. its use to detect mass, organomegally.

### **Percussion**

Percussion is an assessment method in which the body surface is struck to elicit sounds that can be heard or vibrations that can be felt.

Percussion is used to determine the size and shape of internal organs by establishing their borders. It indicates whether tissue is fluid-filled, or solid. Also its used to evaluate the density of underlying tissue and to elicit tenderness.

**Percussion elicits five types of sound. These are:**

**1.Flatness:** A soft, high-pitched sound of short duration normally heard over muscles and bones.

is an extremely dull sound produced by very dense tissue such as muscle or bone. pitched sound of medium intensity normally heard over the liver.

**2. Dullness:** A moderately soft, high- heard over the lung, it can indicate increased density, as in pneumonia.

is a fluid-like sound produced by dense tissue such as the liver, spleen, or heart.

**3.Resonance:** A loud, long, low-pitched sound normally heard over the lung fields. is a hollow sound such as that produced by lungs filled with air.

**4. Hyper-resonance:** A loud, low-pitched, and very long souTnd heard over lungs that are over inflated with air (as in emphysema is not produced in the normal body. Its described as booming and can be heard over an emphysematous ( pathological distension of lung tissues by air).

**5. Tympany:** A high-pitched, loud sound of medium duration usually heard over the stomach, indicating the presence of gastric air bubbles. is a musical or drum-like sound produced from an air-filled stomach.

### **Characteristics of percussion sounds**

Percussion produces sounds that vary according to the tissue being percussed. This chart lists important percussion sounds along with their characteristics and typical locations.

<b>Source</b>	<b>Quality</b>	<b>Duration</b>	<b>Pitch</b>	<b>Intensity</b>	<b>Sound</b>
Muscle, bone	Flat	Short	High	Soft	Flatness
Liver, full bladder, pregnant uterus	Thud like	Moderate	High	Soft to moderate	Dullness
Normal lung	Hollow	Long	Low	Moderate to loud	Resonance
Gastric air bubble, intestinal air	Drum like	Moderate	High	Loud	Tympany
Hyperinflated lung (as in emphysema)	Booming	Long	Very low	Very loud	Hyperresonance

### **Auscultation**

Auscultation is the process of listening to sounds produced within the body. Auscultation may be direct or indirect.

**--Direct auscultation** is the use of the unaided ear,. E.g. to listen to a respiration wheeze or the grating of a moving joint.

**--Indirect auscultation:** is the use of stethoscope, which amplifies the sounds and conveys them to the nurse's ear. A stethoscope is used primarily to listen to sounds from within the body. E.g., heart, lungs, and bowel sounds.

## **OLFACTION**

Olfaction is the sense of smell. Certain alterations in the body function create characteristics body odors. The sense of smell can detect abnormalities that go unrecognized by any other means.

### **Example of odors**

Odor	Site or Source	Potential Causes
alcohol	Oral cavity	Ingestion of alcohol
Ammonia	Urine	UTI
Halitosis	Oral cavity	Poor dental and oral hygiene, gum disease.
Sweet fruity, ketones	Oral cavity	Diabetic acidosis

## **1. General Appearance**

General appearance assessment include the following.

### **Posture and position.**

#### **■ Position:**

The person sits comfortably in a chair or on the bed or examination table, arm relaxed at side, head turned to examiner.

**■ Posture:** the person stands comfortably erect as appropriate for  
Note the normal 'Plumb line" through anterior ear, shoulders, patella, ankle.

### **Expectation are:**

**Toddler:** toddler lordosis.

**Aging person:** stopped with kyphosis.

■ **Body movements:** body movements are voluntary, deliberate, coordinated, and smooth and even.

■ **Dress:** dress is appropriate for setting, season, age, gender, and social group. Clothing fits and is put on appropriately.

■ **Personal hygiene and Grooming:** the person appears clean and groomed appropriately for his/her age, occupation, and socioeconomic status. Hair is clean and groomed, brushed, women's make-up is appropriate for age and culture.

### **Part III: Integumentary System**

#### **Learning objectives**

**At the end of this chapter, the student should be able to:**

1. Describe the process of skin assessment
2. Describe the assessment parameters for integumentary system.
3. Discuss the examination techniques used for skin.
4. Describe the normal finding for each assessment of skin structures.
5. Identify the abnormal findings and expected causes of skin assessment.
6. Explain techniques used in conducting a physical examination.

7. Describe the significance of assessment findings obtained from a physical examination.
8. Discuss documentation of data obtained from a physical examination.

**Skin:** check for the following

**Color:** observe the skin tone. Normally, it is consistent with genetic background and varies from pinkish tan to ruddy dark tan or from light to dark brown and may have yellow or olive overtones.

**Temperature:** the skin should be warm, and the temperature should be equal bilaterally. Warmth suggests normal circulation status. Hands and feet may be slightly cooler in a cool environment.

**Moisture:** perspiration appears normally on the face, hands, axilla, and skin folds in response to activity, a warm environment, or anxiety.

**Texture:** normal skin feels smooth and firm, with an even surface. skin is intact with no obvious lesions.

**Thickness:** The epidermis is uniformly thin over most of the body, although thickened callus areas are normal on palms and soles.

### **Mobility and Turgor**

Mobility is the skin's ease of rising, turgor is the ability of skin to return to place promptly when released.

### **Assessment of the Skin**

<b>Area Of Assessment</b>	<b>Normal Findings</b>	<b>Abnormal Findings and Possible Causes</b>
<b>Color:</b> Inspect under natural light to ensure accurate findings.	<ul style="list-style-type: none"><li>• Uniform color except in sun-exposed areas.</li><li>• In dark-skinned people, nail beds, palms, and lips are lighter than surrounding areas.</li></ul>	<ul style="list-style-type: none"><li>• Redness (inflammation).</li><li>• Bluish coloration (hypoxia).</li></ul>
<b>Moisture:</b> Inspect for wetness and oiliness. Note amount and distribution.	Varies with: Activity Body temperature Ambient temperature Body part (e.g., skinfolds, axillae)	<ul style="list-style-type: none"><li>• Excessive perspiration (hyperthermia, infection, hyperthyroidism, menopause, strong emotions).</li><li>• Excessive dryness (dehydration).</li></ul>
<b>Temperature:</b> Palpate with back of hand. Note uniformity of warmth.	Warm.	<b>Hyperthermia:</b> <ul style="list-style-type: none"><li>• Generalized (fever)</li><li>• Localized (infection)</li></ul> <b>Hypothermia:</b> <ul style="list-style-type: none"><li>• Generalized (shock).</li><li>• Localized (impaired</li></ul>



		circulation)
<b>Texture:</b> Palpate to determine quality, thickness, and suppleness.	<ul style="list-style-type: none"> <li>• Uneven texture (thicker on palms and soles).</li> <li>• Wrinkled leathery skin results from normal aging effects (i.e., decreased collagen, subcutaneous fat).</li> </ul>	<ul style="list-style-type: none"> <li>• Generalized roughness (hypothyroidism).</li> </ul>
<b>Mobility and turgor (elasticity):</b> <ul style="list-style-type: none"> <li>• Apply pressure to dependent areas (e.g., sacrum, ankles, feet). Note areas of indentation .</li> <li>• If indentation occurs, apply firm pressure for 5 seconds.</li> <li>• Note degree of edema based on depth of pitting in millimeters.</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of indentation in dependent areas.</li> </ul> <b>Resilient:</b> Springs back to its previous state after being pinched.	<ul style="list-style-type: none"> <li>• Stretched, shiny skin of dependent areas (trauma, decreased venous blood return).</li> <li>• “Tenting,” failure of skin to spring back to normal shape (dehydration).</li> </ul>

### **Pitting Edema Scale**

- 1+ Indentation up to 2 mm
- 2 +Indentation of 4 mm
- 3+ Indentation of 6 mm
- 4+ Indentation of 8 mm.

**Hair:** check for the following

**Color:** color may vary from pale blonde to total black.

Graying begins as early as the third decade of life because of reduce melanin production.

**Texture:** scalp hair may be fine or thick and may look straight, curly, or kinky. Should look shiny.

**Distribution:** distribution conforms to normal male and female patterns.

### Assessment of the Hair

Area Of Assessment	Normal Findings	Abnormal Findings and Possible Causes
Inspect and palpate scalp to determine quality, distribution, and pattern of hair loss.	Thick and even distribution	<ul style="list-style-type: none"><li>• Thin and brittle (hypothyroidism)</li><li>• Alopecia (aging, chemotherapeutic drugs, hair grooming products)</li><li>• Hirsutism (genetic, some medications)</li></ul>
Inspect for parasitic infestation.	Free of infestation	White ovoid nits (Pediculus capitis, P. corporis, and P. pubis)
Part the hair all over the scalp; inspect for scales and scars.	Shiny and smooth without lesions, lumps, or masses	Masses or lumps (sebaceous cysts, trauma, tumors)
Beginning at front of scalp, palpate down midline and each side. Note any tenderness, pain, lesions, lumps, or masses.	Absence of pain, redness, or scales	<ul style="list-style-type: none"><li>• Dry flaking scales (seborrhea)</li><li>• Red patches covered by thick, dry, silvery, adherent scales (psoriasis)</li></ul>

**Nail :** check for the following:

**Shape and Contour:** The nail surface is normally slightly curved .

**The profile sign:** Note the index finger at its profile and note the angle of the nail base, it should be about 160 degrees.

**Consistency:** the surface is smooth and regular, not brittle or splitting.

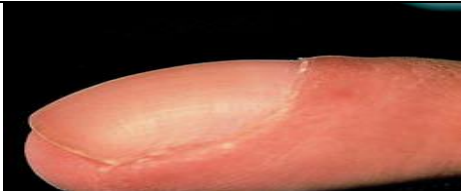


Nail thickness is uniform.

**Color:** all people normally may have white hairline linear markings from trauma or picking at the cuticle.

### Assessment of the Nail

Area Of Assessment	Normal Findings	Abnormal Findings and Possible Causes
Inspect and palpate nails and nail beds, noting color, shape, and texture.	<ul style="list-style-type: none"><li>• Firm when palpated.</li><li>• Pinkish color in light-skinned people.</li><li>• Longitudinal streaks of brown or black pigmentation in dark-skinned people.</li><li>• Angle between nail and base of finger is 160°.</li></ul>	<ul style="list-style-type: none"><li>• variations and abnormalities of nail bed.</li></ul>
Test for capillary refill: Press nail between your thumb and index finger. Note degree of blanching and return of normal color.	Nail promptly returns to its normal color when pressure is released.	<ul style="list-style-type: none"><li>• Delayed return of color to nail bed (circulatory impairment).</li></ul>
Inspect tissue surrounding nails. Note any lesions.	Tissue is intact.	<ul style="list-style-type: none"><li>• Paronychia (inflammation of skin around the nails).</li></ul>

### Variations of the Nail Bed

Normal nail angle	
	<p><b>Clubbing:</b> Hypoxia causes an angle greater than 180° between the fingernail and nail base; nail feels springy when palpated.</p>
	<p><b>Beau's line:</b> Characterized by transverse depression in the nails; associated with injury and severe systemic infections.</p>
	<p><b>Paronychia:</b> Characterized by an inflammation at the nail base (may be swollen, red, or tender); associated with trauma and local infection.</p>

## Part IV: Head and Neck

### Learning objectives

**At the end of this chapter, the student should be able to:**

1. Describe the assessment parameters for head and neck.

2. Discuss the examination techniques used to assess the head and neck.
3. Describe the normal finding for each assessment parameter.
4. Identify the abnormal findings and expected causes for head and neck.

### **Head**

Note the general size and shape ,norm cephalic, is the term that denote a round symmetric skull that is appropriately to body size.

The cranial bones that normally protruded are the forehead, the lateral edge of each parietal bone, the occipital bone, and mastoid process behind each ear.

Note the facial expression and its appropriateness to behavior or reported mood . Anxiety is c common in hospitalized or ill person

### **Neck**

Head position is centered in the midline, and the accessory neck muscles should be symmetric. The head should be held erect and still.

Note any limitation of movement during active motion.

Palpate the lymph nodes.

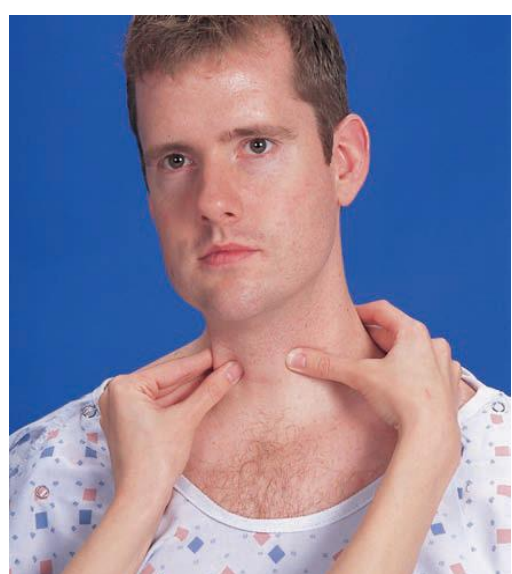
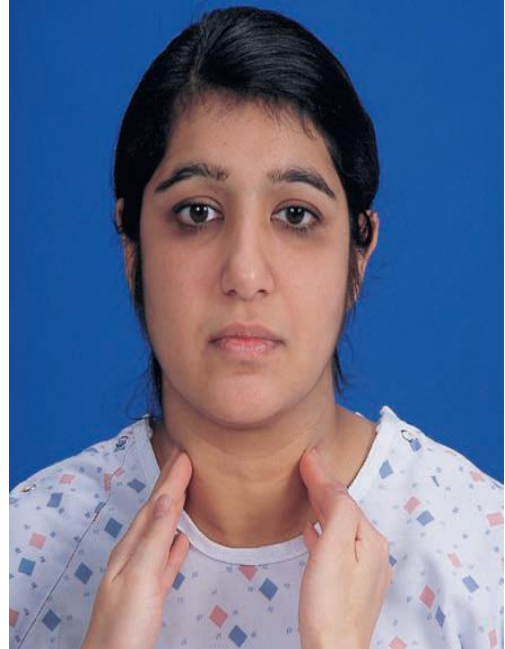
Check the trachea and thyroid gland.

### Assessment of Neck

Area Of Assessment	Normal Findings	Abnormal Findings and Possible Causes
<p>Inspect for symmetry and musculature. Instruct client to flex chin to chest and to each side and shoulder. Instruct client to hyperextend neck backward.</p>	<ul style="list-style-type: none"> <li>• Movement through full range of motion (ROM) with               <ul style="list-style-type: none"> <li>• no limitation or discomfort.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Pain upon flexion or rotation of head (muscle spasm, inflammation of muscles or meninges, vertebral diseases).</li> <li>• Torticollis, i.e. prominent lateral deviation of sternocleidomastoid muscle (inflammation, trauma, sleeping with head in one position). Decreased ROM (degenerative osteoarthritis).</li> </ul>
<p><b>Palpate lymph nodes:</b></p> <ul style="list-style-type: none"> <li>• Instruct client to relax and flex neck slightly forward.</li> <li>• Stand in front of client and systematically palpate anterior cervical nodes and posterior cervical nodes</li> <li>• Note size, shape, mobility, consistency, and tenderness.</li> </ul>	<p>Palpable lymph nodes. Small, movable nodes are insignificant.</p>	<p>Palpable nodes (infection, malignancy).</p>

<p><b>Palpate thyroid gland:</b></p> <ul style="list-style-type: none"> <li>• Stand behind or in front of client .</li> <li>• Instruct client to slightly extend neck.</li> <li>• Rest thumbs on nape of neck, and place index and middle fingers of both hands on thyroid isthmus and anterior surfaces of lateral lobes.</li> <li>• Ask client to swallow and to flex neck forward and to left.</li> <li>• Gently move thyroid cartilage to the right. Note any bulging of gland.</li> <li>• Place your thumb deep into and behind sternocleidomastoid muscle with index and middle fingers in front. Ask client to swallow.</li> <li>• Note any enlargement of glands.</li> <li>• If gland is enlarged, place stethoscope diaphragm over gland.</li> <li>• Note on auscultation presence of bruit</li> </ul>	<ul style="list-style-type: none"> <li>• Thyroid cannot be visualized.</li> <li>• Smooth, soft, non-tender, and not enlarged.</li> <li>• Isthmus is palpable when swallowing occurs.</li> </ul> <p>No bruit.</p>	<ul style="list-style-type: none"> <li>• Masses or enlargements during swallowing (goiter, thyroid disease).</li> <li>• Bruits heard on auscultation (enlarged toxic goiter).</li> </ul>
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(soft vibration or rushing sound).		
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## **Part V: Respiratory assessment**



## **Learning objectives**

**At the end of this chapter, the student should be able to:**

5. Describe the assessment parameters for respiratory system.
6. Discuss the examination techniques used for each organ of respiratory system.
7. Describe the normal finding for anterior and posterior chest.
8. Identify the abnormal findings and expected causes for respiratory assessment.

## **Thorax and Lungs**

### **Anterior Chest**

Palpate symmetric chest expansion, palpate the anterior chest wall to note any tenderness and to detect any superficial lumps.

Assess tactile (vocal fremitus) by palpation, begins palpating over the lung apices in supraclavicular areas. Compare vibrations from one side to other as the person repeats "ninety-nine".

Percuss the anterior chest, note the border of cardiac dullness normally found on the anterior chest.

Check for Breath Sounds. Rate and depth of respiration.

### **Posterior chest**

**Inspect Thoracic Cage, note the shape and configuration of the chest wall. The spinous processes should appear in a straight line.** The thorax is symmetric. The scapulae are placed symmetrically in each hemi thorax.

Palpate symmetric chest expansion.

Assess tactile fremitus.

Percuss for Lung fields

Check for Breath Sounds.

## Assessment of Thorax and Lungs

### Posterior thorax

Area Of Assessment/ technique	Normal Findings	Abnormal Findings and Possible Causes
<b>Inspect posterior thorax</b> -Place client in a sitting position, with arms folded across chest (to separate scapulae) and back exposed. -Inspect shape and symmetry of chest. -Note respiratory rate, rhythm, and movement of chest wall. -Note any signs of distress. -Estimate the anteroposterior diameter in proportion to lateral diameter	-Respirations are quiet, regular, and effortless, with rate of 12–20 per minute. -Thorax rises and falls in unison with respiratory cycle. -Ribs slope across and downward, without movement or bulging in the intercostal space (ICS). -The adult ratio of anteroposterior to lateral chest diameter ranges from 2:2 to 5:7.	- Horizontal slope of ribs (emphysema). -Bulging in ICS (increased respiratory effort). -Retraction of ICS during inspiration (airway obstruction, e.g., asthma). -Impaired respiratory movement (diseases of lungs or pleurae). -Increased anteroposterior diameter(barrel chest as a result of chronic obstructive pulmonary disease).
<b>Palpate posterior thorax</b> -Palpate lesions or areas of tenderness. -Palpate thoracic expansion	-Posterior thorax is free from tenderness, lesions, and pulsations. -Thumbs should separate	-Tenderness (trauma, e.g., fractured rib). -Unilateral decreased thoracic expansion

<p>at 10th rib:</p> <ul style="list-style-type: none"> <li>-Place thumbs close to client's spine and spread hands over thorax .</li> <li>-Note divergence of thumbs; feel for range and symmetry of movement during deep inhalation and full exhalation.</li> <li>-Place ulnar aspect of open hand on each location.</li> <li>-Instruct client to say “99” and palpate for <b>tactile fremitus</b> (vibrations created by sound waves).</li> <li>-Note areas of increased or decreased fremitus.</li> <li>-Move hands from side to side, with client repeating “99” with same intensity every time hands are placed on back.</li> </ul>	<p>an equal distance (approximately 3–5 cm) and in the same direction during inhalation and meet at the midline on expirations.</p> <p>-Fremitus is equal on both sides of thorax, strongest at level of tracheal bifurcation.</p>	<p>(pneumonia, pneumothorax).</p> <ul style="list-style-type: none"> <li>-Bilateral decreased expansion (emphysema, pleurisy).</li> <li>-Absent or decreased fremitus (decreased voice tone; bronchial obstruction; accumulation of fluid, air, or solid tissue in pleural space).</li> <li>-Fremitus is increased over consolidated areas of lungs.</li> </ul>
<p><b>Auscultate posterior and lateral surfaces</b></p> <ul style="list-style-type: none"> <li>-Place stethoscope diaphragm on right lung apex.</li> <li>-Instruct client to inhale and exhale deeply and slowly</li> </ul>	<p>-A large chest produces decreased breath sounds.</p>	<ul style="list-style-type: none"> <li>-Decreased breath sounds (obstruction, e.g., foreign object, emphysema, atelectasis).</li> <li>-Absent breath sounds (empyema, hemothorax, pneumothorax,</li> </ul>

when stethoscope is felt on the back. -Repeat on left lung apex.		pneumonectomy).
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## Assessment of Thorax and Lungs

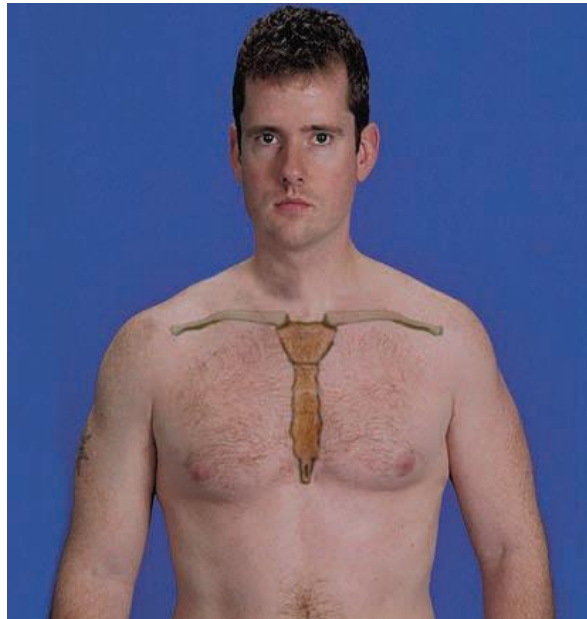
### Anterior thorax

Area Of Assessment/ technique	Normal Findings	Abnormal Findings and Possible Causes
<b>Inspect anterior thorax</b> -Place client in sitting or supine position. -Inspect for symmetry and depth of respiration, rhythm of respirations, slope of ribs, and presence of musculoskeletal deformities.	-Scapulae at same height. Thorax rises and falls in unison with respiratory cycle; ribs are at a 45 angle with sternum. -Inhalation breath sounds inaudible at a distance of more than 2–3 cm from the mouth to lateral chest	-One scapula higher than the other (scoliosis). -Rib angle of less than 45_ (emphysema, cystic fibrosis). -Chest retraction on inspiration obstructs free inflow of air (asthma, tracheal/laryngeal obstruction, tumor).
<b>Palpate anterior thorax</b> -Place finger pads on right	-Same as normal findings for posterior palpation.	-Pulsations (thoracic aortic aneurysm).

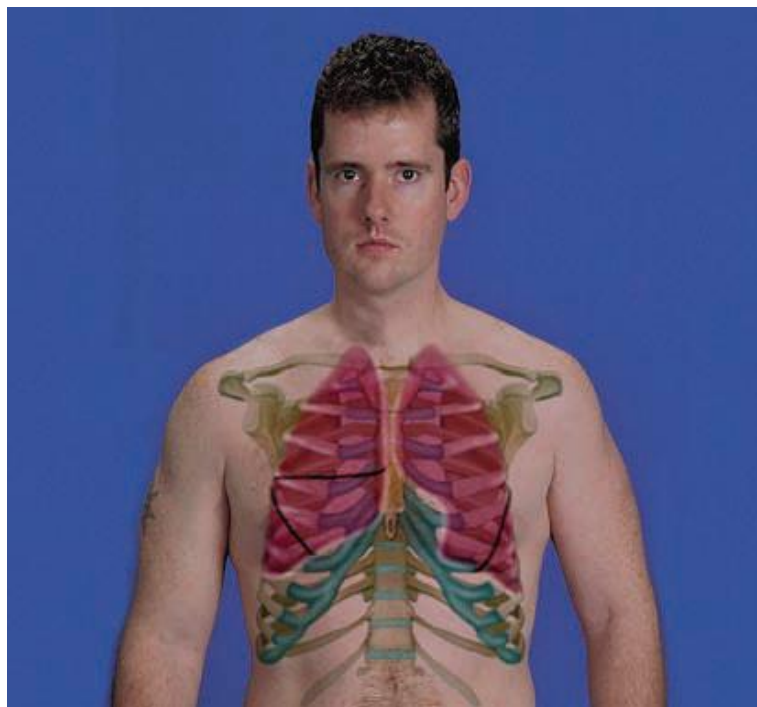
<p>lung apex, above the clavicle.</p> <ul style="list-style-type: none"> <li>-Move downward to each rib and ICS.</li> <li>- Note tenderness, pulsation, masses, and crepitus (a grating or crackling sensation caused by two rough surfaces rubbing together).</li> <li>-Repeat on left side.</li> <li>-Assess respiratory expansion by placing thumbs along each costal margin with hands on lateral rib cage.</li> <li>-Instruct client to inhale deeply.</li> <li>-Note divergence of thumbs on expansion; feel range and symmetry of respiratory movement.</li> </ul> <p>Palpate for tactile fremitus</p>	<ul style="list-style-type: none"> <li>-Note that fremitus is usually decreased or absent over the precordium (chest wall).</li> </ul>	<ul style="list-style-type: none"> <li>-Pain or tenderness (fractured rib).</li> <li>-Unilateral decreased thoracic expansion (pneumonia, pneumothorax).</li> <li>-Crepitus occurs when air escapes the lung and is trapped in subcutaneous tissue (any condition that interrupts the pleurae, e.g., pneumothorax, thoracic surgery).</li> </ul>
<p><b>Auscultate anterior thorax</b></p> <ul style="list-style-type: none"> <li>-Instruct client to breathe through mouth.</li> <li>-Compare symmetrical areas of the lungs while moving stethoscope downward.</li> <li>-Listen to breath sounds.</li> <li>- Note intensity, and identify</li> </ul>	<p>A large chest wall will normally produce decreased breath sounds</p>	<ul style="list-style-type: none"> <li>-Absent breath sounds (empyema, hemothorax, pneumothorax, pneumonectomy).</li> </ul>

<p>abnormal variations.</p> <p>-If breath sounds are diminished, ask client to breathe hard and fast with mouth open.</p>		
<p><b>Percuss anterior thorax</b></p> <p>-Percuss symmetrically</p> <p>-Percuss 2–3 strikes along right lung apex.</p> <p>-repeat on left lung apex</p> <p>- Proceed downward and percuss in every other ICS going from right to left in same position on both sides.</p> <p>-Gently lift breast tissue as necessary.</p> <p>=In each thoracic area, assess for:</p> <p><b>a.</b> Resonant lung field</p> <p><b>b.</b> Cardiac dullness: third to fifth ICS left of sternum</p> <p><b>c.</b> Liver dullness: Place pleximeter finger parallel to upper border of expected liver dullness in right midclavicular line; percuss downward.</p> <p><b>d.</b> Gastric air bubble: Repeat procedure</p>	<p>-Resonant sound over lung tissue (hyperresonance in children and thin adults).</p> <p>-Cardiac, liver, and gastric silhouettes emit dull sound.</p> <p>-Ribs emit flat sound.</p>	<p>Dullness over lung tissue (pneumonia, tumors).</p>

-performed for liver dullness on left side.		
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**Palpation Pattern for Tactile Fremitus:  
Anterior Thorax**



**Percussion Pattern for Anterior  
Thorax**

## **Part VI: Cardiovascular assessment**

### **Learning objectives**

**At the end of this chapter, the student should be able to:**

9. Describe the assessment parameters for cardiovascular system.
10. Discuss the examination techniques for each assessment parameters of the heart structures.
11. Describe the normal finding for heart sounds assessment.
12. Identify the abnormal findings and expected causes.

### **Heart**

Check the apical and radial pulse.



Auscultate heart sound.

**1. The first heart sound (S1):** occurs with closure of the AV Valves and thus signals the beginning of systole.

**2. The second heart sound (S2):** occurs with closure of the semi lunar Valves and signals the end of systole.

### Characteristics of Sound

**1. Frequency (pitch):** heart sounds are described as high pitched or low pitched.

**2. Intensity (Loudness):** loud or soft.

**3. Duration:** very short for heart sounds; silent periods are longer.

**4. Timing:** Systole or diastole.

### Assessment of Heart

Area Of Assessment	Normal Findings	Abnormal Findings and Possible Causes
<b>Heart:</b> Inspect, palpate, and auscultate. -Place client in supine position with head elevated 30- 45. -Drape to expose anterior thorax. <b>Inspect anterior thorax</b> -Note presence of pulsations, heaves, or retractions. -Simultaneously inspect and palpate each of the cardiac landmarks for apical impulses.	Absence of visible pulsations, heaves, or retractions.	-Visible pulsations, heaves, or retractions require additional inspection with palpation to identify exact location and timing in relation to cardiac cycle (systole or diastole). <b>a. Thrill</b> (aortic stenosis or regurgitation). <b>b. Thrill</b> (pulmonic stenosis or regurgitation). <b>c. Pulsations</b> (left ventricular aneurysm, enlarged right ventricle).

<p>- Use finger pads to palpate pulsations and ball of hand to palpate thrill or heaves.</p> <p>a. <b>Aortic area</b> (second ICS to right of sternum)</p> <p>b. <b>Pulmonic area</b> (second left ICS)</p> <p>c. <b>Right ventricular area</b> (left, lower half of sternum and parasternal area)</p> <p>d. <b>Apex of heart</b> (fifth ICS medial to midclavicular)</p>		<p><b>d. Thrill and heave</b> (tricuspid stenosis or regurgitation).</p> <p><b>e. Thrill</b> (mitral stenosis or regurgitation).</p> <p>Heave (left ventricular hypertrophy).</p>
<p><b>Aortic area:</b></p> <p>-Note pulsation, thrill, or vibration of aortic valve closure.</p> <p><b>Pulmonic area:</b></p> <p>Third left ICS:</p> <p>-Note pulsation, thrill, or vibration for pulmonic valve closure.</p> <p><b>Right ventricular area:</b> -</p> <p>Assess for a diffuse lift (heave) or thrill.</p>		
<p><b>Apex of heart:</b></p> <p>-Note pulsation, thrill, or heave.</p> <p>-Palpate high in epigastric region for pulsations, bruits, or masses.</p>	<p>Pulsations thrusting upward against the finger pads are caused</p>	<p>-Bruit (aneurysm).</p> <p>-A mass and strong pulsations (abdominal aortic aneurysm).</p> <p>-Notify primary care provider immediately if signs of aneurysm</p>

<b>Apex of heart:</b> -Note pulsation, thrill, or heave. Palpate high in epigastric region for pulsations, bruits, or masses.	by aorta. -No bruits or masses.	are detected.
<b>Auscultate heart sounds:</b> In every area auscultated, distinguish S1 and S2 sounds.	S1: Usually auscultated at all sites; louder at apical area. -S2: Usually heard at all sites; louder at base of heart. -S3: In children and young adults. S4: In many older adults.	-Increased or decreased intensity. Varying intensity with different beats. -Increased intensity at aortic area. -Increased intensity at pulmonic area. -S3 in older adults. -S4 may be a sign of hypertension.

## Part VII: Peripheral Assessment

### Learning objectives

**At the end of this chapter, the student should be able to:**

13. Describe the parameters for peripheral assessment.
14. Discuss the examination techniques for each assessment parameters.

15. Describe the normal finding for each assessment parameter.

16. Identify the abnormal findings and expected causes.

### **Peripheral Vascular (PVS) Examination**

The peripheral vascular examination is performed to elicit signs of peripheral vascular pathology i.e. examining the blood vessels in the extremities.

(PVD) is a common reason for referral to the Peripheral vascular disease vascular clinics, conditions include intermittent claudication and in emergency situations ischaemia of the limbs.

Like most examination stations this follows the usual procedure of inspect, palpate, auscultate( look, feel listen)

- 
1. Perform a general observation of the patient, noting whether they
  2. are comfortable at rest as well as their general well-being.

Comment on the general appearance of the legs, including any obvious abnormalities such as muscle wasting or scars.

3. Now focus the observation towards the patient's legs, feet and toes. Signs to note include:

- 
- Any signs of gangrene or pre-gangrene such as missing toes or blackening of the extremities.
  - The presence of any ulcers , ensure check all around the feet, including behind the ankle and between the toes.  
These may be venous or arterial – one defining factor is that venous ulcers tend to be painless whereas arterial are painful.

- Any skin changes such as pallor, change in colour (e.g. purple/black from haemostasis or brown from haemosiderin deposition), varicose eczema or sites of previous ulcers.
- Presence of any varicose veins : often seen best with the patient standing.

3. After completing the inspection, move onto palpating the legs. This should include an assessment of the temperature of each leg. Starting distally, feel with the back of hand and compare the legs to each other noting any difference.

4. Check capillary return by compressing the nail bed and then releasing it. Normal colour should return within 2 seconds.

If this result is abnormal, perform Buerger's Test. This involves raising the patient's feet to 45 degrees. In the presence of poor arterial supply, pallor rapidly develops.

Following this, place the feet over the side of the bed, cyanosis may then develop.

- 
5. Any varicosities which noted in the observation should now be palpated. If these are hard to the touch, or painful when touched, it may suggest thrombophlebitis.
  6. Finally for palpation, examiner should feel for the abdominal aorta and each of the peripheral pulses. These are:
    - **Aorta**, this should be palpated just to the left of the midline in the epigastrium, note whether the pulsation is expansile as in an aneurysm.

- **Femoral**, feel at the mid inguinal point, below the inguinal ligament.
- **Popliteal**, ask the patient to flex their knee to roughly 45 degrees keeping their foot on the bed, place both hands on the front of the knee and place the fingers in the popliteal space.
- **Posterior tibial**, felt posterior to the medial malleolus of the tibia.
- **Dorsalis pedis**, feel on the dorsum of the foot, lateral to the extensor tendon of the great toe.

It should feel these on both sides and comment on their strength, comparing one side relative to the other.

7. Check for radio-femoral delay by palpating both the radial and femoral pulses on one side of the body at the same time. The pulsation should occur at the same time, any delay may suggest coarctation of the aorta.

## **Part VIII: Abdominal Assessment**

### **Learning objectives**

**At the end of this chapter, the student should be able to:**

17. Describe the parameters for abdominal assessment.
18. Discuss the examination techniques for each abdominal organ.
19. Describe the examination techniques for each abdominal area and organ.

20. Differentiate between the normal and abnormal examination findings.

21. Identify the abnormal findings and expected causes.

### **Abdominal Assessment**

- The abdominal examination aims to pick up on any gastrointestinal pathology that may be causing a patient's symptoms e.g. abdominal pain or altered bowel habit .
- This examination is performed on every patient that is admitted to hospital and regularly in clinics and general practice.
- This is essentially an examination of the patient's abdomen; it is also called the gastrointestinal examination (GI).
- It is a complex examination which also includes examination of other parts of the body including the hands, face and neck.
- Like most major examination stations this follows the usual procedure of inspect, palpate, auscultate (look, feel, listen).

### **Abdomen**

#### **Check for the followings:**

**Appetite:** any change in appetite, change in weight and its causes.

**Dysphagia :** any difficulty swallowing.

**Food intolerance:** are there any food you cannot eat? Do you use antacids? how often.

**Abdominal pain:** site, intensity, duration. What makes the pain worse ( food, position, stress, medication, activity ..etc.)

**Nausea and vomiting:** any nausea or vomiting, is there any odor or color of vomits.

**Bowel habit:** any diarrhea or constipation, color and consistency of stool, any recent change in bowel habit, bowel movement.

**Past abdominal history:** ever had any operation, post operative complication. Any past history for ulcer, appendicitis, colitis, hernia.

**Medications:** ask about use of any medications, alcohol, smoking.

**Nutritional assessment:** ask for like and dislike foods

**The anatomic location of the organ by quadrants is:**

<b>Right Upper Quadrants( RUQ)</b>	<b>Left Upper Quadrants(LUQ)</b>
Liver	Stomach
Gallbladder	Spleen
Duodenum	Left lobe of liver
Head of pancreas	Body of pancreas
Right kidney and adrenal	Left kidney and adrenal
Hepatic flexure of colon	Splenic flexure of colon
Part of ascending and transverse colon	Part of transverse and descending colon
<b>Right lower Quadrants(RLQ)</b>	<b>Left lower Quadrants(LLQ)</b>
Cecum	Part of descending colon
Appendix	Sigmoid colon
Right ovary and tube	Left ovary and tube
Right ureter	Left ureter
Right spermatic cord	Left spermatic cord
<b>Midline</b>	
<p>Aorta</p> <p>Uterus ( if enlarge)</p> <p>Bladder (if distended)</p>	

**Procedure of abdominal examination**



1. The patient should initially be laid on the bed and exposed from the waist up. Begin by making a general inspection of the patient from the end of the bed.

2. Move on to examine the patient's hands. looking for the presence of:

- **Koilonychia:** also known as **spoon nails**, is a nail disease that can be a sign of hypochromic anemia, especially iron-deficiency anemia. " It refers to abnormally thin nails (usually of the hand) which have lost their convexity, becoming flat or even concave in shape.
- **Leukonychia:** also known as **white nails** or **milk spots**, is a medical term for white discoloration appearing on nails. The most common cause is injury to the base of the nail (the matrix) where the nail is formed.
- **Nail clubbing:** (also known as drumstick fingers and watch-glass nails) is a deformity of the fingers and fingernails associated with a number of diseases, mostly of the heart and lungs.
- **Palmar erythema:** is reddening of the palms at the thenar and hypothenar eminences. ( causes may be, Chronic liver disease, Portal hypertension, Polycythemia, Thyrotoxicosis, ..etc.)

3. At this point ask the patient to lie as flat as possible with their arms straight down beside them and begin your inspection of the abdomen. Comment on any obvious abnormalities such as scars, masses and pulsations. Also note if there is any abdominal distension.

- 
- Unlike other examinations, auscultation for bowel sounds may be carried out before percussion and palpation due to

adverse effect that these procedures may have on the sound from the bowels.

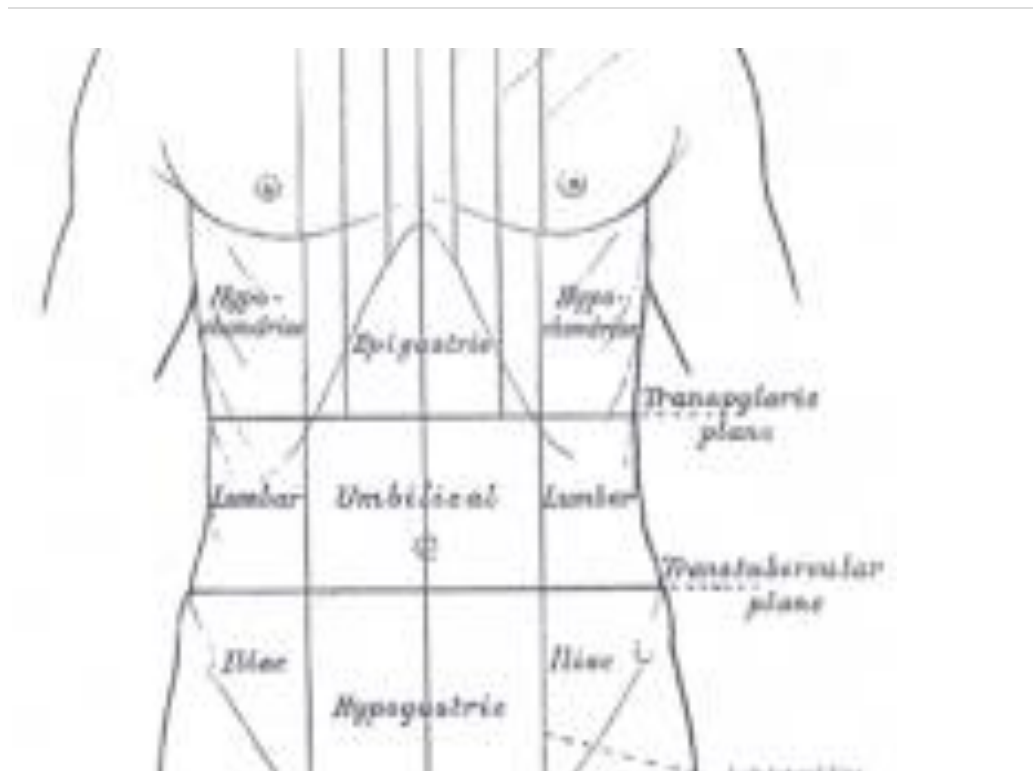
- Listen with the diaphragm next to the umbilicus for up to 30 seconds.

- 
- High pitched or absent sounds may indicate bowel obstruction.
  - Absence of sounds may also be caused by peritonitis.
- 

**Palpation of the abdomen** should be performed in a systematic way using the 9 named segments of the abdomen:

- Right and left hypochondrium,
  - Right and left flank,
  - Right and left iliac fossa.
  - The umbilical area.
  - The epigastrium, and
  - The suprapubic region.
- 

Where you start depends on the patient. If a patient has pain in one particular area, should start as far from that area as possible.



### Procedure of palpation

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- Initial examination should be superficial using one hand.
- Place the hand flat over each area and flex at the metacarpophalangeal joints.
- Examiner should feel whether the abdomen is soft but should always be looking at the patient's face for any signs of pain. feel for any abnormal masses .
- A deeper exam is performed with two hands, one on top of the other again flexing at the MCP joints. it should still be looking at the patient's face for them flinching due to pain. Again, examine all 9 named segments of the abdomen.

- 
- Having performed a general examination of the abdomen, should now feel for organomegaly, particularly of the liver, spleen and kidneys.
  - Palpation for the liver and spleen is similar, both starting in the right iliac fossa.
- 

- For the liver, press upwards towards the right hypochondrium. should try to time the palpation with the patient's breathing-in as this presses down on the liver. If nothing is felt , should move towards the costal margin and try again.



- 
- Palpating for the spleen is as for the liver but in the direction of the left hypochondrium. The edge of the spleen which may be felt if distended is more nodular than the liver.
  - To feel for the kidneys you should place one hand under the patient in the flank region and the other hand on top. should then try to ballot the kidney between the two hands. In the majority of people the kidneys are not palpable, but they maybe in thin patients who have no renal pathology.



- Palpate for the bladder by starting at the umbilicus, move in steps downwards towards the pubic bone



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## **Percussion**

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- This can be also be used to check for organomegaly if it is suspected.
- Percussion over the abdomen is usually resonant,
- over a distended liver it will be dull.
- Percussion can also be used to check for ‘shifting dullness’ – a sign of ascites.

- 
- A distended bladder will also be dull to percussion and this should be checked for.



It should also palpate for the abdominal aorta to check whether it is expansile, which could be suggestive of an aneurysm. Note that the aortic pulsation can often be felt in thin patients, but shouldn't be expansile.



- 
- A deeper exam is performed with two hands, one on top of the other again flexing at the MCP joints.
  - Examiner should still be looking at the patient's face for them flinching due to pain. Again, examine all 9 named segments of the abdomen.
  - A distended liver feels like a light tap on the leading finger when you press down. If the liver is distended, its distance from the costal margin should be noted.



- Palpating for the spleen is as for the liver but in the direction of the left hypochondrium. The edge of the spleen which may be felt if distended is more nodular than the liver.
- To feel for the kidneys examiner should place one hand under the patient in the flank region and the other hand on top, then should try to ballot the kidney between the two hands. In the majority of people the kidneys are not palpable, but they maybe in thin patients who have no renal pathology.



- Palpate for the bladder by starting at the umbilicus, move in steps downwards towards the pubic bone



## **Part IX: Neurological System**

### **Learning objectives**

**At the end of this chapter, the student should be able to:**

- 22. Describe the assessment parameters for neurological system.
- 23. Discuss the examination techniques for each assessment parameters.
- 24. Discuss the assessment criteria of cranial nerves.
- 25. Describe the eye, auditory screening tests.



26. Describe the normal finding for each assessment parameter.

27. Identify the abnormal findings and expected causes.

## **Observation of the patient**

### **Gait**

- Look at the patient's gait as they walk in to the room.
- Is there evidence of e.g. hemiparesis, foot drop, ataxic gait, a typical Parkinsonian gait.

### **Speech**

- Is there a problem with articulation (dysarthria)?
- Here comprehension is retained and speech construction is normal.
- There is usually weakness or incoordination of the orolingual muscles.
- Ask the patient to say 'West Register Street' if you are uncertain.
- Is there a problem with phonation (dysphonia)? This is usually due to laryngeal problems which can cause voice hoarseness.
- There may be reduced speech volume.
- Is there a problem with language function (dysphasia)? This is due to a lesion in the language areas of the dominant hemisphere.

## **Examination of speech<sup>1</sup>**

- Look for spontaneous speech, fluency and use of appropriate words during conversation.
- Ask the patient to name objects.
- Ask the patient to carry out some commands to assess their comprehension.
- Ask the patient to read aloud. This can show evidence of any dyslexia.
- Ask the patient to repeat a simple sentence. Inability to do this suggests a conduction dysphasia.
- Look at the patient's handwriting. There may be problems with form, grammar or syntax which may suggest a more global language problem and not just a speech disorder.

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## **Involuntary movements**

- Is there evidence of, e.g. tremor, tics, chorea, hemiballismus, orofacial dyskinesias?

## History

- Specific emphasis should be placed on the following:
- Ask about any associated symptoms ,(Headache, Numbness, pins and needles, cold or warmth, Weakness, unsteadiness, stiffness or clumsiness ,Visual disturbance, Altered consciousness

## Cranial nerves

- Examination of the cranial nerves takes practice. The cranial nerves and their function is summarized below:

Cranial nerve	Examination of function
I : olfactory nerve	Smell
II : optic nerve	Visual acuity, visual fields and ocular fundi
II, III : optic nerve and oculomotor nerve	Pupillary reactions
III, IV, VI : oculomotor, trochlear and abducent nerves	Extra-ocular movements, including opening of the eyes
V : trigeminal nerve	Facial sensation, movements of the jaw, and corneal reflexes.

VII : facial nerve	Facial movements and gustation.
VIII : vestibulocochlear nerve	Hearing and balance.
IX, X : glossopharyngeal and vagus nerves	Swallowing, elevation of the palate, gag reflex and gustation.
V, VII, X, XII : trigeminal, facial, vagus and hypoglossal nerves	Voice and speech.
XI : accessory nerve	Shrugging the shoulders and turning the head.
XII : hypoglossal nerve	Movement and protrusion of tongue.

## **Cranial nerve examination**

### **Olfactory nerve**

- Tested using bottles containing characteristic substances such as peppermint, coffee or vanilla and ask the patient to identify each in turn.
- Test each nostril separately and occlude the other.
- Patient's eyes should be closed.
- If such bottles are not available, simply ask the patient if he has any problems with smell or taste.
- Remember that most of what we call taste is really smell.

### **Optic nerve**

- Visual acuity can easily be tested with a Snellen chart. If the patient normally wears spectacles, they should wear these.
- **Test the visual fields as follow:**

1. Sit about 40cm away from the patient and ask them to keep their eyes fixed on your nose.
  2. Ask them to cover one eye.
  3. Hold your finger half way between you and the patient with your arm extended. Test each quadrant of their visual field in that eye by moving your finger laterally to medially along the diagonal.
  4. Move inwards from the periphery at a number of points in the upper and lower, nasal and temporal quadrants.
  5. Ask the patient when your finger appears into view. If you also fix on their nose, you can compare their response with yours, taking your own as normal. Repeat for the other eye.
- Test accommodation by asking the patient to look in the distance and then at an object close up. Look for any change in pupil size.

### **Oculomotor, trochlear and abducent nerves:**

- Hold the patient's head still with your left hand on their forehead.
- With your arm extended, hold out your right index finger about 40cm in front of the patient.
- Ask them to follow your finger with their eyes.
- Move your finger up and down and left and right. There should be a full range of movements of both eyes.
- Then move the finger to the left and hold it there for several seconds whilst the eyes are observed for nystagmus.
- Repeat to the right and up and down.
- False positive tests for nystagmus can result from holding the finger too close and by moving it too far to the extreme of vision.

## **Trigeminal and facial nerves**

- Lightly touch each side of the face in the three sensory regions (forehead, cheek/side of nose and chin) and ask if it feels normal and symmetrical.
  - Ask the patient to clench their teeth. Both masseters should feel firm and strong.
  - Ask the patient to open their jaw against resistance.
  - In this brief assessment it is fair to omit the corneal reflex.
- 
- If there is any facial weakness, ask them to raise their eyebrows. The upper motor neurone innervation of the muscles of the forehead is bilateral

## **Vestibulocochlear nerve**

- Either whispering into each ear or using a high frequency tuning fork can give a very crude assessment of hearing.

## **Glossopharyngeal, vagus nerves**

- Ask the patient to open their mouth wide and to say, "Arhh". Phonation should be clear and the uvula should not move to one side.
- Elicit the gag reflex by touching the tonsil or the pharynx. There should be elevation of the pharynx and the palate.

## **Accessory nerve**

- This nerve supplies the trapezius and sternomastoid muscles.
- Ask the patient to shrug their shoulders up and try to push them down.

- Then ask them to rotate their head to the right against resistance on the right side of the chin from your hand.
- Repeat for the left side. Both these movements should be very difficult to resist.

### **Hypoglossal nerve**

- Ask the patient to protrude their tongue and note any deviation or wasting. Assess tongue movement from side to side.

### **Examination of the sensory system**

#### **Eyes**

- Active client participation is necessary for assessment of vision.
- A complete eye assessment includes both visual acuity and anatomic structures.
- Visual acuity should be assessed prior to physically examining the eye.

#### **Assessment of visual acuity**

- Assessment of visual acuity is a simple, noninvasive procedure that uses the Snellen chart, a chart that contains various-sized letters with standardized numbers at the end of each line of letters.
- The standardized numbers (denominators) indicate the degree of visual acuity when the client is able to read the line of letters at a distance of 20 feet.

- Visual acuity of 20/20 is considered normal. A value of 20/40 indicates that the client can read the Snellen chart from a distance of 40 feet.

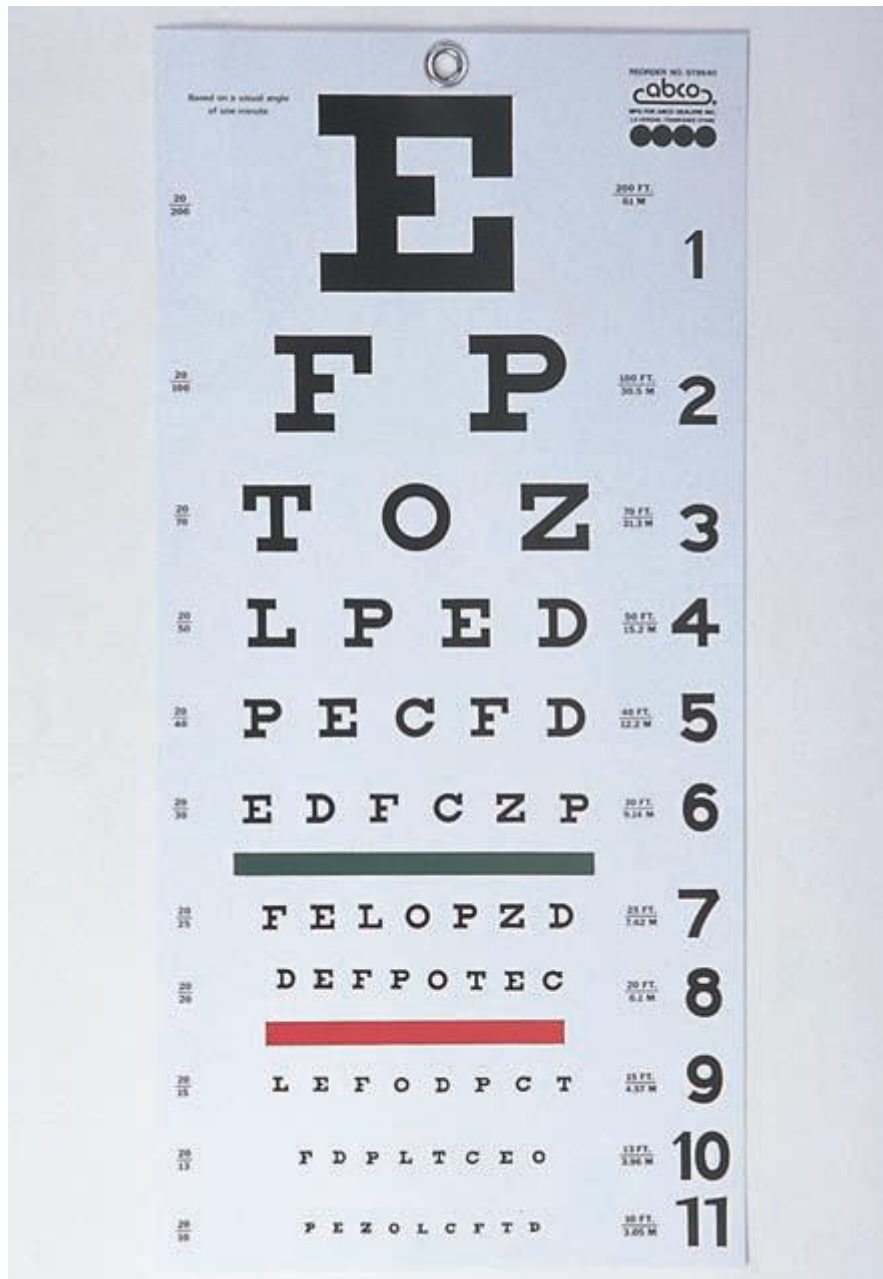
### **Procedure of visual acuity assessment**

- Position the client 20 feet away from and facing the Snellen chart.
- Remove any corrective lenses.
- Instruct client to cover one eye and read as many lines as possible.
- Note the number of the last line that the client reads correctly.
- Repeat the test with the other eye.
- Document findings as “s-c” (without correction) or “c-c” (with correction).

### **Visual acuity may be affected by many types of refractive errors, including:**

- **Astigmatism:** An unequal spherical curve of the cornea that prevents the light rays from being focused directly in a point on the retina.
- **Hyperopia (farsightedness):** Refraction error in which rays of light are brought into focus behind the retina.
- **Myopia (nearsightedness):** Elongation of the eyeball that causes the parallel rays to focus in front of the retina.
- **Presbyopia (farsightedness):** Refraction error that results from loss of elasticity of the lens; occurs with aging

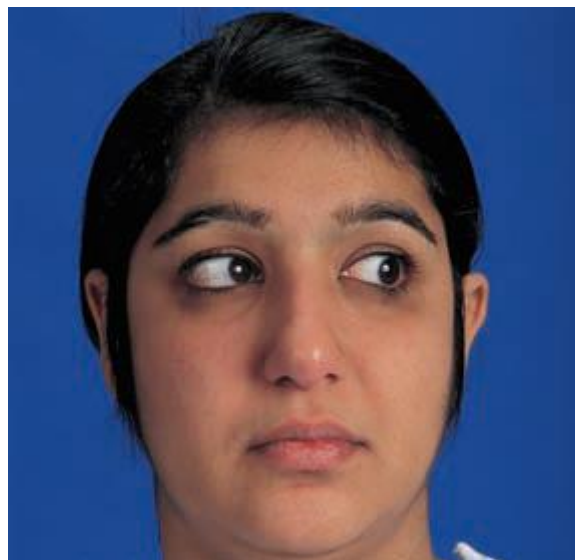


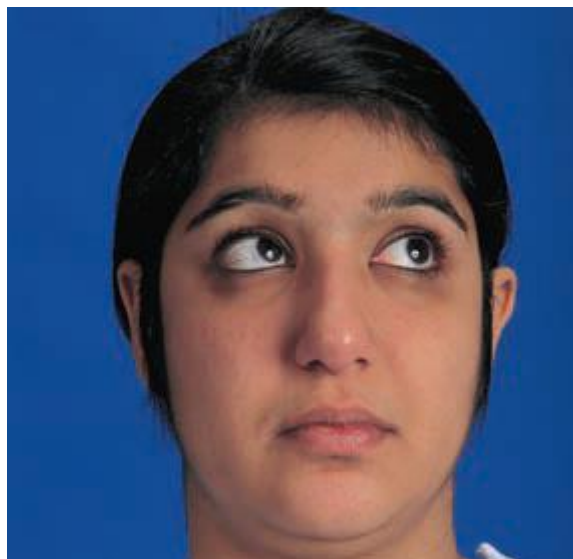
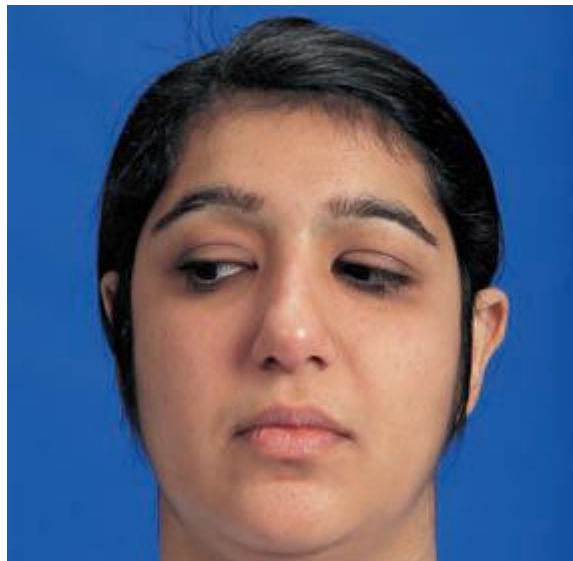
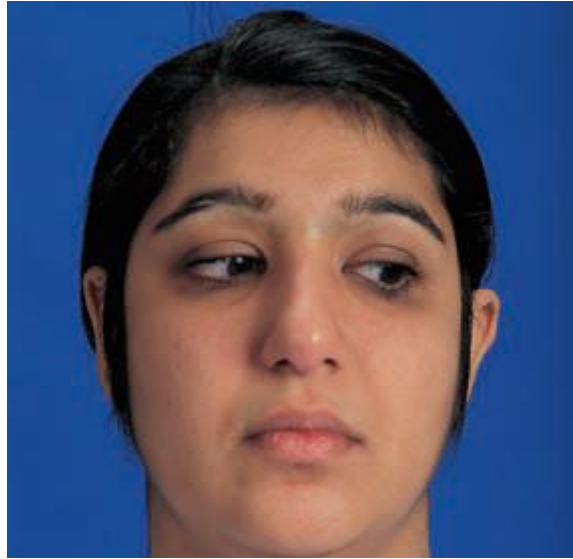


## Testing the Visual Field


1. Stand 2 feet in front of the client.
2. Instruct the client to cover the right eye while you cover your left eye.
3. Ask the client to look into your eye directly opposite to create one visual field.

4. Using the eight directions of gaze , move your finger outside the vision field and slowly bring your finger back to the midpoint of the vision field for each direction of gaze.
5. Instruct the client to state when your finger becomes visible.
6. Note if you see the finger before the client does.
7. Repeat for each visual field.








### Assessment of structural components of the ears

Area Of Assessment	Normal Findings	Abnormal Findings and Possible Causes
<b>External ear</b> Inspect for placement, symmetry, and color. 	Symmetrical, with upper attachment at same level as eye's corner (lateral canthus). Flesh colored.	-Ears set below lateral canthus (congenital anomalies, e.g., Down syndrome). -Erythema (inflammation, fever). -Clear drainage may be cerebrospinal fluid; -if present, stop the examination and notify the primary care provider immediately.
<b>Auricle</b> Observe for discharge, edema, and erythema. Palpate for lesions or tenderness.	Firm, smooth, free from lesions and pain.	-Flaky, scaly skin (seborrhea). -Keloids, or scar tissue, on lobe (piercing). -Yellow or green discharge, itching, or pain (otitis media).
<b>Ear canal</b>	-Canal is pink and dry. Cerumen (yellow-brown waxy substance) is normal. -Intact tympanic membrane is translucent or pearly gray. -Light reflex is seen at 5 o'clock position in right ear and 7 o'clock position in left ear.	Accumulation of cerumen may cause temporary hearing loss due to impaction. If foreign body is present, stop the examination and notify primary care provider. Red, bulging membrane (otitis media). Nontender, nodular swelling deep in ear canal (osteoma, a tumor composed of bone tissue). Whitish appearance on tympanic membrane (pus in the middle ear). Perforation of eardrum (infection, trauma).

## Assessing Auditory Acuity

Examination and procedures	Normal Findings	Abnormal Findings and Possible Causes
<b>Whispered voice test</b> <ul style="list-style-type: none"> <li>- Instruct client to tightly cover one ear and repeat words when heard.</li> <li>- Stand 1–2 feet away from client, out of view to avoid client lipreading.</li> <li>- Stand on side of open ear and softly whisper words.</li> <li>- Increase volume until client identifies words correctly.</li> <li>- Repeat procedure on other ear.</li> </ul>	<p>Able to repeat whispered words correctly.</p>	<ul style="list-style-type: none"> <li>- Inability to hear words may indicate high frequency</li> <li>- hearing loss (excessive exposure to loud noises).</li> </ul>
<b>Weber test</b> <ul style="list-style-type: none"> <li>- Strike tuning fork against your fist or pinch the prongs together.</li> <li>- Hold the base of the vibrating fork with thumb and index finger.</li> <li>- Center base of fork on top of client's head</li> <li>- Ask client to describe the sound.</li> <li>- Repeat test on opposite ear.</li> </ul>	<p>Sound perceived equally in both ears = a negative Weber test.</p>	<ul style="list-style-type: none"> <li>- lateralizes to affected ear with a unilateral conductive hearing loss (cerumen impaction, perforated tympanic membrane).</li> <li>- Sound can also be lateralized to unaffected ear with sensorineural hearing loss (inner ear disorder, auditory nerve damage, ototoxic drugs, prolonged exposure to excessive</li> </ul>

		noise levels
<p><b>Rinne test</b></p> <ul style="list-style-type: none"> <li>- Vibrate prongs of tuning fork, place base of fork on mastoid process of ear being tested, and note time until client no longer hears sound .</li> <li>- Move the vibrating fork in front of ear canal, noting length of time sound is heard .</li> </ul> 	<p>-Sound is heard longer in front of auditory meatus than on mastoid process because air conduction is twice as long as with bone.</p>	<p>-Bone conduction that is equal to or greater than air conduction occurs with conductive hearing loss (disease, obstruction, trauma).</p>

			
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### Neurological Screening Assessment

Area of assessment	Assessment parameter	Findings
<b>Mental status/level of consciousness</b>	<ul style="list-style-type: none"> <li>- Note general appearance, affect, speech content, memory, logic, judgment, and speech patterns during the health history.</li> <li>-Perform the Glasgow Coma Scale (GCS) with motor assessment .</li> <li>-component and pupil assessment</li> </ul>	<p>If any abnormalities are evident,</p> <ul style="list-style-type: none"> <li>-perform a full mental status assessment.</li> <li>-If the GCS &lt; 15, perform a full assessment of mental status.</li> <li>-If motor assessment is abnormal or asymmetrical, perform a</li> </ul>

		complete motor and sensory assessment.
<b>Sensation</b>	Assess pain and vibration in the hands and feet with light touch on the limbs.	If deficits are identified, perform a complete sensory assessment.
<b>Cranial nerves (CNs)</b>	<p>-Assess CN II, III, IV, VI: visual acuity, gross fields, funduscopy, pupillary reactions, and extraocular movements.</p> <p>-Assess CN VII, IX, X, XII: facial expression, gross hearing, voice, and tongue.</p>	-If any abnormalities exist, perform complete assessment of all 12 CNs.
<b>Motor system</b>	-Assess muscle tone and strength, abnormal movements, and grasps.	<p>-If deficits are noted,</p> <p>-perform a complete Musculoskeletal assessment</p>
<b>Cerebellar function</b>	<p>-Observe the client's gait and ability to walk heel to toe and to perform shallow knee bends.</p> <p>-Perform Romberg's test: Ask the client to stand erect, feet together and arms at side, first with eyes open, then closed.</p> <p>- The nurse should stand close to the client to catch the client in the event of a fall.</p> <p>-Note the client's ability to maintain balance with eyes open and closed for 20 seconds with minimum swaying.</p>	<p>-If any deficits exist,</p> <p>-perform a complete cerebellar assessment.</p>



<b>Reflexes</b>	-Assess the muscle stretch reflexes and the plantar response.	-If an abnormal response is elicited. -perform a complete reflex examination.
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## **Part X: Musculoskeletal System**

### **Learning objectives**

**At the end of this chapter, the student should be able to:**

1. Describe the assessment parameters for musculoskeletal system.
2. Discuss the examination techniques for each assessment parameters.
3. Describe the normal finding for each assessment parameter.
4. Identify the abnormal findings and expected causes.

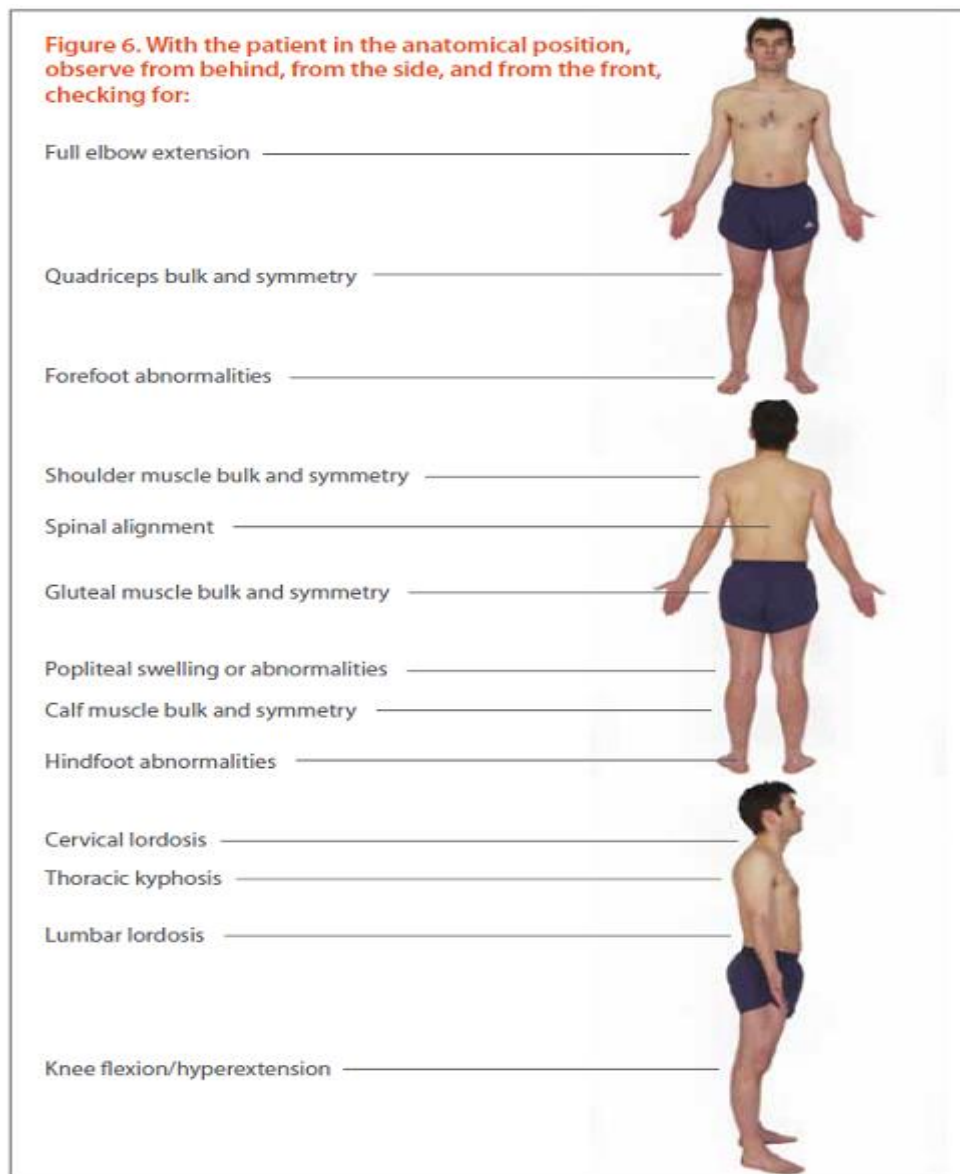
### **Musculoskeletal System**

- Screening examination of musculoskeletal system, which takes 1–2 minutes is devised for routine clinical assessment.
- It involves inspecting carefully for joint swelling and abnormal posture, as well as assessing the joints for normal movement.

- This screening examination is known by the acronym ‘GALS’, which stands for Gait, Arms, Legs and Spine.

## **Gait**

- Ask the patient to walk a few steps, turn and walk back. Observe the patient’s gait for symmetry, smoothness and the ability to turn quickly.
- With the patient standing in the anatomical position, observe from behind, from the side, and from in front for:
  - a. bulk and symmetry of the shoulder, gluteal, quadriceps and calf muscles.
  - b. limb alignment.
  - c. alignment of the spine.
  - d. ability to fully extend the elbows and knees.
  - e. Popliteal swelling.
  - f. abnormalities in the feet such as an excessively high or low arch profile, clawing/retraction of the toes and/or presence of hallux valgus .



## Arms

- Ask the patient to put their hands behind their head. Assess shoulder abduction and external rotation, and elbow flexion (these are often the first movements to be affected by shoulder problems).
- With the patient's hands held out, palms down, fingers outstretched, observe the backs of the hands for joint swelling and deformity.
- Ask the patient to turn their hands over. Look at the palms for muscle bulk and for any visual signs of abnormality.

- Ask the patient to make a fist. Visually assess power grip, hand and wrist function, and range of movement in the fingers.
- Ask the patient to squeeze your fingers. Assess grip strength.
- Ask the patient to bring each finger in turn to meet the thumb. Assess fine precision pinch (this is important functionally).
- Gently squeeze across the metacarpophalangeal (MCP) joints to check for tenderness suggesting inflammatory joint disease. (Be sure to watch the patient's face for non-verbal signs of discomfort.)

## Legs

- With the patient lying on the couch, assess full flexion and extension of both knees, feeling for crepitus.
- With the hip and knee flexed to 90°, holding the knee and ankle to guide the movement, assess internal rotation of each hip in flexion (this is often the first movement affected by hip problems).
- Perform a patellar tap to check for a knee effusion. Slide your hand down the thigh, pushing down over the suprapatellar pouch so that any effusion is forced behind the patella. When you reach the upper pole of the patella, keep your hand there and maintain pressure. Use two or three fingers of the other hand to push the patella down gently. Does it bounce and 'tap'? This indicates the presence of an effusion.
- From the end of the couch, inspect the feet for swelling, deformity, and callosities on the soles.
- Squeeze across the metatarsophalangeal (MTP) joints to check for tenderness suggesting inflammatory joint disease. (Be sure to watch the patient's face for signs of discomfort.)



**Figure 7. Patellar tap test.** Slide your hand down the patient's thigh, compressing the suprapatellar pouch. This forces any effusion behind the patella. With two or three fingers of the other hand push the patella down gently. In a positive test the patella will bounce and tap.

## Spine

- With the patient standing, inspect the spine from behind for evidence of scoliosis, and from the side for abnormal lordosis or kyphosis.
- Ask the patient to tilt their head to each side, bringing the ear towards the shoulder. Assess lateral flexion of the neck (this is sensitive in the detection of early neck problems).
- Ask the patient to bend to touch their toes. This movement is important functionally (for dressing) but can be achieved relying on good hip flexion, so it is important to palpate for normal movement of the vertebrae. Assess lumbar spine flexion by placing two or three fingers on the lumbar vertebrae. Your fingers should move apart on flexion and back together on extension .



## **'GALS' screening examination: checklist**

### **Gait**

- Observe gait .
- Observe patient in anatomical position

### **Arms**

- Observe movement – hands behind head .
- Observe backs of hands and wrists .
- Observe palms .
- Assess power grip and strength .
- Assess fine precision pinch .
- Squeeze MCPJs

### **Legs**

- Assess full flexion and extension .
- Assess internal rotation of hips .
- Perform patellar tap .

- Inspect feet .
- Squeeze MTPJs

### **Spine**

- Inspect spine .
- Assess lateral flexion of neck .
- Assess lumbar spine movement

## **Assessment of Musculoskeletal System**

<b>Examination and procedures</b>	<b>Normal Findings</b>	<b>Abnormal Findings and Possible Causes</b>
<b>Muscles: Inspection and palpation</b> 1. Compare muscles on one side of body to corresponding muscles on opposite side. Inspect for size, using a tape measure for accuracy. 2. Inspect muscles for tremors and shortening (i.e., contractures).	1. Equal on both sides of body. 2. Absence of contractures and tremors. 3. Firm muscles. 4. Strength equal on both sides.	1. Asymmetry, atrophy, or hypertrophy. 2. Misalignment of body part (e.g., foot drop occurs with plantar flexion). 3. Lack of muscle tone. 4. Spasticity or flaccidity.

3. To assess muscle tone, palpate muscles at rest. 4. Test muscle strength on both sides of body.		
<b>Bones: Inspection and palpation</b> 1. Inspect skeleton for alignment and structure. 2. Palpate bones for tenderness and edema.	1. Skeletal alignment with intact bones. 2. Absence of swelling, tenderness, or pain.	1. Fractures, misalignment (e.g., scoliosis). 2. Swelling, tenderness, or pain (fracture, osteoporosis, arthritis, cancer).
<b>Joints: Inspection and palpation</b> 1. Inspect and palpate for size, tenderness, swelling, crepitus, nodules, or masses. 2. Assess ROM in each joint.	No swelling, tenderness, nodules, or masses. Absence of crepitation. Joints move smoothly. ROM will vary according to individual's usual degree of physical activity.	Tenderness, crepitus, and limited ROM (arthritis, bursitis, bone misalignment).

## Part XI: Reproductive System

### Learning objectives

**At the end of this chapter, the student should be able to:**

- Describe the assessment parameters for reproductive system.



6. Discuss the examination techniques for each assessment parameters.
7. Describe the assessment of male reproductive system.
8. Describe the assessment of female reproductive system

### **Female and Male Genitalia**

**Female Genitalia: check for the followings:**

**Menstrual history: check for last menstrual period(LMP)**

Menarche( occur between 12 and 14 years indicate normal growth; **Onset** between 16 and 17 years suggests an endocrine problem.

**Cycle-** normally varies every 18 to 45 days.

**Amenorrhea-** absent menses.

**Duration-** average 3 to 7 day

**Menorrhagia-** heavy menses.

**Obstetric history: Gravida-** number of pregnancies.

**Para-** number of births.

**Abortions-** interrupted pregnancies, including elective abortions and spontaneous miscarriages.

**For each pregnancy,** describe duration, any complication, labor and delivery, baby's sex, birth weight, condition.

**Self care behaviors:** assess self- care behaviors

( last papanicolaou smear? Result?

Have your mother ever mentioned taking hormones while pregnant with you?

**Urinary symptoms;-** Frequency, urgency, Dysuria, Hematuria, Bile in urine or urinary tract infection.

**True incontinence-** loss of urine without warning.

**Stress incontinence-** loss of urine with physical strain due to muscle weakness.

**Vaginal discharge:-** normal discharge is small, clear or cloudy, and always nonirritating. White, yellow green, gray, curd like, foul smelling discharge suggests vaginal infection.

**Past history:** check for any other problem in the genital area( Sores or lesions-now or in the past), any abdominal pain, any surgery on the uterus, ovaries, or vagina.

**Sexual activity:** check for sexual relationship, communication with spouse, interest, beliefs, and the number of partners.

**Contraceptive use-** currently planning a pregnancy or prevent pregnancy.

Which method used.

**Sexual transmitted disease (STD) contact;** check for any sexual contact with partner having a **STDs** ( gonorrhea, herpes, AIDS, chlamydial infection, venereal warts, and syphilis)

**STD risk reduction:** check if the person take any precautions to reduce risk of STDs( use condom).

### Assessment of Female Genitalia

Assessment/ technique	Normal Findings	Abnormal Findings and Possible Causes
<b>Inspection</b> -Look for distribution, amount, and characteristics of pubic hair. -Inspect skin for color, edema, and lesions. -Separate labia majora and labia minora for a thorough inspection.	-Even hair distribution. Clear skin except for nevi. -Labia majora and minora are symmetrical, with a smooth to wrinkled surface that is intact. -Skin of vulva is slightly darker than surrounding areas. -No nodules, ecchymosis, edema, lesions, or rashes. -Sebaceous cysts (non-tender, yellow colored nodules smaller than 1 cm) may be present.	-Scant pubic hair (hormonal changes). -Ecchymosis over mons pubis or labia (trauma, e.g., accidental injury, intentional abuse). -Rash over mons pubis or labia (dermatitis, parasitic infestation). -Labial edema (hematoma, Bartholin's cyst, or obstruction of lymphatic system). -Painless mass with pruritus or a cauliflower like growth (malignancy). -Varicose veins (pregnancy, prolonged standing, or congenital disposition).
<b>Inspect clitoris, urethral meatus. and vaginal introitus when separating labia minora.</b>	-Free from lesions. -Clitoris is less than 1 cm in width and less than 2 cm in length.	-Clitoral hypertrophy (androgen excess). -Foul-smelling discharge of any color (urinary

	<ul style="list-style-type: none"> <li>-Urethral meatus appears as a small slit and is same color of surrounding tissue.</li> <li>-Absence of discharge, redness, and edema.</li> <li>-Introitus mucosa is pink and moist with a clear to white discharge.</li> <li>-Free of odor and bulging.</li> </ul>	<ul style="list-style-type: none"> <li>tract infection, vaginitis, or cervicitis).</li> <li>-Redness or edema around the urethra meatus (infection of Skene's glands, urethral carcinoma, prolapse of urethral mucosa).</li> <li>-Pale color and dryness occur with atrophy (topical steroids, aging). External tear of vaginal introitus (trauma).</li> <li>-Bulging of anterior vaginal wall may indicate a cystocele (protrusion of urinary bladder through the wall of the vagina) due to weak ligaments.</li> </ul>
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### **Breast**

**Male breast:** is a rudimentary structure consisting of a thin disc of undeveloped tissue underlying the nipple. The areola is well developed, the nipple is relatively very small. During adolescence, it is common for the breast tissue to temporarily enlarge, producing *gynecomastia*.

**Female breast:**

## Stages of breast development

- 1. Preadolescent Stage:** Only a small elevated nipple.
- 2. Breast bud Stage:** A small amount of breast and nipple develops; the areola widens
- 3. The breast and areola enlarge:** The nipple is flush with the breast surface.
- 4.** The areola and nipple form a secondary mound over the breast.
- 5. Mature breast:** only the nipple protrudes, the areola is flush with the breast contour ( the areola may continue as a secondary mound in some normal women).

## Examination of breast

### Check for the followings:

Pain, lump or thickening, discharge, rash, swelling, trauma, history of breast disease, and self –care behaviors(breast-self-examination).

### Axillary

Check for tenderness, lump, swelling, rash, and nodes

### Male Genitalia: check for the followings:

**Frequency :** average adult voids five to six times/day, varying with fluid intake, individual habits.

**Urgency**

**Hesitancy and straining.** Loss of force, terminal dribbling, sense of residual urine.

**Penis:** pain, lesions, or any discharge.

**Scrotum, self-care behaviors.** Notice any lump, swelling, hernia.

**Sexual activity and contraceptive use.** Ask about relationship involving sexual intercourse now.

**STD contact.**

**Prostate gland**

**Check for:**

**Size:** 25 cm long by 4 cm wide; should not protrude more than 1 cm into the rectum.

**Shape:** heart shape, with palpable central groove.

**Consistency:** elastic, rubbery.

**Mobility:** slightly movable.

**Sensitivity:** non-tender on palpation

**Assessment of Male Genitalia**

Assessment/ technique	Normal Findings	Abnormal Findings and Possible Causes
<p><b>Pubic hair</b></p> <p>Look for distribution, amount, and characteristics.</p>	<p>-Triangular distribution, often spreading up the abdomen</p>	<p>-Scant amount or absence of hair (hormonal problems).</p>
<p><b>Penis</b></p> <p>-Inspect the anterior and posterior surfaces by lifting the penis.</p> <p>-Retract foreskin on uncircumcised clients.</p> <p>-Note lesions, edema, and inflammation.</p> <p>-Palpate the penile shaft.</p> <p>-Note pulsations, tenderness, swelling, masses, or plaques.</p> <p>-Inspect the urethral meatus.</p> <p>-Note location, color, and presence of discharge</p>	<p>-Foreskin retracts easily.</p> <p>Glans penis varies in size and shape.</p> <p>-A small amount of smegma (oily,pasty material consisting of desquamated epidermal cells and sebum).</p> <p>-Pulsations are present on dorsal sides of penis.</p> <p>-Meatus is centrally located on tip of penis and pink.</p>	<p>-Phimosis (inability of foreskin to be retracted over glans penis) may develop in uncircumcised males.</p> <p>-Paraphimosis occurs when retracted foreskin causes proximal constriction to glans;</p> <p>-penis distal to foreskin becomes edematous and gangrenous.</p> <p>-Priapism is a continuous penile erection.</p> <p>-Absent pulsations indicate vascular insufficiency.</p> <p>-Varied placement of meatus may result from congenital defects, epispadias (meatus opens on dorsal side of penis), and hypospadias</p>

		(meatus opens on underside of penis).
<b>Scrotum</b> -Gently move penis to one side to assess scrotal skin. -Lift up posterior side. -Note lesions, inflammation, and edema. -Begin scrotal palpation at right testicle. -Proceed to the epididymis, then to the spermatic cord and the external ring. -Note consistency and presence of tenderness or masses.	-Scrotal skin is thin and wrinkled. -Scrotal skin hugs testicles firmly in young males; becomes elongated and flaccid in older adults. -Left scrotal sac is lower than the right. -Testicles are sensitive to pressure and are firm, ovoid, smooth, and equal in size bilaterally	-Unilateral edema with a hard, fixed nodule (malignancy). -Enlarged testicle with extreme sensitivity (testicular torsion, i.e., “twisting”). Swollen, indurated, tender (inflammation, i.e., epididymis). -Warm scrotal skin, tenderness, and acute onset of edema indicate orchitis, i.e., testicular inflammation (associated with the mumps).
<b>Inguinal area</b> -Have client stand, if possible. -Inspect first while client is at rest, then instruct client to bear down. -Observe for bulges. -Begin palpation on client’s right side. -Invaginate (telescope) loose scrotal skin with index finger.	-Inguinal area is smooth and free from edema or bulges.	-Swelling above the inguinal ligament may indicate presence of inguinal hernia (protrusion of portion of the bowel through the external inguinal ring). -A mass medial to the femoral vessels and inferior to the inguinal



-Follow spermatic cord upward to opening of external inguinal ring. - Ask client to cough or bear down to check for mass or bulging. -Bearing down may make hernia visible.		ligament indicates a femoral hernia (protrusion of portion of the bowel or omentum through the femoral wall).
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## **Part XII: Laboratory Test**

### **Learning objectives**

**At the end of this chapter, the student should be able to:**

1. Discuss the relevant client teaching guidelines for the care of the client before, during, and after diagnostic testing.
2. Describe the common specimen collection methods.
3. Describe common invasive and noninvasive diagnostic procedures.
4. Discuss nursing interventions for the common diagnostic procedures.

### **Diagnostic procedures**

#### **Invasive:**

#### **A: Endoscopy**

#### **Endoscopic Examination**

##### **1. Gastroscopy**

A gastroscopy is the visual examination of the interior of the stomach.

Gastroscopy is a procedure that uses a lighted, flexible endoscope to see inside the upper GI tract. The upper GI tract includes the esophagus, stomach, and duodenum—the first part of the small intestine.

**Gastroscopy can detect :**

- Ulcers.
- abnormal growths.
- precancerous conditions.
- bowel obstruction.
- Inflammation.
- hiatal hernia

**2. Proctoscopy, Sigmoidoscopy, and Colonoscopy**

Inspection of the intestinal tract is done by tubular endoscopes with appropriate illumination. The instrument for examination of the rectum is called a proctoscope. To examine the sigmoid colon, a device called a sigmoidoscope is used, which can visualize up to 25 cm from the anal verge. To examine the entire colon from the rectum to the cecum a device called a fiberoptic colonoscope is used. The sigmoidoscope or proctoscope can be either rigid or flexible. If a malignancy is suspected, tissue can be removed during the examination for histological study.

**3. Bronchoscopy**

The visual examination of the bronchi of the lungs by the use of the bronchoscope which may be inserted into the oral or nasal cavities. The

larynx, pharynx, and trachea may be visualized as the scope is passed to the bronchi.

#### **4. Laryngoscopy**

##### **a. Direct Visualization**

A laryngoscopy is the visual examination of the larynx and hypopharynx using a laryngoscope.

##### **b. Indirect Visualization**

Examination of the interior wall of the larynx by observation of the reflection of it in a laryngeal mirror.

#### **5. Cystoscopy**

A cystoscopy is the examination of the interior of the urinary bladder by means of a cystoscope. It is inserted into the bladder by way of the urethra and, therefore, can be used to examine the urethra as well.

#### **B: biopsy**

A *biopsy* is a medical procedure in which a tissue sample or a group of cells is removed for laboratory examination. There are several types of biopsies available. Biopsies are typically conducted alongside other diagnostic processes. This will yield a more accurate diagnosis.

#### **Biopsy Types**

## 1. Needle Biopsy

Needle biopsies are frequently performed to analyze growths that can be felt through the skin. Such growths may include lumps in the breasts or testes. There are four main types of needle biopsy:

- **Fine-Needle Aspiration (FNA):** In this procedure, a long, fine needle pierces the skin and is inserted into the suspicious tissue. A syringe is then used to extract cells from the tissue. FNA is relatively painless and can be performed in minutes.
- **Core Needle Biopsy:** When solid tissue is biopsied, or when larger amounts of tissue are needed for evaluation, a hollow core needle is used to perform the procedure. This needle will extract a column of tissue from the suspect area. Sometimes, a small incision must be made in order to make way for this larger needle. When biopsy necessitates an incision, local anesthesia is used.
- **Vacuum-Assisted Biopsy:** This procedure is similar to a normal core needle biopsy. However, in a vacuum-assisted biopsy, a special machine is used to draw even more cells from the suspect tissue.
- **Image-Guided Biopsy:** When the suspect tissue cannot be felt through the skin, but is still a candidate for a needle biopsy, an image-guided biopsy is performed. In this procedure, the standard needle biopsy is guided with the aid of various imaging technologies, such as *computed tomography (CT scan) or ultrasound.*

## 1. Skin (Cutaneous) Biopsy

A skin biopsy is performed to remove cells from the skin, or other tissues on the body's surface. Most skin cancers are diagnosed with a skin biopsy. There are several types of skin biopsy procedures available:

## 2. Curettage

In this procedure, the suspect tissue is scraped using a round curette blade. Sometimes this tool is used in a skin biopsy, but it can also be used to scrape cells from bone and other internal tissues.

### **Non-Invasive diagnostic procedures.**

A medical procedure is strictly defined as *non-invasive* when no break in the skin is created and there is no contact with the mucosa, or skin break, or internal body cavity beyond a natural or artificial body orifice. For example deep palpation and percussion is non-invasive but a rectal examination is invasive. There are many non-invasive procedures, ranging from simple observation, to specialized forms of surgery, such as radio surgery.

Non-invasive techniques commonly used for diagnosis and therapy include the following:

### **Diagnostic images**

- Dermatoscopy.
- Diffuse optical tomography.
- Computed Tomography.
- Magnetic resonance imaging, using external magnetic fields.
- Radiography, and computed tomography, using X-rays.

- Ultrasonography using ultrasound waves .

## Diagnostic signals

### Electrocardiographic tracing

- Electrocardiography (EKG or ECG): is a test that records the electrical activity of the heart/
- Electroencephalography (EEG): A measurement of the continuous brain-wave patterns, or electrical activity of the brain.
- Electromyography (EMG): A measurement of the electrical activity of skeletal muscles.

## Laboratory Tests

### A: Blood

#### BLOOD TEST REFERENCE RANGE CHART

Test	Normal Range
Blood Volume	8.5 - 9.1% of total body weight (5-6 Liters)
Acidity (pH)	7.35 - 7.45
Complete Blood Cell Count (CBC) Tests include: <b>Hemoglobin, hematocrit ,mean</b>	

<b>corpuscular hemoglobin, mean corpuscular hemoglobin concentration, mean corpuscular volume, platelet count, white blood count</b>	
Hemoglobin	Male: 13 - 18 gm/dL Female: 12 - 16 gm/dL
Hematocrit	Male: 45 - 62% Female: 37 - 48%
Mean Corpuscular Hemoglobin (MCH)	
Mean Corpuscular Hemoglobin Concentration (MCHC)	32 - 36% hemoglobin/cell
Mean Corpuscular Volume (MCV)	76 - 100 cu $\mu$ m
Platelet Count	150,000 - 350,000/mL
White Blood Cell Count (WBC)	4,300 - 10,800 cells/ $\mu$ L/cu mm
Red Blood Cell Count (RBC)	4.2 - 6.9 million/ $\mu$ L/cu mm
Erythrocyte Sedimentation Rate (ESR)	Male: 1 - 13 mm/hr Female: 1 - 20 mm/hr
Iron	60 - 160 $\mu$ g/dL (normally higher in males)
Calcium	8.2 - 10.6 mg/dL (normally slightly higher in children)
Glucose FBS	Tested after fasting: 70 - 110 mg/dL
Cholesterol	Less than 225 mg/dL (for age 40-49 yr; increases with age)
<b>Liver Function Tests</b>  Tests include: Bilirubin(total), phosphatase(alkaline),	

,protein(total and albumin),transaminases (alanine and aspartate),prothrombin(PTT)	
<b>Proteins:</b>	
Total	6.0 - 8.4 gm/dL
• Albumin	3.5 - 5.0 gm/dL
• Globulin	2.3 - 3.5 gm/dL
• Bilirubin	Direct: up to 0.4 mg/dL Total: up to 1.0 mg/dL
• Alanine transaminase( ALT)	1 - 21 units/L
• Aspartate transaminase (AST)	7 - 27 units/L
Prothrombin (PTT)	25 - 41 sec

### Arterial blood gases (ABG)

Analyze	Range
pH	7.35–7.45
H <sup>+</sup>	<u>35–45 nmol/L (nM)</u>
PaO <sub>2</sub>	<u>80–100 mmHg</u>
PaCO <sub>2</sub>	35–45 mmHg
HCO <sub>3</sub> <sup>-</sup>	22–26 mmol/L

### Electrolytes

Analyze	Range
Sodium (N++)	135-145milliEquivalents/liter



	(mEq/L)
Potassium ( K <sup>+</sup> )	3.5 - 5.0 milliEquivalents/liter (mEq/L),
Chloride ( Cl <sup>-</sup> )	98 - 108 mmol/L.
Mg <sup>2+</sup> magnesium	1.7 to 2.2 mg/dL
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	22-30 mmol/L.

### Routine Serum Electrolytes

Electrolytes	Normal range	Clinical significant
<b>Sodium</b>	135–148 mEq/L, adult 138–144 mEq/L, children 133–144 mEq/L, newborns	<ul style="list-style-type: none"> <li>• <b>Increased:</b> excessive intake of sodium without water; salt water drowning; high solute concentration (tube feeding, IV, hyperalimentation) without fluid correction; diarrhea; diabetes insipidus; primary aldosteronism; renal failure.</li> <li>• <b>Decreased:</b> excessive intake of water without sodium (oral, IV therapy, tap water enemas); heart failure; cirrhosis; nephrosis and massive diuretic therapy</li> </ul>
<b>Potassium (serum)</b>	3.5–5.0 mEq/L, adult 3.4–4.7 mEq/L, children 3.7–5.9 mEq/L, newborns	<ul style="list-style-type: none"> <li>• <b>Increased:</b> high potassium intake (oral, IV therapy, rapid infusion of aged blood); renal disease; drugs (adrenal steroids, potassiumconserving</li> </ul>

		<p>diuretics, potassium penicillin, chemotherapeutic agents); Addison's disease; burns and other massive tissue trauma; metabolic and respiratory acidosis.</p> <ul style="list-style-type: none"> <li>• <b>Decreased:</b> drugs (diuretics, digitalis); metabolic alkalosis; primary aldosteronism; Cushing's disease; vomiting and gastric suction.</li> </ul>
<b>Calcium</b>	<p>Total 8.4–10.5 mg/dL Ionized 1.13–1.32 mmol/L</p>	<ul style="list-style-type: none"> <li>• <b>Increased:</b> hyperparathyroidism; bone catabolism (multiple myeloma, leukemia, bone tumors); immobility.</li> <li>• <b>Decreased:</b> renal failure; sprue; pancreatitis; Crohn's disease; hyperphosphatemia; drugs (aminoglycosides, antacids containing aluminum, caffeine, cisplatin, corticosteroids, loop diuretics, Mithracin, phosphate).</li> </ul>
<b>Chloride</b>	<p>96–109 mEq/L, adult 98–105 mEq/L, children 94–112 mEq/L, newborn</p>	<ul style="list-style-type: none"> <li>• <b>Increased:</b> hyperparathyroidism; drugs (ammonium chloride, ion exchange resin, phenylbutazone); metabolic acidosis; respiratory acidosis; dehydration.</li> <li>• <b>Decreased:</b> prolonged vomiting and gastric suction; diarrhea; diuretics (ethacrynic acid and</li> </ul>

		furosemide).
<b>Magnesium</b>	1.3–2.0 mEq/L, adult 1.6–2.6 mEq/L, children 1.4–2.9 mEq/L, newborn	<ul style="list-style-type: none"> <li>• <b>Increased:</b> chronic renal failure, drugs (magnesium sulfate, antacids, enemas containing magnesium, sedatives); acute adrenocortical insufficiency.</li> <li>• <b>Decreased:</b> chronic diarrhea and alcoholism; nontropical sprue; steatorrhea; hereditary malabsorption; starvation; bowel resection; diuretics (mannitol, urea, glucose); hypoparathyroidism.</li> </ul>
<b>Phosphate</b>	2.7–4.5 mg/dL, adult 4.5–5.5 mg/dL, children 4.5–6.7 mg/dL, newborn	<ul style="list-style-type: none"> <li>• <b>Increased:</b> renal insufficiency; intake, IV solutions and enemas; blood transfusion; muscle necrosis; hypoparathyroidism.</li> <li>• <b>Decreased:</b> alcohol withdrawal; hyperventilation; diabetic ketoacidosis; phosphate-binding antacids.</li> </ul>

### Renal Function Test RFT

Analyze	Range
Creatinine	0.7-1.4 mg/dl
Urea Nitrogen (BUN)	7-18 mg/dl
Uric acid	Male 2.1-8.5 mg/dl Female 2-7 mg/dl

## **B: Urine**

<b>TEST</b>	<b>NORMAL VALUES</b>
Color	Pale yellow to amber
Turbidity	Clear to slightly hazy
Specific Gravity	1.015-1.025
pH	4.5-8.0
Glucose	Negative
Ketones	Negative
Blood	Negative
Protein	Negative
Bilirubin	Negative
Urobilinogen	0.1-1.0
Nitrate for Bacteria	Negative
Leukocyte Esterase	Negative
Casts	Occasional hyaline casts
Red Blood Cells	Negative or rare
Crytals	Acid Urine:
White Blood Cells	Negative or rare
Epithelial Cells	Few

### **Clean-Voided Specimen, Infant and Child**

- Check the identification band.
- Explain the procedure to family member present with infant or child. If the child can cooperate, tell child what to do before having someone hold him or her in position.
- Wash hands and don gloves.
- Place in a supine position with hips externally rotated.

- Have parent or assistant flex and abduct the knees, and hold the knees throughout the procedure.
- Cleanse the perineal area as you would for an adult.
- Place a sterile collection bag over the perineum or penis and scrotum, and apply a diaper.
- Remove the collection bag immediately after voiding.
- Transfer the urine into the labeled collection container, close lid tightly, and place in biohazard bag for immediate transport to the laboratory.

### **Clean-Voided Specimen, Male**

- Check the client's identification band.
- Instruct the client on the procedure.
- Wash hands and don gloves if the client needs assistance with the procedure.
- If uncircumcised, retract the foreskin, and hold retracted.
- Cleanse the head of the penis with a towelette using a circular motion.  
Cleanse the meatus and glans beginning with the urethral opening, and make one complete circle around the penis, moving down the glans shaft.
- Discard the towelette.
- Repeat the procedure until all three towelettes have been used.

## **C: Stool**

### **Stool Analysis**

A stool analysis is a series of tests done on a stool (feces) sample to help diagnose certain conditions affecting the *digestive tract*. These conditions can include infection (such as from *parasites*, *viruses*, or *bacteria*), poor nutrient absorption, or cancer.

Stool analysis	
<b>Normal:</b>	The stool appears brown, soft, and well-formed in consistency.
	The stool does not contain blood, mucus, pus, undigested meat fibers, harmful <i>bacteria, viruses, fungi, or parasites</i> .
	The stool is shaped like a tube.
	The pH of the stool is 7.0–7.5.
	The stool contains less than 0.25 grams per deciliter (g/dL) or less than 13.9 millimoles per liter (mmol/L) of sugars called reducing factors.
	The stool contains 2–7 grams of fat per 24 hours (g/24h).
<b>Abnormal:</b>	The stool is black, red, white, yellow, or green.
	The stool is liquid or very hard.
	There is too much stool.
	The stool contains blood, mucus, pus, undigested meat fibers, harmful bacteria, viruses, fungi, or parasites.
	The stool contains low levels of enzymes, such as trypsin or elastase.
	The pH of the stool is less than 7.0 or greater than 7.5.

	<p>The stool contains more than 0.5 g/dL or more than 27.8 mmol/L of sugars called reducing factors; 0.25–0.5 g/dL and 13.9–27.8 mmol/L is considered borderline.</p>
	<p>The stool contains more than 7 g/24h of fat (if your fat intake is about 100 g a day).</p>