Chapter 30

Health Assessment and Physical Examination
Purposes of Physical Examination

Triage for emergency care
Routine screening to promote health and wellness
To determine eligibility for:
  ◦ Health insurance
  ◦ Military service
  ◦ A new job
To admit a patient to a hospital or long-term care facility
Purposes of Physical Examination (cont’d)

Use physical examination to:
- Gather baseline data about patient’s health
- Support or refute subjective data obtained in the nursing history
- Identify and confirm nursing diagnoses
- Make clinical decisions about a patient’s changing health status and management
- Evaluate the outcomes of care
Quick Quiz!

1. When meeting a patient for the first time, it is important to establish a baseline assessment that will enable a nurse to refer back to:
   A. Physiological outcomes of care.
   B. The normal range of physical findings.
   C. A pattern of findings identified when the patient is first assessed.
   D. Clinical judgments made about a patient’s changing health status.
Cultural Sensitivity

Culture influences a patient’s behavior. Consider health beliefs, use of alternative therapies, nutritional habits, relationships with family, and personal comfort zone.

Avoid stereotyping.

Avoid gender bias.
Case Study (cont’d)

Mr. Neal is being admitted to the surgery floor for bowel surgery. He is 76 years old and has a history of rectal bleeding and bowel changes. He smokes 2 packs of cigarettes a day and says he has no family history of colon cancer. His wife is with him.

Jane is a nursing student assigned to care for Mr. Neal. She begins her assessment with a review of Mr. Neal’s chart and the health care provider’s orders.
Preparation for Examination

Infection control
Environment
Equipment
Physical preparation of patient
  ◦ Positioning
Psychological preparation of patient
Assessment of age groups
Organization of the Examination

Assessment of each body system
Follows the nursing history
Systematic and organized
Head-to-toe approach
Techniques of Physical Assessment

Inspection
Palpation
Percussion
Auscultation
Inspection

Use adequate lighting.
Use direct lighting to inspect body cavities.
Inspect each area for size, shape, color, symmetry, position, and abnormality.
Position and expose body parts as needed so all surfaces can be viewed but privacy can be maintained.
When possible, check for symmetry.
Validate findings with the patient.
Palpation

Used to gather information
Use different parts of hands to detect different characteristics
Hands should be warm, fingernails short.
Start with light palpation; end with deep palpation.
Percussion

Tap body with fingertips to produce a vibration. Sound determines location, size, and density of structures.
Auscultation

Involves listening to sounds
Learn normal sounds first before identifying abnormal sounds or variations.
Requires a good stethoscope
Requires concentration and practice
General Survey

Assess appearance and behavior.
Assess vital signs.
Assess height and weight.
Skin

Integument

Color
  ◦ Pigmentation
  ◦ Cyanosis
  ◦ Jaundice
  ◦ Erythema

Moisture

Temperature

Texture

Turgor
Skin (cont’d)

Vascularity

Edema

Lesions

Vascular changes

ABCD:

- Asymmetry
- Border irregularity
- Color
- Diameter
- Evolving features
Physical Examination - Color

General pigmentation – should be even throughout

Benign pigmented areas
- Freckles (macules) on sun exposed skin
- Nevi (moles)
- Birthmarks

Vitiligo – absence of melanin in patchy areas
Changes in Color in Light Skinned People

Pallor
- Pale, white color caused by decrease of blood flow (vasoconstriction) or decrease in hemoglobin
- Shock, anemia

Erythema
- Redness due to increased blood flow (vasodilation)
- Fever, inflammatory process, emotions, CO poisoning
Changes in Color in Light Skinned People

Cyanosis
- Bluish, purplish hue due to decreased perfusion of tissues
- Hypoxemia due to heart failure, shock, chronic bronchitis

Jaundice
- Yellow, orange hue due to jaundice (increased bilirubin in blood)
- Due to liver problems such as hepatitis, cirrhosis
Color Changes in Darker-Skinned People

Pallor
- Brown-skinned people will be more yellow
- Black-skinned people will be more gray
- Palpebral conjunctiva and nail beds should be observed

Erythema
- Cannot be observed
- If fever suspected, check skin for warmth
- If edema, check skin for tightness
Color Changes in Darker-Skinned People

Cyanosis
- Darker-skinned people have normal bluish tone on lips
- Palms, but not clearly evident, other clinical signs should be observed

Jaundice
- Hard and soft palate must be observed in addition to sclera of eyes
- Dark urine also present
Quick Quiz!

2. A patient complains of thirst and headache. The patient appears emaciated. Upon initial examination, you find that the skin does not return to normal shape. This finding is consistent with

A. Pallor.
B. Edema.
C. Erythema.
D. Poor skin turgor.
Hair and Scalp

Hair:
- Color
- Distribution
- Quantity
- Thickness
- Texture
- Lubrication
Nails

Condition of nails reflects:

- General health
- State of nutrition
- Occupation
- Level of self-care
- Age
Head and Neck

Includes assessment of the head, eyes, ears, nose, mouth, pharynx, neck, lymph nodes, carotid arteries, thyroid gland, and trachea. Use inspection, palpation, and auscultation.
Eyes

Visual acuity

Extraocular movements

- Nystagmus

Visual fields
Eyes (cont’d)
Eyes (cont’d)
Eyes (cont’d)

External eye structure

- Position and alignment
- Eyebrows
- Eyelids
- Lacrimal apparatus
- Conjunctivae and sclerae
- Corneas
- Pupils and irises
  - PERRLA
Eyes (cont’d)

Internal eye structure
- Retina
- Choroid
- Optic nerve disc
- Macula
- Fovea
- Centrallis
- Retinal vessels

(Courtesy MEDCOM, Cypress, Calif.)
Ears

Auricles
- Texture
- Tenderness
- Lesions
- Color
- Pain
- Cerumen
Ears (cont’d)

Ear canals and eardrums
Ears (cont’d)

Hearing acuity
- Three types of hearing loss
- Ototoxicity
Tuning Fork Tests

Weber’s test

- Hold fork at base and tap it lightly against heel of palm.
- Place base of vibrating fork on midline vertex of patient’s head or middle of forehead.
- Ask patient if he or she hears the sound equally in both ears or better in one ear (lateralization).
Tuning Fork Tests (cont’d)

Rinne test

- Place stem of vibrating tuning fork against patient’s mastoid process (see illustration B).
- Begin counting the interval with your watch.
- Ask patient to tell you when she no longer hears the sound; note number of seconds.
Tuning Fork Tests (cont’d)

Rinne test

- Quickly place still-vibrating tines 1 to 2 cm (1/2 to 1 inch) from ear canal, and ask patient to tell you when she no longer hears the sound.
- Continue counting time the sound is heard by air conduction.
Tuning Fork Tests (cont’d)

Rinne test

◦ Compare number of seconds the sound is heard by bone conduction versus air conduction.
Nose and Sinuses

Nose
- Excoriation
- Polyps

Nares
- Symmetry of size and shape

Nasal cavity
- Color, swelling, drainage, bleeding

Mucous membranes—abnormalities

Septal deviation

Sinuses
Mouth and Pharynx

Lips
- Color
- Texture
- Hydration
- Contour
- Lesions
Mouth and Pharynx (cont’d)

Buccal mucosa
Gums
Teeth
Mouth and Pharynx (cont’d)

Tongue
Floor of mouth
Mouth and Pharynx (cont’d)

Palate
- Hard
- Soft

Pharynx
Neck

Neck muscles
- Anterior triangle
- Posterior triangle
Palpable Lymph Nodes
Neck

Lymph nodes
  ◦ Malignancy
Carotid artery
Jugular vein
Neck (cont’d)

Thyroid gland
Trachea

- Part of the upper respiratory syst
Assessment of the Lungs & Thorax

Inspect thorax with patient sitting up

Observe chest, compare one side with the other

Work from the apex, move downward toward base (from side to side)

Rate, rhythm, depth of inspiration as well as symmetry of chest movement
Assessment of the Lungs & Thorax (cont’d)

Examine AP diameter with lateral diameter
Distance between ribs (intercostal space)
Palpate to assess respiratory movement, symmetry
Crepitus
Thorax and Lungs

Examination

- Inspection
- Palpation
- Auscultation
Thorax and Lungs (cont’d)

Identify anatomical landmarks.

Thorax and Lungs (cont’d)

Posterior thorax

- Check diaphragmatic excursion
- Inspect for deformities, position of the spine, slope of the ribs, retraction of the intercostal spaces during inspiration, bulging of the intercostal spaces, and rate and rhythm of breathing.
Thorax and Lungs (cont’d)

Tactile fremitus
- Created by vocal cords
- Transmitted through lungs to chest wall
- Palpation
Assessment of the Lungs & Thorax (cont’d)

Lung sounds
- Bronchial
- Bronchovesicular
- Vesicular
Auscultating Breath Sounds

Patient should be upright

Use the diaphragm of the stethoscope

Begin at C7 posteriorly and anteriorly from above the clavicles

Move steadily from right to left upper and lower

Compare breath sounds bilaterally

Do not auscultate over clothing
Tracheal Breath Sounds

Auscultated over the trachea
Loud and high pitched
Cause: airflow through tubular trachea
Best heard over the neck and trachea
Occurs during upper airway obstruction
Bronchial Breath Sounds

Anterior: heard on either side of sternum, over main stems of the bronchus from 2nd to 4th intercostal spaces

Posterior: best heard lateral to the spine between 3rd and 6th intercostal spaces

Loud, harsh, less turbulent and lower than tracheal sounds
Bronchial Breath Sounds

Pause between inspiration and expiration; expiration is heard for a longer time than inspiration

Sounds over smaller airways are low pitched and softer
Bronchovesicular Breath Sounds

Heard during inspiration and expiration

Midway in Pitch and loudness between vesicular and bronchial breath sounds

Best heard in 1st and 2nd intercostal spaces of anterior chest, between scapulae of the posterior chest
Vesicular Breath Sounds

Heard over most of the thorax

Soft and low pitched, rustling, from air moving through small airways

Heard longer during expiration, which generally lasts twice as long as inspiration
Adventitious Breath Sounds

Decreased or no sounds where normal sounds should occur

Breath sounds occurring in abnormal locations

Diminished breath sounds demonstrate decreased airflow and potentially decreased oxygen exchange
Adventitious Breath Sounds

Adventitious/extra sounds:
- Represent pathologic conditions of heart or lungs
- Indicate disrupted airflow due to airway spasm, fluid, or secretions
- Crackles (rales-term not used as much), Wheezes, Stridor, Friction rubs
Crackles

Caused by fluid in the airways

Intermittent or discontinuous, nonmusical, or popping sounds

Caused by fluid, inflammation, infection, or secretions

Crackles are described as either fine or coarse

Occur when closed airways snap open during inspiration

Softer, gentler sound may also be heard on inspiration
Wheeze

Heard equally during inspiration and expiration

High-pitched musical sounds

Caused by air flowing across strands of mucus, swollen pulmonary tissue that narrows the airway, bronchospasm

Rhonchi (term for secretions in airways-not used as much)

Inspiratory/expiratory, continuous/ discontinuous, mild/moderate/severe

Asthma, allergies, reactive airway disease
Stridor

Heard only during inspiration as air attempts to flow across an obstruction

Heard without stethoscope as high-pitched, crowing sound

With stethoscope, best heard over large airways, e.g., trachea or bronchus

Report to the health care provider immediately

Indicates airway obstruction requiring intervention
Pleural Friction Rubs

Low-pitched, creaking or squeaking sounds
Occur when inflamed pleural surfaces rub together
Heard on inspiration
Pitch usually increases with chest expansion
Have the patient hold breath to distinguish between pleural and pericardial friction
Quick Quiz!

3. A patient is admitted with pneumonia. When auscultating the patient’s chest, you hear low-pitched, continuous sounds over the bronchi. These sounds are labeled as

A. Crackles.
B. Rhonchi.
C. Wheezes.
D. Pleural rub.
Thorax and Lungs (cont’d)

Anterior thorax

- Observe accessory muscles.
- Palpate muscles and skeleton.
- Assess tactile fremitus.
- Compare right and left sides.
- Auscultate for bronchial sounds.
Pulse Oximetry

Measures arterial oxygen saturation

Pulse oximetry probe on ears, nose, finger, toes, forehead

False readings

Intermittent or continuous monitoring

Ideal values
Pulse Oximetry

Measures $O_2$ saturation of hemoglobin
Reflects light off the hemoglobin molecules
Measures the absorption of light by hemoglobin
Normal range is from 95% to 100%
Factors Interfering with Pulse Oximetry

Nail polish

Automated BP cuffs, hemodialysis fistulas, or arterial lines interfere with blood flow

Shock and hypovolemia

Patient movement, ambient light, and venous pulsations may also cause inaccurate readings
Case Study (cont’d)

During her lung assessment, Jane recognizes that there is a patient teaching opportunity with Mr. Neal. What issue does Jane need to address?
Palpation

Tactile fremitus

- Place your open palms against the upper portion of the anterior chest, making sure that the fingers do not touch the chest.
- Ask the patient to repeat the phrase “ninety-nine” or another resonant phrase while you systematically move your palms over the chest from the central airways to each lung’s periphery.
- You should feel vibration of equally intensity on both sides of the chest.
Percussion

Assess presence of air, fluid, solid mass in underlying tissues

Normal lungs produce a resonant, low-pitched clear sound

Hyperresonance indicates airways are hyperinflated or air is present outside of lung tissue

Dullness indicates that air is absent
  ◦ Pneumonia, pleural effusion, hemothorax, solid tumors
Cardiac Assessment
This is important!

There are three systems that must work together for the heart to beat efficiently:

- Circulatory
- Conduction
- Coronary
## Cardiovascular Blood Flow

<table>
<thead>
<tr>
<th>Unoxygenated Blood:</th>
<th>Oxygenated Blood:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior Vena Cava</td>
<td>Pulmonary veins</td>
</tr>
<tr>
<td>&amp; Inferior Vena Cava</td>
<td>L Atrium</td>
</tr>
<tr>
<td>R Atrium</td>
<td>Mitral Valve</td>
</tr>
<tr>
<td>Tricuspid valve</td>
<td>L Ventricle</td>
</tr>
<tr>
<td>R Ventricle</td>
<td>Aortic Valve</td>
</tr>
<tr>
<td>Pulmonic Valve</td>
<td>Aorta</td>
</tr>
<tr>
<td>Pulmonary Artery to lungs (gets oxygenated)</td>
<td>Body</td>
</tr>
</tbody>
</table>
Cardiac Cycle

**DIASTOLE:**
AV valves open
- Passive flow (75% of volume) into relaxed ventricles,
- Then atria contract
  - Active flow of remaining 25% into ventricles

**SYSTOLE:**
AV valves close
Ventricle pressure increases
Ventricle contracts
Semilunar valves open
- Blood pumped into pulmonary and systemic arteries
Auto-regulatory Mechanisms of The Heart

The heart is supplied by the two branches of the autonomic nervous system.

- The *sympathetic* (adrenergic)
- The *parasympathetic*, or (cholinergic)
Mean Arterial Pressure (MAP)

Must be at least 60 mm Hg to maintain adequate blood flow through coronary arteries and perfuse major organs (brain)

\[ \text{MAP} = \frac{[(2 \times \text{diastolic}) + \text{systolic}]}{3} \]

Usual range: 70-110
Definitions

Cardiac output
Pre-load
After-load
Stroke Volume
Heart rate
Cardiac reserve
Pulse deficit
Pulse pressure
Cardiovascular System Assessment

Patient history
Nutritional history
Family history and genetic risk
Current health problems
  ◦ Pain, discomfort
  ◦ Dyspnea, DOE, orthopnea, PND
  ◦ Fatigue
  ◦ Palpitations
  ◦ Edema
  ◦ Syncope
  ◦ Extremity pain
Assessing Patient’s CV Status

History & Subjective Data

◦ Past Medical history
  ◦ Previous Illness
  ◦ Diagnostic/interventional cardiac procedures
  ◦ Hospitalizations
  ◦ Surgeries
  ◦ Allergies

◦ AMPLEx
Assessing Patient’s CV Status

Social History
- Alcohol intake
- Dietary pattern: caffeine, salt intake
- Cocaine
- Educational level

Medication History
- Prescribed drugs
- OTC
## Assessing Patient’s CV Status: Risk Factors

<table>
<thead>
<tr>
<th>Non-modifiable</th>
<th>Modifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>◦ Age</td>
<td>◦ Cigarette smoking</td>
</tr>
<tr>
<td>◦ Sex</td>
<td>◦ Hypertension</td>
</tr>
<tr>
<td>◦ Family history</td>
<td>◦ Hyperlipidemia</td>
</tr>
<tr>
<td>◦ Race</td>
<td>◦ Physical inactivity</td>
</tr>
<tr>
<td></td>
<td>◦ Diabetes</td>
</tr>
<tr>
<td></td>
<td>◦ Stress</td>
</tr>
<tr>
<td></td>
<td>◦ Obesity</td>
</tr>
</tbody>
</table>
Cholesterol Level:
AHA Recommendation

Total Cholesterol
- < 200 mg/dL
  - best
- 200 – 239
  - borderline high
- 240 mg/dL and above
  - 2X risk of CAD
Cholesterol Level: AHA Recommendation

HDL Cholesterol
- < 40 mg/dL (men)
- < 50 mg/dL (women)
- > 60 mg/dL
  - cardioprotective
Cholesterol Level: AHA Recommendation

**LDL Cholesterol**
- < 100 mg/dL
  - Optimal
- 100 – 129 mg/dL
  - Near or above optimal
- 130 – 159 mg/dL
  - Borderline
- 160 – 189 mg/dL
  - High
- 190 mg/dL
  - Very high
Cholesterol Level: AHA Recommendation

Triglyceride
- < 150 mg/dL
  - Normal
- 150 – 199 mg/dL
  - Borderline high
- 200 – 499 mg/dL
  - High
- 500 mg/dL and above
  - Very high
Physical Assessment

General appearance
Mental Status
Vital signs
Pulses
Heart rate and rhythm
Perfusion
Edema
Lung sounds
Other...
Precordium

Assessment:
- Inspection
- Palpation
- Percussion
- Auscultation
  - Normal heart sounds
  - Paradoxical splitting
  - Gallops and murmurs
  - Pericardial friction rub
Heart

Compare assessment of heart functions with vascular findings. Assess point of maximal impulse (PMI). Locate anatomical landmarks.
Physical Examination

Heart Sounds
- Closure of valves
  - S1
    - first heart sound “lub”; closure of AV valves heard loudest at mitral and usually lower pitch than S2
  - S2
    - second heart sound “dub”; closure of semilunar valves; heard best at aortic and pulmonic areas

https://www.youtube.com/watch?v=2aO0HKIP3vl&index=10&list=PL7D9834D23A7DE909
Physical Examination

S3
- Ventricular gallop
- Heard in early diastole, just after S2
- “Ken-tuc’-ky”
- Due to rapid, early ventricular filling
- Indicates loss of ventricular compliance, diastolic overload
- Heard best: bell, mitral area if produced by left heart; along sternal borders if produced by right heart

https://www.youtube.com/watch?v=mVZFf0xaCQI&list=PL7D9834D23A7DE909&index=11
Physical Examination

S4
- Atrial gallop
- Heard in late diastole, just before S1
- “Ten-nes-see”
- Results when ventricular resistance to atrial filling increased from decreased ventricular compliance or increased ventricular volume
- Seen in: ventricular hypertrophy, ischemic heart disease, MI, hypertension, mitral regurgitation

Summation Gallop
- Presence of all four sounds. S3 and S4 merge into one sound
- Occurs at rates > 100
- Occurs in heart failure
Heart (cont’d)

Heart sounds
- S1
- S2
- S3
- S4
Heart (cont’d)

Inspection and palpation

- Patient must be relaxed and comfortable.
- Inspect and palpate simultaneously.
- PMI
Physical Examination

Extracardiac Sounds
- Pericardial Friction Rubs
  - Caused by inflammation of pericardium
  - Rough, scratchy, squeaky sound “like two pieces of leather rubbing against each other
  - Best heard with patient leaning forward, holding breath in full expiration
Heart (cont’d)

Auscultation
- Dysrhythmia
- Extra heart sounds
- Murmurs (grade, pitch, quality)
Vascular System

Blood pressure
- Readings tend to be higher in the right arm.
- Always record the highest reading.

Carotid arteries
- Reflect heart function better than peripheral arteries
- Commonly auscultated
Vascular System (cont’d)

Carotid bruit

- Narrowed blood vessel creates turbulence, causes blowing/swishing sound.
- Pronounced “brew-ee”
Vascular System (cont’d)

Jugular veins
- Most accessible
- Right internal jugular vein follows more direct path to right atrium.
- Note distention.
- Assess pressure.
Vascular System (cont’d)

Peripheral arteries and veins

- Blood flow
- Condition of skin and nails
- Integrity of venous system
- Pulses/sufficiency of arterial circulation
Vascular System (cont’d)

Pulses
- 0: absent, not palpable
- 1+: pulse diminished, barely palpable
- 2+: expected/normal
- 3+: full pulse, increased
- 4+: bounding pulse
Peripheral Arteries

Radial pulse
- Thumb side of wrist

Ulnar pulse
- Little finger side of wrist
Peripheral Arteries (cont’d)

Brachial pulse
Femoral pulse
Peripheral Arteries (cont’d)

Popliteal pulse
Dorsalis pedis pulse
Peripheral Arteries (cont’d)

Posterior tibial pulse
Ultrasound stethoscopes
Tissue perfusion
Peripheral Veins

Varicosities

Peripheral edema
  - Pitting edema

Phlebitis
Vascular System

Lymphatic system

- Upper and lower extremities
- Assess drainage.
- Palpate.
Chest Pain

This is the most important symptom of cardiac disease

Pain could be from pulmonary, intestinal, gallbladder, or musculoskeletal sources but it **may** be from the heart itself

Every complaint of chest pain must be taken very seriously!
Q-R-S-T-A-A-A

Quality - dull/squeezing

Region – radiation
  - changing
  - right arm/left arm

Severity/Setting
  - rest vs exertion
  - after meals
  - scale of pain
Q-R-S-T-A-A-A-A

Time
- sudden/gradual onset

Alleviators
- Position

Aggravators
- food/position/exertion/people
- constant/episodic

Associated Symptoms
- SOB, cough, temp, nausea, diarrhea
Paroxysmal Nocturnal Dyspnea (PND)

Occurs at night or when patient is supine.

Patient awakens after being asleep about 2 hours and is “smothering”. Runs to window to get more air

This is a specific sign of congestive heart failure
Orthopnea

Dyspnea when lying down

Ask all patients: “How many pillows do you use in order to sleep?”

To quantify the orthopnea, record “3-pillow orthopnea for the past month”
Dyspnea on Exertion (DOE)

This is usually due to chronic CHF or severe pulmonary disease

Quantify the severity by asking, “How many level blocks can you walk before you get short of breath? How many could you walk six months ago?”
How to Chart about Dyspnea

“The patient has had 1-block dyspnea on exertion for the past six months. Before 6 months ago, the patient was able to walk 4 blocks without shortness of breath. In addition, during the past month the patient has noted 4-pillow orthopnea. Previously he was able to sleep with just two pillows.”
Syncope

Fainting or syncope is the transient loss of consciousness that is due to inadequate cerebral perfusion.

Syncope can be from cardiac or non-cardiac causes.
Common Causes of Syncope - CARDIAC

Arrhythmias
- Brady-arrhythmias
  - Sinus bradycardia
  - Sick sinus syndrome
  - Atrioventricular block (AVB)
  - Pacemaker malfunction
  - Drug-induced bradycardia
- Tachy-dysrhythmias
  - VTach, SVT
Fatigue

This is a common symptom of decreased cardiac output. A common complaint from people with CHF and mitral valve disorder.

Fatigue may be the presenting symptom of a woman having an MI.

Not at all specific to heart disease, but you must consider it always.
Dependent Edema

When peripheral venous pressure is high, fluid leaks out from the veins into tissues.

This is often the presenting symptom of right ventricular failure.

Edema will begin in legs and gets worse as the day progresses. Least evident in the a.m. after sleeping with the legs flat, worse as gravity pulls fluid to legs.
More about Dependent Edema

This indicates that there is excess fluid volume and 3rd spacing of fluids.

People on bedrest will have edema of their sacral area

In severe right or bi-ventricular heart failure, people often have abdominal distension, liver engorgement, constipation, and anorexia

Anasarca may develop. Gross generalized edema
Ask These Questions about Dependent Edema

“When did you first notice the swelling?”

“Do both legs swell equally?”

“Did the swelling appear suddenly?”

“What time of the day is it worse?”

“Does it disappear after sleeping?”

“Does propping your legs up make it go away?”
More Questions about Edema...

“What medicines do you take now?”

“Do you have any kidney, heart, or liver disease?”

“Do you have shortness of breath? Pain in your legs? Ulcers on your legs?”
And, More Questions about Edema

Have you noticed a difference in how your clothes fit, especially around the waist?

Have you noticed recent problems with constipation?

How is your appetite?
More and More

Do you add salt to food at mealtime and/or when cooking

Do you eat out in restaurants or get take-out food frequently?

Do you read labels on food before purchasing?
Physical Exam for Edema

Press fingers into the dependent areas for 2-3 seconds.

If pitting is present, the fingers will sink into the tissue and when fingers are removed, the impression of the fingers will remain

Edema is quantified from 1+ to 4+ depending on how deep the indentation is
Point to Remember...

Best indicator of fluid balance is weight

2.2 lb = 1 kg = 1 L of fluid
General Appearance

Is the patient in acute distress?

Is breathing labored or easy?

Is there use of accessory muscles?

Is there cyanosis? Pallor?

Are xanthomata present (stony hard, yellowish masses on extensor tendons of the fingers. Due to hypercholesterolemia
Inspection...

Inspect nails. Splinter hemorrhages are associated with infective endocarditis

Inspect the face. People with supravalvular aortic stenosis have wide-set eyes, stabismus, low-set ears, upturned nose, hypoplasia of the mandible

Moon face suggests pulmonic stenosis
Assessment of Blood Pressure

Always measure in both arms sitting

Then take BP standing
Orthostatic Hypotension

Have the patient lie down for 5 minutes and measure BP and pulse.

Have patient stand and repeat reading immediately. Allow 90 seconds for maximum orthostatic changes.

* A drop in systolic BP of 20 mmHg or more when standing is orthostatic.

There is usually an increase in HR.
Jugular Venous Pulse

Remember that the internal jugular vein provides information about right atrial pressure

The pulsation of the internal jugular vein are beneath the sternocleidomastoid muscle and are visible as they are transmitted through surrounding tissue

The vein itself cannot be seen
Because the right internal jugular vein is straighter than the left, only the right IJV is evaluated.

To determine jugular waveform, have patient lie without pillow at about 25 degree angle. Turn head slight to the right and slightly down to relax the right sternocleidomastoid muscle.
Jugular Venous Pulse, con’t

Standing on the right side of the patient, place your right hand holding a pinlight on the patient’s sternum and shine the light tangentially across the right side of the patient’s neck.

Shadows of the pulsation will be cast on the sheet.

Chart: “JV pulsation seen at 25 degrees”
Jugular Venous Distention

- Height of observed venous distention
- Height of sternal angle

45°

External Jugular Vein
Path of IJ
Clavicular Head of SCM
Clavicle
Sternal Head of SCM
Hepatojugular Reflux

A useful test for assessing high jugular venous pressure (also called abdominal compression)

By applying pressure over the liver, you can grossly assess RV function.
- People with RV failure have dilated sinusoids in the liver.
- Pressure over right upper quadrant pushes blood out and increases JV pressure
How to Check for Hepatojugular Reflex

Have patient lie in bed, mouth open, breathe normally to prevent Valsalva maneuver.

Place right hand over RUQ and apply firm pressure for 10 seconds.

Normally there will be a short increase in venous dilation followed by fall to baseline.
Percussion

Not helpful in CV assessment

CXR shows heart size and borders very accurately
Point of Maximal Impulse (PMI)

Stand on the right side of the patient with him sitting.

Place fingertips at 5th ICS, MCL and you should feel PMI.

PMI is usually within 10 cm of the midsternal line and no larger than 2-3 cm diameter.

PMI that is lateral or displaced suggests cardiomegaly.
PMI, con’t

About 70% of the time you will be able to feel PMI with patient sitting. If you can’t, turn patient to his left side, lying down.

A PMI that is over 3 cm diameter indicates left ventricular hypertrophy and is 86% predictive of increased left ventricular end diastolic pressure.
General Motion

After palpating with the fingertips for PMI, use palm of your hand to palpate any large areas of sustained outward motion ("heave" or "lift")

Palpate all 4 cardiac areas

Any condition that increases the rate of ventricular filling can produce a palpable impulse
Thrills

Thrills are superficial vibratory sensations felt on the skin overlying an area of turbulence.

The presence of a thrill indicates that you will hear a loud murmur (grade 4-6).
Points to Consider in Exam

Inspect for symmetry of extremities

Examine arterial pulses

Auscultate carotid artery with diaphragm (slightly elevate head on pillow and turn slightly away from the side being auscultated)
  ◦ If a bruit is noted, do NOT palpate!

Should not be able to palpate abdominal pulse unless very thin.
  ◦ Err on side of caution. Get abdominal ultrasound to R/O aneurysm. Often too late when bulging mass felt.
Exam, con’t

Palpate abdomen deeply but gently for a mass with laterally expansive pulsation
  ◦ (surgical mortality for a non-ruptured abdominal aneurysm is only 5%, but rupture increases mortality to over 90%)

Listen for bruits over major arteries with patient lying flat.
  ◦ Listen 2 inches above umbilicus for presence of aortic bruit
Exam, con’t

Renal artery bruits may be heard about 2 inches above umbilicus and 1-2 inches laterally from mid-line

Palpate femoral pulse.
- The lateral corners of the pubic hair triangle is where you will find the pulse. Feel both femorals so you can judge equality
...More of the exam...

Palpate popliteal pulse...often hard to feel.
  ◦ Place thumbs on patella and press remaining fingers of both hands in popliteal fossa.
  ◦ Have legs in mid-flexed position

Palpate dorsalis pedis (top of foot) and posterior-tibial pulse (inside ankle bone)
Capillary Refill

Evaluate capillary refill by compressing the toe or fingernail tufts until they blanch.

Color should return in 3-5 seconds

Prolonged time for color to return is a sign of arterial vascular insufficiency
Allen’s Test: Evaluating arterial supply in arms

Occlude the radial artery by firm pressure.
  ◦ Ask patient to clinch his fist, then open the fist and observe the color of the palm

Then compress ulnar artery, clinch fist, and observe color of palm

Pallor of the palm during compression of one artery indicates occlusion of the OTHER artery!
General Principles of Auscultation

Close your eyes when listening

Never listen through any kind of clothing

Listen at all 4 cardiac areas:

- Aortic -- 2nd ICS, RSB
- Pulmonic --- 2nd ICS, LSB
- Mitral -- cardiac apex, 5th ICS, MCL
- Tricuspid --- left lower sternal border
Principles of Auscultation

Normally only the closing of valves can be heard
- Closure of the tricuspid and mitral valves (AV valves) produce the 1st heart sound.
- Closure of the aortic and pulmonic valves produce the 2nd heart sound.

Opening of valves can only be heard if they are very damaged (opening “snap” “click”)

Third Heart Sound

When AV valves open, the period of rapid filling of ventricles occurs

- 80% of ventricular filling occurs now.
- At the END of rapid filling, a 3rd heart sound may be heard

S-3 is normal in children and young adults, but not in people over age 30

- It means there is volume overload of ventricle
Fourth Heart Sound

At the end of diastole, atrial contraction contributes to the additional 20% filling of the ventricle

If the left ventricle is stiff and non-compliant, you will hear an S4
Gallop Rhythms

The presence of an S3 and an S4 creates a cadence resembling the gallop of a horse.

AKA as “gallop rhythm”
Auscultation Procedure

Stand at the patient’s right side while he is flat on his back.

Listen to all 4 valve areas, inching the stethoscope along from area to area.

While listening at the apex and left lower sternal border with the bell, you’ll be able to determine if an S3 or S4 are present.
Auscultation Procedures

Next have the patient turn to his left side and listen to the apex for low-pitched diastolic murmurs with bell.

Have patient sit upright and listen everywhere with diaphragm.

Have patient sit and lean forward, exhale, and hold breath while you listen with diaphragm to hear high diastolic murmur.
Procedure, con’t

To interpret heart sounds correctly, you must clearly identify what sound is S1.

- To do this, palpate the carotid artery while you listen.
- The sound that you hear when you feel the carotid pulse is S1.

S2 will follow the pulse
Breasts

Examine both females and males.
Use inspection and palpation.
Look for symmetry.
Breast Self-Examination

1. Stand before a mirror. Inspect both breasts for anything unusual such as discharge from the nipples, puckering, dimpling, or scaling of the skin.
Breast Self-Examination (cont’d)

2. Watching closely in the mirror, clasp hands behind the head, and swing elbows forward.
Breast Self-Examination (cont’d)

3. Press hands firmly on hips and bow slightly toward the mirror, while pulling shoulders and elbows forward.
Breast Self-Examination (cont’d)

4. Raise left arm. Use three or four fingers of right hand to explore left breast firmly, carefully, and thoroughly. Beginning at outer edge, press flat part of fingers in small circles, moving circles slowly around breast. Gradually work toward nipple. Cover entire breast. Pay special attention to area between breast and armpit, including armpit itself. Feel for any unusual lump or mass under the skin.
Breast Self-Examination (cont’d)

5. Gently squeeze the nipple and look for discharge. Repeat the examination on the right breast.
Breast Self-Examination (cont’d)

6. Repeat steps 4 and 5 while lying down. Lie flat on back, right arm over head and pillow/folded towel under right shoulder. This position flattens the breast for easier examination. Use same circular motion described earlier.
7. Repeat on the right breast.
Breasts
Breasts (cont’d)
Breasts (cont’d)
Breasts (cont’d)
Abdomen

Complex assessment because of organs located in the abdominal cavity

Inspection

Auscultation

Palpation
Abdomen (cont’d)

Inspection
- Umbilicus
- Contour and symmetry
- Enlarged organs or masses
- Movements or pulsations
Abdomen (cont’d)

Auscultation

- Bowel motility
  - Peristalsis
  - Borborygmi
- Vascular sounds
  - Bruits
- Kidney tenderness
Abdomen (cont’d)

Palpation

- Performed last
- Detects tenderness, distention, or masses
- May be light or deep, as appropriate
- Aortic pulsation
Quick Quiz!

4. When conducting an abdominal assessment, the first skill a nurse puts to use is
A. Auscultation.
B. Inspection.
C. Palpation.
D. Percussion.
Female Genitalia and Reproductive Tract

Assessment includes both internal and external organs. Understand cultural sensitivity. Identify changes across the life span. Use inspection and palpation.
Female Genitalia and Reproductive Tract (cont’d)

Preparation of the patient
External genitalia
Speculum examination of internal genitalia
Male Genitalia

Assess the integrity of the external genitalia, inguinal ring, and canal.
Use inspection and palpation.
Male Genitalia (cont’d)

Sexual maturity
Penis
Scrotum
Inguinal ring and canal

Male Genital Self-Examination

Perform the examination after a warm bath or shower, when the scrotal skin is less thick.
Stand naked in front of a mirror, hold the penis in your hand, and examine the head. Pull back foreskin if uncircumcised to expose glans. Inspect and palpate head of penis in a clockwise motion, looking carefully for bumps, sores, or blisters.
Male Genital Self-Examination (cont’d)

Look for any genital warts.
Look at opening (urethral meatus) at end of penis for discharge.
Look along entire shaft of penis for same signs.
Male Genital Self-Examination (cont’d)

Be sure to separate pubic hair at base of penis, and carefully examine skin underneath.
Testicular Self-Examination

Look for swelling or lumps in skin of scrotum while looking in mirror.
Use both hands, placing index and middle fingers under testicles and thumb on top.
Testicular Self-Examination (cont’d)

Gently roll testicle, feeling for lumps, swelling, soreness, or harder consistency.
Find the epididymis (cordlike structure on top and back of testicle; it is not a lump).
Feel for small, pea-sized lumps on front and side of testicle. Abnormal lumps are usually painless.
Call your health care provider for abnormal findings.
Rectum and Anus

Perform after genital examination.
Explain all steps to the patient.
Provide privacy.
Use inspection and digital palpation.
Musculoskeletal System

General inspection:
- Gait
- Postural abnormalities
- Age-related changes
Musculoskeletal System (cont’d)

Assess for lordosis, kyphosis, or scoliosis.

A  Lordosis  B  Kyphosis  C  Scoliosis
Musculoskeletal System (cont’d)

Palpation

◦ Joints
◦ Bones
◦ Muscles
Musculoskeletal System (cont’d)

Range of motion
- Active and passive

From Seidel HM et al. Mosby’s guide to physical examination, ed 7, St. Louis, 2011, Mosby.
Musculoskeletal System (cont’d)

Range of motion

- Goniometer
Musculoskeletal System

(cont’d)

Muscle tone and strength

◦ Hypertonicity
◦ Hypotonicity
◦ Atrophy
Jane continues to care for Mr. Neal. He had a colon resection for cancer 2 days ago. The morning shift has just started, and the night nurse reported that he had an “uneventful” night. Mr. Neal is allowed nothing by mouth (NPO) and has an IV line for parenteral fluids, a nasogastric (NG) tube connected to low intermittent suction, an abdominal dressing, and a urethral (Foley) catheter with gravity drainage.
Structures and Functions of Nervous System

Neurons
- Primary functional unit
- Characterized by
  - Excitability
  - Conductivity
  - Influence
Neurons

Detect changes in environment

Initiate bodily responses

Structures vary according to function

3 Components
  ◦ Soma
  ◦ Dendrites
  ◦ Axons
    ◦ Nodes of Ranvier
Structures and Functions of Nervous System

Neurons
- Axon function
- Myelin sheath
- Nonmitotic
Principles

Divergence

Convergence

Saltatory Conduction
  ◦ Faster
  ◦ *Demyelinating diseases

https://www.youtube.com/watch?v=aMrHCb0-QcI
Neuron Functions

Sensory Neuron

Interneuron

Motor Neuron

https://www.youtube.com/watch?v=cUGuWh2UeMk
Neurotransmitters

Monoamines
  ◦ Catecholamines
  ◦ Dopamine
  ◦ Norepinephrine
  ◦ Epinephrine
  ◦ Serotonin
Neurotransmitters

Dopamine
- Decreased in the brains of patients with Parkinson's
- Plays an important role in sexual behavior, eating, and drinking

Serotonin
- A monoamine inhibitory transmitter
- Plays a physiologic role in sleep, psychotic states, pain transmission, and response to hallucinogens

GABA
- Neutral inhibitory NT
- Found in CNS
Structures and Functions of Nervous System

Brain
- Cerebrum
  - Basal ganglia
  - Thalamus
  - Hypothalamus
  - Limbic system
Structures and Functions of Nervous System
Structures and Functions of Nervous System

Brain
  ◦ Brainstem
    ◦ Midbrain, pons, medulla
    ◦ Ascending and descending fibers
    ◦ Cranial nerves III – XII
    ◦ Reticular formation
    ◦ Vital and other centers
Structures and Functions of Nervous System

Brain
- Cerebellum
  - Coordinates
  - Receives
  - Influences
- Ventricles
- Cerebrospinal fluid (CSF)
  - Subarachnoid space in brain, brainstem, spinal cord
  - Cushions, fluid shifts, carries nutrients
CSF

Functions of CSF
- Cushion brain and spinal cord
- Reduces gravitational weight of brain
- Adjust to changes in the intracranial vault’s pressure and volume
- Exchange in nutrients and waste between blood and cells of CNS
Cerebrum

Interprets sensory input, controls skeletal muscle activity, processes intellect and emotions, memory

Largest portion of the brain

Cerebral cortex-surface

Left and Right hemispheres
Cerebellum

Composed of gray and white matter

Controls reflexive, involuntary fine-tuning of motor-control & balance and posture
Lobes

Frontal Lobe
- Motor function, motor speech area, morals, values, emotions, and judgment

Parietal Lobe
- Integrates sensation, governs discrimination, interprets pain, touch, temperature, and pressure

Temporal Lobe
- Auditory center, sensory speech center

Occipital Lobe
- Visual center
Other Areas

Basal Ganglia
  ◦ Central motor movement

Hypothalamus
  ◦ Regulates ANS, stress response, sleep, appetite, body temperature, water balance, and emotions

Thalamus
  ◦ Screens and relays sensory impulses to cortex; lowest level of crude conscious awareness

Midbrain
  ◦ Motor coordination; conjugate eye movement
Other Areas

Pons
◦ Contains projection tracts to connect medulla, spinal cord, and brain

Medulla Oblongata
◦ Contains all afferent and efferent tracts, and all pyramidal tracts, cardiac, respiratory, vasomotor, and vomiting centers

Cerebellum
◦ Coordinated muscle movement, posture, equilibrium, muscle tone

Limbic System
◦ Regulation of some visceral activities, emotional personality
Frontal Lobe: Judgment reasoning, attention, memory, motor function, personality

Parietal Lobe: Sensation, speech, organization, hand skills, grammar, proprioception

Occipital Lobe: Primary vision, sensation

Temporal Lobe: Hearing, smell, emotion, taste, understanding, speech, memory

Cerebellum: Balance, muscle tone, posture, coordination

Brainstem: Wakefulness, cardiac & respiratory centers, vomit center
Assessment Findings of Cerebellum

Dysfunction in cerebellum will result in decreased tone in limbs ipsilaterally

Decreased rapid alternating movements

Inability to coordinate fine motor movements

Disturbances of gait
  ◦ Broad-based

Testing:
  ◦ Intention tremors- finger to nose
  ◦ Pronation-supination
  ◦ Heel to shin
  ◦ Heel to toe walking
  ◦ Romberg’s test
Structures and Functions of Nervous System

Peripheral Nervous System (PNS)
- Spinal nerves
- Cranial nerves
- Ganglia
- Portions of autonomic nervous system (ANS)
Peripheral Nervous System

12 Pairs of Cranial Nerves

31 Pairs of Spinal Nerves

All other nerves serving functions throughout body
Peripheral Nervous System

Nerve pathways
- Afferent (Ascending)
- Efferent (Descending)
Dermatome
<table>
<thead>
<tr>
<th>Cranial Nerve</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN I Olfactory</td>
<td>Sense of smell</td>
</tr>
<tr>
<td>CN II Optic</td>
<td>Central and peripheral vision</td>
</tr>
<tr>
<td>CN III Oculomotor</td>
<td>Eye movement; elevation of upper eyelid; pupil constriction</td>
</tr>
<tr>
<td>CN IV Trochlear</td>
<td>Downward and inward eye movement</td>
</tr>
<tr>
<td>CN V Trigeminal</td>
<td>Touch, pain, temperature; jaw and eye muscle proprioception; mastication</td>
</tr>
<tr>
<td>CN VI Abducens</td>
<td>Abduction of eye</td>
</tr>
<tr>
<td>CN VII Facial</td>
<td>Close eyelid, muscles of facial expression; secretion by glands of mouth and eyes; taste (anterior two-thirds of tongue)</td>
</tr>
<tr>
<td>CN VIII Acoustic</td>
<td>Equilibrium</td>
</tr>
<tr>
<td>CN IX Glossopharyngeal</td>
<td>Movement of pharyngeal muscles; parotid gland secretion; tongue sensation</td>
</tr>
<tr>
<td>CN X Vagus</td>
<td>Pharyngeal and laryngeal movement; sensation, taste</td>
</tr>
<tr>
<td>CN XI Spinal accessory</td>
<td>Pharyngeal, sternocleidomastoid and trapezius movement</td>
</tr>
<tr>
<td>CN XII Hypoglossal</td>
<td>Tongue movement</td>
</tr>
</tbody>
</table>
Assessment Findings of ANS

Cyanosis/Pallor
- Evaluate skin color to rule out peripheral nerve injury

Skin
- Assess skin for evidence of peripheral neuropathy

Postural BP Changes
Blood Supply of CNS

Internal Carotids and Vertebral Arteries
  ◦ Provide arterial supply

Brain receives 20% of cardiac OP (800-1000 mL/minute)

Circle of Willis
  ◦ Posterior cerebral arteries
  ◦ Posterior communicating arteries
  ◦ Internal carotids
  ◦ Anterior cerebral arteries
  ◦ Anterior communicating artery
Assessment of Nervous System

Cognitive Function – ability to follow commands

Mental status change

Personality change – from tabby cat to Tyrannosaurus Rex?

Language dysfunction
  ◦ Wernicke’s Aphasia
  ◦ Motor Aphasia
  ◦ Anomic Aphasia
Assessment of Nervous System

Motor Function
- Strength
  - Push against resistance
- Tone
  - Passively move limbs
- Coordination
  - Balance, gait
  - Finger-to-nose; heel-to-shin tests
- Symmetry
Assessment of Nervous System

Sensory Function
- Light touch
- Pain and temperature
- Vibration sense
- Position sense (proprioception)
- Cortical sensory functions
  - Graphesthesia
  - Stereognosis
# Rating DTR

<table>
<thead>
<tr>
<th>Rating</th>
<th>Reflex Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Absent reflex</td>
</tr>
<tr>
<td>1+</td>
<td>Trace, or seen only with reinforcement</td>
</tr>
<tr>
<td>2+</td>
<td>Normal</td>
</tr>
<tr>
<td>3+</td>
<td>Brisk</td>
</tr>
<tr>
<td>4+</td>
<td>Non-sustained clonus (i.e., repetitive vibratory movements)</td>
</tr>
<tr>
<td>5+</td>
<td>Sustained clonus</td>
</tr>
</tbody>
</table>
Neurological System (cont’d)

Reflexes
- Position.
- Tap tendon briskly.
- Compare corresponding sides.
# Assessment of Common Reflexes

## Deep Tendon Reflexes

<table>
<thead>
<tr>
<th>Reflex</th>
<th>Description</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biceps</td>
<td>Flex patient’s arm up to 45 degrees at elbow with palms down. Place your thumb in antecubital fossa at base of biceps tendon and your fingers over biceps muscle. Strike triceps tendon with reflex hammer.</td>
<td>Flexion of arm at elbow</td>
</tr>
<tr>
<td>Triceps</td>
<td>Flex patient’s arm at elbow, holding arm across chest, or hold upper arm horizontally and allow lower arm to go limp. Strike triceps tendon just above elbow.</td>
<td>Extension at elbow</td>
</tr>
</tbody>
</table>
# Assessment of Common Reflexes (cont’d)

<table>
<thead>
<tr>
<th>Deep Tendon Reflexes</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patella</strong></td>
<td>Have patient sit with legs hanging freely over side of table or chair, or have him or her lie supine and support knee in a flexed 90-degree position. Briskly tap patellar tendon just below patella.</td>
<td>Extension of lower leg</td>
</tr>
<tr>
<td><strong>Achilles</strong></td>
<td>Have patient assume same position as for patellar reflex. Slightly dorsiflex patient’s ankle by grasping toes in palm of your hand. Strike Achilles tendon just above heel at ankle malleolus.</td>
<td>Plantar flexion of foot</td>
</tr>
</tbody>
</table>
## Cutaneous Reflexes

<table>
<thead>
<tr>
<th>Reflex</th>
<th>Description</th>
<th>Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plantar</td>
<td>Have patient lie supine with legs straight and feet relaxed. Take handle end of reflex hammer and stroke lateral aspect of sole from heel to ball of foot, curving across ball of foot toward big toe.</td>
<td>Plantar flexion of all toes</td>
</tr>
<tr>
<td>Abdominal</td>
<td>Have patient stand or lie supine. Stroke abdominal skin with base of cotton applicator over lateral borders of rectus abdominis muscle toward midline. Repeat test in each abdominal quadrant.</td>
<td>Contraction of rectus abdominis muscle with pulling of umbilicus toward stimulated side</td>
</tr>
</tbody>
</table>
Spinal Nerve Assessment

Symmetry
ROM
Trouble swallowing or breathing
Gait
Balance (cerebellar function)
Motor weakness
Nursing Assessment

Begins with observation of patient’s

- Behavior
- Appearance
- Ability to communicate
Assessment of Nervous System

Objective Data
- Physical examination
  - Mental status
  - Cranial nerve function
  - Motor function
  - Sensory function
  - Cerebellar function
  - Reflexes
Assessment of Neurologic Status: New Onset Symptoms of Concern

- Dizziness/vertigo
- Tremor
- Paresthesia
- Delirium
- Headache
- Weakness
- Unsteady gait/ataxia
- Photophobia
- Vomiting
- Neck stiffness
- Vision problem

- Altered LOC
- Altered mentation
- Altered language
- Altered concentration
- Aphasia/dysphasia
- Breathing problems
- Swallowing problems
- Hallucinations
- Lethargy
- Irritability
- Restlessness
Assessment of Neurologic Status:
Neurological **RED FLAGS**

- Loss of balance, difficulty walking
- Persistent numbness/tingling sensation in feet, toes, hands, or fingers
- Fading in and out of consciousness
- Increasing sensation of pressure in the back, neck, or head
- Difficulty breathing
- Loss of bladder and/or bowel control
Assessment of Neurologic Status:

Focal Neurologic Deficit

- OR

Specific function
Nursing Neuro Assessment

Components:

Level of consciousness
Mental status
Motor exam
Sensory exam
Cranial nerve exam
Neuro Assessment

Components
LOC
Mental Status
Sensory exam
Cranial nerve exam
Level of Consciousness (LOC)

Two components
- Arousal
  - State of wakefulness
- Awareness
  - Content and quality
Altered Level of Consciousness (LOC)

**LOC**: is apparent in the patient who is not oriented, does not follow commands, or needs persistent stimuli to achieve a state of alertness.

- Level of responsiveness and consciousness is the most important indicator of the patient's condition

**LOC is a continuum** from normal alertness and full cognition (consciousness) to coma

- Altered LOC is not a disorder, but the result of a pathology
Altered Level of Consciousness (LOC)

Levels of Consciousness

- Alert
- Lethargic
- Obtunded
- Stuporous
- Comatose
Altered LOC

Delirium

- Altered mental status
  - Characterized by acute change in mental state, inattention, cognitive changes (disorganized thinking), perceptual disturbances, altered LOC
  - Rapid onset
  - Reversible
  - Contributing factors: Illness, electrolyte imbalances, medications, ETOH withdrawal
Altered LOC

Dementia
- Loss of intellectual or cognitive abilities
  - Slow onset
  - Progressive
  - Irreversible
Level of Consciousness

Stimulus response
  - AVPU

GCS
AVPU

Alert
Responds to Verbal Stimulus
Responds to Painful Stimulus
Unresponsive
### Assessing LOC: Glasgow Coma Scale (GCS)

<table>
<thead>
<tr>
<th>Eye Opening Response</th>
<th>Spontaneous-opens with blinking at baseline</th>
<th>4 points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Opens to verbal command, speech, or shout</td>
<td>3 points</td>
</tr>
<tr>
<td></td>
<td>Opens to pain, not applied to face</td>
<td>2 points</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1 point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verbal Response</th>
<th>Oriented</th>
<th>5 points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Confused, but able to answer questions</td>
<td>4 point</td>
</tr>
<tr>
<td></td>
<td>Inappropriate responses</td>
<td>3 points</td>
</tr>
<tr>
<td></td>
<td>Incomprehensive speech</td>
<td>2 points</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1 point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor Response</th>
<th>Obey commands for movement</th>
<th>6 points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Purposeful movement to painful stimulus</td>
<td>5 points</td>
</tr>
<tr>
<td></td>
<td>Withdraws from pain</td>
<td>4 points</td>
</tr>
<tr>
<td></td>
<td>Abnormal (spastic) flexion-decorticate posture</td>
<td>3 points</td>
</tr>
<tr>
<td></td>
<td>Extensor (rigid) response-decerebrate posture</td>
<td>2 points</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1 point</td>
</tr>
</tbody>
</table>

| Glasgow Grade         | Total =                                    |          |
Neuro Assessment

Cognitive Function – ability to follow commands

Mental status change

Personality change – from tabby cat to Tyrannosaurus Rex?

Language dysfunction
  ◦ Wernicke’s Aphasia (sensory or fluent aphasia)
  ◦ Motor Aphasia (Broca’s or non-fluent aphasia)
  ◦ Anomic Aphasia (Amnesic or nominative aphasia)
Altered LOC

Mental status

- Components
  - Orientation
  - Attention
  - Concentration
  - Memory
  - Affect
  - Reasoning
Assessment of Nervous System

Motor Function

- **Strength**
  - Push against resistance

- **Tone**
  - Passively move limbs

- **Coordination**
  - Balance, gait
  - Finger-to-nose; heel-to-shin tests

- **Symmetry**
Assessment of Nervous System

Sensory Function

- Light touch
- Pain and temperature
- Vibration sense
- Position sense (proprioception)
- Cortical sensory functions
  - Graphesthesia
  - Stereognosis
After the Examination

Record findings.
Give the patient time to dress; assist if needed.
If findings are serious, consult health care provider before informing the patient.
Delegate cleaning of examination area.
Record complete assessment; review for accuracy and thoroughness.
Communicate significant findings.
Key Points

Perform a physical examination only after proper preparation of the environment and equipment and the patient has been prepared physically and psychologically. Throughout the examination, keep the patient warm, comfortable, and informed of each step of the process. A competent examiner is systematic while combining simultaneous assessment of different body systems. Information from the history helps to focus on body systems likely to be affected.