LESSON ASSIGNMENT

LESSON 2
Physical Assessment of the Respiratory System.

LESSON ASSIGNMENT
Paragraphs 2-1 through 2-8.

LESSON OBJECTIVES
After completing this lesson, you should be able to:

2-1. Perform the preliminary steps in physical assessment of the respiratory system.

2-2. Perform these examination techniques: inspection, palpation, percussion, auscultation.

SUGGESTION
After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.
LESSON 2

PHYSICAL ASSESSMENT OF THE RESPIRATORY SYSTEM

Section I. GENERAL APPROACH TO PHYSICAL ASSESSMENT

2-1. PATIENT'S HISTORY

The patient's history, obtained by interviewing him, is the patient's view of his health problems, general health condition, past medical history, family health history, and profile of his personal and social life and well-being. Additionally, the patient's history will show information the patient knows about his health, what is important in terms of health care, and what he expects from the health care being asked for. Since the interviewer is getting the information from the patient rather than observing him directly, the patient history information is subjective information. Be sure to record this information immediately and in an organized manner.

2-2. CONDITIONS

The patient should be undressed to the waist. Be sure the examination is conducted in a room with good light.

2-3. PROCEDURE

a. Working from the top of the patient's body down, perform the examination systematically from the head to the foot. In this way, you will be thorough and not miss anything.

b. Compare the findings on one side of the body with the findings on the other side of the body. In many instances, the body is bilaterally symmetrical; that is, the left side of the body has many of the same parts as the right side of the body. The parts are arranged as if the right side had been turned over.

c. Throughout the examination, try to visualize the structure of the body parts underneath the tissues. In each region of the body, consider the function of the body parts and be alert for any abnormalities.

d. Examine the patient's posterior thorax and lungs while he is in the sitting position. The patient’s arms should be folded across his chest so that the scapulae (the shoulder blades) are partly out of the way. Then ask the patient to lie down while you examine his anterior thorax and lungs.
2-4. FUNCTIONS OF THE PHYSICAL ASSESSMENT

There are four functions (or parts) of the physical assessment: inspection, palpation, percussion, and auscultation. When you are doing a physical assessment, perform these functions in the order just given. The definition of each function is given in figure 2-1.

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection</td>
<td>Looking at the patient and observing the patient's behavior and body.</td>
</tr>
<tr>
<td>Palpation</td>
<td>Touching the patient's body and noting what the various structures and parts of the body feel like.</td>
</tr>
<tr>
<td>Percussion</td>
<td>Striking parts of the patient's body with short, sharp blows, and listening to the sounds of the body parts underneath the tissues.</td>
</tr>
<tr>
<td>Auscultation</td>
<td>Using the stethoscope to listen to sounds in the body.</td>
</tr>
</tbody>
</table>

Figure 2-1. Techniques of examination/assessment.

Section II. STEPS OF THE PROCEDURE

2-5. INSPECTION

Inspection, the most important of the examination techniques, begins with the first moment you see the patient. Begin each portion of the examination by looking at the part of the body you are examining.

a. The Patient. The patient should be calm, relaxed, and not unduly apprehensive.

b. Breathing. Observe the patient for these aspects of breathing:

   (1) Respiratory rate. The respiratory rate should be between 12 and 20 breaths per minute with even and easy movements of the respiratory muscles and chest expansion.

   (2) Rhythm. Note the rhythm of the patient's breathing.

   (3) Breathing. Note whether or not it is an effort for the patient to breath.

c. Skin. Look at the color of the patient's skin and check for bruises and/or lacerations.
d. **Chest.** Observe the shape of the patient's chest. The chest should be bilaterally symmetrical.

e. **Respirations.** Respirations should be the result of movement of the diaphragm.

2-6. **PALPATION**

Palpation is touching the part of the patient's body you have just inspected and becoming sensitive to what that body part feels like. It is possible to feel an abnormal from a normal body part.

a. **Four Uses for Palpation of the Chest.**

   (1) **Identify areas of tenderness.** Any area where the patient has reported pain or where there are lesions (a hurt, injury, wound) should be palpated.

   (2) **Assess observed abnormalities.** If you have seen masses or sinus tracts (blind, inflammatory, tube-like structures opening into the skin), palpate the area to evaluate the problem further.

   (3) **Further assess the respiratory excursion.** Determine the range of respiratory movement (how far the chest expands when he inhales and how far the chest contracts when he exhales). You can also feel symmetry of respiratory movement (whether or not the body parts feel the same on both sides during a respiration).

   \[
   \text{REMEMBER: } 1 \text{ RESPIRATION} = \frac{1}{1} \text{ INHALATION} + \frac{1}{1} \text{ EXHALATION}
   \]

   (4) **Elicit tactile fremitus.** When a person speaks, vibrations that can be felt are transmitted through the bronchopulmonary system to the chest wall. These vibrations can best be felt when a person says the words "ninety-nine" or "one-one-one." Ask the person to speak louder or lower his head if you cannot feel the vibrations.

b. **Finger Placement.** Place your finger pads on the skin surface over the area you are palpating. Do not move your fingers over the skin surface during palpation. Palpation should reveal a chest free from pain, tenderness, lesions, and masses. The wall should be firm with no indication of rib fractures or abscesses. The trachea will be midline; a deviated trachea is abnormal. Palpation of the respiratory excursion (respiration at rest position) should reveal an even, symmetrical movement of the chest.
c. **Assessment of Respiratory Excursion.**

(1) **Posterior** (figure 2-2).

(a) Place your thumbs about the level of and parallel to the 10th rib, your hands grasping the lateral rib cage.

(b) As you position your hands, slide them medially in order to raise loose skin folds between your thumbs and the patient’s spine.

(c) Feel for range of symmetry of respiratory movement.

(2) **Anterior** (figure 2-3).

(a) Place your thumbs along each costal margin with your hands along the lateral rib cage.

(b) As you position your hands, slide them medially a bit to raise a loose skin fold between the thumbs.

(c) Ask the patient to inhale deeply.
(d) Watch for your thumbs to separate as the thorax expands.

(e) Feel for the range and symmetry of respiratory movement.

Figure 2-3. Anterior palpation.

d. **Palpate the Chest for Tactile Fremitus** (figure 2-4). Fremitus refers to the palpable vibrations transmitted through the lungs to the chest wall when the patient speaks. Have the patient say "ninety-nine" or "one-one-one" and you will feel vibrations. Vibrations are more difficult to feel over bone. NOTE: Patients with a heavy layer of fat may need to speak more loudly for you to feel the vibrations.

Figure 2-4. Sequence of tactile fremitus examination.
e. **Follow this Procedure to Palpate Properly.**

(1) Use the ball of the hand (the palm of the hand at the base of the fingers), palpate and compare like areas of the lungs. To be more accurate, use only one hand rather than both hands. Do not let your fingers touch the patient's chest.

(2) Have the patient repeat a sound that will make full and rich sounds such as "ninety-nine" or "one-one-one." Symmetrically move your hand over the patient's chest.

(3) You should feel vibrations of equal intensity on either side of the patient's chest.

(4) Normally, you will feel fremitus on the upper chest, close to the bronchi.

(5) Also, normally, you should feel little or no fremitus in the lower chest.

(6) Compare like (symmetrical) areas of the lungs.

f. **Diaphragm Level** (figure 2-5). The level of the diaphragm can be estimated roughly by noting where fremitus stops upon the downward palpation of the chest. It is normal to find that the right side of the diaphragm is slightly higher than the left side.

![Figure 2-5. Diaphragm level.](image-url)
2-7. PERCUSSION OF CHEST

To perform a percussion examination, strike the surface of the body. When this is done, various sounds can be heard. The sounds are different depending on the underlying structure of the body. There are two reasons to use percussion as an examination technique. First, percussion results in setting the chest wall and underlying tissues in motion. This produces sounds that can be heard. Second, percussion sounds can be divided into four recognizable notes. Train your ear to recognize the pitch and duration of these notes. The sound can indicate whether the underlying tissues are filled with air, filled with fluid, or solid. NOTE: Percussion will set tissues in motion only about five to seven centimeters into the chest, so the percussion examination technique is not a way to detect lesions that are very deep.

<table>
<thead>
<tr>
<th>Flatness</th>
<th>Intensity</th>
<th>Pitch</th>
<th>Duration</th>
<th>Example Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dullness</td>
<td>medium</td>
<td>medium</td>
<td>medium</td>
<td>liver</td>
</tr>
<tr>
<td>Resonance</td>
<td>loud</td>
<td>low</td>
<td>long</td>
<td>normal lung</td>
</tr>
<tr>
<td>Tympany</td>
<td>loud</td>
<td>&quot;musical timbre&quot;</td>
<td></td>
<td>gastric air bubble or puffed out cheek</td>
</tr>
</tbody>
</table>

Table 2-1. Table of percussion notes.

a. Procedure. In order to perform the percussion examination technique, strike the stationary finger of one hand with a flexed finger of the other hand. The technique, described here, can be practiced on any surface. Here are the key points:

(1) Firmly rest the first joint of the middle finger of one hand on the patient's chest, but don't let the rest of the hand touch the chest (figure 2-6).
(2) Keep the fingers of the other hand flexed and the wrist loose (figure 2-7).

Figure 2-7. Hand position.

(3) With the tip of the middle finger of the flexed hand, strike the first joint of the middle finger of the hand that is on the patient's chest (figure 2-8). Have the motion come from the wrist.

Figure 2-8. Striking position.

(4) Withdraw the striking finger immediately to avoid damping the vibration.

(5) Strike once or twice, then move your hands symmetrically to another part of the chest.

b. **Areas of Percussion.**

(1) Ideally, the patient should lie in the supine position (lying on the back, face upward) for percussion on the front of the chest. The patient should be sitting up for percussion on the back.
(2) If the patient is ill and unable to sit up, examine with the patient lying on the right or left side.

(3) Percuss the patient's anterior chest (figure 2-9). In a healthy patient, the entire upper chest is resonant except for the area of cardiac dullness. Percuss across the top of the body and work downward, symmetrically.

Figure 2-9. Anterior percussion.

(4) Percuss the patient's posterior chest, symmetrically down the chest wall making a side to side comparison (figure 2-10). Percussion over lung fields should reveal equal bilateral findings. Omit percussion over the shoulder blades.

Figure 2-10. Posterior percussion.
(5) Measure the diaphragmatic excursion (movement of the diaphragm from a position of rest) by noting the difference between the levels of dullness when the person inhales fully and exhales fully. See figure 2-11. The difference is normally about 5 or 6 cm.

Figure 2-11. Diaphragmatic excursion.

2-8. AUSCULTATION OF CHEST

Auscultation (listening with a stethoscope) of the lungs is useful in estimating the airflow through the tracheobronchial tree, detecting an obstruction, and assessing the condition of the surrounding lungs and the pleural space.

a. Position the patient. Have the patient sitting or in a supine position. When the patient is lying down, examine his back by turning the patient from side to side.

b. Show the patient how you want him to breath through the mouth, deeper and more forcefully than usual.

c. Listen with the stethoscope.

(1) Start at the top of the back and work downward, comparing the right and the left sides.

(2) Then, start at the top of the chest and work downward, comparing symmetric points sequentially.

(a) Listen to one full breath in each location.

(b) Be alert for patient discomfort—light-headedness, faintness—that signals hyperventilation.
d. Auscultate normal breath sounds. Auscultate (examine by listening) normal breath sounds in accordance with table in 2-2.

<table>
<thead>
<tr>
<th>NOTE: Two normal breath sounds can be auscultated as follows:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of inspiration and expiration</td>
</tr>
<tr>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>vesicular breath sounds</td>
</tr>
<tr>
<td>bronchial or tubular breath sounds</td>
</tr>
</tbody>
</table>

Table 2-2. Auscultated normal breath sounds.

e. Auscultate vesicular breath sounds (figure 2-12). These sounds are normally heard over the entire lung surface, except beneath the manubrium sterni and in the interscapular region. The sounds are long when the patient inhales and short when the patient exhales.

f. Auscultate bronchial (tubular) breath sounds (figure 2-13). These sounds result from consolidation or compression of the pulmonary tissue that assists in the transmission of sound from the bronchial tree. Bronchial breath sounds do not occur in the normal lung except directly over the trachea. These sounds are short when the person breathes in and long when the person breathes out. The sounds are usually louder than vesicular breath sounds.  

Figure 2-12. Auscultation over lung surfaces.
g. Check for abnormal sounds. Check for sounds in the lungs that are not modifications of breath or voice.

(1) **Rhonchi**. These are coarse, rattling sounds produced when the patient exhales. The sounds are usually very clear but might change with coughing. Low-pitched, these sounds occur when there is mucus in the bronchi.

(2) **Rales (Crackles)**. Rales, also called crackles, are fine, rattling sounds. These are noncontinuous, high-pitched, fine crackles, like the sound of carbonated beverages. The sounds are usually heard when the patient breathes in and sometimes when the patient begins to exhale. These sounds are usually caused by the presence of fluid in the alveoli and the bronchioles. Sometimes the fluid is in these parts of the respiratory system, and sometimes the fluid is not there. This is the reason that sometimes the fine rattling can be heard, and sometimes it is not heard. Coughing usually makes the sounds louder.

(3) **Wheeze**es. Wheezes are musical sounds like the high-pitched notes on a clarinet. Wheezes are produced by constricted or partially obstructed airways. The sounds can be heard when the patient breathes in.

(4) **Pleural friction rub**. These are scratchy sounds like crinkling Saran™ wrap. The sounds are produced by the movement of inflamed pleural surfaces rubbing together.

**Continue with Exercises**
EXERCISES, LESSON 2

INSTRUCTIONS. Answer these exercises by writing the answer in the space provided. After you have answered all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. The four techniques used in examining a patient are:
   a. ________________________________.
   b. ________________________________.
   c. ________________________________.
   d. ________________________________.

2. The patient’s respiration rate should be _____ to _____ breaths per minute.

3. List three things to observe when you are inspecting the patient.
   a. ________________________________.
   b. ________________________________.
   c. ________________________________.

4. When you are inspecting a patient, look at the skin and check for ____________ and ______________ ______________.

5. During an inspection examination, observe the chest to see if it is shaped ______________ ____________________.
6. List four uses of palpation of the chest.
   a. ________________________________.
   b. ________________________________.
   c. ________________________________.
   d. ________________________________.

7. During palpation, your fingers should not ____________________________.

8. When you are performing a palpation examination, it is normal to find that the 
   __________________ side of the diaphragm is slightly higher than the 
   __________________ side.

9. List two reasons to perform chest percussion.
   a. ________________________________.
   b. ________________________________.

10. List two uses of examination of the chest by auscultation.
    a. ________________________________.
    b. ________________________________.

11. Coarse rattling sounds produced when the patient coughs are called
    ________________________________.

12. Musical sounds like the high-pitched coughs are called ________________.

Check Your Answers on Next Page
SOLUTIONS TO EXERCISES, LESSON 2

1. Inspection.
   Palpation.
   Percussion.
   Auscultation. (para 2-4)

2. 12 to 20 (para 2-5b(1))

3. Respiration rate.
   Rhythm of breathing.
   Effort of breathing. (paras 2-5b(1)-(3))

4. Bruises and lacerations. (para 2-5c)

5. Symmetrically. (para 2-5d)

6. Identify areas of tenderness.
   Assess observed abnormalities.
   Further assess respiratory system.
   Elicit tactile fremitus. (paras 2-6a(1)-(4))

7. Move over the skin surface. (para 2-6b)

8. Right; left. (para 2-6f)

9. Set the chest wall and underlying tissues in motion to produce sounds that can be heard.
   
   These sounds can be used to help decide if the underlying tissues are filled with air, fluid, or a solid. (para 2-7)

10. You are correct if you listed any two of the following:
    
    Estimating airflow through the tracheobronchial tree.
    Detecting an obstruction.
    Assessing condition of the lungs and pleural space. (para 2-8)

11. Rhonchi. (para 2-8g(1))

12. Wheezes. (para 2-8g(3))

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