

# Breathing Patterns

By  
BreathSounds

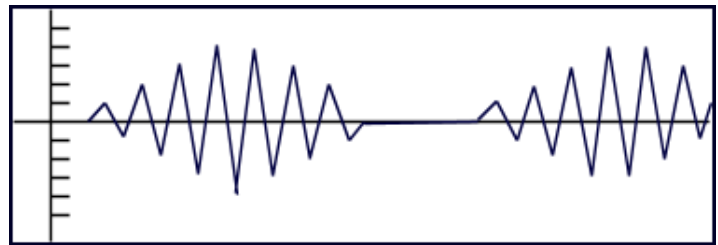
Breathing isn't just a matter of inhaling the good air and exhaling the bad used air. The entire respiratory pattern is important. Rate, depth, timing, and consistency of breaths are all important to the delicate balance of respiration and metabolism.

Certain illnesses or injuries can cause changes in the breathing pattern. Changes other than the typical fast or slow breathing that is most common with many conditions. Below are some of the less common breathing patterns that make many healthcare professionals ask themselves... "Hey, what is that pattern anyway?"

## Breathing Patterns:

### 1. Cheyne-Stokes respirations

- a. Definition: This respiratory pattern is characterized by periods of respirations during which the tidal volume starts shallow and gets progressively deeper, and then gets

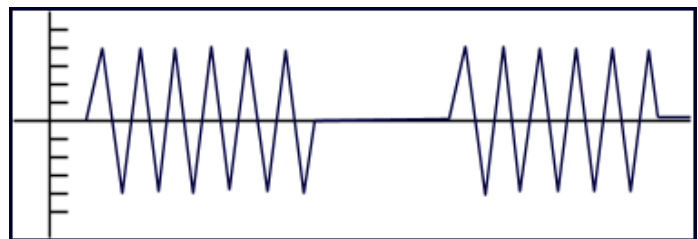


progressively shallower. This shallow-deep-shallow pattern is followed by periods of significant apnea that can last up to 30 seconds or longer, then the cycle starts over. Each cycle can take anywhere between 30 seconds and 2 minutes or longer.

- b. Causes: This pattern of respiration is often caused by strokes, traumatic brain injuries, brain tumors, carbon monoxide poisoning, and metabolic encephalopathy. This pattern of respiration can be seen in healthy patients experiencing first-time high altitude sickness, and can also be a normal side-effect of morphine administration.

### 2. Biot's breathing (aka cluster respiration)

- a. Definition: A respiratory pattern characterized by periods or "clusters" of rapid respirations of near equal depth or VT followed by regular periods of apnea.

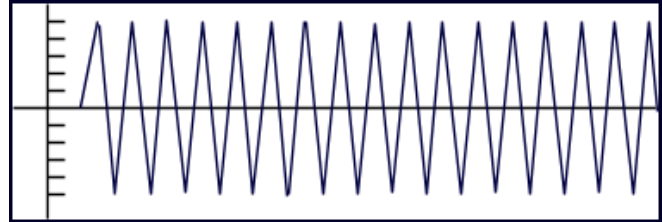


- b. Causes: Biot's breathing can be caused by damage to the medulla oblongata by stroke (CVA) or trauma, pressure on the medulla due to uncal or tentorial herniation. This type of respiratory pattern can also be caused by prolonged opioid abuse.

### 3. Kussmaul's respirations

a. Definition: A type of labored or hyperventilation characterized by a consistently deep and rapid respiratory pattern.

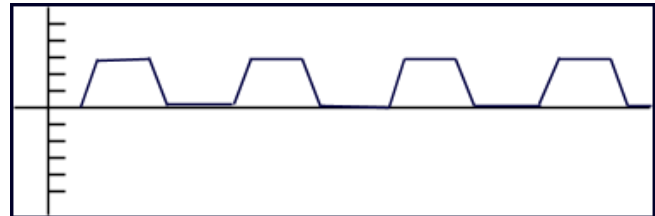
b. Causes: This type of labored hyperventilation is usually seen in the late stages of a severe metabolic acidosis such as diabetic ketoacidosis. The patient



becomes very "air-hungry" and the desperate gasping characteristic of Kussmaul's breathing almost appears involuntary. Most of the time a respiratory pattern secondary to a metabolic acidosis is rapid and shallow and a true kussmaul breathing pattern is rarely reached before the acidosis is corrected.

### 4. Apneustic respirations

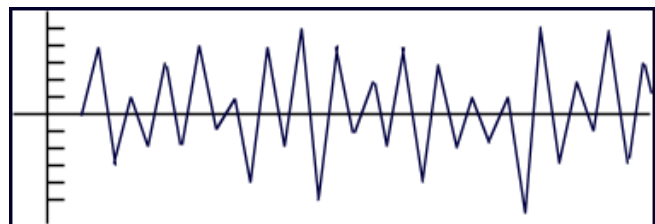
a. Definition: Apneustic respirations have a prolonged inspiratory phase followed by a prolonged expiratory phase commonly believed to be apneic phases.



b. Causes: Apneustic breathing is caused by damage to the upper part of the pons, which is the upper portion of the brain stem. The pons contains, among other things, the "respiratory center" of the brain.

### 5. Ataxia respirations

a. Definition: Completely irregular breathing pattern with irregular pauses and increasing episodes of apnea. As breathing continues to deteriorate ataxic respirations begins to merge with agonal respirations.



b. Causes: Ataxic respirations are most often caused by damage to the medulla oblongata secondary to trauma or stroke. This respiratory pattern usually indicates a very poor prognosis.