



Figure 2-21. Chest wall shape at birth.



Figure 2-22. Chest wall shape at 6 months.



Figure 2-23. Chest wall shape at 12 months.

the chest wall, allowing for changes in the dimensions of the chest during inhalation and exhalation. The general shape of the thorax and chest cavity are established by 12 months of

age. Further changes occur with growth spurts through bone growth and lengthening of muscles. The rib cage continues to rotate downward and does not fully ossify until the mid-20s.³¹ Figures 2-21 to 2-23 depict the shape of the chest at birth, 6 months, and 12 months of age, respectively.

During childhood and early adolescence, there is a marked increase in total lung capacity. Starting at age 5 years, total lung capacity is estimated to be approximately 1400 cm³. By age 14 years, total lung capacity will triple to nearly 4500 cm³. This increase in total lung capacity parallels the child's growth in stature and is positively correlated with the height and weight of the child.³² This increase in lung capacity results in a slowing of respiration from an average of 24 breaths per minute at age 6 years to 13 breaths per minute on average at age 17 years.³³ Note that this phenomenon parallels what we observed with heart development; that is, as the child grows and develops, his or her left ventricle increases in size, enabling the heart to pump more blood per beat and minute, which allows his or her HR to slow. Thus, as children get older and bigger, they tend to show decreased rates of respiration as well as slower HRs.

Although breathing rates decline during childhood and adolescence, tidal volume (VT) and VC both increase during these same periods of development. VT is the amount of air that is moved into and out of the lungs during normal inspiration and expiration.²¹ VC is the greatest amount of air that can be expelled in one single maximum expiratory effort.²¹ Both increase with lung growth and body size. VC per kilogram (kg) of body weight has been found to be greater in