Hypotonic (hyposmotic or hyponatremic) dehydration occurs when the electrolyte deficit exceeds the water deficit. Because ICF is more concentrated than ECF in hypotonic dehydration, water transfers from the ECF to the ICF to establish osmotic equilibrium. This movement further increases the ECF volume loss, and shock is a frequent result. Because there is a greater proportional loss of ECF in hypotonic dehydration, the physical signs tend to be more severe with smaller fluid losses than with isotonic or hypertonic dehydration. Plasma sodium concentrations are typically less than 130 mEq/L.

Hypertonic (hyperosmotic or hypernatremic) dehydration results from water loss in excess of electrolyte loss and is usually caused by a proportionately larger loss of water or a larger intake of electrolytes. This type of dehydration is the most dangerous and requires more specific fluid therapy. This sometimes occurs in infants with diarrhea who are given fluids by mouth that contain large amounts of solute, or in children receiving high-protein nasogastric (NG) tube feedings that place an excessive solute load on the kidneys. In hypertonic dehydration, fluid shifts from the lesser concentration of the ICF to the ECF. Plasma sodium concentration is greater than 150 mEq/L.

Because the ECF volume is proportionately larger, hypertonic dehydration consists of a greater degree of water loss for the same intensity of physical signs. However, neurologic disturbances, such as seizures, are more likely to occur. Cerebral changes are serious and may result in permanent damage. These include disturbances of consciousness, poor ability to focus attention, lethargy, increased muscle tone with hyperreflexia, and hyperirritability to stimuli (tactile, auditory, bright lights).

Degree of Dehydration

Diagnosis of the type and degree of dehydration is necessary to develop an effective plan of therapy. The degree of dehydration has been described as a percentage of body weight dehydrated: mild—less than 3% in older children or less than 5% in infants; moderate—5% to 10% in infants and 3% to 6% in older children; and severe—more than 10% in infants and more than 6% in older children (Greenbaum, 2016). Water constitutes 60% to 70% of an infant's weight. However, adipose tissue contains little water and is highly