Table 33-5 Assessment of Degree of Dehydration

	MILD	MODERATE	SEVERE
Infant	5%	10%	15%
Adolescent	3%	6%	9%
Infants and young children	Thirsty, alert; restless	Thirsty; restless or lethargic; irritable	Drowsy; limp, cold, sweaty, cyanotic extremities; may be comatose
Older children	Thirsty, alert	Thirsty, alert (usually)	Usually conscious (but at reduced level), apprehensive; cold, sweaty, cyanotic extremities; wrinkled skin on fingers and toes; muscle cramps
SIGNS AND SYMPTOMS			
Tachycardia	Absent	Present	Present
Palpable pulses	Present	Present (weak)	Decreased
Blood pressure	Normal	Orthostatic hypotension	Hypotension
Cutaneous perfusion	Normal	Normal	Reduced and mottled
Skin turgor	Normal	Slight reduction	Reduced
Fontanelle	Normal	Slightly depressed	Sunken
Mucous membrane	Moist	Dry	Very dry
Tears	Present	Present or absent	Absent
Respirations	Normal	Deep, may be rapid	Deep and rapid
Urine output	Normal	Oliguria	Anuria and severe oliguria

Data from World Health Organization.

more often increased fluid losses. An infant with **moderate dehydration** has demonstrable physical signs and symptoms. The patient needs fairly prompt intervention. A patient with **severe dehydration** is gravely ill. The decrease in blood pressure indicates that vital organs may be receiving inadequate perfusion (shock) (see Chapter 40). Such a patient should receive immediate and aggressive intravenous (IV) therapy. Clinical assessment of dehydration is only an estimate; the patient must be continually re-evaluated during therapy. The degree of dehydration is underestimated in hypernatremic dehydration because the osmotically driven shift of water from the intracellular space to the extracellular space helps to preserve the intravascular volume.

Laboratory Evaluation

Serum blood urea nitrogen (BUN) and creatinine concentrations are useful in assessing a child with dehydration. Volume depletion without renal insufficiency may cause a disproportionate increase in the BUN, with little or no change in the creatinine concentration. This is secondary to increased passive reabsorption of urea in the proximal tubule caused by appropriate renal conservation of sodium and water. This increase in the BUN may be absent or blunted in a child with poor protein intake because urea production depends on protein degradation. Conversely, the BUN may be disproportionately increased in a child with increased urea production, as occurs in a child with a gastrointestinal bleed or a child who is receiving glucocorticoids. A significant elevation of the creatinine concentration suggests renal injury.

The urine specific gravity is usually elevated (≥1.025) in cases of significant dehydration but decreases after rehydration. With dehydration, a urinalysis may show hyaline and granular casts, a few white blood cells and red blood cells, and 30 to 100 mg/dL of proteinuria. These findings usually are not associated with significant renal pathology, and they remit with therapy. Hemoconcentration from dehydration causes an increase in the hematocrit and hemoglobin.

Calculation of Fluid Deficit

A child with dehydration has lost water; there is usually a concurrent loss of sodium and potassium. The fluid deficit is the percentage of dehydration multiplied by the patient's weight (for a 10-kg child, 10% of 10 kg =1 L deficit).

Approach to Dehydration

The child with dehydration requires acute intervention to ensure that there is adequate tissue perfusion (see Chapter 40). This resuscitation phase requires rapid restoration of the circulating intravascular volume, which should be done with an isotonic solution, such as normal saline (NS) or Ringer's lactate. Blood is an appropriate fluid choice for a child with acute blood loss. The child is given a fluid bolus, usually 20 mL/kg of the isotonic solution, over about 20 minutes. A child with severe dehydration may require multiple fluid boluses and may need to receive fluid at a faster rate. The initial resuscitation and rehydration is complete when signs of intravascular volume depletion resolve. The child typically becomes more alert and has a lower heart rate, normal blood pressure, and improved perfusion.

With adequate intravascular volume, it is now appropriate to plan the fluid therapy for the next 24 hours (Table 33-6). To