



- **What is maintenance fluid?**

- It is the amount of fluid that a person needs everyday to maintain his biologic functions (e.g. the ongoing metabolic processes) and this is nearly equal to 2 liters.

- **What is deficit fluid?**

- **It is the fluid which is needed when there is loss in the form of:**

- ✓ Vomiting.
- ✓ Diarrhea.
- ✓ Excessive urination.
- ✓ Fever and sweating.

Notice that with ongoing losses (continuous vomiting or diarrhea), you are going to calculate maintenance and deficit fluid amounts but still additional amounts of fluid must be calculated to compensate for this ongoing loss.

- **In pediatrics, calculation of the amount of fluid which is needed is dependent on the body weight. Therefore, maintenance fluid is calculated as the following:**

100 ml/kg/day	For 1 st 10 kg
50 ml/kg/day	For 2 nd 10 kg
25 ml/kg/day	For the rest of the weight

- **Calculation of deficit fluid is dependent on knowing the percentage of dehydration (is it mild, moderate or severe?). Therefore, you have to estimate the percentage of weight loss in the patient so you will be able to calculate the deficit according to the following:**

- **Mild dehydration (5%):** 50 ml/kg
- **Moderate dehydration (10%):** 100 ml/kg
- **Severe dehydration (15%):** 150 ml/kg

- **What are the clinical manifestations of different degrees of dehydration?**

Mild dehydration (5%)	Moderate dehydration (10%)	Severe dehydration (15%)
<ul style="list-style-type: none"> • Mild dry mucous membrane • Sense of thirst • Skin turgor may be normal 	<ul style="list-style-type: none"> • Skin is gray in color • Decreased skin turgor • Dry mucous membrane • Decreased tearing • Oliguria • Capillary refill time: 2-4s 	<ul style="list-style-type: none"> • Mottled skin (because peripheral circulation is poor) • Skin turgor. • Dry, cracked lips with collapse of sublingual veins • Sunken eyes and depressed anterior fontanel • Lethargy and coma • Anuria • Capillary refill time > 4s

- **How would you administer all of this IV fluid –which you calculated- to the patient:**

- **In the first 8 hours** = 1/3 maintenance fluid + 1/2 deficit fluid
- **In the following 16 hours** = 2/3 maintenance fluid + 1/2 deficit fluid

- **If the patient is presented with hypovolemic shock due to very severe dehydration (e.g. tachycardia and hypotension) → you have to give him a bolus of IV fluid to save his life. How do you calculate it?**

- **IV bolus = 20 x patient's weight**

Notice that the value of this IV bolus will be subtracted from the total IV fluid value which you will administer to the patient in the first 8 hours.



- Also in severe dehydration, bolus will be tried 3 times and if still there is no improvement in patient's condition → 5% albumin will be administered (because this indicates that the fluid which is given is escaping from blood vessels).

- Calculation of 24 hours electrolytes needs:

- **Calculate maintenance of Na⁺ and K⁺**

Na ⁺	2-3 meq/kg/24 hours
K ⁺	2-3 meq/kg/24 hours

- **Calculate deficit of Na⁺:**

- ✓ Sodium deficit = (difference between measured Na⁺ and normal Na⁺) x 0.6 x weight
- ✓ Notice that correction cannot be more than 12 meq/25 hours (e.g. no rapid correction).

- Example:

- **A 4-year-old boy presented with diarrhea, no vomiting. Clinical assessment showed moderate dehydration, his weight is 12 kg.**

- ✓ Calculate maintenance and deficit of water:

- ❖ *Maintenance of water:*

- First 10 kg: 10 x 100 = 1000 ml

- Second 10 kg: 2 x 50 = 100 ml

Therefore, maintenance of water is 1100 ml

- ❖ *Deficit of water (moderate dehydration: 100 ml/kg):*

- 100 x 12 = 1200 ml

- ✓ How would you administer this calculated fluid need?

- ❖ *8 hours* = 1/3 (1100) + 1/2 (1200) = 363 + 600 = 963 ml

- ❖ *Following 16 hours* = 2/3 (1100) + 1/2 (1200) = 726 + 600 = 1326 ml