- **What is diarrhea?**
  - It is a sudden increase in stool frequency and looseness. The main and most serious complication of diarrhea is dehydration!
- **What are our goals when we want to manage diarrhea?**
  - Treating the underlying cause which lead to diarrhea.
  - Preventing dehydration.
- **Management of dehydration:**
  - **You start with history and physical examination (why?):**
    - ✓ To determine the degree of dehydration.
      - ❖ *Mild*: 5% of body water is lost.
      - ❖ *Moderate*: 10% of body water is lost.
      - ❖ *Severe*: 15% of body water is lost.

Signs and symptoms	Mild (5%)	Moderate (10%)	Severe (15%)
Dry mucous membrane	±	+	+
Reduced skin turger	-	±	+
Depressed anterior fontanel	-	+	+
Sunken eyes	-	+	+
Tachypnea	-	±	+
Hypotension	-	±	+
Increased pulse	-	+	+
Urine volume	Small	Oliguria	Anuria
pH	N	↑	↑↑↑

   - ✓ This helps in determining the cause of dehydration.
   - ✓ To recognize complications.
  - **Assessment of the severity of dehydration to determine:**
    - ✓ Urgency of the situation.
    - ✓ Route of fluid supplement.
    - ✓ Volume of fluid needed.
  - **Investigations:**
    - ✓ Serum sodium: to determine the type of dehydration.
    - ✓ Blood gas: for acid-base imbalance (mostly metabolic acidosis).
    - ✓ Urea and creatinine: renal insufficiency.
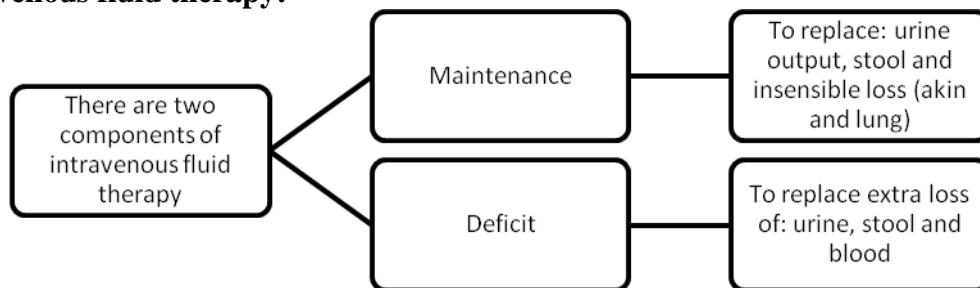   - ✓ Serum potassium: hypokalemia.
- **Treatment of dehydration:**
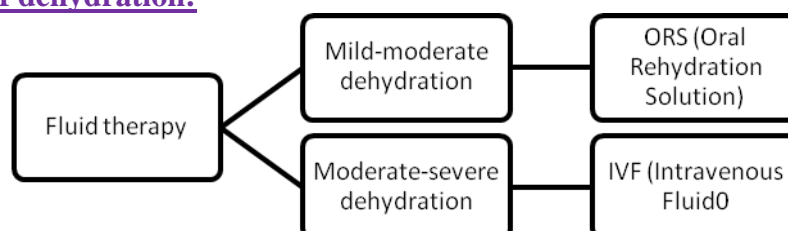
  - **Both of these fluid therapies are composed basically of**: glucose, water, sodium and potassium.
  - **ORS:**
    - ✓ Ingredients: glucose, NaCl, KCl and citrate.
    - ✓ Calculation of ORS:
      - ❖ *Initial step:*
        - ➢ Mild (5%) dehydration: 50 ml/kg
        - ➢ Moderate (10%) dehydration: 100 ml/kg.
      - ❖ *Second step:*
        - ➢ 10 ml/kg for each stool.

- **Intravenous fluid therapy:**

- ✓ Calculation of intravenous fluid therapy:
    1. Calculate 24 hours water need:
        - ➤ Calculate maintenance:

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

        - ➤ Calculate deficit:
            - ▪ Mild dehydration: 50 ml/kg
            - ▪ Moderate dehydration: 100 ml/kg
            - ▪ Severe dehydration: 150 ml/kg
    2. Calculate 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 = (measured Na^+ - normal Na^+) x 0.6 x weight
    3. Select appropriate fluid.
    4. 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 + ½ deficit fluid
    5. 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.

- **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*