

# Fluid & Electrolyte Basics IV

## Fundamentals of Nursing

### Factors that Influence Fluid Balance

- Muscle (more fluid)
- Body Fat (less fluid)
- Gender (men retain more fluid)
- Age

### MUSCLE RETAINS MORE H<sub>2</sub>O



### Key Terms

#### Osmosis:

The movement of fluid from an area of **LOWER** concentration to an area of **HIGHER** concentration, leading to equalization.

**Example:** Large intestines that absorb high nutrients & balance fluids.

#### Diffusion:

The movement of solutes from an area of **GREATER** concentration to an area of **LESSER** concentration, leading to equalization.

**Example:** exchange of O<sub>2</sub> & CO<sub>2</sub> inside the lungs.

#### Filtration:

The movement of **BOTH** fluid & solutes from an area of **HIGH** hydrostatic pressure to an area of low pressure.

**Example:** Kidneys that filter the blood.

#### Osmolality:

The concentration of a solution.

Higher osmolality = Higher solutes (heavy)

Lower osmolality = Lower solutes (light & dilute)

**Examples:**

- **Isotonic** solutions: Equal osmolality 270 - 300 millimoles / kg (same as blood concentration)
- **Hypertonic** solutions: High osmolality (heavy & thick concentration) **OVER** 300 millimoles / kg
- **Hypotonic** solutions: Lower osmolality (lighter & dilute) **Less than** 300 millimoles / kg

### Fluid Volume Overload - Overhydration

Clients puff up like a big water balloon manifesting as edema (the swelling of soft tissues from excess fluid).



### Overhydration for Overload!



#### Other Names:

- Fluid Volume Excess
- **Hypervolemia**
- FVO (Fluid Volume Overload)

#### Edema:

The swelling of soft tissues as a result of excess fluid accumulation

### Grading the Pitting Edema

Edema makes the skin look like a memory foam mattress, ranging from 0+ to 4+ pitting edema.

|    |                                                            |
|----|------------------------------------------------------------|
| 0+ | No pitting edema                                           |
| 1+ | 2 mm or less <b>Mild</b><br>(immediate rebound)            |
| 2+ | 3-4 mm <b>Moderate</b><br>(15 seconds rebound)             |
| 3+ | 5-6 mm <b>Moderately Severe</b><br>(30 seconds to rebound) |
| 4+ | 8 mm or deeper <b>SEVERE!</b><br>(3-2 minutes to rebound)  |

### 4 Main Causes of Edema

#### 1. Increased hydrostatic pressure **TEST TSP**

- Increased volume
- Manifestations:
  - High blood pressure (BP)
  - Pitting edema
- **Examples:**
  - Renal Failure
  - Heart Failure

#### Memory Trick:

- **H<sub>2</sub>O** - Heart failure
- **H<sub>2</sub>O** - heavy fluid

#### 2. Decreased colloid osmotic pressure

- **Low Albumin** (low plasma proteins)

#### Memory Trick:

- **A** - Albumin
- **A** - Attracts fluid

• **Examples:**

- Cirrhosis (liver disease)
- Starvation

#### 3. Increased capillary permeability

• **Examples:**

- Bacteria (infection)
- Burns

#### 4. Obstruction of the lymphatic system

- Cancer (tumor blockage)
- Infection (big lymph nodes)

HIGH

PIVING EDMA

# Acdec Study Guide

**RJ Shavelson**



## **Acdec Study Guide:**

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