

## Role of Water in Health and Oral Health

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### Abstract

The water forms an important component of our body and is essential for life. Water is involved in every bodily function from digestion and circulation through to the control of body temperature and the excretion of waste products. It plays an important role in body homeostasis. If there is an excess loss of water then it adversely affects various oral and surrounding structures. Water loss is temporary and can be easily replenished.

**Keywords:** Water, Homeostasis, Xerostomia.

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### INTRODUCTION

Water is probably the most important and essential nutrient in diet of man. Most of the inorganic chemicals in drinking water are naturally occurring. They are acquired by the contact of water with rocks and soil and the effects of the geological setting, including climate. However, the chemical composition of drinking water also depends on the contaminating effects of industry, human settlements, agricultural activities and water treatment and distribution [1-4].

Water is an essential component of the body and is so essential to body function that the body provides a special signal thirst, to make its lack known at once. Water lost by kidneys, intestine, lungs and skin must be balanced every day by the intake of water from drinking of water, beverages, soup, and other food, especially vegetables. If it is not maintained dehydration results. The elderly are particularly susceptible to water balance, usually caused by excessive water loss through damaged kidneys.

Water forms 61.6% of body weight of which 50% is contained in muscles; intracellular 30% and extra cellular 20% (for organs and cells).

### FUNCTION OF BODY WATER

#### Lubrication

- Water wets all the cells and tissues of the body. It lubricates the tissues so that they are flexible and move easily, especially the joint muscles and tendons.

- Water in the form of saliva is essential during the mastication of food to form a moist lubricated bolus that can be swallowed.

#### Transportation

- Water is needed to transport the nutrients from the intestines to the cells.
- To carry all metabolites from the cells to the blood stream to be eliminated as urine or as feces.

Failure to eliminate the toxic products may result in uremia due to kidney failure or autointoxication due to the failure in the bowel function.

#### Secretion

- Water is a major component of all body secretion. eg. Digestive juices, sweat.
- Water in the form of perspiration is essential for temperature control of the body.

### EFFECTS OF EXCESSIVE WATER LOSS

#### Skin

subcutaneous connective tissue provides the main storehouse for water. The skin wrinkle with aging due to water loss from the subcutaneous connective tissue. This changes the firm, turgid, soft tissue of children and young adults to the pale dry and wrinkled cheek, neck, arm, and thighs of the elderly. The face shows the change early as it is readily visible and is exposed to the sun and weather.

## Muscles

The muscle mass shrinks with aging and becomes thin and stringy due to water loss. This results in sagging of all the muscles: muscle strength diminishes and the facial cantors collapse.

## SECRETIONS

All secretions depend up on the availability of large amount of water to the secreting cells.

- If water is not available sweat and sebaceous glands secretions diminish, causing dryness of the skin that is characteristic of the aged.
- The normal secretion of hydrochloric acid in the stomach and all the digestive enzymes in the intestine decrease in volume if water intake is deficient.
- **Xerophthalmia:** Xerophthalmia refers to the constellation of ocular signs and symptoms associated with Vitamin A deficiency [5].
- Eye becomes dry due to diminished secretion of tears. Absence of tears causes irritation especially when the air is dry and polluted.
- Bitot spots form at the inner canthus of the eye. These are analogous to the material alba, between the teeth.
- The cornea becomes wrinkled.

## DRY MOUTH [6-8]

- Xerostomia causes the oral mucous membrane to become hot, dry and fragile. Dentures are not well tolerated by this mucosa.
- Materia Alba accumulates due to lack of self-cleansing by saliva.
- Mastication of dry foods becomes difficult, elderly are restricted to “mush” and watery foods.
- Accumulation of epithelial debris on the dorsum forms the coated tongue of the elderly. (Food pigments especially blood from meat becomes brown if not cleaned regularly).
- Xerostomia causes a loss of taste due to degeneration of the taste buds. Sense of taste of salty or sweet foods disappears early. Bitter taste buds in CVP persist much longer.
- As age and xerostomia progress in the senescent person, the tongue sheds its epithelial coat and becomes smooth (bald) and atrophic (shriveled).

## Causes for Chronic Water Loss and Tissue Dehydration

### Depressed Kidney Function

- Kidney function is depressed in many elderly persons as a result of “Glomerular leakage” caused by years of kidney damage incident to excreting toxins during fever, food additives and many drugs.
- The filtration system of the kidney is required to excrete toxic additives and preservatives in

food. Every day for years and years. Over the years, kidney damage is cumulative and reaches clinical effects in the elderly.

## ALCOHOL

- Alcohol is also a prime factor in kidney damage. “One drink per day knocks out one kidney cell and one brain cell.”
- Uremia, caused by excessive damage to kidney cells, is a major cause of death in the elderly.

## PRODROMAL SIGNS

### NOCTURIA

- It is usually the result of the kidney failure to recycle fluids and a leak, less elastic bladders.

### Tissue Edema

- Ankle edema is caused by water retention in the tissue. Intracellular water from within the cells shifts to the extra cellular connective tissue.
- Palatal edema usually occurs at night. The upper denture is tightened; this is followed by shrinking during the day, which loosens the upper dentures.

### Physical Discomfort

Fatigue, aches and pains, arthralgias due to lack of water in the synovial fluid of the joints and myalgias caused by shrinking and water loss in the large muscle masses are almost inevitable in the aged due to water loss.

### Emotional Factors

Depressions, anxiety and insomnia are frequent in the elderly. Although these are multifactorial, the dehydrated person is subject to severe emotional disturbances and behavioral symptoms in this category.

## TREATMENT

The elderly patient, who appears clinically dehydrated, especially in terms of xerostomia, requires treatment to restore the health before satisfactory prosthesis can be expected.

- Dehydration includes loss of intra cellular as well as extra cellular water. While acute dehydration resulting from severe acute fevers and acute diarrhea can be dehydrated by intra venous are subcutaneous fluids under hospital care, it is questionable whether the long – term chronic dehydration of aging can be serviced. But it can be altered by judicious and correct ingestion of hydrophilic (water – bound) foods.
- Soups are probably the most efficient food for providing water and nutrition to the dehydrated tissues and cells of the elderly. Free water (drinking water/ that in coffee) passes to quickly and eliminated to quickly. Bound water. i.e., water bound is to organic or inorganic molecules can be much more effectively observed in the intestines

and carried in to the tissues and cells by the vascular systems.

- Vegetable soups are highly desirable. It may be enriched with meat (or fish) and bone (for calcium). Complex proteins are broken down to proteases, which can be easily absorbed by the elderly intestines than fried and coagulated proteins.
- Soups with high salts contains should be avoided.
- Vegetable fibers are strongly hydrophilic and bind the water until it reaches in the large intestine; which acts as the main area for water re-absorption.
- Fiber in the diet also softens the feces and facilitates passage and elimination of moist fecal mass. A dry and irritating fecal mass results in constipation and perianal discomfort.

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