**Oral Rehydration Solutions: Understanding Choices for Improved Outcomes**

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**Oral Rehydration Solution (ORS):**
A solution of salts and a small amount of carbohydrate which is taken by mouth to restore hydration.

ORS can be useful in an intestinal rehabilitation program as well as an ongoing adjunct in treatment for short bowel syndrome (SBS). Most patients who have increased output and require fluid supplementation have SBS or a similar diagnosis that causes increased gastrointestinal (GI) losses, and many depend on home parenteral nutrition (PN). However, advances in drug therapy, medical nutrition therapy and clinical care have led to increased utilization of specialized diet and fluid interventions to reduce dependence on home PN.

**Rationale for Use**
Sodium is lost from the GI tract with diarrhea, vomiting, or GI output through a fistula, ostomy, or drain. Consuming or enterally infusing a solution containing sodium, carbohydrate, and sometimes potassium and bicarbonate, allows the fluid consumed to be absorbed to treat the dehydration. Sufficient gut absorption is required, and osmolality should be approximately 300 mOsm/L.

**Key Components of an ORS**
- Sodium — absorption occurs in the intestinal lumen. The transport of sodium into the cell requires glucose. Sodium will not be absorbed without glucose.
- Carbohydrate — glucose/sucrose, in a small amount
- Fluid — usually water, a hypotonic, or a calorie-free fluid
- Other — Additional ingredients that can be added to treat or prevent electrolyte disturbances: Potassium, bicarbonate

**The “Standard”**
The World Health Organization (WHO) ORS is often used as the “standard” comparison. Content per liter is as follows:
- 90 mEq sodium (Na)
- 20 gm carbohydrate (glucose)
- 20 mEq potassium
- 30 mEq bicarbonate
- Osmolality — 310 mOsm/L

*Reducing the carbohydrate content to 13.5 g glucose decreases the osmolality to 245 mOsm/L.

**ORS Sources**
- Premixed/Commercial
  - Specially designed, patient-specific — adult and pediatric
  - Sports drinks
  - Other ORS solutions

**Advantages**
- Easy to prepare — already prepared or powdered to mix with water
- Taste?

**Disadvantages**
- Sport drinks may not have the appropriate electrolyte and carbohydrate levels for patients with SBS
- Cost
- Availability
- Taste?

**“Homemade”**
Homemade recipes for ORS solutions are available for consumers requiring fluid supplementation.

**Advantages**
- Low cost
- Easy to prepare — made with readily available "grocery store" products
- Taste?

**Disadvantages**
- Consistency — consumers may not use appropriate substitutes for products in the recipe
- Taste?

**How Do They Stack Up?**

**Methods**
An educational session on ORS along with a taste testing at an Oley Foundation Consumer and Clinician Conference with home PN consumers predominately in attendance.

**Goals**
- To increase consumer knowledge of ORS solutions and their application to fluid replacement
- To allow hands-on preparation and taste testing

**ORS Mixed and Taste Tested by Those Attending Oley**

**World Health Organization ORS**
- ½ tsp salt (sodium chloride)
- ½ tsp Morton® Salt Substitute (potassium chloride)
- 1 tbsp baking soda (sodium bicarbonate)
- Add tap water to make one liter

**ORS with a Gatorade® Base**
- 2 cups Gatorade
- 1 tsp salt

**ORS with an Apple Juice Base**
- 1 cup apple juice
- 3 cups water
- 1 tsp salt

**ORS with a Grape or Cranberry Juice Base**
- ½ cup juice
- 3 cups water
- ½ tsp salt

**Cranberry Juice Base**
- 3½ cups water
- ½ cup juice
- ½ tsp salt
- 3 cups water
- 1 cup apple juice
- 2 cups water
- 2 cups Gatorade

**MAK’s Orange Juice ORS**
- 1 cup orange juice (unsweetened, without pulp)
- ½ tsp baking soda
- 8 tsp water
- 4½ tsp water

**Randy’s Rehydration Drink**
- ¼ tsp baking soda (sodium bicarbonate)
- 3½ cups water
- 1 envelope of orange or lemon sugar-free drink flavoring mix (for 500 ml)

**Randy’s Rehydration Drink rated #1 in the taste test.**

**The WHO ORS**
- Contains water, potassium chloride, sodium chloride, sodium bicarbonate, and sucrose was second with the comment that it tasted like “soft water”.
- Juice-based ORS were favored based on personal preference for the juice.
- The sports beverage base with added water and sodium chloride was the least preferred; however, the lower carbohydrate sports beverage with added sodium improved acceptability.

**Results**
- All consumers stated that they had enhanced their knowledge of the use of an ORS and their confidence in being able to make their own tasty solution improved.
- Sessions with taste-testing and hands-on preparation of ORS as well as other food items have been added to the Oley Consumer and Clinician Conference each year.
- Consumers report improved fluid balance when using an ORS through principles learned at these sessions.
- Hands-on taste tests and discussions can be the best method to demonstrate the use and palatability of an ORS and that compliance to daily intake is achievable.
- Clinicians who work with patients with SBS who are on home PN should not only be aware of these ORS recipes, but should also provide an opportunity to mix and taste with their consumers.

**Conclusion**

**Address for Correspondence**
Cranberry Juice Base
3½ cups water
½ cup juice
½ tsp salt
3 cups water
2 cups water
2 cups Gatorade

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**References**

**ORS Recipes**
- World Health Organization recipe shared by Efremke Kelly, MS, RD, CNSD
- Additional recipes provided by Randy Camp, MD, MS, CNSD; Darla TX, Marjorie King, MPH, RD, CNSD; Marni, PA, Laura Maratunga, PhD, RD, CNSD

**Resources**
www.oley.org | www.ohlhealth.com