

## Dehydration, Children: Dilute Apple Juice

### → Summary

Oral administration of dilute apple juice (or other preferred fluids) instead of electrolyte-containing oral rehydration solutions (ORS).

### → Indication & Benefits

Children aged between 6 months and 5 years of age with mild dehydration due to gastroenteritis. Levels of dehydration are shown in the table below. This intervention is only for those with mild dehydration.

Symptoms Associated with Dehydration (Pediatric)			
Symptom	Minimal or no dehydration (< 3% loss of body weight)	Mild to moderate dehydration (3% to 9% loss of body weight)	Severe dehydration (≥ 10% loss of body weight)
Mental status	Well, alert	Normal, fatigued or restless, irritable	Apathetic, lethargic, unconscious
Thirst	Drinks normally, might refuse liquids	Thirsty; eager to drink	Drinks poorly; unable to drink
Heart rate	Normal	Normal to increased	Tachycardia, with bradycardia in most severe cases
Quality of pulses	Normal	Normal to decreased	Weak, thready, or impalpable
Breathing	Normal	Normal; fast	Deep
Eyes	Normal	Slightly sunken	Deeply sunken
Tears	Present	Decreased	Absent
Mouth and tongue	Moist	Dry	Parched
Skin fold	Instant recoil	Recoil in < 2 sec	Recoil in > 2 sec
Capillary refill	Normal	Prolonged	Prolonged; minimal
Extremities	Warm	Cool	Cold; mottled; cyanotic
Urine output	Normal to decreased	Decreased	Minimal

Dilute apple juice or other preferred fluids were tested against ORS in a Canadian trial in 2016. Treatment failure (ie need for IV hydration) occurred in 25% of children given ORS and 17% of those given dilute apple juice. For every 12 children given dilute apple juice instead of ORS, one less child

experienced treatment failure.

Dilute apple juice tastes better than ORS, which results in greater intake and reduced need for IV hydration.

Traditionally, beverages with high sugar content have been discouraged because of their potential to induce osmotic diarrhoea although recent studies have found this effect to be minimal.

## → Contraindications & Adverse Effects

### Contraindications

Dilute apple juice rehydration is not appropriate for children with:

- a need for immediate IV rehydration
- possible acute abdomen
- a history of chronic gastrointestinal disease
- bilious vomiting
- bloody diarrhoea.

### Precautions

Children younger than 6 months of age may (rarely) be more likely to develop water intoxication through the administration of hyponatraemic solutions (eg apple juice).

The Canadian trial excluded moderately or severely dehydrated children.

## → Availability

Apple juice is more available than ORS. It can be bought in supermarkets and convenience stores and is therefore available outside chemist hours.

## → Practical Description

### Dilution

Dilute apple juice with water to achieve 50:50 mix. Other preferred fluids can be used at the same dilution.

### Dosing

During the consultation, give the child 5 mL aliquots to drink every 2–5 minutes from a spoon or a 5-mL syringe. Continue this at home while symptoms persist and/or until urine output is restored.

As a guide, the child should be given 10 mL/kg for each episode of diarrhoea or 2 mL/kg for each episode of vomiting.

If vomiting and diarrhoea have stopped before rehydration treatment is started, continue rehydration until restoration of normal urine production. (Restoration of hydrated body weight can also be used, but

this is rarely known with enough accuracy.)

## Tips and challenges

Many guidelines discourage the use of fluids other than ORS due to the potential for osmotic diarrhoea or hyponatraemia. In the Canadian trial one out of 323 in each arm developed hyponatremia. There was no statistically significant difference in episodes of diarrhoea.

Children older than 2 years of age tend to experience the greatest benefit from the dilute apple juice or preferred fluid. Compared with younger children, those older than 2 years are more accustomed to drinking apple juice, more taste discriminating and less likely to become moderately or severely dehydrated.

There is considerable variation in sugar content between different store-bought apple juice products. A product that the child already likes may be a useful first choice. Diluting the apple juice reduces the theoretical risk of osmotic diarrhoea. The sugar provides useful calories while they are not absorbing other nutrients.

Concurrent administration of ondansetron may be beneficial for children older than 6 months of age and greater than 8 kg who are vomiting.

## → Resources

### Training

The Royal Children's Hospital Melbourne Clinical Practice Guidelines:

- [Dehydration](#)
- [Gastroenteritis](#)

### Consumer Resources

[NHS Choices: Diluted apple juice 'as good as' rehydration drinks for children](#)

## → Evidence

*NHMRC Level II evidence.*

### References

1. Freedman S, Willan A, Boutis K, Schuh S. Effect of dilute apple juice and preferred fluids versus electrolyte maintenance solution on treatment failure among children with mild gastroenteritis: A randomized clinical trial. JAMA 2016;315(18):1966-74.

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