



## Importance of Vitamin C and Arginine in Pediatric Dietary Health

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### DESCRIPTION

Vitamin C and arginine are two essential nutrients that play important roles in various biological processes, such as collagen synthesis, wound healing, immune function, and nitric oxide production. Deficiency of these nutrients can lead to various clinical manifestations, such as scurvy, impaired growth, infections, and poor wound healing. Therefore, it is important to ensure adequate intake of vitamin C and arginine from dietary sources or supplements, especially for children who are at risk of deficiency due to various factors. Vitamin C deficiency is rare in developed countries, but it can occur in children with inadequate access to food, concomitant diseases, or severe dietary restrictions. Vitamin C deficiency can cause symptoms such as fatigue, weakness, anorexia, bleeding gums, ecchymoses, petechiae, coiled hairs, hyperkeratosis, arthralgias, and impaired wound healing. Vitamin C deficiency can also impair the absorption of iron and increase the risk of iron deficiency anemia. The Recommended Dietary Allowance (RDA) of vitamin C for children aged 1-18 years ranges from 15 mg to 75 mg per day. Vitamin C can be obtained from various fruits and vegetables, such as citrus fruits, tomatoes, potatoes, broccoli, strawberries, and sweet peppers. However, vitamin C is sensitive to heat and oxidation, so cooking or storing foods can reduce its content.

Arginine deficiency is also uncommon in healthy children, but it can occur in children with certain genetic disorders, such as urea cycle defects or argininosuccinic aciduria. Arginine deficiency can also occur in children with severe infections, burns, trauma, or surgery, as these conditions increase the demand for arginine and decrease its synthesis. Arginine deficiency can cause symptoms such as poor growth, skin rash, hair loss, muscle wasting, and impaired wound healing. Arginine is also a precursor of nitric oxide, which are a vasodilator and a modulator of immune and inflammatory responses. The RDA of arginine for children aged 1-18 years ranges from 10 mg to 20 mg per kg body weight per day<sup>5</sup>. Arginine can be obtained from various protein-rich foods, such as meat, poultry, fish, dairy products, nuts, seeds, and legumes. Nutritional therapy for vitamin C and arginine deficiency supplementation in children

aims to correct the deficiency and prevent or treat the associated complications. The choice of supplementation depends on the severity of the deficiency, the underlying cause, the availability of the supplements, and the preference of the child and the caregiver. Oral supplementation is preferred over parenteral supplementation whenever possible.

The dose of oral vitamin C supplementation depends on the degree of deficiency and the clinical manifestations. A general guideline is to give 100 mg -300 mg per day for mild to moderate deficiency and 300 mg -1000 mg per day for severe deficiency or scurvy. The duration of oral vitamin C supplementation depends on the response to treatment and the resolution of symptoms. A general guideline is to give oral vitamin C supplementation for at least one month for mild to moderate deficiency and for at least three months for severe deficiency or scurvy. The dose and duration of parenteral vitamin C supplementation should be determined by a specialist based on the individual case. Parenteral vitamin C supplementation may be indicated for children with severe deficiency or scurvy that cannot tolerate oral supplementation which has malabsorption disorders. The side effects of vitamin C supplementation are usually mild and include gastrointestinal symptoms such as nausea, diarrhea, abdominal cramps, and bloating. High doses of vitamin C supplementation may increase the risk of oxalate kidney stones or hemolysis in patients with Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency.

### CONCLUSION

The dose and duration of parenteral arginine supplementation should be determined by a specialist based on the individual case. Parenteral arginine supplementation may be indicated for children with severe deficiency or urea cycle disorders who cannot tolerate oral supplementation or have malabsorption disorders. The side effects of arginine supplementation are usually mild and include gastrointestinal symptoms such as nausea, diarrhea, abdominal cramps, and bloating. High doses of arginine supplementation may increase the risk of hyperammonemia, hypotension, or herpes simplex virus reactivation.

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