

## A Physician's Guide to Oral Iron Supplements

Anemia is a common medical problem that is frequently diagnosed and treated by family physicians. Iron deficiency, the most common cause of anemia, may be treated with oral iron supplements, or less frequently with parenteral iron. Supplements are especially important when an individual is experiencing clinical symptoms of iron deficiency anemia. The goals of providing oral iron supplements are to supply sufficient iron to restore normal iron stores and replenish hemoglobin deficits.

Doctor William Ershler, formerly a hematologist at the National Institute of Health and now Scientific Director, Institute for Advanced Studies in Aging, states, *“Once a physician has determined a diagnosis of iron deficiency anemia, searching for the cause of that anemia is as important, if not more important, than correcting the anemia. Initiating a work-up to get to the cause of the diagnosis may uncover a potentially curable cancer before it progresses. Referral to a gastroenterologist or hematologist may be necessary if the etiology of the anemia is not easily detectable.”*

In order for oral iron therapy to effectively resolve iron deficiency anemia, patients must receive and absorb an adequate dose of elemental iron. Since most oral iron preparations are non-prescription, physicians must provide their patients with adequate education to insure that they are choosing the right iron, taking it at the right time, and minimizing the common side effects that can often lead to discontinuation of therapy.

For adults who are not pregnant, the Centers for Disease Control and Prevention (CDC) recommends 50-60 mg of oral elemental iron twice daily for three months for the therapeutic treatment of iron deficiency anemia.<sup>1</sup> However, physicians evaluate each case separately, and prescribe according to the individual needs of the patient.

### Over-the-Counter Iron Supplements Contain Varying Amounts of Iron

Iron Supplement	Tablet Size	Elemental Iron
Ferrous fumarate	325 mg	108 mg
Ferrous sulfate	325 mg	65 mg
Ferrous gluconate	325 mg	35 mg

*Fishbane S, et al. Kidney Int Suppl. 1999 Mar.<sup>2</sup>*

### Iron Supplements

There are a large number of iron preparations available with various amounts of iron, iron salts, complexes, combinations, and dosing regimens. They are available in regular tablets and capsules, liquid and drops, coated and extended release tablets and capsules. Oral iron preparations are available in both ferrous and ferric states. Ferrous salts are preferred because they are absorbed much more readily. The most commonly available oral preparations include ferrous sulfate, ferrous gluconate and ferrous fumarate. All three forms are well absorbed but differ in elemental iron content. Ferrous sulfate is the least expensive and most commonly used oral iron supplement.<sup>3</sup>

### Compliance and Effectiveness

According to Ershler, *“It is very important to follow up with your patients after starting oral iron therapy. Compliance is a huge problem; many patients simply cannot take oral iron. Asking patients specific questions about how, when, and how often they take their iron therapy coupled with a laboratory work-up will help determine compliance. Patients who are unable to complete a course of oral iron can be treated with an intravenous iron agent. The newer IV irons are safe and effective, and may represent a viable alternative for these patients.”*

The effectiveness of iron supplementation is determined by measuring laboratory indices, including reticulocyte count, hemoglobin and ferritin levels. Hemoglobin usually increases within 2-3 weeks of starting iron supplementation. Therapeutic doses of iron should increase hemoglobin levels by 0.7-1.0 g/dL per week. Reticulocytosis occurs within 7-10 days after initiation of iron therapy.<sup>3</sup> Serum ferritin level is a more accurate measure of total body iron stores. Adequate iron replacement has typically occurred when the serum

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ferritin level reaches 50 µg/L. If patients with iron deficiency anemia do not begin to respond to iron supplementation within two months, the patient should be re-evaluated for blood loss, noncompliance or poor absorption.

One common reason for iron therapy treatment failure is ineffective iron intake. This could be due to non-compliance, under-dosing, or a failure to absorb iron from the supplement. Iron uptake and absorption may be impaired by malabsorption states, as well as the concomitant use of medications and ingestion of foods that inhibit iron absorption.<sup>4</sup> Some of the factors that affect the absorption of iron supplements are listed to the left and below.

## Factors that affect the absorption of iron supplements

- The amount of iron absorbed decreases as doses get larger. For this reason, it is recommended that most people take their prescribed daily iron supplement in two or three equally spaced doses.<sup>1</sup>
- Oral iron supplements must dissolve rapidly in the stomach so that the iron can be absorbed in the duodenum or upper jejunum. Enteric-coated preparations and long-acting supplements may be ineffective, since they do not dissolve in the stomach.<sup>3</sup>
- Ascorbic acid is an enhancer of iron absorption and can reverse the inhibiting effects of substances such as tea and calcium. Ascorbic acid facilitates iron absorption by forming a chelate with ferric iron at acid pH that remains soluble at the alkaline pH of the duodenum.<sup>6</sup>
- To minimize side effects, iron supplements are often taken with food. This may decrease iron absorption by as much as 40-66%.<sup>4</sup>
- Food and drug interactions may reduce the efficacy of oral iron

The primary reason for failure of iron therapy is poor compliance, often related to the frequent gastrointestinal side effects of oral iron. Therapeutic doses of iron supplements frequently cause gastrointestinal side effects such as nausea, vomiting,

constipation, diarrhea, dark colored stools, and/or abdominal distress in more than 25% of patients. It has been estimated that 20% of patients who start oral iron therapy discontinue their medication because of side effects.<sup>4</sup>

Physicians can help minimize the risk of treatment failure through the proper selection and dosing of iron supplements along with educating patients on strategies to maximize iron absorption, manage side effects, and improve compliance. Effective iron supplementation can help patients to relieve the symptoms of iron deficiency anemia, improve quality of life and improve their well being.

### Foods and Drugs that Impair Iron Absorption

- Taking oral iron with food reduces absorption
- Caffeinated beverages (especially tea)
- Calcium containing foods and beverages
- Calcium supplements

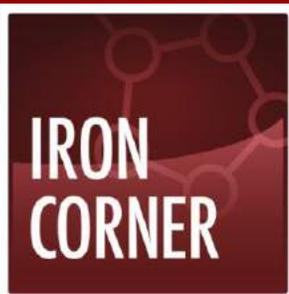
### Ways to Minimize Adverse Effects of Oral Iron<sup>1</sup>

- Start with half the recommended dose and gradually increase to the full dose
- Take iron supplements with food to alleviate gastrointestinal distress (this may decrease iron absorption by as much as 40-66%)
- Change to a different iron preparation
- Take the supplement in divided doses
- Concomitant use of a stool softener, such as docusate, may help alleviate constipation

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### References

1. Centers for Disease Control and Prevention. CDC Recommendations to prevent and control iron deficiency in the United States. MMWR Recomm Rep 1998;47:1-29.
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3. Little DR. Ambulatory management of common forms of anemia. *Am Fam Physician.* 1999 Mar 15;59(6):1598-604.
4. Arcangelo V, Peterson A. *Pharmacotherapeutics for Advanced Practice A Practical Approach.* Second Edition, 2006. Philadelphia, Pa. Lippincott Williams and Wilkins. Chapter 55 Anemias (Kelly Barranger) pg 800.



5. National Institute of Health. Office of Dietary Supplements. Dietary Supplement Fact Sheet: Iron.
6. Lynch SR, Cook JD. Interaction of vitamin C and iron. *Ann N Y Acad Sci.* 1980;355:32-44.

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