IMPORTANCE OF IRON IN SWIMMERS

Red blood cells are responsible for delivering oxygen throughout the body and helping to remove carbon dioxide, both crucial functions during training. An iron deficiency could inhibit the body's ability to create new red blood cells, remove muscle waste products and obviously have a negative effect on an athlete's general health, let alone their ability to practice. Serum Ferritin is considered to be the best indicator of an athlete's iron status and essential in the creation of new red blood cells.

Maintaining an optimum iron status is very important for athletes, especially given that even a mild shortfall appears to not only reduce maximum oxygen uptake capacity and aerobic efficiency but also to reduce the body's response to aerobic training. The fact that iron is more difficult to absorb than most other nutrients and that vigorous aerobic training appears to readily deplete tissue iron only serves to underline the extent of the potential problem, especially for young female athletes.

What iron is and where it can be obtained
Iron helps the body transport oxygen to cells. This is important for the swimmer, as a deficiency in iron will limit oxygen delivery to all cells, including the all-important muscles. There are two sources of iron in our food supply: haem iron (from meats and fish) and non-haem iron (from plant foods). While both are absorbed and utilized by the body, haem iron sources are better absorbed than non-haem iron foods

How iron needs change and what they are
As swimmers grow, iron needs increase because blood volume expands naturally. Iron requirements are as follows:
Male:
9-13 years :8 mg per day
14-18 years:11 mg per day

Female:
9-13 years :8 mg per day
14-18 years: 15 mg per day
The female swimmer almost doubles her iron needs when puberty hits, this is due to blood volume increases, and blood losses (menstruation).

Signs of not getting enough
Fatigue or lack of energy, paleness, low body temperature, chronic infections/colds, and reduced academic performance are indicators of a potential problem. Iron deficiency is caused by too little iron in the diet and can lead to iron-deficiency anemia. Swimmers who are lacking iron in their diet will need to focus on getting more. Swimmers who have anemia may be prescribed an iron supplement to rejuvenate their iron stores, in addition to an iron-rich diet.

At-risk populations
Swimmers and other endurance athletes are at higher risk for iron deficiency anemia. This is due to blood cell breakdown during exercise, making iron more of a concern. Children and teens who are picky eaters, dieters, meal skippers or who have a poor quality diet (heavy on junk, light on nutritious options) are at risk for iron deficiency. Lastly, female swimmers have a double-whammy—greater iron needs with growth and blood loss due to menstruation.

TESTING FOR IRON DEFICIENCY

Testing for iron status is straightforward. A low blood haemoglobin (Hb) measurement only appears in the very advanced stages of iron deficiency. It's perfectly possible to have a normal blood Hb level while suffering severe effects from a tissue deficiency. A more reliable method of monitoring iron is to check Ferritin levels. Serum Ferritin is considered to be the best indicator of an athlete's iron status and essential in the creation of new red blood cells.

Table 1: Current tests for iron status

Haemoglobin	**Normal** 120-160 g/dl		**Anaemic** <120 g/dl
Serum ferritin	**Normal** 50-200 mcg/l	**Depleted** 20- 50 mcg/l	**Anaemic** <20 mcg/l

TREATING IRON DEFICIENCY

1.Boost your dietary iron intake-please see the attached Iron Dietary Information

-If you're not vegetarian, try to include some lean cuts of red meat in your diet once or twice each week. Protein helps iron absorption. When meat is combined with iron sources (the "meat factor,"), absorption of iron increases 2-3 times!

-If you are vegetarian, aim to consume more beans (especially lima beans), lentils, dark green leafy vegetables, eggs and nuts;

-Increase your intake of vitamin C-rich foods (including citrus fruits, berries, new potatoes, broccoli, sprouts, tomatoes, peppers and kiwis).

-Don't drink tea and coffee with meals as the tannins present strongly bind to any iron in food, making it less available to the body;

2.Iron Supplements-these are tablets which can be bought over the counter at any Pharmacy. If you are diagnosed as Iron Deficient then it is worth taking a proper Iron Tablet each day to compensate. Eg-Ferrogradumet, Ferro-F, FGF,etc.

- It is important to only take Iron Supplements under proper advice and after having tests done, as too much Iron can be harmful to some individuals.

CONCLUSION

A sensible way forward for athletes is to consume a diet that is naturally rich in iron and to assess their risk for iron deficiency. Those whose diets are not iron rich should consider having their iron status tested. Those who assess their iron deficiency risk as being significant should seek a test for iron status regardless of diet quality. Routine use of iron supplementation is not recommended until iron status has been properly assessed.

FINAL WORD OF CAUTION- remember that not all Tiredness or lack of energy is simply due to lack of Iron. Proper medical evaluation is required if you think a significant problem is present.

iron deficiency

OUR BODIES REQUIRE IRON EVERYDAY

Iron is a key component of haemoglobin in red blood cells that transport oxygen around the body. It is involved in the body's chemical reactions, which produce energy. *Iron deficiency* can cause weakness, tiredness, a reduced ability for the body to maintain a constant body temperature (resulting in chills & hot flushes), impaired immune system and a decreased ability for physical activity. Prolonged iron deficiency can cause *anaemia* resulting in reduced levels of haemoglobin in the blood and less oxygen reaching the body's tissues.

DAILY IRON REQUIREMENTS:

Children (1-11yrs): 6-8 mg/day
Adolescents (12-18yrs): 10-13 mg/day
Adult Men: 7 mg/day
Adult Women: 12-16 mg/day

(N.B. Pregnant & postmenopausal women have different iron requirements.)
Infants, adolescents, pregnant & pre-menopausal women are at greatest risk of iron deficiency.

WHAT CAN YOU DO?

FOOD AND NUTRITION TIPS

Eat Iron-Containing Foods*: Everyday foods provide a plentiful source of iron to meet our daily requirements. Most animal based foods contain *haem iron that is easily* absorbed by the body. Plant foods contain *non-haem iron* that is not as easily absorbed by the body.

FOOD	IRON (mg/serve)	SERVING SIZE	TYPE OF IRON
• Red meat e.g. lean beef, raw	3.4	fillet steak (100g)	Haem
• Green leafy vegetables e.g. spinach, raw	3.2	½ cup (100g)	Non-haem
• Wholegrain cereals e.g. iron fortified breakfast cereal	3.0	2 wholewheat biscuits (30g)	Non-haem
• Legumes e.g. lentils	2.5	½ cup cooked (125g)	Non-haem
• Nuts e.g. cashews	2.5	25 nuts (50g)	Non-haem
• Seafood e.g. canned red salmon	1.2	½ cup (100g)	Haem
• Eggs	0.8	1 medium egg, boiled (48g)	Non-haem
• Seeds e.g. sunflower seeds, dry roasted	0.7	1 tablespoon (15g)	Non-haem
• Poultry e.g. skinless chicken, baked	0.6	½ chicken breast (80g)	Haem

*AUSNUT – Australian Food and Nutrient Database, ANZFA 1999.

The absorption of non-haem iron can be enhanced or inhibited by other food components consumed with the meal.

> ***Vitamin C** increases* non-haem iron absorption by 2-3 times. To increase iron absorption, include citrus fruits, berries, fruit juice, tomato, capsicum, broccoli and cabbage with your meals.
> ***Phytates*** found in wholemeal cereals, bran & legumes can *inhibit* absorption of iron. However, vitamin C can counteract the effect of phytates.
> ***Polyphenols*** found in tea and coffee can *inhibit* iron absorption.
> ***Too much calcium*** (especially supplements) will *inhibit* the absorption of both haem & non-haem iron.

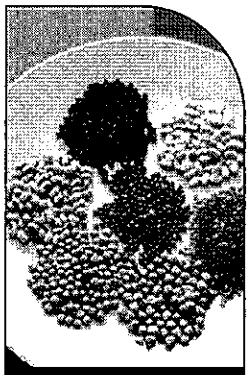
Increase Iron Absorption

> ***Add fruits high in vitamin C,*** such as berries, to your iron fortified breakfast cereal each day.
> ***Have a glass of orange juice*** with your wholegrain breakfast cereal or toast.
> ***Add tomato or red capsicum,*** which are high in vitamin C, to your sandwiches, lentil, bean, pasta and rice-based dishes.
> ***Avoid drinking tea, coffee and cola drinks*** with your main meals.

LIFESTYLE TIPS

RECIPE FOR REST: While nutrition is important for treating iron deficiency, time for rest is also important. Your body needs this time to rejuvenate, so for a good restful sleep:

> *Avoid caffeine after dinner* > *Enjoy some physical activity*
> *Try some soothing music to help you wind down*



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At the **Sanitarium Nutrition Service**, we are a team of qualified nutritionists and dietitians who work together for the sole purpose of helping people enjoy healthy foods and the benefits of a healthier lifestyle.

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✔ *Subscribe to our **FREE**, quarterly food & nutrition newsletter, **'GOOD FOOD NEWS'.***

✔ *Talk with a qualified dietitian about any nutrition issue of interest to you.*

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