



# Weight Loss: Scaling the Issues

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As presented at the College of Family Physicians Annual Convention, November 2004.

Family doctors are in a unique position to assist their patients with respect to health promotion and disease prevention through diet. Obesity/overweight and nutrition are two separate, but related issues.

## *What about obesity and overweight?*

Calories determine weight. Overweight and obesity occur by eating too many calories relative to their expenditure. Patients often say they don't eat much, but patients often underestimate their calorie intake (some studies suggest up to a 55% underestimation). This does not suggest that they are lying, but that most patients are misinformed about the calorie load of the food they eat. In addition, most patients think they can exercise their weight off. Unfortunately, it takes an average of nine hours of aerobic activity to burn off a single pound of fat (3,500 calories/lb, average 400 calories/hour).

The best way to lose fat mass is to reduce caloric intake by 500 or more calories per day;

the best way to keep the fat off is to exercise.

The psychology of weight loss must also be considered. This includes:

- failure,
- reward,
- control and
- disappointment and guilt.

*It takes nine hours of aerobic activity to burn off a single pound of fat.*

## *Nutrition and health promotion*

The quality of calories determines a person's overall state of nutrition. A short list of medical conditions affected by diet include:

- psychiatric—depression, bipolar affective disorder;
- gastrointestinal disease—irritable bowel syndrome, inflammatory bowel disease and gastroesophageal reflux disease;

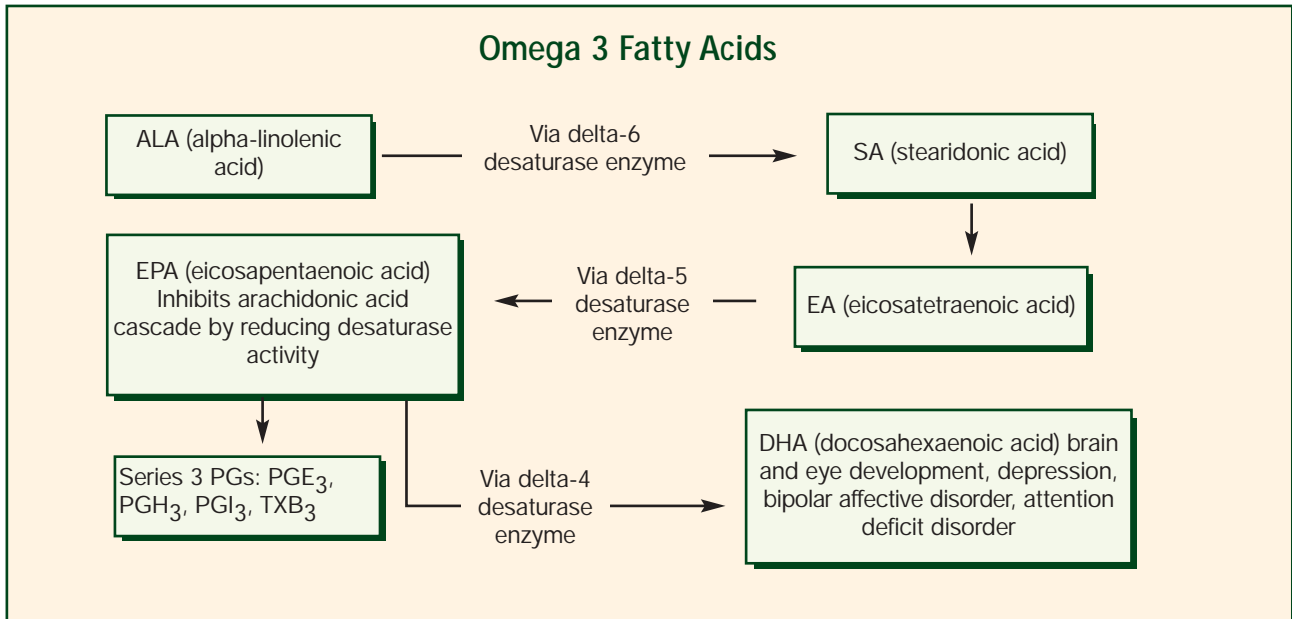


Figure 1. Fatty acid metabolism and eicosanoid production.

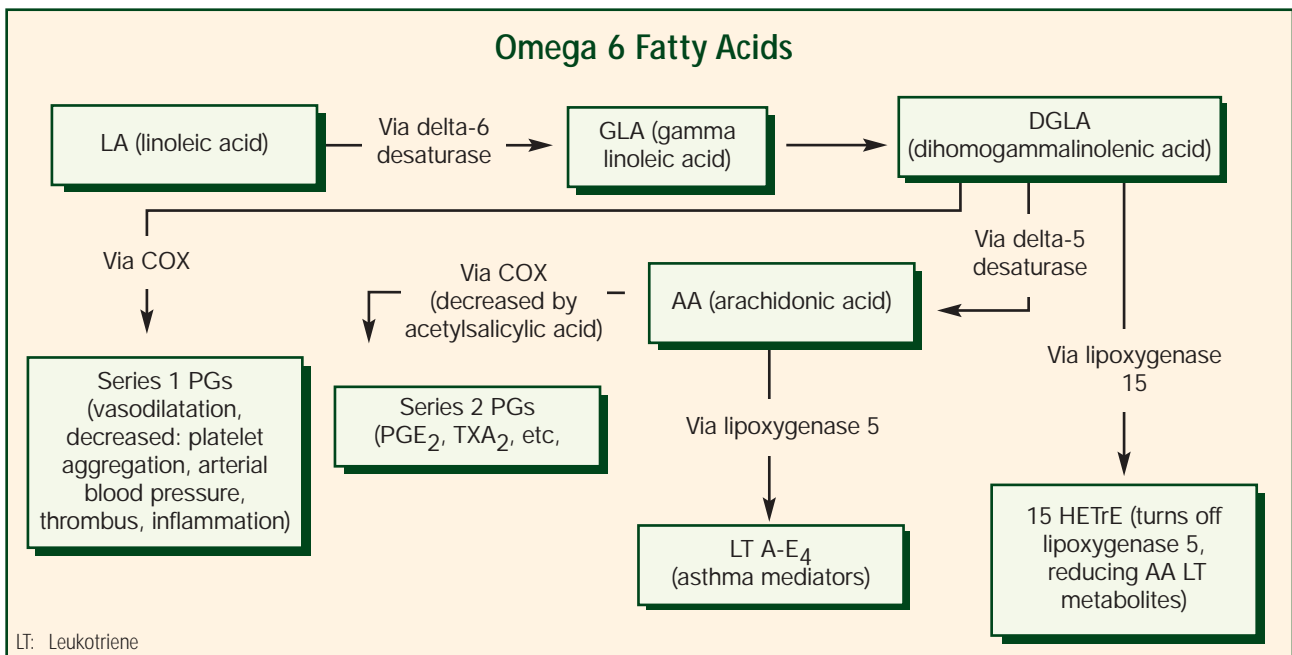


Figure 2. Fatty acid metabolism and eicosanoid production.

- inflammatory and pain states—asthma/rheumatoid arthritis;
- syndrome X—hypertension, lipids, non-insulin dependent diabetes mellitus;
- coronary artery disease/sudden cardiac death;

- cancer and
- prevention—alzheimer's disease, attention deficit hyperactivity disorder, pregnancy.

Insulin resistance and fatty acid metabolism are also issues of concern.

Table 1

## The effects of fats on cholesterol

Fat	Source	Name	LDL effect	HDL effect	TG effect
Saturated	Tropical oils	Palmitic	Moderate increase	Mild increase	None
	Animal products Butter, cheese	Stearic	None	Mild increase	None
		Myristic	Significant increase	Mild increase	None
		Lauric	Mild increase	Mild increase	None
Trans fat	Hydrogenated Oils	Elaidic acid	Mild increase	Mild decrease	None
Monounsaturated	Olives, avocado	Oleic	Mild decrease	Mild increase	Mild decrease or none
Omega-3 polyunsaturated	Flax, canola, green leafy vegetables	Alpha-linolenic acid	Mild decrease	Unknown	Mild decrease
	Fish oils	Docosahexenoic acid, eicosapentaic acid	Mild decrease or mild increase	Unknown	Mild decrease
Omega-6 polyunsaturated	Vegetable oils	Linoleic acid	Mild decrease	Mild decrease, mild increase or none	Mild decrease

LDL: Low-density lipoprotein

HDL: High-density lipoprotein

TG: Triglycerides

## Insulin resistance

### Metabolic syndrome

Metabolic syndrome is generally thought to be genetic and often leads to hyperinsulinemia with elevated fasting levels. A 14-hour fasting insulin level via your local lab is the easiest measure. A positive result suggests compensatory hyperinsulinemia with a strong prognostic indicator of ensuing diabetes.

Metabolic syndrome is defined as a glucose intolerance and/or insulin resistance, in addition to two or more of the following:

- Hypertension: 140/90 mmHg
- Serum triglycerides: > 1.7 mmol/L; serum high-density lipoproteins: < 0.9 mmol/L
- Central obesity: (Waist-to-hip circumference ratio (WHR): > 0.9 men, > 0.85 women)
- Microalbuminuria: > 20 µg/min

Nitric oxide response is blunted in patients with insulin resistance, contributing to hypertension.

Impaired glucose tolerance and diabetes mellitus occur secondary to prolonged compensatory hyperinsulinemia and secondary pancreatic fatigue. Low-density lipoprotein cholesterol is raised through the stimulatory effect of insulin on HMG Co A reductase.

### Polycystic ovarian syndrome

Polycystic ovarian syndrome (PCO) often presents with:

- infertility,
- acne,
- oligomenorrhea,
- excess hair growth and
- frontal alopecia.

PCO affects up to 10% of women and is mainly a clinical diagnosis. Ninety per cent of women with irregularly irregular periods will have PCO. It should be considered in any of the above presenta-

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Table 2

### The effects of omega-3 and 6 fats directly and indirectly through actions of eicosanoids

- Sudden cardiac death is reduced by 45% with omega-3 fats [*Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto Miocardico* (GISSI), Diet After Reinfarction Trial (DART)]
- Attention deficit hyperactivity disorder, Alzheimer's disease, bipolar affective disorder, depression and alcoholism associated with low levels of docosahexaenoic (DHA)
- Placental DHA necessary for fetal neural/retinal development
- Acetylsalicylic acid lowers myocardial infarction (MI), but is associated with higher fatality, possibly due to proarrhythmic effect of arachidonic acid
- EPA, DHA do not lower risk of MI, but lower death rates via antiarrhythmic effects
- ALA, DGLA may lower MI rates via anti-inflammatory properties
- ALA, DGLA may benefit patients with any inflammatory disease (rheumatoid arthritis, SLE, RAD) via anti-inflammatory properties


EPA: Eicosapentaenoic acid                      SLE: Lupus  
 ALA: Alpha linolenic acid                      RAD: Asthma  
 DGLA: Dihomogammalinoleic acid

tions, especially in a woman with a WHR of > 0.8 or a family history of metabolic syndrome. Complications are cosmetic and the same as metabolic syndrome. Treatment is a low glycemic index diet, weight loss, exercise and medication as a last resort.

### Eicosanoids and fatty acid metabolism



Eicosanoids are comprised of prostaglandins, thromboxanes and leukotrienes, which affect all aspects of health and are derived from fatty acid metabolism (Figures 1 and 2). Patients need to increase omega-3 (non-animal: flax, walnuts; animal: fish), omega-6 (borage and primrose oil, nuts and seeds) and to reduce transfats (processed/packaged foods).

Table 1 reviews the effect of dietary fats on cholesterol and Table 2 reviews the effects of omega-3 and 6 on health and disease. 

### Take-home message



Food quantity affects weight and food quality affects health. Some basic recommendations you can make to your patients to improve their health and lose fat mass are:

- Be realistic and ready
- Keep a food diary to help provide awareness
- Balance each meal to provide low-calorie, high-nutrition food
- Eat lean protein-fish (12 oz/week), chicken, veal, and pork
- Increase low-glycemic index and low-calorie carbohydrate (fruits, vegetables, whole grains) intake
- Increase omega-3 (flax 2 tbsp/day), omega-6 (borage or primrose oil up to 2.8 g/day) and monounsaturated fat (olives, nuts, avocado) intake
- Take a vitamin D3 supplement from October to March, 1,000 IU/day
- Consider gluten avoidance for patients with eczema/inflammatory states and "functional" complaints