

**Short Communication**

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## Tailoring dietary fiber intake to the individual needs

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### Introduction

Recommended dietary fiber intakes are meant for the general population. There are, however patients who may need individualized fiber plans, as too much or too little fiber can be detrimental to their health.

### Types of fiber:

1. Nonfermentable or Insoluble: These include lignin, cellulose, and hemicelluloses. These act to increase fecal bulk and decrease intestinal transit time. They are found in all plants, whole grains, wheat, wheat bran, wheat products, rye, rice, and vegetables.
2. Viscous or Soluble: These include pectins, gums, mucilages, and some hemicelluloses. They act to delay stomach emptying and slow glucose absorption, and they can lower blood cholesterol. They are found in citrus fruits, apples, bananas, oat products, carrots, barley, beans, and in thickeners added to foods.
3. Functional Fibers: Fibers added to foods to provide health benefits.
4. Prebiotics: A category of functional fibers, which includes a group of short-chain carbohydrates or oligosaccharides that are resistant to digestion, but fermented by bacteria in the colon. They are thought to stimulate the growth or activity of beneficial bacteria in the large intestine and therefore promote the host's health. [4]

### Benefits of fiber:

**Maintaining bowel regularity:** Thereby decreasing constipation. Excessive pressure in the large intestine from constipation may lead to hemorrhoids or diverticula. If diverticula is asymptomatic, as is the case in 80% of affected people, it is called diverticulosis, if it is inflamed and painful it is known as diverticulitis. If diverticulitis occurs, intake of fiber should actually be reduced to limit further bacterial activity. Once the inflammation subsides, a high-fiber diet is resumed to ease stool elimination and reduce the risk of a future attack.

**Weight control:** The bulky nature of high-fiber foods requires

more time to chew, satisfies us and fills us up without yielding many calories.

**Treatment of diabetes:** Consuming large amounts of viscous fibers, such as oat fiber, slows glucose absorption from the small intestine, and so contributes to better blood glucose regulation, and decrease in insulin. In fact, adults whose main carbohydrate sources are low-fiber foods are much more likely to develop diabetes than those who have high-fiber diets.

**Reducing blood cholesterol:** Reducing blood cholesterol and possibly reducing the risk of cardiovascular disease and gallstones. This is because a high intake of viscous fiber inhibits absorption of cholesterol and cholesterol-rich bile acids from the small intestine. Also, the beneficial bacteria in the large intestine degrade soluble fiber and produce certain fatty acids that probably reduce cholesterol synthesis in the liver. In addition, one of the effects of insulin is to stimulate cholesterol synthesis in the liver, so the reduction in insulin may contribute to the ability of viscous fiber to lower blood cholesterol.

**Decreasing incidence of colon cancer:** Many population studies have shown a link between increased fiber intake and a decrease in colon cancer development. The health benefits to the colon that arise from a high-fiber diet are partially due to the nutrients that are commonly present in most high-fiber foods, such as vitamins, minerals, phytochemicals, and in some cases essential fatty acids. Thus, it is more advisable to increase fiber intake using fiber-rich foods, rather than relying on fiber supplements.[1]

### How much fiber do we need?

The Adequate Intake of fiber for adults is 25 grams per day for women and 38 grams per day for men. The goal is to provide at least 14 grams per 1000 kcal in a diet. After age 50, the Adequate Intake falls to 21 grams per day and 30 grams per day, for women and men, respectively.

The Daily Value used for fiber on food and supplement labels is 25 grams for a 2000 kcal diet.[4]

Following a diet which meets the fiber recommendations is possible and enjoyable if you incorporate plenty of whole-wheat bread, fruits, vegetables, and beans.

However, the fiber recommendations above are for normal healthy individuals only! Some patients need tailored fiber intakes. According to their condition, some patients need high fiber diets, while others actually require low fiber diets.

**High-Fiber Diets.** High-fiber diets are those containing 30 grams or more dietary fiber. They are believed to help prevent constipation, diverticulosis, hemorrhoids, and colon cancer. They also are helpful in the treatment of diabetes mellitus and atherosclerosis. It is currently estimated that most people get only about 11 grams of dietary fiber each day. A high-fiber diet is often 25 to 35 grams and should not exceed 50 grams a day. The recommended foods for this diet include coarse- and whole-grain breads and cereals, bran, all fruits and vegetables (especially raw), and legumes. Milk, meats, and fats do not contain fiber. A high fiber diet is nutritionally adequate. [2]

When implementing a high fiber diet, two precautions must be taken:

1. High-fiber diets must be introduced gradually to prevent the formation of gas and the discomfort that accompanies it.
2. Eight 8-ounce glasses of water also must be consumed along with the increased fiber.

**Very high fiber diets.** Very high intakes of fiber, for example 60 grams per day, should be followed only under the guidance of a physician. Increased fluid intake is extremely important with these diets.

#### **Problems with High-Fiber Diets:**

1. Inadequate fluid intake can cause severe constipation and may even contribute to blockages in the intestine, requiring surgery.
2. A high fiber diet may also decrease the availability of nutrients. Certain components of fiber may bind to essential minerals, keeping them from being absorbed. For example, Zinc and iron absorption may be hindered.
3. In children, a very high fiber intake may reduce overall calorie intake, because fiber can quickly fill a child's small stomach before food intake meets energy needs.[1]

**Fiber-Restricted diets.** Diets of 5 to 10 grams of dietary fiber a day are intended to reduce the normal work of the intestines by restricting the amount of dietary fiber and reducing food residue. Fiber restriction is recommended during acute phases of intestinal disorders, as ulcerative colitis, when the presence of fiber may exacerbate intestinal discomfort or cause diarrhea or blockages. Fiber-restricted diets are used before some surgeries to minimize fecal volume and after surgeries, especially gastrointestinal surgery, during transition to a regular diet.

Fiber-restricted diets often eliminate or restrict whole-grain breads and cereals, nuts and seeds, raw and dried fruits, berries, dried beans and peas, chunky peanut butter, winter squash, and most

raw vegetables.[4,5]

**Low-Residue diets.** When even greater reductions in colonic residue are required, this can be achieved by following a low-residue diet, although the terms "low-fiber diet" and "low residue diet" are often used interchangeably. Low residue diets may be used in cases of severe diarrhea, diverticulitis, ulcerative colitis, and intestinal blockage and in preparation for and immediately after intestinal surgery. In some facilities, these diets consist of foods that provide no more than 3 grams of fiber a day and that do not increase fecal residue. A low- residue diet excludes, in addition to, most fruits and vegetables, foods high in resistant starch, milk products that contain significant lactose, and foods that contain fructose or sugar alcohols (such as sorbitol). These foods contribute to colonic residue because some of their nutrients may be poorly digested (such as the lactose in milk) or poorly absorbed, example, sorbitol and fructose.

Some foods that do not actually leave residue in the colon are considered low-residue foods because they increase stool volume or provide a laxative effect. Milk and prune juice are examples. Milk increases stool volume, and prune juice acts as a laxative. [4,3]

Some foods to be allowed in low residue diet plans include eggs, soup broth, meats, chicken, fish and other proteins, carbonated beverages, tea, coffee, custards, cottage cheese, ice cream, refined carbohydrates as macaroni, pasta, white rice and crackers, cakes and cookies.

Note that low residue diets should only be followed for limited periods of time, or else they must be supplemented to avoid nutritional deficiencies.

#### **Conclusion**

It is very important that the patient's condition must be fully understood, before any dietary fiber recommendations can be given. Also, complete follow up of the patient is vital to reveal any possible complications or deficiencies, and to deal with them accordingly.

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