



Celiac Disease and the Gluten-Free Diet

Celiac Disease is an autoimmune disorder affecting 1 in every 133 not at risk Americans. The incidence is substantially higher in the at risk populations¹.

Celiac Disease, though considered a rare disorder, is more common than Crohn's Disease, Ulcerative Colitis and Cystic Fibrosis combined.

The onset of the disease can occur at any age and affects both sexes.

The only treatment for Celiac Disease is a strict Gluten-Free Diet for life.

This presentation is designed to increase awareness of Celiac Disease by offering information about symptoms, diagnosis and dietary treatment.

The material contained in this presentation is for information purposes only and should not substitute for the care and guidance of a medical practitioner.

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Description

Celiac Disease (also known as celiac sprue or gluten sensitive enteropathy) is a life-long digestive disorder found in genetically susceptible individuals. Damage to the intestine is caused by an immunologically toxic reaction to ingested gluten.

Gluten is a common food protein found in grains such as wheat, rye, barley, triticale, spelt, and kamut. Oats are also included with the gluten containing grains because of the difficulty in obtaining pure oats free of other gluten containing grains.

When individuals with Celiac Disease consume foods containing gluten, they have an autoimmune reaction, causing the villi in the gut (the hair-like projections) to become inflamed. The villi become flattened and disappear. This prevents proper absorption of food nutrients including proteins, carbohydrates, fats, vitamins, and minerals, leading to serious health problems.

Some people are asymptomatic or demonstrate no active disease for many years, only discovering the disease after a traumatic experience such as childbirth, surgery, severe emotional distress or severe infection.

If left untreated, Celiac Disease can lead to other life threatening disorders.

Brief History

The origin of Celiac disease is not known. It is, however, described as a true autoimmune disease for which the genetic predisposition (HLA), the exogenous trigger (gluten), and the autoantigen (tTG) are knownⁱⁱ.

It is now evident that Celiac Disease is the result of an inappropriate T cell-mediated immune response against ingested gluten.ⁱⁱⁱ

Celiac disease is one of the most common genetically mediated autoimmune diseases known.

Chromosome 6

Though the exact cause of Celiac Disease is unknown, research indicates that it is strongly related to a group of genes on Chromosome 6.

These genes are involved with regulating the bodies' immune response to gluten proteins. These genetic markers are present in 95% of people with Celiac Disease.^{iv}

Symptoms:

The symptoms of Celiac Disease can be vague and varied and often mimic symptoms of other diseases. Some people display no apparent symptoms of the disease. Diagnosis is frequently the result of identifying the cause of some seemingly unrelated condition.

Symptoms can include:

Abdominal cramping	Easy bruising of the skin	Malnutrition
Anemia	Edema of the ankles and hands	Mouth ulcers
Arthritis	Extreme weakness and fatigue	Nausea and vomiting
Bone and joint pain	Infertility, amenorrhea, impotence	Osteopenia/osteoporosis
Depression	Intestinal gas and bloating	Steatorrhoea
Dermatitis Herpetiformis	Lactose intolerance	Vitamin deficiencies
Diarrhea and/or constipation	Loss of sensation or neuropathy	Weight loss or gain

And additionally in children:

Abdominal distension	Failure to thrive	Short stature
Delayed puberty	Learning difficulties	
Dental abnormalities	Severe irritability	

Many of these symptoms are not seen as gut related and are often confused with other conditions.

Celiac Disease is frequently misdiagnosed as:

Allergies	Crohn's disease	Lactose intolerance
Anemia	Diverticulosis	Spastic colon
Chronic fatigue syndrome	Gallbladder disease	Stress
Colitis	Irritable bowel syndrome	Viral gastroenteritis

Untreated Celiac Disease

Untreated Celiac Disease can result in a number of other disorders including:

Central and peripheral nervous system disorders	Other food sensitivities
Internal haemorrhaging	Tooth enamel defects
Intestinal lymphoma	Vitamin and mineral deficiencies
	Iron deficiency (anemia)
	Osteoporosis

Celiac Disease can occur more frequently with other diseases and conditions including:^v

Addison's disease	IgA deficiency	Thyroid disease
Autoimmune hepatitis	Sarcoidosis	Type I diabetes
Down's syndrome	Sjogren's syndrome	Turner syndrome
Epilepsy	Systemic lupus erythematosus	William's syndrome

Diagnosing Celiac Disease

Screening with the use of **Blood Tests**

Antibodies are produced by the immune system as a response to ‘threatening’ substances. Research shows that people with Celiac Disease have higher than normal levels of these antibodies.

A number of serologic tests can assist in preliminary screening for Celiac Disease.^{vi}

Either Serum IgA-endomesial antibody testing (IgA-EMA)

Or Serum IgA-tissue transglutaminase testing (IgA-tTG)

Plus Total serum IgA

Tests should be done before and after starting a gluten free diet. These tests are not absolute and it is recommended that a patient have a **small bowel biopsy** to confirm results and assess the extent of damage to the small bowel.

Intestinal Biopsy

To confirm diagnosis, an upper intestinal endoscopy must be performed. The biopsy samples are thoroughly examined to assess damage to the villi.

The patient must then be placed on a gluten-free diet. Favourable response to the gluten-free diet is evaluated in the follow-up care provided by the physicians.

Though many people still experience delays in diagnosis, increased awareness of the now apparent high incidence of Celiac Disease, the greater understanding of the broad range of often vague symptoms, combined with better screening tools have made it easier to diagnose Celiac Disease.

It is strongly recommended that the gluten-free diet never be started without an accurate diagnosis by health care professionals.

It is also recommended that all first degree relatives of a person with biopsy proven Celiac Disease be tested for Celiac Disease.

What is Gluten

Gluten refers to several different cereal grain storage proteins, or prolamins. These include gliadin in wheat, secalin in rye and hordein in barley.^{vii}

The average non-Celiac person consumes between 10 and 40 grams of gluten daily (based on the average amount of gluten contained in a piece of whole wheat bread and a serving of pasta). Amounts of gluten as small as 0.1 gram per day or the amount in 1/48 of a piece of bread have been known to cause intestinal damage in people with Celiac Disease (as demonstrated by biopsy).

The Gluten-Free Diet

Currently, the only treatment for Celiac Disease is life long adherence to a gluten-free diet. When gluten is removed from the diet, the small intestine begins to heal and normal absorption of nutrients is restored.

Adapting to a gluten-free diet can be challenging. Gluten may be present in many foods, medications, nutritional supplements, seasonings and beer. Learning to read product labels is imperative in order to identify any potential gluten content and to avoid accidental ingestion of gluten.

When first diagnosed, the assistance of a qualified dietitian^{viii} and a Celiac Support Group^{ix} can make the transition to a gluten-free life style easier.

There are also a number of excellent books and web sites that provide accurate information on gluten-free foods and food preparation, as well as other resources useful to establishing a healthy gluten-free life style^x.

A gluten-free diet is very healthy. It must be adhered to life-long. There is a risk of some foods becoming contaminated with gluten, so care must be taken in handling foods. Research is necessary^{xi} to identify specific brands that are safe products for use in the gluten-free diet. Toll free numbers are available for many food manufacturers. Check product labels for current listings. Some toll free numbers are also available on the support group web sites.

When dining out, many restaurants carry ingredient lists which may assist in identifying gluten-free meal selections. Many restaurants^{xii} are also initiating the development of assured gluten-free menu selections.

Why stick to a gluten-free diet?

Intentional or unintentional ingesting of gluten, even in small amounts, will cause continued damage to the intestinal lining. Apparent symptoms may not be experienced. The bodies' ability to restore intestinal health is reduced. This continued damage can interfere with nutrient absorption and increase the risk of associated conditions.

THE SAFE GRAINS and FOODS

The following are safe grains and grain substitutes that can be milled into flour:

Amaranth	Dried Legumes	Potatoes	Tapioca
Arrowroot	Flax	Quinoa	Teff
Buckwheat	Millet	Rice	Wild rice
Cassava	Nuts	Sago	
Corn (Maize)	Poi	Sorghum	
Dahl	Polenta	Soy	

In addition, the gluten-free diet can include all fresh vegetables and fruits, eggs, cheese, fresh meats, poultry, fish and seafood, as well as foods made with safe grains and grain products.

UNSAFE GRAINS and GRAIN PRODUCTS DO NOT USE

Barley	Emmer	Malt Flavouring	Spelt (Dinkel)
Bulgur	Filler	Oats ^{xiii}	Triticale
Cereal binding	Farro	Oat gum	Wheat
Couscous	Graham flour	Roux	Wheat germ
Durham	Kamut	Rye	
Einkorn	Malt	Semolina	

These grains and grain products are used to produce many foods that are unsafe for people with Celiac Disease, including: breads, cakes, cereals, crackers, gravies, noodles, sauces, soups, beer and malt vinegar.

THE QUESTIONABLE PRODUCTS READ ALL LABELS - USE WITH CAUTION

There are also many less obvious foods that **may** contain gluten, including:

Baking powder	Licorice and candies
Baked beans	Marinades and sauces
Beverage mixes	Modified food starch
Bouillon cubes	Pilaf mixes
Cheese spreads	Processed meats
Condiments	Puddings
Dried fruits	Rice and soy beverages
Dry roasted nuts	Salad dressings
Flavourings	Seasonings
Herbal teas	Seasoned fries
Hydrolysed plant/vegetable proteins (HPP/HVP)	Self basting poultry
Ice cream and yoghurt	Soups and broths
Icing sugar products	Soy sauce
Imitation seafood	Worcestershire sauce

It is important to check regularly with manufacturers to assure that products continue to be gluten-free.

Cross Contamination

Cross contamination occurs when gluten-free food comes in contact with food containing gluten, making it unsafe for use in the gluten-free diet. **Care must be taken to ensure that gluten-free foods remain gluten-free.**

Preventing Contamination and Cross Contamination of Gluten-Free Foods

When preparing a gluten-free meal, it is important to prevent contamination of the gluten-free foods with particles and residues from gluten-containing foods. Even small amounts of gluten can result in continued intestinal damage for people with Celiac Disease.

The Kitchen and Equipment

- Select a preparation area that is separate from other food preparation areas.
- Air-borne flour and other gluten-containing food particles can cause contamination of gluten-free foods. Minimize the use of fans during gluten-free food preparation. Cover all open food containers.

- Ensure all food preparation surfaces, cooking surfaces and cooking utensils have been thoroughly cleaned. This includes the counter top, meat slicer, grill surface, cutting boards, bowls, knives, utensils, thermometers and cleaning cloths.
- Use dedicated pots, pans, utensils, and cutting boards whenever possible to minimize the risks of cross-contamination.
- Rolled edge pans are easier to clean and ensure easier removal of gluten-containing particles.

Scrub with soap and water to ensure total removal of gluten-containing particles. Disinfect according to your current standards of practice.

The Staff

- Wash hands thoroughly before handling gluten-free foods and ingredients.
- Use sanitary gloves for food preparation and change them before handling gluten-free foods and ingredients.
- Ensure that the powder used in the gloves does not contain gluten. Even powder-free gloves may have trace amounts of powder. Check with the suppliers for any gluten content.
- Become knowledgeable about gluten-free and other special needs diets and menu selections.

Educational programs are offered through many of the local Chapters of the Canadian Celiac Association.

The Foods and Food Preparations

- Ensure all ingredients are gluten-free.
- **Check product ingredients regularly.** Manufacturers can change ingredients without notice.
- Ensure anti-caking and flow agents are gluten-free. Be aware that these agents may not be identified in the list of ingredients. Check with suppliers.
- Use boldly labelled, separate, airtight containers for all food products designated as gluten-free.
- Prepare gluten-free meals before other menu selections.
- Clean utensils must be used for each condiment, butter, sauce and all other items. Do not use any utensil in more than one food item. The thermometer must be cleaned before checking temperatures and between use in each different product.
- Use individual portions and/or squeeze bottles for condiments to prevent contamination.
- Deep fryer oil previously used for gluten-containing foods is unsafe for gluten-free cooking.
- Fresh water must always be used for boiling, poaching or steaming.
- When oven space is shared, use the top oven racks for cooking gluten-free foods. This helps to prevent gluten-containing particles from falling or dripping into gluten-free foods.
- Use caution with or avoid the use of convection ovens because of the risk of air-borne gluten-containing particles.

- Use toaster bags to prevent contamination of gluten-free bread products in toasters and toaster ovens.

Other Considerations

- Arrange buffet tables with gluten-free selections first and separated from the gluten-containing selections. Label the gluten-free foods. This minimizes the risk of serving spoons being interchanged amongst containers which can result in the contamination of the gluten-free selections.
- Bulk bins can be a source for cross contamination. Scoops may have been interchanged, carrying gluten-containing particles and residues with them.

The accidental ingestion of gluten does not create the profound anaphylactic response that is common with peanuts and other allergens. As unpleasant as the upset can be, it does not cause a life threatening allergic response. Though many individuals will have immediate intestinal or other types of symptoms, the effects are more likely to be cumulative and can lead to other medical conditions.

In addition to the footnotes, this material is compiled from the additional resources noted.^{xiv}

ⁱ At risk populations include: first degree relatives 1 in 22; second degree relatives 1 in 39; symptomatic individuals 1 in 56.

Alessio Fasano, MD et al: Prevalence of Celiac Disease in At-Risk and Not-at-Risk Groups in the United States

ⁱⁱ Alessio Fasano, MD and Carlo Catassi, MD: Current Approaches to Diagnosis and Treatment of Celiac Disease: An Evolving Spectrum

ⁱⁱⁱ Current Approaches to Diagnosis and Treatment of Celiac Disease: An Evolving Spectrum

^{iv} Anshu Srivasta, MD and J. Decker Butzner, MD, FRCP(C): Genetics and Screening of Celiac Disease

^v Genetics and Screening of Celiac Disease

^{vi} Genetics and Screening of Celiac Disease;

Colin C. Barker, MD and J. Decker Butzner, MD, FRCP(C): Screening for Celiac Disease, An Idea Whose Time Has Come

^{vii} Shelley Case, Dietitian: Gluten-Free Diet, A Comprehensive Resource Guide

^{viii} Your physician can arrange for a consultation with a registered dietitian

^{ix} Celiac support groups are available throughout Canada and the USA

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Web: <http://www.celiaccenter.org>

^x <http://www.glutenfree.com>

Canadian Celiac Assoc. Edmonton Chapter
Web: www.celiac.edmonton.ab.ca

Celiac Canada
Web: www.penny.ca; GF Product Lists under Health or Food Headings.

Shelley Case, RD
Web: www.glutenfreediet.ca

Celiac Kids (Danna Korn)
Web: www.celiackids.com

Westchester Celiac Sprue Support Group
Web: www.glutenfreerestaurants.org

^{xi} Many retailers will provide lists of their gluten free products.

^{xii} A list of Celiac friendly restaurants is available on our web site <http://www.calgaryceliac.com>

^{xiii} Oats are currently excluded from the gluten free diet because of the high risk of contamination from gluten containing grains.

^{xiv} Canadian Celiac Association: New Member Kit

CCA: Celiac Disease – Hidden and Dangerous