Canadian Celiac Association
5170 Dixie Road, Suite 204
Mississauga, ON, L4W 1E3
1-905-507-6208
This form is available on www.CeliacGuide.org.

Nutrition Complications for Celiac Disease

Nutritional Consideration	Comments	Counselling Suggestions
Iron Deficiency Anemia	• Iron deficiency anemia is common with celiac disease. • In the 2007 Canadian Celiac Health Survey, 49% of respondents reported that they had been diagnosed with iron deficiency anemia prior to the diagnosis of celiac disease (1). • Celiac disease should be considered in the differential diagnosis of unexplained iron deficiency anemia (4). • Iron deficiency will persist until gut morphology is restored and iron stores are replenished (5-7). • Long-term follow-up of serum ferritin in clients with celiac disease is helpful to determine if iron deficiency has resolved completely (8).	• Treatment with a strict gluten-free diet, with special attention to iron rich foods should correct iron deficiency. • Optimize dietary sources of iron with: • **Heme iron sources:** meat, fish, poultry. • **Non-heme iron sources:** nuts, seeds, legumes, dark green vegetables dried fruits (apricots, prunes, raisins), eggs, amaranth, bean flours, quinoa, rice bran, soy flour, black-strap molasses, teff. • Combine non-heme iron sources with foods high in vitamin C to facilitate absorption – oranges, tangerines, tomatoes, bell peppers etc. • Short term gluten-free iron supplementation may be required in some clients (it is essential to recognize that iron supplements can cause side effects which include stomach discomfort and constipation).
Lactose Intolerance	• Lactose intolerance may occur temporarily in newly diagnosed patients as a result of damaged villi and decreased lactase production. • In the Canadian Celiac Health Survey, 26% of respondents reported it as symptom prior to diagnosis (1). • With a strict gluten-free diet, lactose intolerance symptoms should disappear within 6 months to one year (with the healing of the small intestine). If lactose intolerance persists, consider the possibility of primary lactose intolerance or hidden gluten in the diet.	• Start with a strict gluten-free diet and if symptoms persist, a temporary restriction of dietary lactose may be necessary (in addition to the gluten-free diet). • If a lactose-free diet is required consider: o Lactase enzyme drops or tablets as tolerated o Lactose-free (and gluten-free) beverages fortified with calcium, vitamin D and other nutrients • Once a client is asymptomatic, re-introduce lactose in small amounts to assess tolerance.

Adapted from: Case S, Kaplan CR. Gluten-Free Guidance: Practical Tips for Dietitians and their Celiac Patients. Today's Dietitian. March 2003: 44-49.:

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Osteopenia or Osteoporosis	• Early bone disease is common in both men and women with celiac disease due to malabsorption. In the Canadian Celiac Health Survey 9 % of respondents reported osteopenia and 26 % reported osteoporosis (1). • The high prevalence of osteoporosis in celiac disease warrants a Bone Mineral Density (BMD) be ordered at the time of diagnosis (9). • Vitamin D deficiency, which is common in celiac disease, needs to be treated to maintain serum 25-dihydroxyvitamin D levels in the target range (9). • Osteoporosis may persist even with strict adherence to the gluten-free diet (10-12). • A North American study found that osteoporosis and low BMD affected adults with celiac disease whether or not they followed a gluten-free diet (13). • Adult celiac patients on a gluten- free diet with adequate calcium intake for four years had reduced fractional calcium absorption and BMD compared with control subjects despite the remission in their clinical symptoms (14).	• Treatment with a strict gluten-free diet, with special attention to calcium and Vitamin D rich foods. • **Calcium rich sources**: milk, cheese, yogurt, gluten-free calcium fortified beverages (orange juice, gluten-free rice milk/ soy milk), broccoli, kale, turnip, mustard greens, bok choy, almonds, teff. • **Vitamin D rich sources**: milk, fatty fish (sardines, salmon, herring), fish oil, gluten-free vitamin D enriched beverages (soy, rice, orange juice), teff. • Gluten-free supplementation of vitamin D and calcium may be required with inadequate dietary intake. • Consider recommending yearly bone density as part of regular follow-up. • Encourage regular physical activity, with concentration on weight bearing exercises.
Folate Deficiency	• Folate deficiency may occur in severe cases of malabsorption. • It is important to assess folate intake and adherence to the gluten-free diet in women with celiac disease who are planning a pregnancy or who are pregnant.	• Treatment with a strict gluten-free diet, with special attention to folate rich foods. • **Folate rich sources**: legumes, green leafy vegetables, broccoli, asparagus, orange juice, liver, peanuts, walnuts, sesame seeds, sunflower seeds, bean flour, amaranth, flax. • Recommend enriched and whole grain gluten-free foods. • Gluten-free supplementation of folate is required in pregnancy. It may also be required with inadequate dietary intake.

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Vitamin B_{12} Deficiency	• Although celiac disease predominately affects the proximal bowel, vitamin B_{12} deficiency can occur in severe cases of malabsorption. Vitamin B_{12} nutritional status should be assessed before administering any therapies that provide additional folate / folic acid. • Deficiency should normalize with strict adherence to a gluten-free diet.	• Treatment with a strict gluten-free diet, with special attention to Vitamin B_{12} rich foods. • **B_{12} rich sources:** liver, eggs, milk, meat, poultry, fish, seafood. • Gluten-free supplementation of B_{12} may be required with inadequate dietary intake and strict vegan diet.
Diarrhea	• In the Canadian Celiac Health Survey, 76% of respondents reported diarrhea as a symptom prior to diagnosis. • Potential causes: 1) damaged villi; 2) malabsorption; 3) lactose intolerance.	• Treatment with a strict gluten-free diet. • Ensure adequate fluid and electrolyte intake. • Limit high simple sugar sources. • May need to limit gassy vegetables. • Lactose restriction may be beneficial in patients who have lactose intolerance (should be challenged at a later date to see if this has resolved).
Constipation	• In the Canadian Celiac Health Survey 32 % of respondents reported constipation as a symptom prior to diagnosis. • The gluten-free diet tends to be low in fibre; constipation may develop once the diet has been initiated.	• Treatment with a strict gluten-free diet, with special attention to fibre containing foods. • Ensure adequate fluid intake. • Gradually increase dietary fibre to minimize adverse gastrointestinal side effects. • **Sources of dietary fibre**: fruits, vegetables, raisins, nuts and seeds, legumes and beans, bean flours, flax, brown/rice/wild rice, corn bran, quinoa, amaranth, pure uncontaminated oats, teff.

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Growth Failure in Children	• In a recent Canadian Survey, 70% of children had poor growth and 18% had short stature prior to diagnosis. • Growth problems may occur when undiagnosed celiac disease interferes with nutrient absorption. • If children are diagnosed and treated early enough, catch-up growth is possible. • In rare cases of severe malabsorption and / or weight loss, children may benefit from supplemental nutrition (oral or enteral).	• Treatment with a strict gluten-free diet. • Aim for the achievement of appropriate weight for height. • Encourage intake of high calorie foods to promote growth and / or weight gain.
Calorie/Protein Deficiency	• Potential causes: 1) poor intake secondary to gastrointestinal symptoms (e.g. poor appetite, vomiting, diarrhea); 2) malabsorption.	• Treatment with a strict gluten-free diet. • Consider energy and/or protein boosting.
Calorie Excess and Overweight/Obesity	• Gluten-free prepared foods tend to be higher in fat, carbohydrates and calories and lower in fibre. • As the intestine heals, there is increased absorption of macronutrients. • Patients with celiac disease are at risk of becoming overweight.	• Treatment with a strict gluten-free diet. • Encourage general healthy eating. • Choose lower fat, high fibre (e.g., whole grain) gluten-free food alternatives when available. • Encourage appropriate serving sizes (according to Canada's Food Guide). • Encourage regular physical activity.
Vitamin deficiencies	• If patients with a history of steatorrhea and diarrhea, vitamin deficiencies may occur. • Bruising and / or hemorrhaging may be an indication of Vitamin K malabsorption.	• Treatment with a strict gluten-free diet. • Encourage enriched and whole grain gluten-free products. • Gluten-free multi-vitamin mineral supplements may be required with inadequate dietary intake.

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