Episode 96 – Eating Disorders: Part 2 November 10, 2023

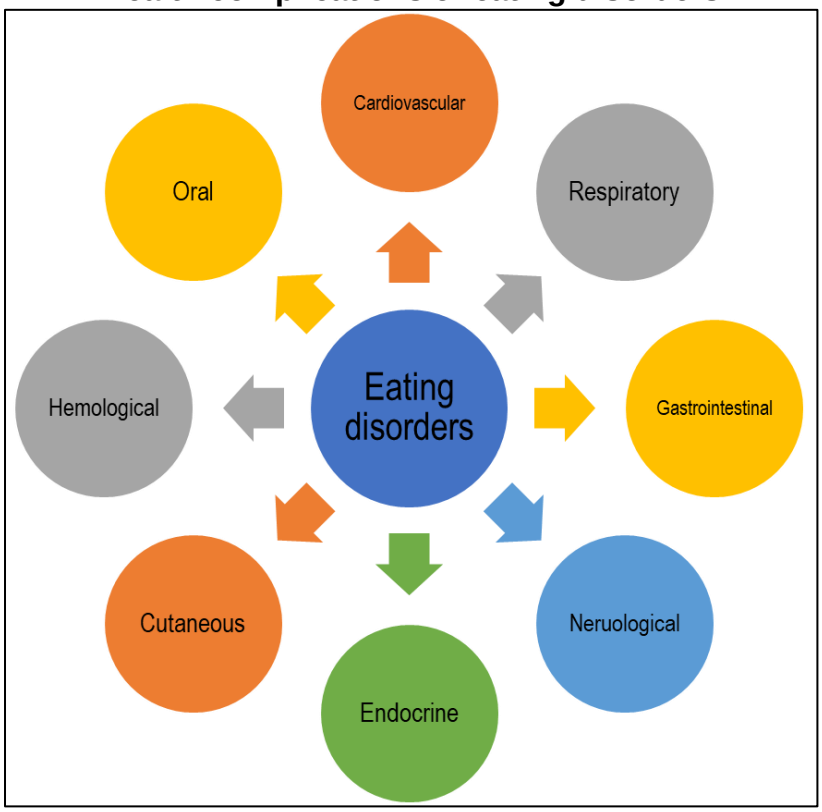
Introduction

Eating disorders are a range of conditions involving an obsession with food, weight, and appearance, which significantly impairs physical health, relationships, and day-to-day living.[1] They are among the most life-threatening mental health conditions[2], associated with significant morbidity and mortality. To be diagnosed with an eating disorder, an individual must have both disordered eating and psychological disturbance. [1] [2]

Health complications of eating disorders

Eating disorders can impact the whole body, leading to a myriad of adverse effects, including cardiovascular, respiratory, digestive, endocrine, and oral health complications.

Health complications of eating disorders



[1] Refer to Episode 95 for part one on eating disorders.
[2] Refer to Episode 88 for discussion on the relationship between mental health and oral health.

Cardiovascular complications

- When too few calories are consumed, the body breaks down tissue to use for fuel. Muscles are some of the first organs broken down, including the heart muscle. Heart rate and blood pressure will drop because the heart has insufficient energy to pump blood and fewer cells to pump with. The risk for heart failure rises as heart rate and blood pressure levels decrease.
- A slow pulse associated with an eating disorder (due to a malnourished heart), should not be confused with the slow pulse of an athlete, which is due to a strong, healthy heart. Thus, low heart rate may be a symptom of an eating disorder.
- Dehydration from vomiting, misuse of laxatives or diuretics, and excessive exercise can result in both resting and exertional sinus tachycardia, hypotension, and orthostatic hypotension.[3] This purging behaviour results in hypokalemia (low serum potassium), which can cause a prolonged QT interval, increasing risk for significant arrhythmias, syncope, and palpitations. The most severe type is Torsades de pointes, a specific type of ventricular tachycardia that can be fatal if untreated.
- Besides potassium, other electrolytes (e.g., sodium and chloride), can become imbalanced by purging or by drinking excessive amounts of water.[4] Electrolyte imbalances can lead to cardiac arrhythmias, heart failure, and death.
- Chronic use of syrup of ipecac[5] to self-induced vomiting can lead to toxic levels of the active ingredient emetine. Emetine toxicity can cause irreversible damage to cardiomyocytes (cardiac muscle cells) resulting in severe congestive heart failure, ventricular arrhythmias, and sudden cardiac death.[6] [3] [4]

Respiratory complications

- Increased risk of aspiration pneumonia, due to aspiration of regurgitated food from self-induced vomiting. Self-induced vomiting with aspiration should be considered in an otherwise healthy young adult with sudden onset respiratory distress and lower lobe opacities on chest radiography.
- Self-induced vomiting may cause pneumomediastinum, also known as mediastinal emphysema, a condition in which air is present in the mediastinum (the space between the lungs) caused by alveolar rupture due to retching. Pneumomediastinum usually causes severe chest pain below the sternum that may radiate to the neck or arms. The pain may be worse with breathing or swallowing. However, the condition may also be asymptomatic. [4] [5] [6]

[3] Orthostatic hypotension (also called postural hypotension) is a condition in which blood pressure suddenly drops when an individual stands up from a seated or lying position. It can cause dizziness, lightheadedness, blurred vision, weakness, confusion, and syncope. [42]

[4] Hyponatremia occurs when the concentration of sodium in blood is abnormally low. Causes may include chronic, severe vomiting or diarrhea; certain medications (e.g., diuretics); and drinking too much water. The main etiology is too much water, which dilutes sodium levels. As a result, water moves into the cells, causing them to swell. Swelling in brain cells can lead to confusion, seizures, coma, and death. [40]

[5] Syrup of ipecac is a medication previously used to treat acute toxic ingestions. It is no longer recommended for routine use in toxic ingestion. However, abuse of syrup of ipecac as a purgative in eating disorders is increasing. [39]

[6] Refer to Episodes 79, 80, and 81 for additional information on cardiovascular diseases.

Gastrointestinal complications

- Food restriction and/or purging by vomiting interferes with normal stomach emptying and nutrient digestion causing gastroparesis. Symptoms of gastroparesis include:
    - Nausea, vomiting, stomach pain, and bloating.
    - Feeling full after eating only small amounts of food.
    - Blood glucose fluctuations due to frequent changes in rate and amount of food passing into the small intestine.
    - Blocked intestines from bezoars,[7] which can be life threatening if the passage from stomach to small intestines is blocked.
- Constipation caused by:
    - Insufficient food in the intestines for the body to eliminate.
    - Weakened intestinal muscles from chronic inadequate nutrition leaving them depleted of strength to propel digested food out of the body.
    - Laxative abuse creating dependency to have a bowel movement.
- Although rare, binge eating can cause the stomach to perforate or rupture from acute gastric dilation, creating a life-threatening emergency. Symptoms include vomiting, abdominal pain, and bloating.
- Chronic self-induced vomiting and damage to the esophageal sphincters can lead to acidic gastric contents entering the upper gastrointestinal tract, which can manifest as gastroesophageal reflux and/or laryngopharyngeal reflux.
- Chronic gastroesophageal reflux (acid reflux) can damage the esophagus and lead to gastroesophageal reflux disease (GERD). Symptoms include heartburn, chest pain, regurgitation, acidic taste, belching, dysphagia (difficulty swallowing), and halitosis.[8] Other complications of chronic vomiting include dysphagia (difficulty swallowing), odynophagia (painful swallowing), esophagitis, esophageal erosions and ulcers, bleeding, and Barrett's esophagus. Barrett's esophagus is a risk factor for esophageal carcinoma.
- Laryngopharyngeal reflux occurs when regurgitated acidic contents come into contact with the vocal cords and surrounding areas, resulting in hoarseness, dysphagia, chronic cough, burning sensation in the throat, globus sensation (lump in the throat), chronic throat clearing, or repeated sore throats. Hoarseness may be a clinical indicator of an eating disorder involving self-induced vomiting, particularly in young individuals of normal weight or underweight status.
- Although rare, vomiting can erode the esophagus and cause it to rupture (i.e., Boerhaave syndrome), creating a life-threatening emergency. Symptoms include chest pain, dyspnea (shortness of breath), and the unique complaint of painful yawning in someone with tachypnea (rapid shallow breathing), tachycardia, and significant distress.
- Both malnutrition and purging can cause pancreatitis. Symptoms include pain, nausea, and vomiting.
- Intestinal obstruction caused by bezoars or ingested non-food items.

[7] Bezoars are tightly packed collections of partially digested or undigested material that can become stuck in the digestive tract, most commonly in the stomach. Most bezoars cause no symptoms. Bezoars are classified according to their composition. For example, phytobezoars (most common) are made of indigestible fruit/vegetable fibre, peels, and seeds; trichobezoars are made of hair; pharmacobezoars are made of indigested medications (e.g., antacids). [43] [44]

[8] Refer to Episode 67 for addition information on halitosis.

- Perforation the stomach or intestines caused by the ingestion of a non-food item.
- Intestinal infections from ingesting feces or dirt (e.g., toxoplasmosis, toxocariasis).
- Poisoning (e.g., heavy metal poisoning from ingesting lead-based paint). [3] [4] [7] [8] [9] [10] [11]

Neurological complications

- Dieting, fasting, self-starvation, and/or erratic eating deprives the brain from fuel, which can lead to obsessing about food and difficulties concentrating.
- Extreme hunger or fullness at bedtime can create difficulties falling or staying asleep.
- Severe vitamin B12 deficiency may damage nerves, causing paraesthesia (numbness, tingling) in the hands and feet, muscle weakness, loss of reflexes, difficulty walking, and confusion.
- Severe dehydration and electrolyte imbalances can lead to seizures and muscle cramps.
- If the brain and blood vessels cannot push enough blood to the brain, it can cause fainting or dizziness, especially upon standing (i.e., orthostatic hypotension).
- Individuals of higher body weight are at increased risk of sleep apnea. [3] [12]

Endocrine complications

- The body makes many of its required hormones with the fat and cholesterol from food. Without enough fat and calories in the diet, levels of hormones can fall, including estrogen, testosterone, and thyroid hormones.
- Lowered sex hormones can cause menstrual dysfunction (e.g., irregular menstrual cycles, amenorrhea).
- Lowered sex hormones can significantly increase bone loss (osteopenia and osteoporosis[9]), escalating risk of bone fractures.
- Reduced resting metabolic rate results from the body attempting to conserve energy.
- Over time, binge eating can potentially increase risk of developing insulin resistance, leading to type 2 diabetes.[10]
- Without enough energy to fuel metabolism, core body temperature will drop and hypothermia may develop.
- Starvation can cause high cholesterol levels, although this is not an indication to restrict dietary fats, lipids, and/or cholesterol. [3]

Cutaneous complications

Effects of malnutrition and starvation on the skin may include:

- Xerosis (dry skin), presenting as skin roughness, tightness, flaking, and scaling, which may be complicated by fissuring, pruritus (itching), and bleeding.
- Lanugo,[11] a layer of fine, downy hair, which the body grows to conserve warmth during periods of starvation; often found on back, abdomen, and forearms, but also on sides of the face.

[9] Refer to Episodes 41 and 42 for additional information on osteoporosis.
[10] Refer to Episodes 91, 93, and 94 for additional information on diabetes.
[11] Lanugo is present on the skin of fetuses and approximately 30% of newborns. In utero, lanugo protects skin from amniotic fluid, and promotes proper hydration, temperature regulation, and innate immune

- Pruritus has been associated with starvation and/or rapid weight loss but the pathomechanism remains unclear. Iron deficiency may be a contributing factor. Correcting existing nutritional imbalances by iron supplementation and appropriate weight gain may lead to symptom resolution. Since xerosis may be a contributing factor to pruritus, treating xerosis may also be helpful.
- Acrocyanosis, which is a bluish-dusky discolouration, most commonly affecting hands and feet, but may also affect the nose and ears. It is typically a sign of cold intolerance, possibly due to shunting of blood centrally in response to hypothermia. Cold intolerance may be secondary to a functional hypothyroid state.
- Carotenoderma (also called carotenosis or carotenemia), which is characterized by yellow pigmentation of the skin and increased beta-carotene levels in the blood. In eating disorders, carotenoderma may be due to a high-carotene diet, nutritionally related hypercholesterolemia, or altered vitamin A metabolism.
- Alopecia (hair loss), brittle hair, and/or hair hypopigmentation from malnutrition and/or thyroid dysfunction.
- Nail fragility. [1] [4] [13] [14] [15]

Other dermatologic findings include:
- Russell's sign, callous formation typically on the knuckles of the hands, from mechanically inducing vomiting by inserting fingers into the mouth, resulting in repetitive trauma and skin abrasions to the hand.
- Individuals with eating disorders are at increased risk for self-harming and body-focused repetitive behaviours, including skin cutting, superficial burning, onychophagia (nail biting), and trichotillomania (repetitively pulling out hair from scalp, eyebrows, eyelashes, or other areas). [3] [4] [16] [14] [15]

<u>Hematological complications</u>
- Severe malnutrition can decrease components of the blood resulting in anemia (low red blood cell count), thrombocytopenia (low platelet numbers), and leukopenia (low white blood cell count), increasing risk of infection.
- Iron-deficiency anemia develops when there is insufficient iron in the diet. Symptoms include fatigue, lightheadedness, weakness, dyspnea, chest pain, and cold hands and feet.
- Vitamin-deficiency anemia can develop when the diet contains too little vitamin B12 or B9 (folate). Symptoms include fatigue, dyspnea, weakness, arrhythmia, and paraesthesia in the hands and feet. [3] [17] [18] [19]

<u>Other health complications</u>
- Subconjunctival hemorrhage (ruptured blood vessels in the sclera of the eyes) from self-induced vomiting.
- Recurrent epistaxis (nosebleeds) from self-induced vomiting. Recurrent bouts of epistaxis should prompt inquiry about purging.
- Severe, prolonged dehydration can lead to kidney failure. [3] [4]

response. Babies typically shed lanugo before birth; however, some do not shed it for several weeks after birth. [41]

Oral health complications
Oral complications arising from eating disorders include glossitis, stomatitis, cheilitis, dental erosion, reduced salivary flow, tooth hypersensitivity, dental caries, periodontal disease, and xerostomia. [14]

Oral mucosa
Oral mucosal ulcerative lesions are usually related to self-induced vomiting habits, such as palatal or oropharyngeal trauma, produced by the finger or toothbrush to provoke vomiting.

Individuals with eating disorders exhibit a higher prevalence of dry lips, palatal tissue discoloration (orange-yellow palate), hemorrhagic lesions, lip-cheek biting, and burning tongue. [20]

Additional adverse effects include:
- Glossitis and/or stomatitis from vitamin B12 or B9 deficiency.
- Glossitis and angular cheilitis related to iron deficiency.
- Cheilitis and labial erythema from irritation due to self-induced vomiting.
- Increased risk of candidiasis from nutritional deficiencies or chronic hyperglycemia related to diabulimia. Additional complications related to chronic hyperglycemia include taste dysfunction; coated, fissured, or geographic tongue; recurrent aphthous stomatitis; oral lichen planus; oral potentially malignant disorders; and oral cancer.[12] [14] [21] [22] [23] [24]

Periodontium
Nutritional deficiencies can impact the periodontium. In particular, vitamin C deficiency can create a predisposition to periodontal diseases. This deficiency can cause defective collagen synthesis, which is associated with spontaneous gingival bleeding, ulceration, tooth mobility, and increased periodontal infections. Lack of other micronutrients (e.g., iron, calcium, zinc, selenium, magnesium, copper) may further impact periodontal health. [25]

Nutritional deficiencies may induce hematological disorders, in particular anemia, thrombocytopenia, leukopenia, and neutropenia. These factors can contribute to the onset of periodontal disease. [25]

Carbohydrates may form a higher proportion of total energy intake in individuals with eating disorders. A high consumption of sugar has been associated with gingival inflammation in adolescents and young adults. [20]

There are conflicting results in the literature regarding plaque control and gingival inflammation. Some studies have reported lower plaque indices, while other have reported higher plaque indices and gingival bleeding in individuals with eating disorders. Some individuals with eating disorders may show reduced interest in oral self-care due to depressive symptoms. However, a high frequency of toothbrushing (three times or

[12] Refer to Episode 94 for additional oral complications of chronic hyperglycemia.

more per day) has been repeatedly reported in individuals with eating disorders. [20] [25]

Gingival abrasion related to compulsive toothbrushing (i.e., extreme and frequent brushing) can result in multiple areas of gingival recession, especially in individuals with thin periodontal phenotypes. [20]

Individuals with anorexia and bulimia have an increased prevalence of gingival recession. A whitish appearance of the free gingival margin of the recession is frequently a sign of chemically induced tissue damage by intrinsic and extrinsic acids. Atypical locations such as the palatal surfaces of the upper molars are characteristic of chronic vomiting. The acid environment may amplify the pathogenesis of gingival recession in vomiting-associated eating disorders. [20] [26]

Dental erosion

Dental erosion refers to loss of tooth structure via a chemical process without bacterial involvement. Chronic self-induce vomiting causes persistent introduction of gastric acids (pH of ~1.5) into the oral cavity, resulting in dissolution of tooth enamel, which occurs when teeth are persistently exposed to a pH less than 5.5.

Teeth affected by dental erosion may differ between eating disorders. For example, palatal surfaces of maxillary teeth are often more affected by chronic vomiting beginning at the cingulum and expanding to the entire lingual surface of the anterior teeth. As duration of self-induced vomiting persists, erosive lesions become more severe, affecting the dentin, and palatal and occlusal surfaces of posterior maxillary teeth. Though mandibular teeth may also be affected, they are believed to be somewhat protected from gastric acids by the tongue. In addition, abrasion from toothbrushing is usually observed concomitantly when traumatic toothbrushing follows vomiting episodes.[13] Dental erosion from rumination often includes equal involvement of maxillary and mandibular teeth. [4] [14] [20]

Dental erosion may be apparent as early as six months after onset of regular self-induced vomiting. Rate and severity of erosion is determined by duration of illness, types of food consumed, oral hygiene, frequency of vomiting, and baseline quality of the tooth structure. Individuals with eating disorders typically select carbonated drinks with artificial sweeteners to control their appetite and weight, increasing the risk of erosion. Loss of tooth structure can lead to tooth sensitivity and discolouration. [4] [27]

The basic erosive wear examination (BEWE) index[14] is simple and reliable to use in daily practice to assess and monitor dental erosion. Erosive tooth wear can also be monitored by clinical photographs and/or intraoral scanners. [28] [29]

Chipped and fractured teeth and soft tissue trauma may occur from ingestion of non-food items associated with pica. [27]

[13] Refer to Episode 82 for additional information on tooth wear.
[14] Refer to Episode 82 for an overview on utilizing the BEWE index, including management of dental erosion according to BEWE risk level.

Dental caries

Increased frequency of dental caries has been reported with eating disorders. Risk factors include binging on high carbohydrate-content foods, multiple episodes of food intake, increased consumption of carbonated beverages, poor oral hygiene, acid exposure, hyposalivation, and xerostomia. [4] [20] [30]

Temporomandibular disorder

Loss of interarch contacts and a loss of vertical tooth height from dental erosion may lead to or contribute to temporomandibular disorders. [20]

Salivary glands

Sialadenosis (hypertrophy of the salivary glands) has been reported with self-induced vomiting. It is generally bilateral, only minimally tender, and can also occur when the individual stops vomiting. Parotid glands are most commonly involved, but submandibular enlargement may also be seen. Salivary gland enlargement has been correlated with elevated serum amylase levels. [3] [4]

Hyposalivation has been reported in individuals with eating disorders across comparative studies. Xerostomia is also a common side effect of many medications prescribed to treat eating disorders. Hyposalivation can contribute to halitosis, plaque accumulation, gingival inflammation, dental caries, and erosion. [20] [25]

Other oral complications include:

- Poor wound healing.
- Impaired immune functioning.

Oral health interventions

Frequently, individuals with eating disorders do not speak willingly about their disorder with oral health clinicians. Thus, good client communication in a nonthreatening manner is crucial to create a safe place for clients to disclose their eating disorder. [20] [31]

Toothbrushing is usually intense and frequent in individuals with anorexia and bulimia. It is used as a way to hide the aftermath of vomiting or as a way to provoke vomiting. Toothbrushing behaviour should be reviewed, with focus on less frequent brushing (twice daily is recommended), using proper technique and a fluoridated toothpaste (high fluoride may be required). A power toothbrush with a pressure monitoring system may help reduce aggressive brushing. Good oral self-care and frequent preventative oral healthcare appointments should be encouraged. [20]

Instead of brushing, advise rinsing with an acid-neutralizing solution (e.g., baking soda and water), plain water, or a mouth rinse with fluoride immediately after vomiting. Brushing should be delayed for at least an hour after vomiting. Use of a tongue cleaner to remove acid residue as soon as possible after vomiting is recommended. [20] [31]

Individuals at risk for dental erosion should use a high fluoride toothpaste. Regular fluoride toothpastes offer some degree of protection, especially stannous ion-containing

formulations, but effects of the active ingredients are sometimes counteracted by the presence of abrasives. [20] [32]

Treatment strategies for xerostomia should focus on reducing symptoms, increasing salivary flow, and preventing complications. Strategies include staying well hydrated, using sugar-free gum or mints (e.g., xylitol-sweetened), brushing with a fluoride toothpaste (e.g., high fluoride toothpaste), topical fluoride applications (e.g., fluoride varnish), nighttime use of bedside humidifier, and using mucosal lubricants, saliva substitutes, and salivary stimulants as required. [27]

Clients at high risk for caries should be informed about their risk factors, including those unrelated to eating disorders. Treatment options include brushing with a fluoride toothpaste, applying fluoride varnish, addressing oral self-care issues, reducing cariogenic food consumption, and instituting frequent recare appointments. [27]

Restorative treatment

Usually, aesthetic damage to the dentition is the primary reason for oral health consultation. The scope of the restorative treatment plan depends on the extent, severity, and depth of the lesions. A temporary treatment plan to stabilize the damaged dentition is usually recommended, since a favourable prognosis for permanent treatment cannot be attained before recovery from the binge-and-purge episodes. Mild cases, not involving a significant loss of hard tissue but painful due to enamel loss and dentin exposure, need an ultraconservative approach, such as the application of desensitizing agents and restorations with composite or glass ionomer cement, to reduce the hypersensitivity. [20]

Nonsurgical and surgical periodontal treatment

Control of local and systemic risk factors should be considered as part of the periodontal treatment. The therapeutic approach includes a phase of initial therapy with personal and professional biofilm control and re-evaluation. A phase of periodontal surgery aimed at root coverage and to increase the width of the gingiva may also be indicated after careful evaluation of the stage of progression of the disease. [20]

Treatment of eating disorders

There are many types of treatment to overcome an eating disorder. Some treatment services can only be accessed in person, while others are available online. Types of treatment include:

- Outpatient individual or group therapy for individuals who are medically stable (e.g., weekly therapy appointments).
- Day treatment programs, a form of outpatient care where the individual spends several hours at the program and eats meals there while still living at home. In Canada, these are often hospital-based programs.
- Professionally facilitated support groups.
- Peer support groups where all group members are going through similar situations and come together to support and empower each other.
- Self-help groups.

- Residential treatment programs for individuals who are medically stable but for whom outpatient or day treatment has been unsuccessful. Twenty-four-hour care is provided, with aspects of inpatient care incorporated into some sites.
- Inpatient treatment, which in Canada is a form of hospital-based care for individuals whose eating disorder symptoms require intensive medical interventions or monitoring. It is intended to be relatively short-term with the goal of stabilizing the individual's physical health so that they can continue treatment. [33]

Treatment approaches include:
- Psychoeducation, such as self-help resources and resources for families
- Nutritional counselling
- Psychotherapy, such as cognitive behavioural therapy (CBT) and interpersonal psychotherapy (IPT)
- Pharmacotherapy [1]

New research
There has been considerable growth in clinical trials using serotonergic psychedelics for various mental health conditions, including post-traumatic stress disorder (PTSD), substance use disorder, anxiety disorder, and major depressive disorder. Classical psychedelics include lysergic acid diethylamide (LSD), mescaline (also known as Peyote), psilocybin (magic mushrooms), and dimethyltryptamine (DMT). [34]

Psychedelic-assisted psychotherapy showed promise in treating various disorders (e.g., depression, anxiety, anorexia nervosa). Psychedelics were increasingly employed in psychiatry as late as 1970. However, following widespread recreational use and their subsequent classification as a controlled substance in 1970, open medicinal use stopped, and clinical studies of psychedelics were nearly absent until the mid 2000s. Since at least 2013, Health Canada has been granting exemptions for academic and medical institutions to conduct clinical trials involving psychedelics. [34]

In August 2020, Health Canada began exempting psilocybin therapy for individuals struggling with end-of-life anxiety and depression. This was the first-time non-study participants were legally permitted to use psilocybin in Canada since the substance's criminalization in 1970. [35]

Peck et al. (2023) from the University of California at San Diego studied the effects of synthetic psilocybin as a therapeutic in treating anorexia nervosa. Ten female participants in partial remission from anorexia received psilocybin therapy, which included psychological support by trained therapists. Psilocybin therapy was found to be safe and well-tolerated. Participants reported positive changes three months after dosing, with some demonstrating clinically significant reductions in eating disorder psychopathology. Some participants had a robust positive response to just a single-dose treatment. No serious adverse events were reported. However, randomized controlled trials are needed to establish the role of psilocybin in anorexia treatment. [36]

Currently, a multi-site phase 2 study is being conducted investigating the safety and feasibility of MDMA-assisted (methylenedioxymethamphetamine) psychotherapy for

eating disorders. The study is taking place in three research sites, Toronto, Ontario, Vancouver, British Columbia, and Denver, Colorado. [37] [38]

Take home messages

- Oral health practitioners may be the first to see signs of eating disorders during routine oral healthcare. Early identification, with appropriate referrals for diagnosis and treatment, is associated with fewer oral and systemic adverse effects and a more favourable prognosis.
- Multidisciplinary treatment is needed to treat eating disorders, this also includes oral health professionals. Close collaboration with the treatment team (e.g., psychiatrists, psychologists, registered dieticians, etc.) is important.
- Prevention of further systemic and oral complications requires correction of the underlying behaviours and eating disorders.
- Oral health professionals play a vital role in helping clients with eating disorders by providing preventive and therapeutic oral healthcare, which includes education and frequent follow-up.

References

[1] CAMH, "Eating Disorders," 2023. [Online]. Available: https://www.camh.ca/en/health-info/mental-illness-and-addiction-index/eating-disorders. [Accessed 2 October 2023].

[2] J. López-Gil, A. García-Hermoso, L. Smith, et al., "Global proportion of disordered eating in children and adolescents: A systematic review and meta-analysis," *JAMA Pediatrics,* vol. 177, no. 4, pp. 363-372, 20 February 2023.

[3] National Eating Disorders Association, "Health Consequences," 2022. [Online]. Available: https://www.nationaleatingdisorders.org/health-consequences. [Accessed 16 October 2023].

[4] P. Mehler and M. Rylander, "Bulimia Nervosa – Medical complications," *Journal of Eating Disorders,* vol. 3, article 12, pp. 1-5, 3 April 2015.

[5] A. Nitsch, M. Kearns and P. Mehler, "Pulmonary complications of eating disorders: A literature review," *Journal of Eating Disorders,* vol. 11, article 12, pp. 1-14, 30 January 2023.

[6] John Hopkins Medicine, "Pneumomediastinum," 2023. [Online]. Available: https://www.hopkinsmedicine.org/health/conditions-and-diseases/pneumomediastinum. [Accessed 16 October 2023].

[7] O. Dincel and M. Goksu, "Acute gastric dilatation due to binge eating may be fatal," *Northern Clinics of Istanbul,* vol. 4, no. 2, pp. 199-202, 2017.

[8] M. Dewangan, M. Khare, S. Mishra and J. Marhual, "Binge eating leading to acute gastric dilatation, ischemic necrosis and rupture –A case report," *Journal of Clinical & Diagnostic Research,* vol. 10, no. 3, pp. PD06-PD07, March 2016.

[9] R. Sanssone and L. Sansone, "Hoarseness: A sign of self-induced vomiting?," *Innovations,* vol. 9, no. 10, pp. 37-41, October 2012.

[10] Brown, J; Shermetaro, C, "Laryngopharyngeal Reflux," 19 December 2022. [Online]. Available: https://www.ncbi.nlm.nih.gov/books/NBK519548/. [Accessed 16 October 2023].

[11] Mayo Clinic, "Gastroparesis," 11 June 2022. [Online]. Available: https://www.mayoclinic.org/diseases-conditions/gastroparesis/symptoms-causes/syc-20355787. [Accessed 16 October 2023].

[12] L. Johnson, "Vitamin B12 Deficiency," Merck Manual Consumer Version, November 2022. [Online]. Available: https://www.merckmanuals.com/home/disorders-of-nutrition/vitamins/vitamin-b12-deficiency. [Accessed 16 October 2023].

[13] P. Mehler and C. Brown, "Anorexia nervosa – Medical complications," *Journal of Eating Disorders,* vol. 3, article 11, pp. 1-8, 31 March 2015.

[14] D. S. K. Zhang and B. Shields, "Cutaneous signs of malnutrition secondary to eating disorders," *Cutis,* vol. 111, no. 5, pp. 231-238, May 2023.

[15] A. Jaffe, L. McAliley and L. Singer, "Carotenemia in normal-weight bulimia: A finding unrelated to other physical manifestations of the syndrome," *International Journal of Eating Disorders,* vol. 6, no. 6, pp. 749-755, 1987.

[16] R. Strumia, "Skin signs in anorexia nervosa," *Dermato-Endocrinology,* vol. 1, no. 5, pp. 268-270, September-October 2009.

[17] M. Funayama, A. Koreki, Y. Mimura, et al., "Restrictive type and infectious complications might predict nadir hematological values among individuals with anorexia nervosa during the refeeding period: A retrospective study," *Journal of Eating Disorders,* vol. 10, article 64, pp. 1-11, 5 May 2022.

[18] National Heart, Lung, and Blood Institute, "Iron-Deficiency Anemia," 24 March 2022. [Online]. Available: https://www.nhlbi.nih.gov/health/anemia/iron-deficiency-anemia. [Accessed 16 October 2023].

[19] Mayo Clinic, "Vitamin deficiency anemia," 18 January 2022. [Online]. Available: https://www.mayoclinic.org/diseases-conditions/vitamin-deficiency-anemia/symptoms-causes/syc-20355025. [Accessed 16 October 2023].

[20] J. Rangé, P. Colon, N. Godart, et al., "Eating disorders through the periodontal lens," *Periodontology 2000,* vol. 87, no. 1, pp. 17-31, 2021.

[21] National Health Service, "Vitamin B12 or folate deficiency anaemia," 20 February 2023. [Online]. Available: https://www.nhs.uk/conditions/vitamin-b12-or-folate-deficiency-anaemia/. [Accessed 16 October 2023].

[22] B. Rohani, "Oral manifestations in patients with diabetes mellitus," *World Journal of Diabetes,* vol. 10, no. 9, pp. 485-489, 2019.

[23] American Dental Association, "Diabetes," 24 January 2022. [Online]. Available: https://www.ada.org/en/resources/research/science-and-research-institute/oral-health-topics/diabetes. [Accessed 31 August 2023].

[24] B. Landean, A. Hung and B. Bradshaw, "Support the Health of Patients With Type 2 Diabetes," *Dimensions of Dental Hygiene,* 2 December 2022.

[25] M. Monda, M. Costacurta, L. Maffei and R. Docimo, "Oral manifestations of eating disorders in adolescent patients. A review," *European Journal of Paediatric Dentistry,* vol. 22, no. 2, pp. 155-158, 2021.

[26] E. Paszynska, A. Hernik, H. Rangé and eta., "Diet traps during eating disorders among dentate patients at an oral health glance," *Nutrients,* vol. 15, no. 20, 18 October 2023.

[27] M. Azzam and C. Casa-Levine, "Oral effects of eating disorders," *Dimensions of Dental Hygiene,* vol. 20, no. 4, pp. 38-41, 7 April 2022.

[28] D. Bartlett, C. Ganss and A. Lussi, "Basic Erosive Wear Examination (BEWE): A new scoring system for scientific and clinical needs," *Clinical Oral Investigation,* vol. 12, no. suppl 1, pp. 65-68, March 2008.

[29] S. O'Toole, F. L. B. Marro and S. Mehta, "Monitoring of erosive tooth wear: What to use and when to use it," *British Dental Journal,* vol. 234, pp. 463-467, 24 March 2023.

[30] S. Kisely, H. Baghaie, R. Lalloo and N. Johnson, "Association between poor oral health and eating disorders: Systematic review and meta-analysis," *British Journal of Psychiatry,* vol. 207, no. 4, pp. 299-305, 2015.

[31] National Eating Disorders Association, "Dental Complications of Eating Disorders," 2022. [Online]. Available: https://www.nationaleatingdisorders.org/dental-complications-eating-disorders. [Accessed 16 October 2023].

[32] A. Lussi, M. Buzalaf, D. Duangthip, et al., "The use of fluoride for the prevention of dental erosion and erosive tooth wear in children and adolescents," *European Archives of Paediatric Dentistry,* vol. 20, pp. 517-527, 2019.

[33] National Eating Disoder Information Centre, "Types of Eating Disorders," 2022. [Online]. Available: https://nedic.ca/eating-disorders-treatment/. [Accessed 16 October 2023].

[34] S. Borgland and D. Neyens, "Serotonergic psychedelic treatment for obesity and eating disorders: Potential expectations and caveats for emerging studies," *Journal of Psychiatry & Neuroscience,* vol. 47, no. 3, pp. E218-E221, 15 June 2022.

[35] Green Economy Law Professional Corporation, "The War on Drugs," 2023. [Online]. Available: https://www.psychedeliclaw.ca/history. [Accessed 16 October 2023].

[36] S. Peck, S. Shao, T. Gruen, et al., "Psilocybin therapy for females with anorexia nervosa: a phase 1, open-label feasibility study," *Nature Medicine,* vol. 29, pp. 1947-1953, 24 July 2023.

[37] Government of Canada, "Clinical trials query results," 23 June 2023. [Online]. Available: https://health-products.canada.ca/ctdb-bdec/brand/?submissionNo=240088. [Accessed 16 October 2023].

[38] Multidisciplinary Association for Psychedelic Studies, "An Open-Label, Multi-Site Phase 2 Study of the Safety and Feasibility of MDMA-Assisted Therapy for Eating Disorders Timeline," 2022. [Online]. Available: https://maps.org/mdma/eating-disorders/news/. [Accessed 16 October 2023].

[39] T. Benzoni and J. Gibson, "Ipecac," National Library of Medicine StatPearls [Internet], 21 January 2023. [Online]. Available: https://www.ncbi.nlm.nih.gov/books/NBK448075/. [Accessed 29 October 2023].

[40] Cleveland Clinic, "Hyponatremia," 22 August 2022. [Online]. Available: https://my.clevelandclinic.org/health/diseases/17762-hyponatremia. [Accessed 29 October 2023].

[41] Cleveland Clinic, "Lanugo," 3 November 2022. [Online]. Available: https://my.clevelandclinic.org/health/body/22487-lanugo. [Accessed 16 October 2023].
[42] National Institute of Neurological Disorders and Stroke, "Orthostatic Hypotension," 20 January 2023. [Online]. Available: https://www.ninds.nih.gov/health-information/disorders/orthostatic-hypotension. [Accessed 16 October 2023].
[43] Z. Malik, "Bezoars," Merck Manual Professional Version, April 2023. [Online]. Available: https://www.merckmanuals.com/en-ca/professional/gastrointestinal-disorders/bezoars-and-foreign-bodies/bezoars. [Accessed 30 October 2023].
[44] M. Z, "Bezoars," Merck Manual Consumer Version, April 2023. [Online]. Available: https://www.merckmanuals.com/en-ca/home/digestive-disorders/bezoars-and-foreign-bodies-of-the-digestive-tract/bezoars. [Accessed October30 2023].

Client Resources

National Eating Disorder Information Centre (NEDIC)
NEDIC provides information, resources, referrals and support to anyone in Canada affected by an eating disorder. https://nedic.ca/

NEDIC Helpline: Phone toll-free at 1-866-633-4220 (1-866-NEDIC-20) or 416-340-4156 in GTA or email helpline at nedic@uhn.ca.
Live chat services are available (in EST):

- 9am – 9pm Monday – Thursday
- 9am – 5pm on Friday
- 12 – 5pm on Saturday and Sunday

Find a Provider for Professional Help
https://nedic.ca/find-a-provider/

Eating Disorders: Where to go when you're looking for help
https://www.camh.ca/-/media/files/education-2021/community-resource-sheets/eating-disorders-pdf.pdf

Eating Disorder Community Groups
https://nedic.ca/community-groups/

Related Programs and Services:

- Treatment at CAMH: Access CAMH
- Help for families from CAMH
- ConnexOntario
- Kids Help Phone at 1 800 668-6868

Acid Reflux and Oral Health, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Acid-Reflux.20.2.pdf

Enamel Erosion, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Enamel-Erosion.VFS21.13.pdf

Dry Mouth, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Dry-Mouth.VFS18-copyright.pdf

Fluoride, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Fluoride.VFS18-copyright.pdf

Brushing, Flossing, Rinsing, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Brushing-Flossing.14.1-copyright.pdf

Periodontal (Gum) Disease, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Gum-Disease.14.1-copyright.pdf

Tooth Decay (Caries), ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Tooth-Decay.14.1-copyright.pdf

Tooth Sensitivity, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Tooth-Sensitivity.VFS18-copyright.pdf

Xylitol and Oral Care, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Xylitol-copyright.pdf

Additional Resources

Eating Disorders, CDHO Factsheet, September 16, 2019
https://cdho.org/factsheets/eating-disorders/

Eating Disorders, CDHO Advisory, September 18, 2019
https://cdho.org/advisories/eating-disorders/

Eating Disorders, ODHA Dental Hygiene Resource Sheet
https://odha.on.ca/member-benefits/dental-hygiene-resource-sheets/

Anorexia nervosa – Medical complications, Mehler, P; Brown, C; *Journal of Eating Disorders*, Volume 3, Article 11, March 31, 2015, p 1-8
https://jeatdisord.biomedcentral.com/articles/10.1186/s40337-015-0040-8

Bulimia Nervosa – Medical complications, Mehler, Rylander, M; *Journal of Eating Disorders*, Volume 3, Article 12, April 3, 2015, p 1-5
https://jeatdisord.biomedcentral.com/articles/10.1186/s40337-015-0044-4

Pulmonary complications of eating disorders: A literature review, Nitsch, A; Kearns, M; Mehler, *Journal of Eating Disorders*, Volume 11, Article 12, January 30, 2023, p 1-14 https://jeatdisord.biomedcentral.com/articles/10.1186/s40337-023-00735-w

Cutaneous signs of malnutrition secondary to eating disorders, Zhang, D; Slaven, K; Shields, B. *Cutis*, Volume 111, Issue 5, May 2023, p 231-238 https://www.mdedge.com/dermatology/article/262701/hair-nails/cutaneous-signs-malnutrition-secondary-eating-disorders

Unveiling skin manifestations: Exploring cutaneous signs of malnutrition in eating disorders, Wani, M; Chakole, S; Agrawal, S; et al. *Cureus*, Volume 15, Issue 9, p 1-15 https://www.cureus.com/articles/181599-unveiling-skin-manifestations-exploring-cutaneous-signs-of-malnutrition-in-eating-disorders#!/

Skin signs in anorexia nervosa, Strumia, R; *Dermato-Endocrinology*, Volume 1, Issue 5, September-October 2009, p 268-270 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2836432/

Restrictive type and infectious complications might predict nadir hematological values among individuals with anorexia nervosa during the refeeding period: a retrospective study, Funayama, M; Koreki, A; Mimura, Y; et al. *Journal of Eating Disorders*, Volume, 10, Article 64, May 5, 2022, p 1-11 https://jeatdisord.biomedcentral.com/articles/10.1186/s40337-022-00586-x

Eating disorders through the periodontal lens, Rangé, H; Colon, P; Godart; et al. *Periodontology 2000*, Volume 87, Issue 1, August 31, 2021, p 17-31 https://onlinelibrary.wiley.com/doi/10.1111/prd.12391

Oral manifestations of eating disorders in adolescent patients. A review, Monda, M; Costacurta, M; Maffie, L; Docimo, R. *European Journal of Paediatric Dentistry*, Volume 2, Issue 2, 2021, p 155-158 https://www.ejpd.eu/pdf/EJPD_2021_22_02_13.pdf

Relationship between risk factors related to eating disorders and subjective health and oral health, Jung, E; Jun, M. *Children*, Volume 9, Issue 6, May 26, 2022, p 1-13 https://www.mdpi.com/2227-9067/9/6/786

Oral changes in pediatric patients with eating disorders, Lesar, T; Juras, D; Tomić, M; et al. *Acta Clinica Croatica*, Volume 61, Issue 2, August 2022, p 185-192 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9934042/

Oral effects of eating disorders, Azzam, M; Casa-Levine, C. *Dimensions of Dental Hygiene*, Volume 20, Issue 4, April 2022, p 38-41 https://dimensionsofdentalhygiene.com/article/oral-effects-eating-disorders/

Diet traps during eating disorders among dentate patients at an oral health glance, Paszynska, E; Hernik, A; Rangé, H; et al. *Nutrients*, Volume 15, Issue 20, October 19, 2023, p 1-18 https://www.mdpi.com/2072-6643/15/20/4414

Association between different dietary patterns and eating disorders and periodontal diseases, Casarin, M; da Silveira, T; Bezerra, B; et al. *Frontiers in Oral Health*, Volume 5, March 22, 2023, p 1-7 https://www.frontiersin.org/articles/10.3389/froh.2023.1152031/full

Oral health and individuals with a lived experience of an eating disorder: A qualitative study, Patterson-Norrie, T; Ramjan, L; Sousa, M; et al. *Journal of Eating Disorders*, Volume 11, Article 121, July 17, 2023, p 1-12 https://jeatdisord.biomedcentral.com/articles/10.1186/s40337-023-00841-9

Association between poor oral health and eating disorders: Systematic review and meta-analysis, Kisely, S; Baghaie, H; Lalloo, R; Johnson, N. *British Journal of Psychiatry*, Volume 207, Issue 4, 2015, p 299-305 https://www.cambridge.org/core/journals/the-british-journal-of-psychiatry/article/association-between-poor-oral-health-and-eating-disorders-systematic-review-and-metaanalysis/4DCA614AB4A471A480AFD934D89162DB

Oral cavity clinical evaluation in psychiatric patients with eating disorders: A case-control study, Szupiany-Janeczek, T; Rutkowski, K; Pytko-Polończyk, J. *International Journal of Environmental Research and Public Health*, Volume 20, Issue 6, March 8, 2023, p 1-17 https://www.mdpi.com/1660-4601/20/6/4792

Serotonergic psychedelic treatment for obesity and eating disorders: potential expectations and caveats for emerging studies, Borgland, S; Neyens, D; *Journal of Psychiatry & Neuroscience,* Volume 47, Issue 3, June 15, 2022, p E218-221 https://www.jpn.ca/content/47/3/E218

Psilocybin therapy for females with anorexia nervosa: A phase 1, open-label feasibility study, Peck, S; Shao, S; Gruen, T; et al. *Nature Medicine*, Volume 29, July 24, 2023, p 1947-1953 https://www.nature.com/articles/s41591-023-02455-9