From Research to Practice/Eating Disorders and Diabetes

In Brief

Disturbed eating behaviors are common in adolescent girls and young women; however, these behaviors are significantly more common in those with type 1 diabetes than in the general population. Long-term treatment of patients with eating disorders and type 1 diabetes (ED-DMT1) often occurs in outpatient settings. This article reviews the clinical issues and strategies relevant to the outpatient treatment of ED-DMT1.

Outpatient Management of Eating Disorders in Type 1 Diabetes

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Intensive inpatient programs that address the specific needs of patients with eating disorders and type 1 diabetes (ED-DMT1) are rarely available to patients and treatment teams. Such inpatient programs are described in detail in the article on p. 153 of this issue. However, the majority of patients with ED-DMT1 receive their care in outpatient settings. Outpatient treatment can vary from periodic consultations with an endocrinologist to weekly treatment with members of a multidisciplinary diabetes treatment team. This article will focus on the clinical issues and strategies relevant to treatment of ED-DMT1 within a broad range of outpatient settings and also aims to establish recommendations for optimal treatment in those outpatient settings where comprehensive resources are available.

Treatment Recommendations

A multidisciplinary team approach to treatment is considered the standard of care for both eating disorders and diabetes.1–3 When designed to treat patients with ED-DMT1, the team should ideally include an endocrinologist/diabetologist, a registered nurse, a registered dietitian with eating disorder and/or diabetes training, and a psychologist or social worker, also with eating disorder and/or diabetes training, to provide weekly individual therapy. Depending on the severity of related psychiatric symptoms such as depression and anxiety, a psychiatrist should also be consulted for psychopharmacological evaluation and treatment. Team members must be allowed to frequently and openly communicate with each other to maintain congruent treatment approaches, messages, and goals.

One of the most important aspects of treatment is for members of the treatment team to establish a positive rapport with patients such that patients know they are not going to be judged or subjected to unrealistic expectations. Because these patients often feel ashamed of their struggle with ED-DMT1, they need to learn to trust their treatment team to feel comfortable communicating openly and honestly about their status. When trust, understanding, and acceptance are established, patients may be more likely to engage in ongoing treatment.

Conducting an effective assessment of patients with ED-DMT1 is crucial to initiating treatment. Medication lists should be reviewed and updated and should include over-the-counter and herbal products, such as laxatives, diuretics, diet pills, and ipecac. Eating disorder patients are at high risk for using or abusing weight loss drugs. When patients indicate use of these medications, clinicians should ascertain how much and how often they are used. Clinicians should counsel patients about the dangers of these products.

The initial goal of treatment is to establish medical safety for patients. In fact, within the context of recurrent insulin restriction and severe hyperglycemia, the initial focus of treatment may be as small (but clinically meaningful) as the prevention of...
Table 1. Customizing Treatment Goals Based on Eating Disorder Diagnosis and Symptom Severity

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Concerns</th>
<th>MNT goals</th>
<th>Diabetes goals</th>
</tr>
</thead>
</table>
| Restriction of all foods; not interested in achieving or maintaining effective diabetes control | • Low body weight; often this population will set perfectionistic goals for their diabetes management once they do not have control of their food intake  
• Other medical concerns (e.g., lack of menses) | Short-term:  
• Weight status with goal range; usually BMI > 19 kg/m² with use of an eating disorders meal plan directed by an RD based on caloric needs  
• 3 meals/3 snacks usually warranted unless patient can get adequate calories into 3 meals | Long-term:  
• Intuitive eating patterns  
• Avoid focus on food labels |
| Perfectionism related to both food intake and diabetes care (e.g., not wanting blood glucose levels > 100 mg/dl) | • Overemphasis on perfect blood glucose control  
• Compulsive behaviors (e.g., SMBG 10–15 times per day or A1C in low-5% range)  
• Recurrent problems with severe hypoglycemia requiring the help of another person | Short-term:  
• Weight status within goal range; usually BMI > 19 kg/m² with use of an eating disorders meal plan directed by an RD based on caloric needs  
• 3 meals/3 snacks usually warranted unless patient can get adequate calories into 3 meals  
• Avoid focus on food labels, especially if this is a trigger for food restriction | Long-term:  
• Intuitive eating patterns |
| Restriction of certain food groups (e.g., carbohydrates or fats)       | • Patient is aware that carbohydrates are the nutrient that most directly influences blood glucose  
• Patient believes that either less insulin is better or that insulin will make him or her fat | Short-term:  
• Weight status within goal range; usually BMI > 19 kg/m² with use of an eating disorders meal plan directed by an RD based on caloric needs  
• 3 meals/3 snacks usually warranted unless patient can get adequate calories into 3 meals  
• Avoid focus on food labels, especially if this is a trigger for food restriction | Long-term:  
• Intuitive eating patterns |

future episodes of diabetic ketoacidosis (DKA). Patients should be educated about the signs and symptoms of DKA, as well as its medical seriousness. At a minimum, to be treated in an outpatient setting, patients should show that they can commit to routinely taking basal insulin doses for DKA prevention.

As treatment progresses, the American Diabetes Association (ADA) standards of care for diabetes and the goals of eating disorder treatment can be adapted to individual patients with ED-DMT1. This typically means that the treatment team must be willing to set small, incremental goals toward which patients feel they are
able to work. It is important to note that intensive glycemic management of diabetes is not an appropriate early treatment goal for people with ED-DMT1. In fact, aiming for near-normal glycemia too quickly can increase a patient’s risk of developing retinopathy or worsening a preexisting condition and exacerbate neuropathy pain. Therefore, the treatment team should establish a goal of gradually improving average blood glucose ranges over a period of months. Table 1 offers suggestions for customizing treatment goals based on symptom presentation.

We recommend that patients meet weekly with a mental health provider. At the start of treatment, in addition to weekly therapy, some patients may benefit from weekly meetings with

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</thead>
<tbody>
<tr>
<td>Binging and purging for weight control; no concerns about diabetes care</td>
<td>• Blood glucose control usually severely compromised</td>
<td>Short-term:</td>
<td>Short-term:</td>
</tr>
<tr>
<td></td>
<td>• Hypoglycemia can result from binging/purging</td>
<td>• Decrease time between meals and snacks; a schedule is very important for meals</td>
<td>• A schedule is very important for meals</td>
</tr>
<tr>
<td></td>
<td>• Coverage of binging/purging is often a “guess” resulting in over- or underestimation of insulin needs</td>
<td>• Avoid going extended periods without food; this can increase the episodes of binging and purging at night</td>
<td>• Insulin needs may require frequent adjustment as eating disorder symptoms improve</td>
</tr>
<tr>
<td></td>
<td>• Medical concerns with purging</td>
<td>• 3 meals/3 snacks with eating disorders meal plan needed until symptoms improve</td>
<td>• Make sure that insulin is taken before meals/snacks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Weight status within goal range; usually BMI &gt; 19 kg/m²</td>
<td>Long-term:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term:</td>
<td>• Consistent SMBG and insulin administration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intuitive eating patterns with consistent insulin administration</td>
<td>• A1C &lt; 7%</td>
</tr>
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<tr>
<td>Restriction of all or part of the prescribed insulin doses for weight control (Patients may require frequent lab tests or inpatient treatment if they cannot take enough insulin to avoid DKA)</td>
<td>• May be restricting short-acting insulin or long-acting insulin or a combination of both</td>
<td>Short-term:</td>
<td>Short-term:</td>
</tr>
<tr>
<td></td>
<td>• Patients with pumps may eliminate boluses or disconnect or turn off their pump for periods of time</td>
<td>• Weight status within goal range; usually BMI &gt; 19 kg/m² with use of an eating disorders meal plan directed by an RD based on caloric needs</td>
<td>• Safe blood glucose levels and absence of ketones</td>
</tr>
<tr>
<td></td>
<td>• Possible low body weight</td>
<td>Short-term:</td>
<td>• A1C within safe guidelines; discourage perfectionistic goals for A1C and pre- and postprandial SMBG</td>
</tr>
<tr>
<td></td>
<td>• Malnourished because of longstanding hyperglycemia</td>
<td>• Malnourished because of longstanding hyperglycemia</td>
<td>Long-term:</td>
</tr>
<tr>
<td></td>
<td>• Very limited or no SMBG because awareness of actual blood glucose levels serve as reminder of insulin needs</td>
<td>• Minimal SMBG because awareness of actual blood glucose levels serve as reminder of insulin needs</td>
<td>• Consistent SMBG and insulin administration</td>
</tr>
<tr>
<td></td>
<td>• Presence of ketones; possible DKA</td>
<td>Short-term:</td>
<td>• A1C &lt; 7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intuitive eating patterns with consistent insulin administration</td>
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</table>

DKA, diabetic ketoacidosis; MNT, medical nutrition therapy; RD, registered dietician; SMBG, self-monitoring of blood glucose.

Table 1. Customizing Treatment Goals Based on Eating Disorder Diagnosis and Symptom Severity, continued from p. 148
alternating members of the diabetes treatment team. Patients should be encouraged to bring diabetes self-care supplies such as their blood glucose meter to every appointment. Medical nutrition plans, diabetes medications, and diabetes self-care goals will need to be adjusted as patients continue through treatment; this will be done, in part, in response to changing blood glucose data from patients’ meters. As patients’ symptoms improve, less frequent follow-up will be necessary with members of the diabetes team. For example, patients may start treatment meeting monthly with an endocrinologist and move to appointments every 3–6 months as treatment progresses.

**Weight measurement**

At the start of treatment, weekly weight checks are recommended. Depending on availability, weight checks can occur with any member of the diabetes team or the mental health provider. Patients should get on the scale with shoes off and position themselves in a way that discoursages them from seeing their weight because knowledge of their weight changes can trigger an exacerbation of eating disorder symptoms. For patients who are underweight, the goal is weight restoration by 1–2 lb per week in the outpatient setting. For patients at a normal or above-normal weight, the goal is weight stability. Weight loss is not emphasized for patients with ED-DMT1 because weight loss preoccupation can also contribute to a worsening of eating disorder symptoms.

**Physical examination, vital signs, and laboratory measurements**

The physical examination begins with vital signs. Although most patients with ED-DMT1 do not typically have hypertension, blood pressure and pulse abnormalities may be associated with dehydration or autonomic neuropathy. Screening laboratory studies should be done in accordance with ADA guidelines. When clinicians are concerned about the possibility of electrolyte disturbances, a serum chemistry battery should also be completed.

During the physical examination, the skin should be checked for acrocyanosis, trauma, and necrobiosis diabeticorum. A neurological exam should be included to detect sensory or motor neuropathy, which are common among even young patients with ED-DMT1. Additionally, it is important to ask about vision changes, numbness, tingling, or weakness. Visual changes from ventricular edema are common in the early stages of treatment, as average blood glucose levels improve. Peripheral edema is also quite common at this stage and presents as a major challenge in treatment because of patients’ sensitivity to weight changes and changes in body shape.

It is also important to inquire about symptoms suggestive of gastroparesis, such as bloating, nausea, and excessive fullness. Many patients who have been restricting food have some degree of gastroparesis, but this is especially common and severe in patients with ED-DMT1 whose bodies have been exposed to long-term hyperglycemia.

Painful peripheral neuropathy may also develop or worsen as patients improve their diabetes control. As stated earlier, this is one of many reasons that tight glucose management should be avoided initially. A gradual decrease in average glucose over several months may decrease the severity of eye, gastrointestinal, and peripheral nerve symptoms and may even decrease the severity of edema.

**Diabetes medications**

Once fluid levels have stabilized and edema has resolved, patients’ ongoing concerns about weight gain must also be taken seriously by the treatment team. When patients attempt to lower their blood glucose ranges and experience unwanted weight gain, their frustrated attempts to lose the weight may again reinforce the utilization of insulin restriction for weight loss. As a result, it is important to address the rationale and patients’ feelings about weight gain during treatment.

It is important to note that insulin plans must be individualized for any patient with diabetes, including those with ED-DMT1. The most appropriate insulin plan should be determined on an individual basis, and clinicians should consider factors such as lifestyle, type of eating disorder behavior (i.e., insulin restriction vs. binging/purging vs. calorie restriction), and overall progress in treatment. Multiple daily insulin injections (i.e., basal/bolus or physiological insulin therapy) or the use of an insulin pump may afford patients the most flexibility in meal planning and precision of insulin dosing. However, these management plans may not be well-suited for ED-DMT1 patients who are still struggling with significant insulin restriction. In this situation, a transition to a split-mixed insulin plan or the use of a premixed insulin such as a 70/30 formulation may improve regimen adherence until these patients are ready for a more complex insulin plan.

**Medical nutrition therapy**

Nutrition and meal planning recommendations for diabetes are aimed at portion control of carbohydrates, which directly influence blood glucose concentrations. However, the constant focus on carbohydrate or caloric content can lead some diabetic patients to develop overly rigid, perfectionistic standards aimed at dietary restraint, a key precipitating factor in the cycle of binge eating and purging. Thus, medical nutrition therapy (MNT) should emphasize flexible and nondepriving approaches to eating that can be adopted by patients’ entire family for overall health and wellness.

Dietitians may be concerned that the nutrition education goals for effective diabetes management conflict with the nutrition education goals of eating disorder treatment. In reality, there is little conflict; the treatment aim for both conditions is to normalize eating and involves using the “total diet” approach. This approach focuses on “moderation and proportionality in the context of a healthful lifestyle, rather than specific nutrients or foods.”

There is little in the literature regarding appropriate meal plans for patients struggling with ED-DMT1; however, we recommend combining meal planning strategies appropriate for both conditions. Because most ED-DMT1 patients are malnourished from both inadequate nutrition and high glucose levels, it is important for them to get balanced nutrition while keeping their blood glucose levels as close as possible to the target goals established by their diabetes team. MNT goals are customized according to the type and the severity of patients’ eating disorder symptoms (Table 1).

As treatment begins, achieving adequate overall nutrition may need to take precedence over carbohydrate-counting approaches to diabetes management. It can be hard for patients who know how to count carbohydrates to make the transition to a meal plan prescribed to address eating disorders. Because of their eating disorder concerns,
patients may struggle with wanting to continue to restrict certain foods or categories of food (e.g., can only eat noncarbohydrate foods, can only eat 15 g of carbohydrate food at a time, or severely restrict fat intake).

Careful education is important to assist patients in moving toward accepting a more flexible meal plan with fewer rigid rules and unrealistic expectations. Patients who were originally taught to follow strict dietary plans to manage their diabetes may struggle with vivid memories of food restriction. For these complex reasons, ED-DMT1 patients may need ongoing encouragement to accept the new message that all foods can fit into a healthy meal plan.

**Aspects of mental health treatment: anticipating and problem-solving common hurdles**

Assisting patients in identifying, anticipating, and potentially problem-solving common challenges to their recovery ahead of time can help to solidify their working alliance with their treatment team and may decrease their risk of relapse or treatment drop-out. The following section is written with the expectation that comprehensive treatment of ED-DMT1 should optimally involve weekly treatment with a mental health professional. However, when access to mental health treatment is limited, some of these issues can be addressed by other members of the diabetes treatment team.

**Weight regain.** One of the first challenges most patients face early in treatment is weight gain associated with improving blood glucose levels. If they have been routinely restricting insulin and are dehydrated at the start of treatment, patients need to be alerted to the likelihood of developing fluid retention or edema. They should be warned that they may feel fat, bloated, and uncomfortable, but that this fluid retention is temporary and not the development of fat tissue. Encouraging intake of adequate fluid and limiting diuretics such as caffeine may be helpful in this situation.

Because these patients are sensitive to body shape and weight changes, edema right at the start of treatment is an enormous challenge for them. When discussing this issue, patients often refer to past experiences of discomfort and confusion over fluid retention as a trigger for relapse to insulin restriction and other disturbed eating behaviors.

**Blood glucose monitoring.** In addition to fear of weight gain, frustration and a sense of failure can result when clinicians, family members, or patients have unrealistic and perfectionistic expectations about blood glucose patterns. Establishing gradually improving and realistic blood glucose goals may also help to maintain patient motivation, decrease

### Table 2. Total Diet Approach for ED-DMT1

<table>
<thead>
<tr>
<th>Topics</th>
<th>Eating Disorders Philosophy</th>
<th>Diabetes Philosophy</th>
<th>Compromise for ED-DMT1</th>
</tr>
</thead>
<tbody>
<tr>
<td>“All foods fit”</td>
<td>Yes</td>
<td>Very important</td>
<td>Same</td>
</tr>
<tr>
<td>Number of food groups</td>
<td>7</td>
<td>1 main (carbohydrate)</td>
<td>Focusing on 7 food groups is more important than just counting carbohydrates</td>
</tr>
<tr>
<td>Exact portion sizes of foods/measuring</td>
<td>Approximate determination of portions is adequate</td>
<td>Very important for carbohydrate counting</td>
<td>Food estimation may be the same as when the patient goes out to eat versus measuring everything</td>
</tr>
<tr>
<td>Individual meal plan</td>
<td>Yes (3 meals/3 snacks)</td>
<td>Very important for establishing and using insulin-to-carbohydrate ratio</td>
<td>Meal plans are always individualized, but if patients are being treated for an eating disorder, an eating disorder prescribed meal plan is encouraged</td>
</tr>
<tr>
<td>Snacks</td>
<td>Very important</td>
<td>Not needed; use of snacks would require additional insulin</td>
<td>Individualized based on insulin regimen and eating disorder symptoms</td>
</tr>
<tr>
<td>Food labels</td>
<td>Not a focus</td>
<td>Very important</td>
<td>Individualized depending on insulin regimen and symptoms. If focusing on food labels is a trigger for worsening eating disorder symptoms, patients should be encouraged to estimate portions with help from a dietitian</td>
</tr>
<tr>
<td>Diet/sugar-free foods</td>
<td>Not appropriate</td>
<td>Important; use of these foods should be encouraged</td>
<td>Diet drinks, sugar substitutes, and sugar-free syrup/gum/mints are acceptable with moderate use</td>
</tr>
<tr>
<td>Fat</td>
<td>Important to include, but not to focus on</td>
<td>A key component of diabetes education; focused more with adults</td>
<td>Moderate fat intake is important for overall health; long-term education is focused on healthier fats versus saturated or trans fats</td>
</tr>
</tbody>
</table>

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patient burnout, and decrease the risk of relapse or treatment drop-out.

**Hypoglycemia.** Fear of hypoglycemia may also lead patients with diabetes to aim for higher glycemic goals than those recommended by their diabetes treatment teams. Fear of hypoglycemia should be appreciated as separate from ED-DMT1; however, there are interconnections between fear of hypoglycemia and ED-DMT1. In running high blood glucose levels to avoid hypoglycemia, some patients report that they “stumbled upon” the relationship between hyperglycemia and weight loss and subsequently developed ED-DMT1.

Furthermore, because hypoglycemia requires treatment in the form of eating a carbohydrate source, some patients report that treating it can trigger episodes of binge eating. Other patients worry about taking in these extra calories and therefore fear having to treat hypoglycemia. It may be helpful to anticipate with patients that treating hypoglycemia can trigger a fear of overeating and concerns about weight gain. To reduce this risk, it can be useful to educate patients about portion-controlled treatments for hypoglycemia such as glucose gels or tablets, which may be less tempting to overeat or use during episodes of binging.

Over time and with symptom improvement, treatment goals can build toward increased doses of insulin, increased food intake, greater flexibility of meal plan, more regularity of eating routines, and more frequent blood glucose monitoring. Frequent blood glucose pattern reviews by other members of the diabetes team and medication adjustments to address changing insulin needs can help to mitigate problems of recurrent hypoglycemia and reduce the risk of unnecessary weight gain. This kind of frequent communication among team members and active patient support can also help to establish and reinforce realistic expectations for blood glucose improvements.

**Hyperglycemia.** Chronic hyperglycemia is associated with feelings of lethargy, appetite and sleep pattern changes, and low or irritable mood. de Groot et al. report a consistently strong association between elevated A1C values (indicating hyperglycemia) and depression; however, the direction of that association remains unknown. In other words, it remains unclear whether hyperglycemia causes depressed mood or whether hyperglycemia is secondary to depression and concomitant diminished motivation for diabetes self-care. Further, Lustman et al. has noted that the relationship may be a reciprocal one in which hyperglycemia is provoked by depression and then independently contributes to the exacerbation of depression. This appears to be the case in women with disordered eating and diabetes.

Once frequent insulin restriction begins, the low energy and depressed mood associated with the resulting hyperglycemia appear to contribute to an exacerbation of the cycle of poor self-care, fear of weight gain, and hopelessness that health and wellness will ever improve. Symptoms of depression need to be directly targeted with psychopharmacology and psychotherapeutic treatments. However, glycemic improvements should also be reinforced by increasing patients’ awareness of their independent contribution to improvements in mood and energy.

**Conclusions**

Effective outpatient treatment of ED-DMT1, in the ideal situation, requires a multidisciplinary team approach, which is considered the standard of care for both eating disorders and diabetes treatment. However, such complex and comprehensive treatment is not always available. Thus, it is important that clinicians who work with these patients possess knowledge of both conditions and understand how they can use effective treatment strategies for both. Because treatments for eating disorders and diabetes can sometimes appear to have conflicting goals and strategies, it is important that these issues be effectively addressed, with an initial focus on establishing medical stability before addressing specific eating disorder symptoms and gradually moving toward optimal diabetes management.

**References**


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