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# Refeeding the Patient with Anorexia Nervosa: Perspectives of the Dietitian, Psychotherapist and Medical Physician

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**Abstract** Anorexia nervosa has the highest mortality of any psychiatric illness. Yet, these patients are often young and have many productive years yet to live. Weight restoration and nutritional rehabilitation, along with psychotherapy, are at the core of a successful treatment plan along with avoiding medical complications during the early periods of refeeding. This article is generated from an extensive literature search including Pubmed and Embase (1990 to 2015), of English-language manuscripts that addressed this topical area. This paper provides multidisciplinary expertise from the vantage points of a dietitian, psychotherapist and internal medicine physician to help with the treatment of a patient with anorexia nervosa in order to effectuate a successful treatment outcome.

***Keywords:*** *anorexia nervosa, medical complications, refeeding, dietician, psychotherapist*

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## 1. Introduction

Anorexia nervosa is a chronic mental disorder of eating. According to the American Psychiatric Association's Diagnostic and Statistical Manual, Fifth Edition [DSM-5], the diagnosis of anorexia nervosa requires that the following criteria be fulfilled.

- Restriction of food intake which causes loss of body weight and a body mass index (BMI) less than 18.5.
- Intense fear of gaining weight.
- Distorted perceptions of body image and undue influence of weight and shape on self-worth [1].

There are two main subtypes of anorexia nervosa namely a restricting one, characterized by weight loss achieved through excessive dieting, and a purging subtype, wherein patients also engage in purging behaviors, in addition to restricting, to achieve marked weight loss.

Anorexia nervosa is associated with many different medical complications that are all secondary to the malnutrition and excessive weight loss which define this disorder. [2] Medical complications and suicide account for the majority of deaths in anorexia nervosa. Indeed, anorexia nervosa has the highest mortality rate of any psychiatric disorder. Standardized mortality ratios show that the death rate in anorexia nervosa is 12 times greater than in aged-matched controls. A very recent study confirmed the high mortality rate and demonstrated a standardized mortality ratio of 11.5. [3] Herein we will describe treatment specifics for refeeding the patient with anorexia nervosa from the perspectives of the dietitian, psychotherapist and an internal medicine physician.

## 2. Dietitian

Successful efforts to reduce the mortality rate and safely weight restore these patients requires medical, dietary and psychological expertise. Nutritional management of the inpatient with anorexia nervosa is focused on medical stabilization, prevention and treatment of refeeding symptoms, and the establishment of a regular pattern of eating. [4] Typically, more advanced self-feeding skills, such as introducing variety and flexibility into the diet, as well as cooking, and food preparation, will take place at the residential and/or partial levels of care.

Inpatients with anorexia nervosa present in a complex way in that they are at high risk for refeeding syndrome due to their low body weight and poor nutritional intake, but also frequently require more energy per kilogram than might be expected to achieve adequate weight restoration. Many patients ultimately require 70-100 kcal/kg to achieve a weight gain of 2-4 pounds per week. [5,6] Measures should be taken with meal planning and laboratory monitoring to prevent refeeding hypophosphatemia while at the same time being mindful to not delay the progression of calories to achieve necessary weight gain. [7] Collaborating with a medical doctor versed in the medical complications of anorexia

nervosa regarding lab values and changes to the calorie level of the meal plan, is of utmost importance to prevent complications. In an inpatient setting with daily medical monitoring, it is generally safe to initiate refeeding with an average caloric range of 1200-1400 kcals/day. Increasing the meal plan by 300-400 kcals every 2-3 days, until consistent weight restoration is being achieved, is recommended as long as the patients phosphorus and electrolyte levels remain stable. [6] Progression of the meal plan should be slowed if the patient has severe phosphorus, electrolyte or liver function test abnormalities, complications with edema, or worsening bowel motility during this initial phase.

Little has been definitively proven about nutrition interventions for anorexia nervosa or about the optimal macro- or micro-nutrient distribution for the refeeding meal plan. [8] Meal planning should be individualized and focused on addressing the individual's physical complaints, concomitant refeeding symptoms, and cognitive distortions regarding food and weight. Most patients will require 5 to 6 feeding times per day in order to more easily consume often upwards of the required 3000 kcals/day. [5] The meal plan should provide a balance of nutrients to meet basic carbohydrate, protein, and fat requirements. Generally a macro-nutrient distribution of 50% carbohydrates, 25% protein, and 25% dietary fat is safe; however, the amount of each macro-nutrient may need to be individualized. For instance, a patient with elevated liver enzymes may benefit from a slightly lower carbohydrate ratio (40% of total calories) to help prevent hepatic steatosis; likewise, a patient who suffers from early satiety and upper abdominal fullness, from gastroparesis, may benefit from a meal plan with decreased fat and fiber content. Additionally, someone who has a very low body weight (<70% IBW) or severely restricted intake prior to admission, may better tolerate a soft texture and low-residue diet for the first 1-2 weeks of the refeeding process.

The registered dietician (RD) is often tasked with supporting the anorexia nervosa inpatient with initiating and increasing oral food intake, incorporating previously restricted foods, and tolerance of weight restoration. [1] While the dietitian should provide the patient with accurate nutritional information and education, the RD should be cautious about his/her ability to help the patient change their distortions and beliefs about food and body weight through nutrition education alone. The RD can employ a number of different methods to support the patient, although the type of patient may dictate which ones are likely to be most successful. Research, specific to guidelines for refeeding individuals with anorexia nervosa, is limited [9].

Some inpatients with anorexia nervosa will be self-motivated to reinitiate eating out of fear from the severity of their current physical and medical condition. For these patients, the RD can encourage and highlight positive behavior change while concurrently empathizing with the discomfort of refeeding. The RD may see these patients begin to struggle more with their eating once they start to feel better physically and/or begin to notice changes in their physical appearance. At this point, reality checking may be a useful tool to remind the patient of how ill they were when they came into treatment and how far away from a state of good health they remain. The RD can best assess whether specific numeric values regarding weight and other data should be used for the specific patient they are working with, as not all patients will benefit from having such detailed information. At this junction it may also be useful for the RD to discuss the patient's values and goals. By doing this, the RD can help the patient assess the direction of their life with the healthy changes they are currently practicing, versus the direction of their life reverting back to eating disorder behaviors and weight loss. For instance, if the patient identifies studying abroad as a goal, helping the patient see the big picture of how eating a challenging food (for instance pasta if they want to study in Italy) would make their experience abroad richer and more successful than if they opted to not immerse themselves in this part of the culture.

Some patients, on the other hand, will enter inpatient treatment highly resistant, fearful, and obsessional due to their low weight. With these patients, building rapport and trust with the RD are key to helping them eat more. Addressing the issue of ambivalence is often important to building a relationship with the highly resistant patient. These patients need to understand the urgency of nutritional rehabilitation, while at the same time feeling there is no judgment from the RD if he/she is not committed to sustaining recovery. [5] Encouraging experimentation with behavior changes, for a short duration of time, rather than asking the patient to commit to permanent change, may help the patient. The RD should also assess readiness for change and be prepared to meet the highly resistant inpatient where they are at in terms of their willingness to eat certain foods; the RD may need to sacrifice the ultimate goals of food variety and flexibility at first in order for the patient to meet their baseline nutritional needs, especially when medical stabilization and the prevention of further weight loss are top priorities. In these instances, the RD may need to allow the patient more "safe" foods at first but let them know that the calorie level of the meal plan is not negotiable. Once the patient has begun to restore weight and cognitive functioning, the RD can then move towards incorporating more foods into the patient's diet.

Incentives for compliance can also be used successfully for inpatients with anorexia nervosa, especially for the more resistant patient. Using external motivators as incentives for eating and weight gain can be valuable until the patient has been able to identify more internal motivation. Incentives may include increased phone and electronics privileges, supervised time allowed outside for fresh air, increased visiting time with friends and family, and eventually extended passes off the unit [10].

For the patient who, despite the above strategies, remains unwilling or unable to advance their meal plan through oral intake alone, the treatment team may need to assess the risks versus benefits of using enteral feedings for short-term nutritional rehabilitation. The patient should ideally see the use of enteral feeds as a tool to help him/her through this very difficult phase of refeeding rather than as threat. Goals for tapering or discontinuing the feeding tube should be made clear from the very start to prevent the patient from becoming too dependent on the enteral feeds. But in the end, nutritional counseling interventions need to be highly individualized in order to achieve success [11].

## 3. Medical

Many body systems may be adversely affected by anorexia nervosa [12]. (Table 1) In general, the incidence and severity of adverse medical events increases as the severity of weight loss progress. While all of the medical complications need to be addressed, for the purposes of this paper the focus will be on those body systems which directly impact the ability to successful weight restore these patients. However, it is also worth briefly noting the litany of other medical complications which can develop.

**Table 1. Medical Complications of Anorexia Nervosa**

**Cardiovascular**
- Bradycardia and hypotension
- Mitral valve prolapse
- Sudden death - arrhythmia
- Refeeding syndrome
- Echo changes

**Dermatologic**
- Dry skin
- Alopecia
- Lanugo hair
- Starvation-associated pruritis

**Gastrointestinal**
- Constipation
- Refeeding pancreatitis
- Acute gastric dilatation delayed gastric emptying
- Hepatitis
- Dysphagia

**Endocrine and Metabolic**
- Amenorrhea
- Infertility
- Osteoporosis
- Thyroid Abnormalities
- Hypercortisolemia
- Hypoglycemia
- Neurogenic diabetes insipidus
- Arrested growth

**Hematologic**
- Pancytopenia due to starvation
- Decreased sedimentation rate

**Neurologic**
- Cerebral atrophy

**Opthalmic**
- Lagopthalmos

**Pulmonary**
- Aspiration pneumonia
- Respiratory failure
- Spontaneous pneumothorax
- Emphysema

Specifically, cardiovascular complications include pericardial effusions, [13] atrophy of cardiac mass and decreased cardiac output, [14] mitral valve prolapse, [15] and abnormalities of cardiac depolarization. [16] There are many different endocrine complications of anorexia nervosa including hypogonadism, hypercortisolemia, hypothalamic amenorrhea, and appetite hormone dysregulation. [17] In addition, these patients, notwithstanding their generally young ages of onset of anorexia nervosa, often have severe loss of bone mineral density resulting in osteopenia and osteoporosis. [18] Because anorexia nervosa impairs bone accrual during the period typically marked by rapid bone accumulation, these patients have a life-long increased fracture risk, both in adults with anorexia nervosa as well as adolescents [19,20].

These patients also have problems clearing free water by their kidneys and concentrating their urine, and thus have a propensity for hyponatremia if they excessively drink water. Pulmonary complications take the form of pulmonary function test abnormalities [21] and spontaneous pneumothorax. [22] The bone marrow is affected by anorexia nervosa and often shows trilinear hypoplasia with leukopenia, anemia and thrombocytopenia. [23] There may also be permanent neurocognitive impairments [24].

However, the main medical issues encountered during the actual refeeding of the patient with anorexia nervosa are related to the gastrointestinal system and the overall risk for the refeeding syndrome. Administration of nutrition to patients with anorexia nervosa is their archetypal basic life support, but it is being provided to patients who are severely underweight and thus have had an overall slowing of their gastrointestinal system including their esophagus, stomach, small bowel, colon and liver. Each of these body systems, within the overall gastrointestinal tract, can impact and be impacted by the process of refeeding.

Specifically, with ongoing weight loss, these patients may develop dysphagia caused by pharyngeal muscle weakness. This difficulty swallowing manifests with coughing during eating and a feeling of uncoordinated transfer of the food type into the esophagus [25]. This generally improves back to normal with nutritional rehabilitation and consultation with a speech therapist. [26] There may also be a temporary need for the dietician to modify the consistency of the foods in the meal plan early on in the refeeding program to address the dysphagia.

There is often also the presence of gastroparesis which accompanies the weight loss of anorexia nervosa. This basically connotes paralysis or slowing of the normal gastric emptying rate. As a result, these patients complain of early satiety, bloating, and left upper quadrant abdominal fullness with occasional nausea soon after eating. Surprisingly, the exact incidence of this is not known in anorexia nervosa, but clinical experience suggests that it is fairly common. Once again the dietician plays a major role in dealing with this troubling constellation of symptoms by switching some or all of the caloric intake to liquid food supplements and by dividing the daily caloric intake into multiple smaller meals while avoiding legume type foods and fiber-containing products which cause gas and distention. Recently, in diabetic gastroparesis, small particle size meals were found to be effective in relieving the symptoms of early satiety and bloating. [27,28] Clinicians may also opt to cautiously use low dose metoclopramide or erythromycin to hasten gastric emptying rates. Gastric emptying rates will generally self-improve with moderate amounts of weight gain.

In addition, the stomach can also, for unclear reasons, dilate acutely during the early phases of refeeding and cause severe abdominal pain, left upper quadrant distention and vomiting. This is a potential emergency, because if left untreated the stomach can markedly dilate and cause gastric perforation [29]. Treatment for this rare event includes making the patient NPO, and possibly inserting a nasogastric tube to decompress the stomach or watchful waiting if it is deemed safe to do so.

A related complication is termed the superior mesenteric artery (SMA) syndrome. Due to weight loss, there is atrophy of a fat pad that normally cushions the SMA. As a result there is compression of the duodenum between the aorta and vertebral spine posteriorly and the SMA anteriorly. This then narrows the normal angle between the SMA and the aorta and entraps and compresses the duodenal lumen, impeding the passage of food through the small intestine. With the SMA syndrome, patients will complain of left upper quadrant pain, postprandial fullness, nausea and vomiting. The diagnosis is made by CAT scan or an upper gastrointestinal series. [30] If SMA syndrome is diagnosed, treatment involves changing to a liquid based diet, delivered orally or via a nasogastric or a percutaneously placed jejunal tube, or even parenterally for a few weeks, until that fat pad presumably is restored via nutrition and weight gain [31].

Similar to the slowing of gastric emptying discussed above, there is also overall delayed gastrointestinal transit time through the colon, resulting in constipation. [32] Presumably there is reflux hypofunctioning of normal colonic peristalsis due to chronic lack of oral intake. This improves, once again, with nutritional restoration and weight gain. However, because constipation can interfere with successful completion of meal plans, it is often necessary to provide polyethylene glycol powder, one to three tablespoons per day, especially early on in the refeeding process. Less commonly these patients can complain of diarrhea early on in the refeeding process. This is felt to be attributable to starvation-induced atrophy of intestinal villi with a reduction in absorptive area leading to diarrhea. When relevant, it may be prudent to alter the diet temporarily to more elemental feeds, which are less dependent on the integrity of the mucosal surfaces in the villi.

Lastly, the liver can be adversely affected, both due to starvation as well as with aggressive refeeding. Liver transaminases (AST and ALT) are often elevated in anorexia nervosa. [33] There are two possible causes for these elevations which require divergent treatment strategies. The more common cause is liver apoptosis which involves autophagy and programmed hepatocyte cell death. [34] This is present even after refeeding begins and is a sign of possible of multi-organ failure. [35] The treatment is monitoring with ongoing nutritional support. In contrast, if the elevations in the transaminases occurs with refeeding and progressively is worsening, then it may be a form of hepatic steatosis due to excessive dextrose calories. A reduction of those types of calories helps to resolve. If there exists uncertainty as to which process is causative, a liver ultrasound can help distinguish since in the latter will appear as an enlarged fatty liver [36].

The other main medical issue to be concerned with during the refeeding of patients with anorexia nervosa is the actual refeeding syndrome. This syndrome was first described in survivors of concentration camps who were liberated and then fed excessive amounts of high-dextrose containing foods by their well-intentioned liberators. Surprisingly, many died soon after their liberation despite receiving high quality nutrition and despite having lived under horrific conditions in the years prior. Then, further attention was called to this in the "Minnesota Experiment," wherein conscientious war objectors were noted to have a marked decrease in the size, of their heart size as seen on chest radiographs during their periods of starvation. In 1969, with the invention of total parenteral nutrition (TPN) and its early administration to patients on a burn unit, this lesson was repeated when many of the patients died soon thereafter, and were noted to have critically low serum phosphorous levels. Anorexia nervosa now serves as a sobering model of the inherent calamity which can occur with the refeeding of starved patients if there is inattention to the metabolic responses to the renewed nutrition.

Briefly, phosphate is critical for glucose metabolism. When starved patients shift from a catabolic state to an anabolic state with the provision of calories anew, there is great demand for the production of high energy compounds for glycolysis, the Krebs cycle and the formation of adenosine triphosphate (ATP) and 2,3-diphosphoglycerate (2,3 DPG), resulting in marked utilization of serum phosphorous and a reduction in phosphorus levels. [37] The resultant hypophosphatemia, if severe (<1.5 mmole/L), causes the development of a group of serious adverse sequela including seizures, heart failure, hemolysis, rhabdomyloysis, respiratory failure, coma and sudden death. These phenomena, all or in part, are known collectively as the refeeding syndrome. In theory, any person who has been malnourished and without caloric intake for just a few weeks, is at risk for its development as they begin to reefed if there is lack of attention to their phosphorous, potassium, magnesium and glucose levels. [38] The risk for refeeding syndrome seems to mostly begin just 2-3 days after the initiation of refeeding and it lasts in general for 1-2 weeks with progressive calorie increases. It best correlates with the severity of malnutrition as defined by nadir percent of ideal body weight. [39] Different series have reported on the incidence of refeeding hypophosphatemia, varying from 15% to upwards of 35%. [7,40] Prophylactic phosphorous is therefore not indicated, but rather, it is most important to closely monitor the patient during the first weeks of refeeding for clinical and laboratory changes. Early identification of high risk patients is the key. The NICE guidelines provide a useful tool to follow in the prevention thereof (Table 2).

**Table 2. Refeeding Syndrome**

| Patients at Risk for Refeeding Syndrome | | |
|---|---|---|
| **One** or more of the following | -OR- | **Two** or more of the following |
| BMI <16 kg/m$^2$ | | BMI <18.5 kg/m$^2$ |
| Unintentional weight loss of >15% in the previous 3-6 months | | Unintentional weight loss of >10% in the previous 3-6 months |
| Little or no nutritional intake for >10 days | | Little or no nutritional intake for >5 days |
| Low levels of potassium, phosphorus, or magnesium before refeeding | | History of alcohol abuse or drugs including insulin, chemotherapy, antacids or diuretics |

National Institute for Clinical Excellence (NICE) Guideline for Management of Refeeding Syndrome.

## 4. Psychotherapist

In addition, to the requisite collaboration between the dietician and the medical physician, a psychotherapist is the third critical member of the treatment team. In the end, there is always a deeply ingrained mental health component to the illness of anorexia nervosa. The process of engaging the patient with anorexia nervosa in treatment is varied depending on the patient's temperament and the degree to which the eating disorder has kept them from connecting to the values in their lives. Most often patients come to treatment with a great deal of fear and anxiety around being asked to challenge the many rules that accompany the eating disorder. The disorder has been the means to manage the anxiety that the patient believes to be unmanageable in any other way. Eating disorders are phobic disorders; meaning that the patient will often appear inflexible and fearful around being asked to challenge the foundation of how they feel held together psychologically. The eating disorder negates the patient's anxiety, an anxiety that can feel debilitating. When the patient enters treatment they are being asked to look at how to engage in life knowing that anxiety may be part of the new journey.

The Temperament Character Inventory, (TCI) developed by Cloninger, identifies "the intensity of and relationships between seven basic personality dimensions of temperament and character, which interact to create the unique personality of an individual". [41] Patients with eating disorders, and specifically anorexia nervosa, tend to be in high harm avoidance and in low self-directedness scales. A harm avoidant personality is one that has high sensitivity to cues of possible punishment and thus is motivated by an impulse to retreat. Self-directedness as defined by Cloninger is the "personality trait of self-determination, that is, the ability to regulate and adapt behavior to the demands of a situation in order to achieve personally chosen goals and values." Patients with anorexia nervosa in particular will have low novelty seeking and high persistence. Low novelty seeking predisposes them to being rule seeking, reserved and analytical. High persistence means they do not give up easily; a trait that may have been helpful in certain areas of their lives, but with regard to the eating disorder, may mean they continue to follow a line of thinking even when it has proven unsuccessful and potentially detrimental to their health. Thus, the world does not feel like a safe place to explore and there is a wish to keep anxiety producing stimuli at bay. Patients may feel that the only place they are able to assert their autonomy, and decrease unwanted stimulation, is in the realm of the eating disorder. Thus, providers are working to help them feel grounded when the heretofore familiar arenas for control are being challenged.

The therapist's work in the early phases of treatment is to help the patient move toward nutritional rehabilitation and weight restoration despite the formidable psychological challenge this presents. As the disorder is mitigating the anxiety that feels debilitating, said anxiety will increase further with the prospect of breaking well ingrained food rules. It is important to note that patients will be cognitively impaired in the early phases of their treatment due to their undernourished brain. Patients may have difficulty with memory, cognition and ultimately engaging in the therapeutic process. As the patient begins to weight restore, their cognitive functioning will improve, but their body distortions and physical discomfort will increase. This may serve to divert their attention away from the pertinent therapeutic issues. It is important to begin to normalize the fear and discomfort they have tried to avoid since ultimately it will only diminish through confrontation. Anorexia nervosa, like most phobic disorders requires asking patients to take the opposite approach and move toward the anxiety with curiosity in order to begin to understand it. This feels counter intuitive and requires the patient have a strong connection with the therapist. In addition, the patient should have begun to define their life values as a way to create a stronger sense of self. Many of these patients, although typically bright and accomplished, have a severely impoverished sense of self, lacking both a sense of competence and a "road map" for how to move forward [42].

Using the Acceptance and Commitment Therapy (ACT) Model, psychotherapists help patients "accept what is out of their personal control while committing to action that will improve their quality of life." [43] By helping patients begin to define what they value in their lives and what it looks like when they engage in a values driven life, they start to see a bigger picture rather than becoming lost in the details of the eating disorder. Where there is emotional pain in one's life, there is usually a value attached. For example, sadness around disappointing family members with the prospect of relapse, usually indicates a value of family and connection. Connection is one of the strongest human values and will often be what helps patients make some more directed, albeit uncomfortable, decisions. Patients are being asked to challenge the anxiety and rigidity that maintains the eating disorder and use connection and other values to guide their decisions, including their decision to eat and engage in recovery while fear is still present. The idea that discomfort will be totally eliminated is challenged; instead the belief becomes that life is full of discomfort and that they can move forward toward the things they value while tolerating the discomfort that goes along with it.

Having a treating professional who can model a values driven life, that includes anxiety and discomfort, is a powerful tool in treatment success. The relationship can help the patient see how the eating disorder interrupts connection, and that life can be richer and more meaningful when there is room for connection and vulnerability. Some appropriate self-disclosure on the part of the therapist regarding what is necessary to live in a world where all the potential outcomes are not easily controlled, helps normalize the idea that life and predictability do not always go hand in hand. The hope is that patients with anorexia nervosa can have that experience with their treating professionals and peers in order to connect to something greater and richer than they have heretofore found in their eating disorder.

## 5. Conclusion

In summary, the successful treatment of the patient with anorexia nervosa requires a team who possess dietary, medical and psychological expertise. This process is fraught with a multitude of potential complications. But,

vigilant and assiduous multidisciplinary care can recognize or prevent most of these complications from becoming severe, and more likely result in a successful treatment outcome.

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