



The starvation syndrome

Severe restriction of food over time can lead to serious physical and psychological complications. 'The Starvation Syndrome' describes the signs and symptoms that can be triggered in response to a person being starved of energy. Regardless of a person's weight, someone with an eating disorder is at higher risk of developing Starvation Syndrome, especially if their behaviors include calorie restriction, purging or excessive exercise.

Much of what is known about the effects of restrictive dieting and weight loss is based on the results of an experimental study from the 1940s, known as the 'Minnesota Starvation Study'. Dr Ancel Keys and his colleagues from the University of Minnesota studied 36 young, physically healthy and psychologically normal men. The experiment involved six months of semi-starvation and three months of refeeding or renourishment. During semi-starvation, the men were restricted to at least half of their former intake and were encouraged to participate in vigorous daily activities. As the same meals were often provided, this also limited the variety of foods eaten.

The participants of the study experienced dramatic effects on their physical, psychological, behavioral and social wellbeing, which continued well into the refeeding or renourishment phase. The results of this study have become important as many of the changes observed are the same as those experienced by people with eating disorders. These effects included:

Physical:

- Weight loss up to 25% of original body weight
- Reduced strength and increased weakness/tiredness
- Interrupted sleep
- Increased hunger
- Gastrointestinal discomfort and constipation
- Dizziness, headaches, hypersensitivity to noise and light, visual and auditory disturbances (e.g. unclear vision and ringing noise in ears)
- Oedema (excess fluid causing swelling).
- Hair loss
- Decreased body temperature and tolerance for cold temperatures (cold hands and feet)
- Decreases in heart rate and respiration
- Reduction in basal metabolic rate (the amount of energy the body needs to carry out normal bodily functions) of 40%
- Impaired immune system (slowly healing response and less white blood cells)
- Reduced sperm motility

Psychological:

- Depression and anxiety.
- Emotional distress.
- Mood swings, irritability and outbursts of anger.
- Impaired concentration, judgement and decision making.

Attitude and behaviour related to food and eating:

- Food preoccupation - constant thoughts about food and eating; food as the dominating topic of conversation, reading and daydreaming; new interest in reading cookbooks and menus
- Binge eating followed by self-criticism.
- Changed table manners - licking plates, long mealtimes, playing with food, smuggling food
- Changed speed of eating (some ate slowly, some ate more quickly)

Social:

- Social withdrawal and isolation.
- Reduced libido (sex-drive)

During the three-month refeeding or renourishment phase, the changes the participants experienced in semi-starvation gradually reversed, with energy, dizziness, lethargy and metabolism the first to improve. Subjects began reporting concerns about “feeling fat”, despite their body weight and fat percentages returning to pre-experimental levels over time. It took eight months of refeeding for most participants to return to

normal eating habits, with the pattern of weight restoration highly variable. Whilst for many, weight restored without issue, some noticed the initial distribution of weight in abdominal regions before this then evened out, others noted a 10% increase in weight before it settled back to baseline and for some, it took a longer time to restore to their natural set point.

The Starvation Study demonstrated that many of the symptoms previously attributed to Anorexia Nervosa and Bulimia Nervosa are actually the result of starvation. It also showed that the potential effects of this are not limited to just changes in food behaviours and weight, but extend to almost all areas of psychological and social functioning.

This study clearly shows just how much the body will do to restore lost weight as a mechanism of survival. As such, it is essential that weight is restored during eating disorder recovery so that psychological functioning can then be accurately assessed and addressed in therapy. Restoring nutrition will not address the psychological problems that were present prior to the eating disorder, though it will place you in a better position to do the important work of therapy.

The physical and psychological effects of starvation

The table below lists some of the physical and psychological effects of starvation as described above. Use this list to highlight (✓) any symptoms you might be currently experiencing.

Effect	✓	Effect	✓
Eating slowly		Anxiety	
Poor sleep		Irritability	
Loss of libido		Lability	
Feeling hungrier after eating		Depression	
Diminished saliva		Social withdrawal	
Dental decay		Narrowing of interests	
Receding gums/ teeth loss		Food fads	
Fine downy hair on face/body		Mood swings	
Dreaming about food		Declining motivation	
Feeling full after eating		No menstrual periods	
Bloating		Impaired fertility	
Getting the cold/flu frequently		Poor concentration	
Constipation		Memory impairment	
Diarrhoea		Height stunting	
Water retention (oedema)		Dry skin/hair	
Low blood sugar levels		Hair loss or thinning hair	
Electrolyte disturbances		Feeling tired/fatigued	
Palpitations		Faintness	
Low blood pressure		Low body temperature	

Effect	✓	Effect	✓
Slow pulse		Poor temperature regulation	
Kidney function impairment		Cold hands and feet	
Decreased growth rate		Osteoporosis	
Difficulty seeing the big picture		Poor bone density	

Further reading

Garner, D.M. (1997), 'Starvation symptoms. The effects of starvation on behaviour: Implications for eating disorders', in Garner, D. & Garfinkel P. (eds), Handbook for Treatment of Eating disorders, Guilford Press, New York, NY, 145 – 177.

Podcast:

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