



FORMULITE

Bariatric Weight Loss Protocol



A guide for bariatric health professionals caring for patients with obesity

Written by Dr. Fiona Tsuey Hung Lee (MBBS, FRACP, MD)
and Sally-Anne Livock APD

Edited and Compiled by Glennis Winnett

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Formulite
info@formulite.com.au
www.formulite.com.au

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FORMULITE VERY LOW ENERGY DIET CLINICAL PROTOCOL FOR BARIATRIC SURGERY

The Formulite Very Low Energy Diet Clinical Protocol for Bariatric Surgery is intended to support health care professionals caring for patients before and after bariatric surgery. The Protocol identifies specific nutritional issues for bariatric patients and guides health care professionals about the best use of Formulite products for patients who may benefit from using a VLED.

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INTRODUCTION

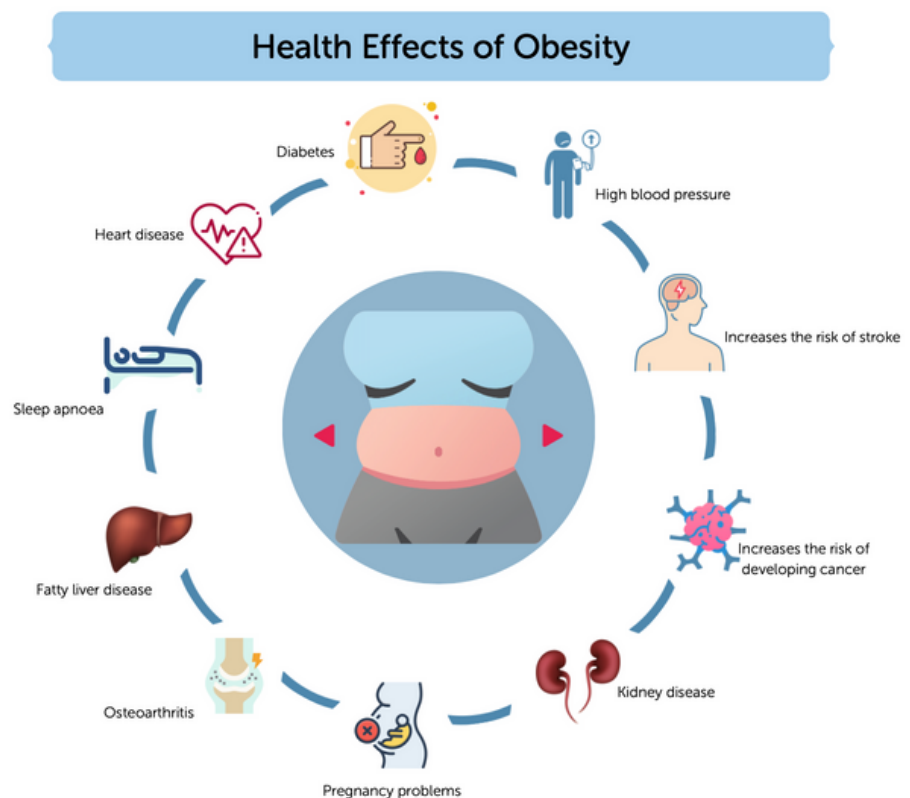
Obesity is a difficult disease to treat. Obesity has reached “crisis level” as stated in a recent position paper from the Australian Medical Association (AMA).

The Australian Bureau of Statistics reports that in 2017-18 67% of Australians were overweight or obese, a jump from 63.4% in 2014-15 - this increase, as stated by the AMA, has resulted in the current “Obesity crisis”.

Dieting and lifestyle interventions are difficult to maintain long term, and success rates of weight loss programs are poor (1). For many, dedication to rigid programs brings initial weight loss success, however, less than 10% of participants are successful in maintaining this weight loss past one year (2).

Bariatric surgery has now been recognised as an effective treatment for obesity. The landmark Swedish Obesity Study has shown a maximal weight loss of 20-32% was achieved one or two years post-surgery. Weight loss was sustained at 27% even after 15 years (3).

It has been estimated that obesity has a greater negative impact on quality of life than 20 years of ageing. The extent of this impact doesn't reduce even after considering demographics, medical conditions and health habits (7).



Obesity substantially raises the risk of many chronic diseases including heart disease, sleep apnoea, osteoarthritis and joint problems, and has been found to increase the risk of some cancers, including endometrial, breast, colorectal and gall bladder cancers. Being overweight or obese is associated with an increased risk of premature illness and mortality (5).

Australia's obesity crisis has also brought with it an epidemic of diabetes. Today, 1.8 million Australians have diabetes. Additionally, there are more than 4,400 amputations every year as a result of diabetes health related complications. The total cost of the impact of diabetes in Australia is estimated to be over \$14.6 billion annually. (Australian Bureau of Statistics)

Being overweight and obesity are directly linked to 11 cancers and research shows obesity may even impact the effectiveness of chemotherapy (9).

BARIATRIC SURGERY

Bariatric Surgery Efficacy

The AMA considers bariatric surgery to be an important intervention for long-term reductions in weight and an effective mechanism to improve health and general wellbeing, primarily for obese adults and, in exceptional cases, for obese adolescents who may present with significant comorbidities and for whom all other measures have not been successful (6).

Bariatric surgery is recognised as an effective treatment for many chronic diseases including diabetes. Studies have shown up to 72% of patients with Type 2 Diabetes required no medication or were in remission 2 years post bariatric surgery (4).

In a recent statement endorsed by the Australian Diabetes Society, bariatric–metabolic surgery was deemed to be an established treatment option in the algorithm to manage Type 2 Diabetes Mellitus (T2DM).

Bariatric surgery has produced similarly positive outcomes in management of other chronic diseases, including hypertension, non alcoholic steatohepatitis, sleep apnoea and osteoarthritis (4,7).

Bariatric–metabolic surgery is recommended for:

- All individuals with BMI ≥ 35 kg/m²
- Individuals with BMI 30–35 kg/m² with metabolic disease despite lifestyle and optimal medical therapy
- Asian population with BMI >27.5 kg/m²
Children/adolescents with a BMI $>120\%$ of the 95th percentile and major comorbidity, or a BMI $>140\%$ of the 95th percentile should be considered for MBS after evaluation by a multidisciplinary team in a specialty center.

Bariatric surgery statistics

The Australian Bariatric Surgery Registry 2018-2019 (6) data shows over 70,000 bariatric procedures reported by the registry in Australia since 2012 with 24,226 procedures in 2018-2019, an exponential rise from the 9,300 surgeries in 2005-2006 (8).

Bariatric surgery now has data showing effective long-term obesity management out to 20 years (3,4), far exceeding other weight management strategies in successful sustainable outcomes.

Obesity diagnosis

Currently bariatric surgery in Australia is limited to individuals identified as:

- CLASS III Obese BMI > 40 kg/m²
- CLASS II Obese BMI > 35 kg/m²
- CLASS I Obese BMI > 30 kg/m² with comorbidities

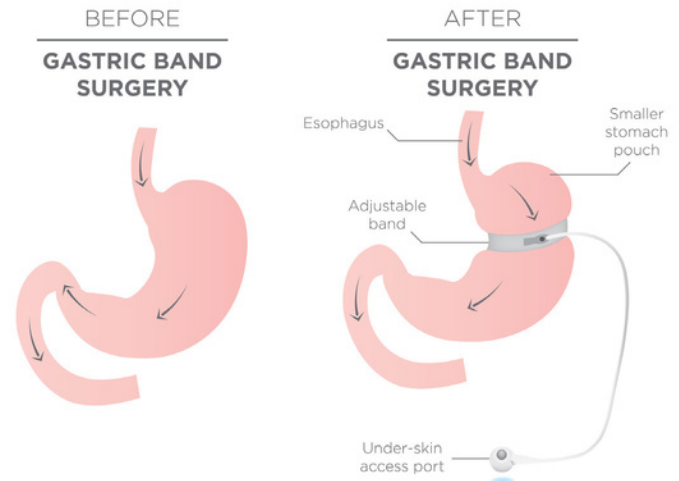
Laparoscopic Adjustable Band (LAGB) is approved for individuals with BMI > 30 kg/m² with comorbidities.

Types Of Bariatric Surgeries

Bariatric surgeries commonly performed in Australia include:

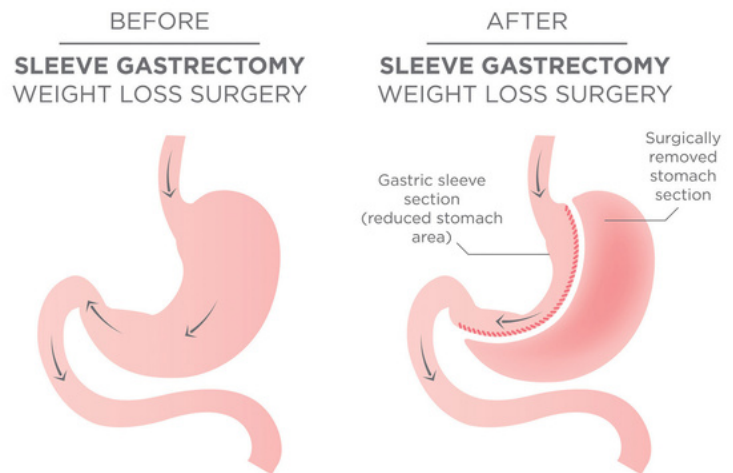
LAPAROSCOPIC ADJUSTABLE BAND (LAGB)

Adjustable silicone band placed just below the gastroesophageal junction, reducing stomach volume to 25% and applying gentle pressure to suppress hunger. The level of restriction can be adjusted by varying the amount of fluid contained inside the band.



GASTRIC SLEEVE

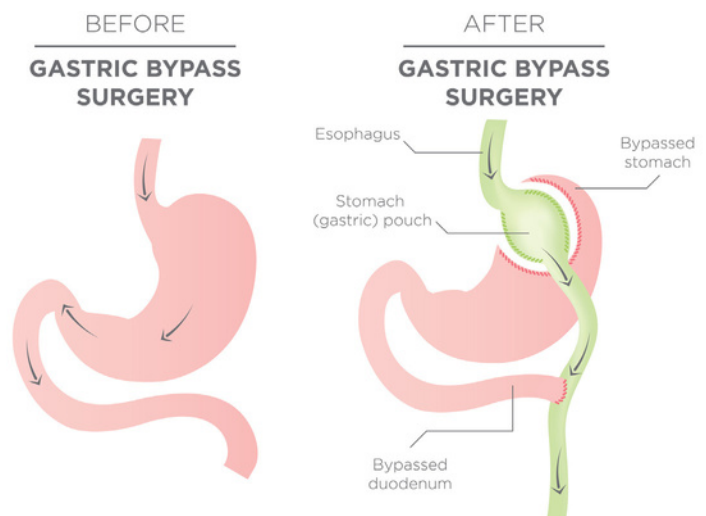
Greater portion 2/3 of stomach-fundus and body removed creating reduced gastric volume. Hormonal changes created by this process assist appetite regulation. This change in brain's appetite drivers reduces urge to eat.



RYGB (Roux-en-Y Gastric Bypass) AND THE MINI OMEGA LOOP BYPASS

Combination procedure:

- 1) Small stomach pouch restricts gastric volume.
- 2) Pouch is joined to jejunum bypassing the lower stomach, duodenum and initial jejunum. Associated hormonal changes assist appetite regulation and blood glucose control. Nutritional deficiencies need to be carefully managed as degree of malabsorption is created.



With each procedure from the minimally intrusive LAGB, through to the Gastric Sleeve and finally the 2-in-1 RYGB surgery, there is increasing surgical complexity and risk, as well as nutritional concerns.

MALNUTRITION OF OBESITY

Nutritional Status

As well as metabolic and disease complications, obesity is directly associated with significant rates of malnutrition, where it has been found that up to 80% of patients are in a compromised nutritional state prior to surgery (10,27).

Nutrient-poor food choices and chronic dieting cycles can contribute to this state of malnutrition. Additionally, side effects of medications to treat comorbidities may impact on nutrition as well as other environmental and lifestyle factors. Patient malnutrition is often masked by an excess intake of energy.

Studies of pre surgery bariatric patients show the following incidence of malnutrition (10,26).

Nutrient	% Bariatric pre surgery patients' deficiency
Iron	Up to 45%
Vitamin B12	2-18%
Folate	54%
Vitamin D	65-90%
Thiamin	20%
Zinc	20%
Vitamin A	14%

It is recommended that thorough micronutrient blood testing be completed, and any deficiencies corrected prior to surgery especially for revisional surgeries (4,10).

Nutritional screening should be completed at least 1-month prior to surgery to allow for dietary corrections to begin. Refer to assessment for screening details (Pg. 9).



Protein Status

Bariatric patients have higher protein requirements than the general population due to a combination of the following factors:

1) Sarcopenic Obesity

Sarcopenia is a complex multifactorial condition influenced by nutrition, physical activity, comorbidities and psychosocial factors. Sarcopenia is identified as low levels of muscle strength, muscle performance and skeletal muscle mass. Loss of mass, performance and strength impact, ability to exercise, can impede tasks of daily living, and can increase risk of falls - all impacting quality of life.

Like osteoporosis, the changes that precipitate sarcopenia can occur early during the fourth and fifth decade of life.

Sarcopenia is facilitated by an inactive lifestyle, catabolic stressors including acute or chronic illness, or injury, inflammation, low dietary protein intake, and poor nutrition - often all present in the bariatric population (11).

2) NAFLD (Non-Alcoholic Fatty Liver Disease) occurs in up to 90% of pre surgical patients and is also

associated with increased protein requirements (22).

3) Post-operative period of compromised nutrition - it is often difficult to meet protein

requirements in the post-operative period - intake may be compromised by prolonged poor tolerance, restricted volumes, and reduced absorption associated with reduced production of hydrochloric acid (13).

It has been shown that bariatric surgery patients can lose up to 25% of preoperative muscle mass by the end of the first post-surgical year - most of which happens in the first trimester (14).

It is important to consider the increased protein requirements of bariatric patients when formulating nutrition plans pre and post-surgery.

The points of significance are:

- If pre surgery low energy diets are not correctly formulated patients may be in protein deficit prior to surgery which is only exacerbated by the often nutritionally difficult post-surgery phase.
- Studies have shown lean tissue loss exceeds fat loss in both the VLED and immediate post-surgery dietary phases (12,26).
- A recent study published in Obesity Surgery cited total weight loss of 4.5 kg (consisting of 2.8 kg lean mass and 1.7 kg fat mass) after following a popular VLED product for a 2-week program (12).
- There is strong evidence that lean tissue loss can be attenuated by diets higher in protein, compared to those with a lower protein intake (13,14,17).
- Low energy diets require high biological value protein at up to 1.5 g protein/kg/day to limit lean muscle loss (11,17,18).

As of yet, there are no clinical guidelines for the recommended protein intake pre or post bariatric surgery (4).

FORMULITE AND PROTEIN REQUIREMENTS

The Formulite 3 shakes/day program is currently the only VLED on the Australian market with a 3 product/day program meeting protein requirements for the majority of our Bariatric population (Aug 2020).

Formulite - 3 shakes/day provides 105 g protein

Other most popular VLED used in Australia - 3 shakes per day provides 60 g protein.

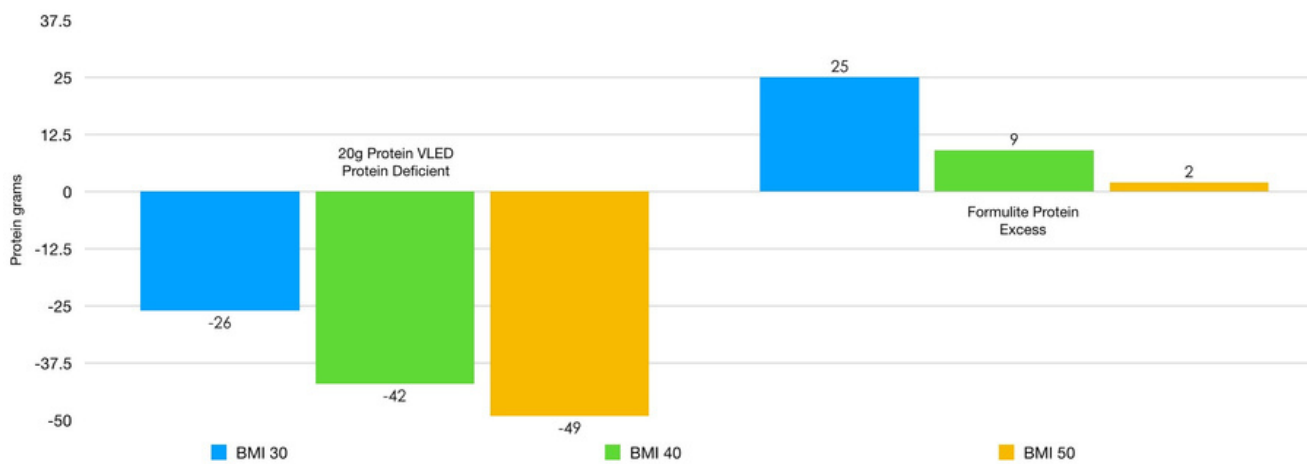
(DAA OSSANZ dietitian survey – based on Aug 2020 NIPs)

Product - 3 Daily	Energy KJ	Protein g	Carbohydrate g
Formulite	2673	105	31.8
20g Protein VLED	2520	60	54.6
Higher Protein VLED	2250	84	60

Most VLED products are prescribed as a 3-product program. As demonstrated in the graphs below, this standard 60g protein program falls vastly short of meeting actual dietary protein requirements.

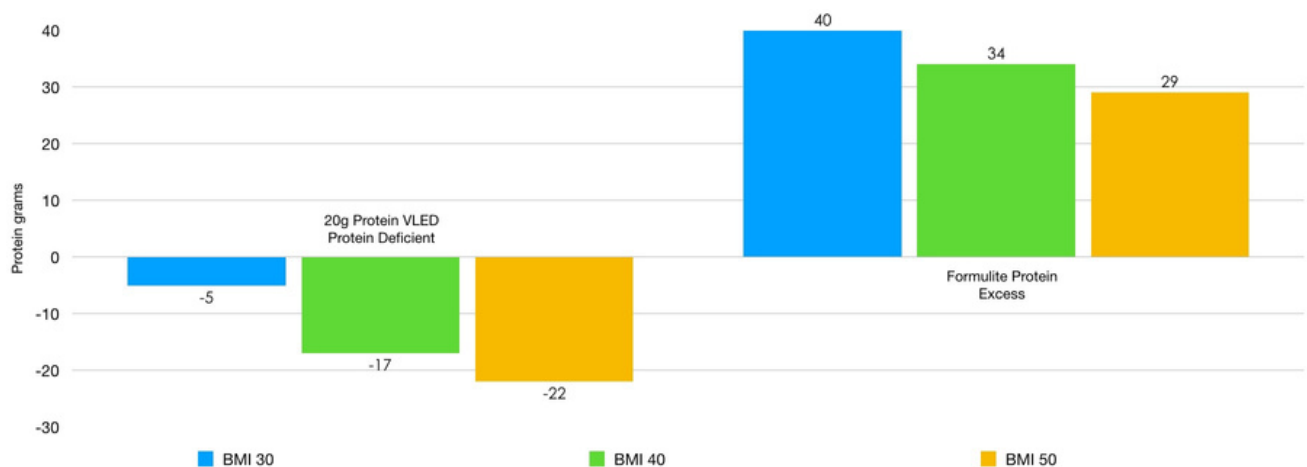
Protein deficit/excess VLED programs MEN

Gibson & Franklin et al (1)
3 daily VLED Protein RDI 0.94g/kg/day AIBW



Protein deficit/excess VLED programs WOMEN

Gibson & Franklin et al (1)
3 daily VLED Protein RDI 0.74g/kg/day AIBW



Deficit of protein at all BMI levels is shown with the standard 20g protein (60g protein/day) VLED product.

Simply adding another VLED product to provide extra protein is not ideal as extra carbohydrate and energy will also be provided which may impact VLED effectiveness.

Formulite adequately meets the needs of patients at all BMI levels up to a BMI of 50.

The majority of bariatric patients using Formulite will not need extra products or extra protein serves to meet protein requirements.



We are now seeing a rise in revisional surgeries. Over 20% of surgeries performed in Australia 2018-2019 were revisional (6). With this rise in revisional surgeries, consideration to meet protein requirements is even more vital as lean tissue mass in this group is often reduced (19, 20).

There is strong evidence that higher protein diets >0.8 g/kg/IBW per day do attenuate loss of lean tissue mass (13,14,17).

The higher protein formulations also assist with satiety during the VLED than lower protein formulations (1). Please refer to Pre-Surgical Protocol Assessment of Protein (pg.11) for detail regarding calculation of protein.

VLED AND FORMULATED MEAL REPLACEMENTS

Definition

A VLED is a very low-calorie diet providing 3450 kJ or 800 kcal /day or less. It is also typically low in carbohydrate (less than 100 g/day), thus facilitating a state of ketosis.

Whilst ketosis may be attained with carbohydrate intake up to 100 g/day, studies show carbohydrate content at 50 g/day or less helps restrict the drive to eat i.e. assist appetite control whilst undertaking a VLED program (1).

Formulite is a specifically formulated meal replacement meeting the rigorous nutritional requirements of the Food Standards Code for formulated meal replacements.

Nutritionally complete products such as Formulite are the only formulated products that should be used during a 3 shake VLED program.

Formulated supplementary sports foods and shakes are often marketed and sold alongside Formulated Meal Replacements but these products are not nutritionally designed to be used as part of a complete meal replacement VLED.

Role of VLED in Surgery

Obesity, in particular, central obesity, leads to increased visceral adipose tissue, abdominal wall thickness and liver size-hepatomegaly (21).

Statistics show a high prevalence of enlarged fatty livers in the bariatric population

NAFLD 90%
Steatosis 52-90%
Steatohepatitis 33-89%

A loss of just 5-10% body weight and 15-20% liver volume before surgery will provide the following benefits (21,22):

- Reduction of visceral and abdominal wall fat. This reduces surgical complexity, operating times and associated surgical risks.
- Reduction in size of liver via reduction of glycogen stores thus facilitating easier retraction and reducing risk of a liver injury.
- Improved metabolic parameters: blood glucose levels (BGL), insulin sensitivity, lipid levels - which are causally related to improved post-surgical complications and length of stay.
- Reduced conversion rates from laparoscopic to open surgical procedures
- Patient engagement. Many have considered surgery and waited years. Commencing a VLED prior to surgery can help them start their journey and feel engaged in the process.

Comprehensive studies have shown that 80% of liver volume reduction occurs in the first 2 weeks of a VLED (1,23).

Periods greater than 2 weeks have shown further liver reduction up to 2.4% per week and should be considered in those with high BMI>50 and steatohepatitis (3).

Meeting the high protein needs of the bariatric population during this phase is essential as longer periods of VLED have been shown to further reduce lean mass loss.

FORMULITE VLED PRE-SURGERY PROTOCOL

Patient Assessment

The following processes should take place to ensure the patient is well prepared for surgery. A detailed pre surgery assessment should be undertaken by a qualified bariatric dietitian (27).

The role of this assessment is to:

1. Engage and establish rapport with the patient. Bariatric patients have improved outcomes if they have extensive post-surgical support and an engaged compassionate dietitian who listens to their client's narrative. This can play a vital role in client outcomes (24).
2. Discuss goals and expectations (weight health and lifestyle) with patient, to ensure both are realistic and achievable.
3. Screen for any "red flags" e.g. past history of eating disorders especially anorexia nervosa or specific dietary preferences to be considered e.g. vegetarian or veganism.
4. Assess micronutrient status - All patients must undergo appropriate nutritional evaluation, including micronutrient measurements before bariatric procedures -with more extensive investigations for malabsorptive procedures and revisional surgeries where rates of deficiencies may be as high as 80% (4,27).
5. Determine current eating habits and behaviours to identify possible areas of concern post-surgery.
6. Educate patient regarding the type of procedure and physiology of action.
7. Clearly inform the patient that bariatric surgery is a "tool" that will facilitate initial weight loss, but long-term success is based around the development of new healthy food habits and lifestyle behaviours.
8. Discuss possible weight re-gain and use of revisional surgery or pharmacotherapy as tools to manage this.
9. Educate regarding the pre surgery VLED protocol.
10. Provide an overview of the post-surgery dietary phases and return to full diet, with a discussion explaining details of how eating changes after bariatric surgery.

List of Bloods

Nutritional bloods should be ordered, and any deficiencies corrected well before surgery.

Thus, nutritional screening should be completed at least one-month prior to surgery to allow for corrections to begin.

It is important to conduct further post-surgical testing at 6 and 12 months (and sooner if concerned about pre surgical deficiencies).

As well as routine baseline biochemical markers Additional tests recommended before RYGB, Mini the following micronutrients should be screened. Omega Loop Bypass, malabsorptive or revisional ASMBS Micronutrient update (4, 10, 27) recommends procedures or in patients of nutritional concern: routine pre surgery screening of the following:

- Full Blood count
- Iron studies• Zinc
- Active Vitamin B12• Serum Copper
- Folic acid (RBC folate homocysteine)• Vitamin K and Vitamin E
- Serum 25-hydroxy Vitamin D • Selenium
- PTH
- Vitamin A
- Thiamine

Medical Comorbidities

Advice should be obtained from the patient's medical practitioner or bariatric surgeon regarding suitability for VLED and management of medications and possible adjustment of the VLED program to meet client's individual requirements. For example - those with diabetes, especially type 1 diabetes, or type 2 requiring insulin will require advice regarding insulin titration.



Calculation of Protein Requirements

As discussed, bariatric patients often have high protein requirements pre surgery and face weeks of compromised nutrition post-surgery. It is vital that the pre surgery VLED adequately meets protein needs. Therefore, protein requirements must be accurately and individually calculated for bariatric patients both pre and post operatively (see protein calculations below).

Formulite is the highest protein containing VLED shake on the Australian market allowing protein targets to be more easily met.

Formulite's high protein shake formulation with 35 g/serve meets the needs of all but BMI > 50 men with a straightforward 3 shakes/day program.

Calculation of protein requirements will allow determination of the number of shakes/day as well as any additional foods required to meet protein needs.

As with any obese population, energy calculations should be made using ADJUSTED IDEAL BODY WEIGHT AIBW (1).

This takes into account the 25% excess metabolically active tissue, in an obese individual.

ABW=Actual body weight IBW = Ideal body weight (weight at BMI 25)
AIBW = (Actual weight - IBW) x 0.25 + IBW E.g. Actual weight 135 kg height 168 cm weight at BMI 25 = 71 kg
AIBW = ((135-71) x 0.25) + 71 = (64 x 0.25) + 71 = 71+16 = 87
Protein Requirements = 87 g/day (1 g protein/kg AIBW/day)

Current guidelines vary but recommend 0.75-1 g protein/kg and studies show protein >0.8g/kg/IBW is required to prevent excess loss of lean tissue during a VLED (12,14,26).

We recommend at least 1 g protein/kg AIBW/day, and advise individual circumstances to be considered, taking into account factors discussed in Protein Status pages.

Post-surgery this should increase to at least 1.5g protein/kg AIBW/day to attenuate lean muscle loss (14,18,19,20) and calculations should be made based upon individual patient requirements

Recalculations should be made as weight reduces post-surgery and use of IBW once BMI < 30 considered.

Essential Components of the VLED

Liver preparation is achieved by limiting carbohydrate intake to between 50-100 g/day (1) to exhaust glycogen stores thus facilitating shrinkage and achieving desired pre surgery benefits.

In order to achieve both weight loss and adequate liver preparation, it is important to choose additional foods only, from the allowed extras list. Avoid all food and beverage from the avoid list-alcohol, sugars and foods containing extra carbohydrates.

Foods to include

1. Formulite shakes
2. Additional low carbohydrate foods and drinks- Allowed extras table below
3. Additional essential fat
4. Additional protein to meet individual requirements
5. 2 litres of water daily

Additional low carbohydrate foods are required to meet daily micronutrient requirements (including folate for women of childbearing age). They also help provide dietary fibre, variety and snack option.

2. Allowed extras

These foods may be used at each meal - a total of 2 cups of vegetables or salads each day.

Vegetables & Salads	Condiments	Beverages
asparagus bamboo shoots bean sprouts beans, green beetroot basil bok choy broccoli Brussel sprouts cabbage capsicum cauliflower carrot celery choko choy sum cucumber eggplant	endive garlic ginger leeks lettuce marrow mushrooms onion spring onion pumpkin radish radicchio rocket sauerkraut silverbeet spinach tomato zucchini	fresh or dried spices fresh or dried herbs chilli sauce (not sweet chilli) fresh or dried herbs soy sauce (not other e.g. oyster) vinegars - balsamic (not reduced), apple cider vinegar garlic ginger lemongrass lemon juice lime juice vegemite promite mustard curry powder or paste (not sauces) stock or clear broth
		soda water diet cordials miso soup mineral water spring water diet soft drink - but encouraged to limit coffee, 2/day (dash of milk) coffee substitutes
		Fruit 1-2 cups of fresh or frozen berries 2-3 passionfruit 1 small fruit (e.g. apple orange or pear)
		Others diet jelly sugar free gum

Foods to avoid

Carbohydrates	Drinks	Vegetables	Sugars	Alcohol
bread, rice, pasta, all other grains, fruits not on extras list, vegetables not on above tables, crackers, legumes	soft drink cordials & juices milk based products	potato sweet potato corn	confectionery chocolate	all alcohol

3. Essential Fats help reduce the risk of gall bladder complications (25).

Sources of essential fats - 1 choice daily recommended from the following:

- 10 (approx. 15 g) raw nuts
- 1/4 medium avocado
- 5 ml oil (1 teaspoon)

4. Additional Protein may be used if the 3-shake program does not meet protein needs or to replace a shake in a combination meal and shake program.

Examples of food protein sources:

- 100 g lean beef (approx. 65 g cooked) = 25 g protein
- 100 g poultry (approx. 80 g cooked) = 26 g protein
- 120 g fish (approx. 100 g cooked) = 24 g protein
- 2 eggs = 12 g protein
- Tofu 130 g = 15.5 g protein
- 160 g natural or high protein (low carb) yoghurt = protein 10 g • 1 cup milk = 9 g protein

Duration Of VLED

The VLED duration is typically 14 days to achieve maximal liver shrinkage.

Patients with greater adiposity i.e. BMI > 45 with comorbidities or steatosis or steatohepatitis may require a longer duration and duration should be individually assessed.

We would also suggest consideration of a 'weaning in period' where a minimal or no alcohol and sugar intake, combined with a reduced carbohydrate diet is utilized prior to the meal replacement VLED plan for those with Diabetes, NASH (Nonalcoholic Steatohepatitis), or excess alcohol intake.

A VLED program (3 shakes/day) may be followed for a period of up to 12 weeks if required. We would suggest (for patient acceptability and compliance) consideration of a 2 shake and 1 meal program if long term use is required.



VLED Formulation

Formulite may be used as:

- A complete 3 meal replacement program

Or alternatively as



- A 2 shake and 1 protein and low carb veg/salad meal

Factors to consider when formulating your plan include:







- Patient preference - some like to join a family meal in the evenings
 - Duration of VLED - individuals on the program for longer than 2 weeks often have improved compliance with a combination VLED and meal option
- Patient lifestyle - shift workers, those not office based or those who regularly miss meals, may find shakes more convenient
- Medical comorbidities - patients with diabetes may need mid meal and pre dinner carbohydrate snack
- To improve compliance some patients may like a diet jelly for desert

Meal Plan Examples

2 Shakes/Day Low Carb Meal Plan

<p>Breakfast 1 Formulite Shake & piece of fruit</p>	
	<p>Morning Snack 200g natural or high protein/low carb Yoghurt</p>
<p>Lunch 1 Formulite Shake</p>	
	<p>Afternoon Snack 1 Small Orange & 30g raw almonds</p>
<p>Dinner Thai Chicken Patties with Asian Salad</p>	
	<p>Supper 1 Cup Herbal Tea</p>

3 Shakes/Day Plan

<p>Breakfast 1 Formulite Shake & piece of fruit</p>	
	<p>Morning Snack Healthy Snack 1 cup of carrot sticks</p>
<p>Lunch 1 Formulite Shake</p>	
	<p>Afternoon Snack Healthy Snack 1 cup of berries</p>
<p>Dinner 1 Formulite Shake & 1 cup of Stir-fried Veggies</p>	
	<p>Supper 1 cup of herbal tea</p>

The quantity of protein in this low carb meal will be determined by individual protein requirements but we suggest the inclusion of 1 dairy serve - such as milk coffee (200 ml reduced fat milk) or yoghurt (160 g natural or low sugar/high protein) plus lean protein meat or alternative:

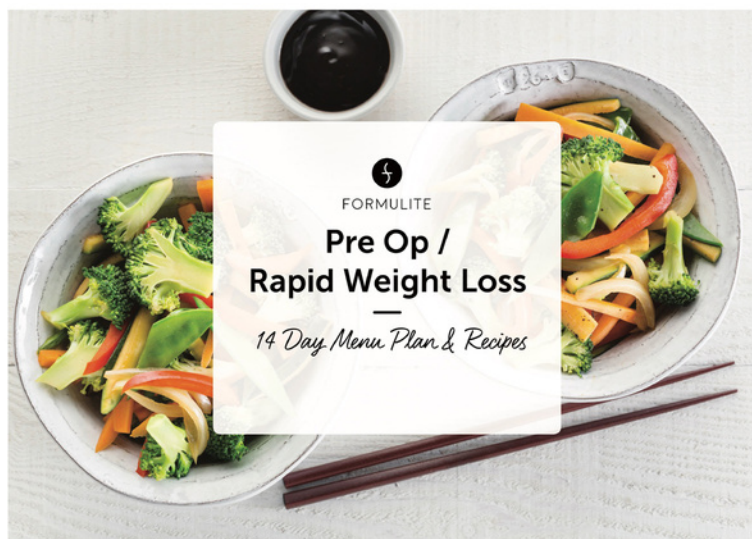
Women = 80 - 100 g lean protein

Men = 100 - 120 g lean protein

Program	Protein	Total Protein
3 Formulite Shake Plan	100 g	105 g
2 Formulite 100 g meat 1 dairy	70 g 25 g 9 g	104 g
2 Formulite 120 g meat 1 dairy 2 eggs	70 g 30 g 9 g 12 g	121 g

Note : Those with very high requirements may have 3 shakes/day + 1 meal which will provide an extra 35 g protein daily but only 10.6 g carbohydrate.

Refer to the Formulite VLED Meal Plan & Recipe eBook for menu suggestions and recipes.
Available on request from info@formulite.com.au



Monitoring

Regular monitoring by surgeon or specialist is essential for patients with comorbidities or medical concerns.

Close monitoring of medical status as well as possible titration of medication is important for all patients, especially those with diabetes, hypertension, renal or cardiac comorbidities.

Patients requiring psychotropic medication, anticonvulsants or anticoagulant medications should be regularly reviewed by a medical practitioner.

Dietitian review for ongoing education and support is advised for those on an extended period VLED e.g. longer than 4 weeks.

The VLED can be challenging for some and dietitian support to assist with the establishment of regular eating practices, avoidance of alcohol and sugary beverages as well avoidance of take away and snacks foods is invaluable. This assists development of healthy eating behaviours post-surgery.

POST-SURGICAL NUTRITIONAL PHASES

Phase 1 Liquids

- In the post-operative phase, time periods vary between procedures and surgeons, but an initial 2-week fluid program is often advised (4).
- Meeting nutritional requirements during this phase is difficult and continuation of a VLED product such as Formulite, allows protein and nutritional needs to be more adequately met.
- Volumes of fluids consumed will be small - initially 50 ml/hr and building up over the first couple of days to reach an ideal intake of at least 1.2 L - 1.5 L daily.
- Dehydration and constipation can be a concern if fluid intake is inadequate and meeting daily targets should be encouraged.
- Avoidance of fluids containing sugar, carbonation and excess fats are advised to minimise possible dumping syndrome and nausea.
- Formulite may be used as the major component i.e. 3-4 shakes/day in this fluid phase or may be used in conjunction with other nutritious fluids including soups, milk-based drinks, and other low energy nutritious non-carbonated beverages.
- Continued use of a VLED shake or soup as opposed to protein shakes is advised due to a more comprehensive macro and micro-nutrient profile in the VLED products.
- Rapid weight loss occurs during this period and it is essential to meet protein requirements - as per pre surgery calculations in order to assist minimisation of lean muscle loss (1, 16).
- Commencement of daily multivitamins and calcium supplementation as per ASMBS guidelines is advised (5, 27).

Phase 2 Pureed diet

- Once again time frames vary between procedures and surgeons, but a 2 week pureed phase typically follows the 2-week fluid phase.
- Nutritious foods smooth pureed (1/2 cup per serve) form the basis of this phase.
- Use of a Formulite shake provides a valuable 35g protein as well as micronutrients, fibre and pre and probiotics which are all most valuable at this time.
- A shake also provides an opportunity for a quick and easy meal, whether it be breakfast (which is often previously missed in the bariatric population) or a convenient lunch at work, when a pureed meal may be difficult to prepare.

Phase 3 Soft diet

- Transition to soft mashable moist foods occurs generally at week 5 and duration is usually 2 weeks.
- Once again, a Formulite shake assists meeting protein and nutritional requirements and offers a convenient meal option.

Phase 4 Full Diet

- At week 8-10 normal consistency foods may be slowly re introduced.
- At this time, the principles of mindful eating should be discussed as SMALL and SLOW should form the basis of eating behaviours.
- As weight reduces, recalculation of protein requirements should be undertaken. When BMI approaches 30, Ideal Body weight (IBW) may be substituted for the AIBW actual ideal body weight that has been used to date.
- It is advised that protein targets be at least 1g protein/kg ideal body weight (IBW) and up to 2.1g protein/Kg/day post-surgery in those with greater needs to attenuate lean muscle loss (4,13,14) - protein requirements should be individually determined for each patient
- Some patients chose to continue to use a Formulite shake long term.

BENEFITS OF FORMULITE

Highest protein VLED with 35 g/serve - this allows the high protein needs of most bariatric patients to be easily met. Additional protein sources are not required (unless male and BMI > 50) if patients prefer a shake only program.

Low carbohydrate content 10.6 g/serve and only 3.1 g sugar/serve

A low carbohydrate VLED allows for the addition of extra food choices such as dairy, which assist nutrition as well as compliance, while not compromising liver shrinkage.

Gluten free and low lactose – average of 2.2 g per serve and contains no milk powder. Usually **well tolerated** by those sensitive to lactose.

Source of pre and probiotics Lactobacillus acidophilus and Bifidobacterium lactis.

Source of pre and probiotics Bromelain aids with **digestive enzyme** digestibility and tolerance.

Contains Dietary fibre - A soluble prebiotic dietary fibre which aids constipation management and assists **gut health**.

Whey protein concentrate, whey protein isolate and micellar casein – increases satiety and attenuates loss of muscle mass.

Contains Leucine - a vital amino acid involved in muscle synthesis and maintenance (13).

Source of Omega 3 fats - which assist in cardiovascular health and reduces inflammation.



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