Obesity & Diet

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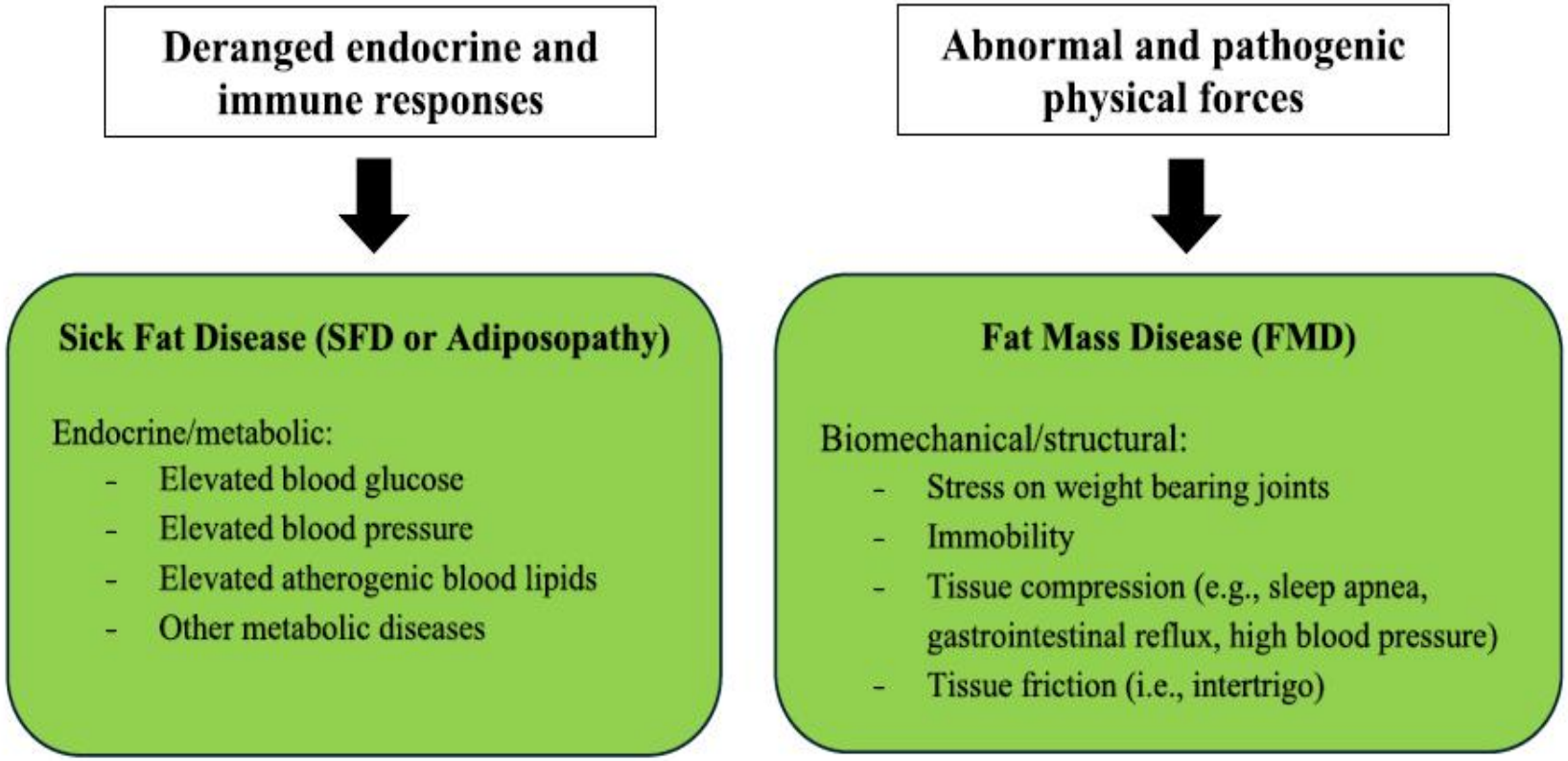
Is Obesity a Disease?

According to the OMA, obesity is defined as a: "Serious, chronic, progressive, relapsing, and treatable multi-factorial, neurobehavioral disease, wherein an increase in adiposity promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences" [2]

Why is it important to manage obesity?

- CVD
- T2DM
- HTN
- Dyslipidemia
- Thrombosis
- Sleep Apnea
- Mental Stress
- Cancer



How is obesity diagnosed?

Common BMI criteria for overweight and obesity include [2]:

- BMI $\geq$25 kg/m^2 = overweight or pre-obesity
- BMI $\geq$30 kg/m^2 = obesity
- Central obesity = waist circumference $\geq$40 inches (102 cm) for males and $\geq$35 inches (88 cm) for females

These diagnostic criteria may not apply to all patients. For example, among Asian individuals [16], criteria may include:

- BMI $\geq$23–24.9 kg/m^2 = overweight or pre-obesity
- BMI $\geq$25 kg/m^2 = obesity
- Central obesity = waist circumference $\geq$35.4 inches (90 cm) for Asian males; $\geq$31.5 inches (80 cm) for Asian females

More Accurate Measurements

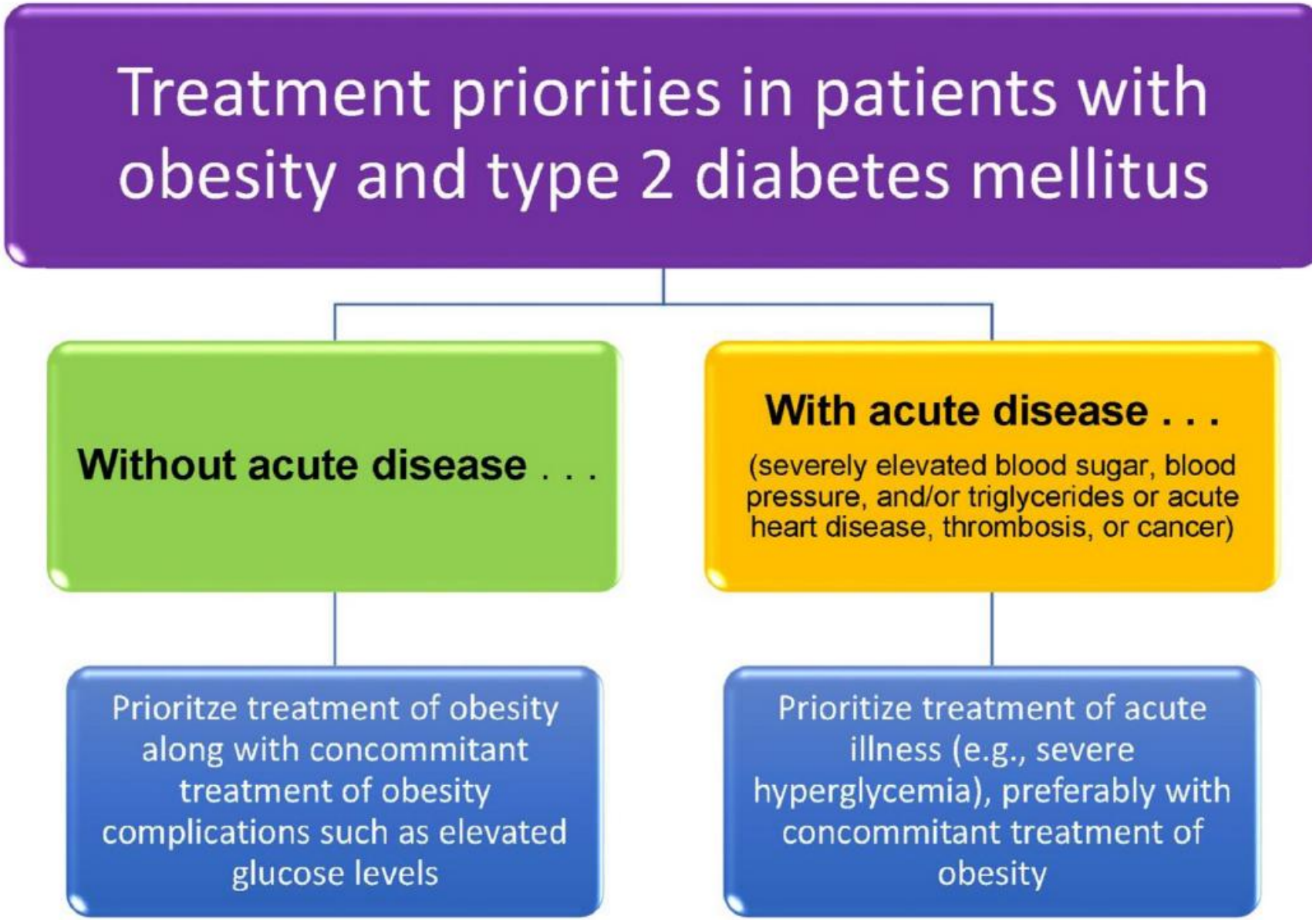
Obesity Medicine Association Classifications of Percent Body Fat in Adults as Assessed by DXA

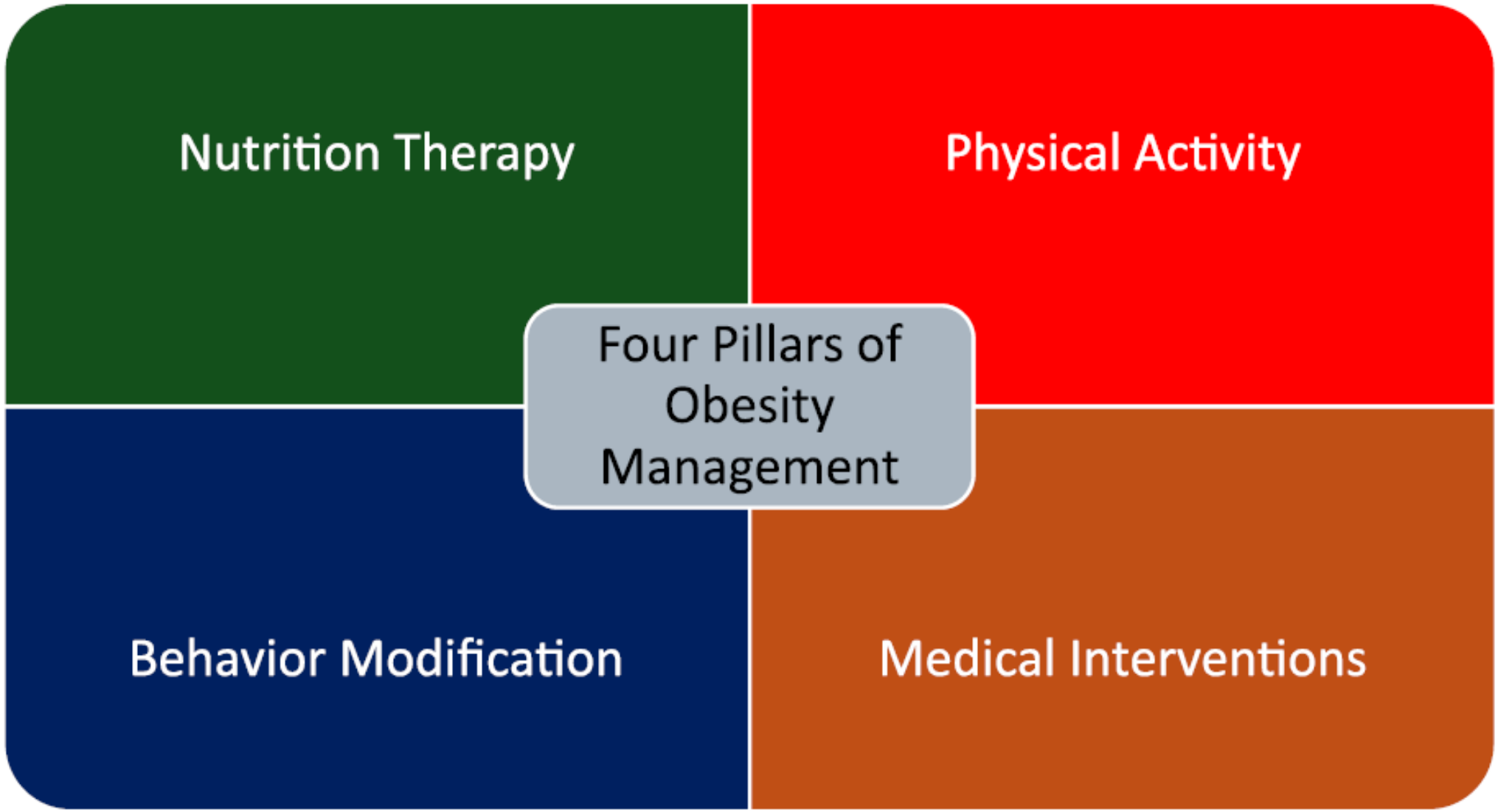
	Women	Men
Essential fat	<15 %	<10 %
Athlete	15–19 %	10–14 %
Fitness	20–24 %	15–19 %
Acceptable	25–29 %	20–24 %
Pre-obesity	30–34 %	25–29 %
Obesity	≥35 %	≥30 %

Barriers of obesity management



Degree of weight reduction associated with improvement in health condition	Medical conditions
≥2.5 % weight reduction	• Improvement in glucose metabolism • Reduction in triglyceride blood levels • Improvement in polycystic ovary syndrome and infertility
≥5.0 % weight reduction	• Improvement in Impact on Weight on Quality-of-Life score • Improvement in depression • Improvement in mobility • Improvement in knee functionality, as well as improvement in walking speed, distance, and pain among patients with knee osteoarthritis • Reduction in hepatic steatosis • Improvement in urinary incontinence • Improvement in sexual function • Increase in high density lipoprotein cholesterol levels • Improvement in health care costs
≥10 % weight reduction	• Improvement in sleep apnea • Improvement in non-alcoholic steatohepatitis[a]
>15 % weight reduction	• Potential reduction in cardiovascular and overall mortality


Treatment priorities in patients with obesity and type 2 diabetes mellitus
Without acute disease . . .
With acute disease . . .
(severely elevated blood sugar, blood pressure, and/or triglycerides or acute heart disease, thrombosis, or cancer)
Prioritze treatment of obesity along with concommitant treatment of obesity complications such as elevated glucose levels
Prioritize treatment of acute illness (e.g., severe hyperglycemia), preferably with concommitant treatment of obesity


Nutrition Therapy
Physical Activity
Four Pillars of Obesity Management
Behavior Modification
Medical Interventions

Claiming Your Health by Claiming Your History

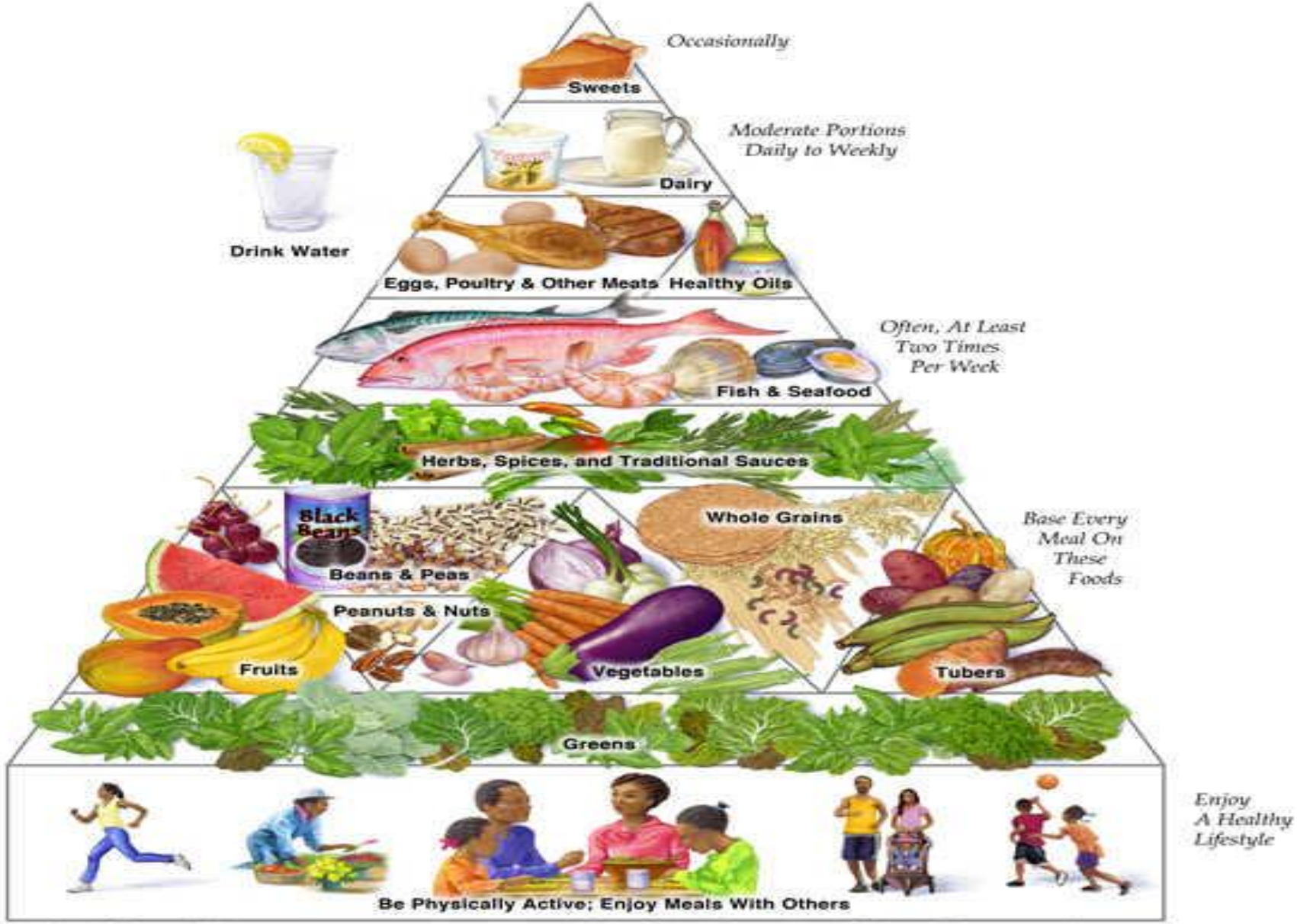


Illustration by George Middleton

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Anti-obesity medications indicated for long-term use. Anti-obesity medications should be avoided with pregnancy, during lactation, or if there is a known hypersensitivity to any of the components. Orlistat is rarely used in clinical practice and was omitted from this table. For a summary of orlistat, see Ref. [52].

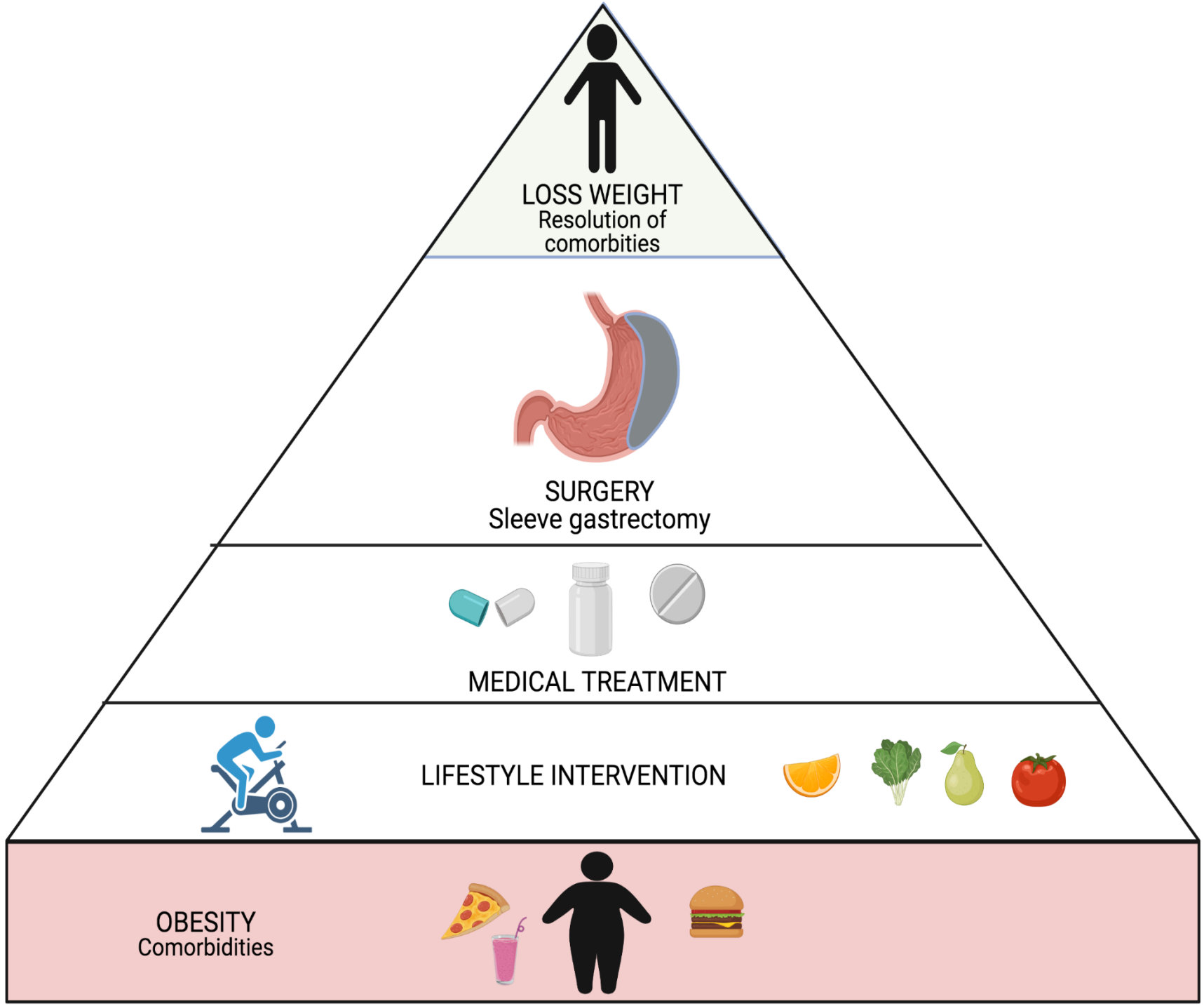
Medication	Phentermine/Topiramate ER 3.75/23→ 15/92 mg	Bupropion/Naltrexone 90/8 mg 1 qD→2BID	Liraglutide 0.6 mg→3.0 mg	Semaglutide 0.25 mg→2.4 mg	Tirzepatide 2.5 mg→15 mg
Dosing	Daily	Twice daily	Daily	Weekly	Weekly
Route	Oral Scheduled IV Controlled Agent	Oral	Injectable	Injectable	Injectable
Minimum Age	12 years	18 years	12 years	12 years	18 years
Contra-indications	Glaucoma Hyperthyroidism Taking or within 14 days of stopping monoamine oxidase inhibitors	Uncontrolled hypertension, seizure disorders, anorexia nervosa or bulimia, abrupt discontinuation of alcohol, benzodiazepines, barbiturates, and antiepileptic drugs, opioid use, during or within 14 days of taking monoamine oxidase inhibitors	Personal or family history of medullary thyroid carcinoma (MTC) or Multiple Endocrine Neoplasia (MEN) syndrome type 2	Personal or family history of MTC or in patients with MEN 2	Personal or family history of medullary thyroid carcinoma or in patients with Multiple Endocrine Neoplasia syndrome type 2
Side Effects	Glaucoma, change in mood, cognitive impairment, metabolic acidosis, decrease in renal function, paraesthesia, dizziness, dysgeusia, insomnia, constipation, and dry mouth	Nausea, constipation, headache, vomiting, dizziness, insomnia, dry mouth and diarrhea	Nausea, diarrhea, constipation, vomiting, injection site reactions, headache, hypoglycemia, dyspepsia, fatigue, dizziness, abdominal pain, increased lipase, upper abdominal pain, pyrexia, and gastroenteritis	Nausea, diarrhea, vomiting, constipation, abdominal pain, headache, fatigue, dyspepsia, dizziness, abdominal distension, eructation, hypoglycemia in patients with type 2 diabetes, flatulence, gastroenteritis, gastroesophageal reflux disease, and nasopharyngitis	Nausea, diarrhea, vomiting, constipation, abdominal pain, dyspepsia, injection site reactions, fatigue, hypersensitivity reactions, eructation, hair loss, gastroesophageal reflux disease
Reported weight loss	10 %	7 %	7–8 %	15 %	20 %

Nutrient	Preferred test	Baseline prior to SG, RYGB	Baseline prior to SADI-S, BPD/DS
Vitamin A (retinol)	Retinol serum		X
Vitamin Bl (thiamin)	Whole blood thiamin	X	X
Vitamin B9 (folate)	Red blood cell folate	X	X
Vitamin B12 (cyanocobalamin)	B12 serum, methylmalonic acid (MMA) serum (provides early sign of B12 deficiency)	X	X
Vitamin D (D2, (ergocalciferol) or D3, (cholecalciferol))	25-OH Vit D	X	X
Vitamin E (A-Tocopherol)	Vit E serum		X
Vitamin K	Vit K serum		X
Calcium (citrate)	Calcium, ionized, serum	X	X
Copper	Copper, serum		X
Iron	Iron and iron binding capacity	X	X
Zinc	Zinc, serum		X

SG: sleeve gastrectomy; RYGB: roux-en-Y gastric bypass; BPD-DS: biliopancreatic diversion with duodenal switch; SADI-S: single anastomosis duodenal-ileostomy with sleeve gastrectomy; OH: hydroxy.

Nutrient	Recommended supplementation SG or RYGB	Recommended supplementation BPD-DS, or SADI-S
Vitamin Bl (thiamin)	At least 12 mg oral daily	At least 12 mg oral daily
Vitamin B9 (folate, folic acid)	400 mcg oral daily (800 mcg oral daily for child-bearing women)	400 mcg oral daily (800 mcg oral daily for child-bearing women)
Vitamin Bl2 (cobalamin; cyanocobalamin synthetic form)	350 mcg oral daily	500 mcg oral daily
Vitamin A (retinol)	5000 IU (1500 mcg)/oral daily	10,000 IU (3000 mcg)/oral daily
Vitamin D (D3, cholecalciferol)	3000 IU (75 mcg)/oral daily	3000 IU (75 mcg)/oral daily
Vitamin E (alpha-tocopherol)	15 mg oral daily	15 mg oral daily
Vitamin K (phylloquinone)	90 mcg oral daily	300 mcg oral daily
Calcium (citrate)	1200 mg oral daily	1800 mg oral daily
Copper	2 mg oral daily	2 mg oral daily
Iron	45 mg oral daily	45 mg oral daily
Zinc'	16–22 mg oral daily	16–22 mg oral daily
Vitamin B2 (riboflavin)	200 % DV, (2.6 mg)	200 % DV, (2.6 mg)
Vitamin B3 (niacin)	20 mg daily (125 % DV)	200 % DV, (F: 28 mg; M: 32 mg)
Vitamin B5 (pantothenic acid)	200 % DV, (10 mg)	200 % DV, (10 mg)
Vitamin B6 (pyridoxine)	4 mg daily	4 mg daily
Vitamin B7 (biotin)	200 % *DV, (*60 mcg)	200 % DV, (60 mcg)
Vitamin C	120 mg daily	180 mg daily

RYGB: roux-en-Y gastric bypass; SG: sleeve gastrectomy, BPD-DS: biliopancre-


LOSS WEIGHT
Resolution of comorbities
SURGERY
Sleeve gastrectomy
MEDICAL TREATMENT
LIFESTYLE INTERVENTION
OBESITY
Comorbidities