



**Pennington Biomedical
Research Center**
Louisiana State University



Be the Reason

Annual Childhood Obesity Conference

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Empowering Teens:

A Practical Guide to Nutrition, Healthy Habits, and the Medical Management of Obesity

Presented by: Katie Queen, MD, FAAP, DABOM | Steven Heymsfield, MD |
Catherine Champagne, PhD, RDN

Disclosure

- Dr. Philip Raymond Schauer, a speaker for this activity, has disclosed relationships with Medtronic/Covidienm, Ethicon, GI Dynamics, Mediflix, Novo Nordisk, Eli Lilly, and Keyron, LTD.
- Dr. Steven Heymsfield, a speaker for this activity, has disclosed relationships with Regeneron, Eli Lilly, Novo Nordisk, and Tanita Corporation.
- Dr. Katie Queen, the speaker for this activity, has reported that she has financial relationships with Novo Nordisk, Rhythm Pharmaceuticals, and Vivus.
- All other speakers, planners, and reviewers for this activity have disclosed no relevant financial relationships with ineligible companies. All relevant financial relationships have been mitigated.
- **Accreditation:** This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Texas Medical Association (TMA) through the joint providership of Louisiana AAP and Pennington Biomedical Research Center. The Louisiana AAP is accredited by TMA to provide continuing medical education for physicians.
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From Stigma to Science: Medication Support for Teens with Obesity

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Katie Queen, MD

- Fellow of the American Academy of Pediatrics (FAAP)
- Diplomate of the American Board of Obesity Medicine (DABOM)
- Medical Director, Our Lady of the Lake Weight and Nutrition Center
- Assistant Professor, Adjunct – LSU Pediatrics
- Assistant Instructor, Gratis – Pennington Biomedical Research Center

Now Open!

Our Lady of the Lake Children's Health Weight & Nutrition Center

Many children struggle to maintain a healthy weight, whether that's due to genetics, environment or both. Our goal is to offer help before weight causes long-term health problems, and to prevent and treat complications such as diabetes and high blood pressure.

A parent's first step should be to discuss their concerns with their child's pediatrician who can look at recent growth trends, determine body mass index and whether further intervention is recommended. For patients needing more, Our Lady of the Lake Children's Health has established the Weight & Nutrition Center on the fourth floor of the Our Lady of the Lake Children's Hospital Medical Office Building.

At our center, patients meet with a pediatrician certified in pediatric obesity medicine, a dietitian and other specialists as needed. Patients receive specialized care and support as we work together to create healthy habits that will last a lifetime.



Katie Queen, MD

Who should make an appointment with the Weight & Nutrition Center?

Children and teens ages 2 to 17 with a BMI greater than or equal to the 95th percentile for age

- Those who have tried basic lifestyle changes without success
- Those who are concerned about weight-related problems such as pre-diabetes, high blood pressure or high cholesterol

What will happen during a Weight & Nutrition Center visit?

- A pediatrician with special training will assess your child and implement a personalized treatment plan
 - Weight-loss medication may be considered as well as voluntary participation in a research study
- A dietitian will take a comprehensive diet history and work with the family to make a sustainable nutrition plan
- The team will assess the family's ability to support the patient's treatment plan and provide resources for success

What should be done before a Weight & Nutrition Center visit?

- Though not required beforehand, we recommend the following baseline lab work, which can be ordered by your pediatrician:
 - Comprehensive metabolic panel
 - Fasting lipid profile
 - Hemoglobin A1C

How to refer your patient?

- Physicians within our network can enter a referral into EPIC ("ambulatory referral to healthy weight clinic")
- Non-network physicians can fax a referral to (225) 374-1678

Our Lady of the Lake Children's Health Weight & Nutrition Center
(Outpatient clinic of Our Lady of the Lake Regional Medical Center)
8200 Constantin Blvd., 4th Floor
Baton Rouge LA, 70809

For parents: (225) 374-HEAL
For providers: (225) 374-KIDS
Video Visits are available



OUR LADY OF THE LAKE
CHILDREN'S HEALTH

Learning Objectives

- **Describe** the role of obesity pharmacotherapy in the treatment of pediatric obesity.
- **Explain** the current FDA approved obesity medications, indications, and contraindications.
- **Increase awareness** of the chronic nature of obesity and the need for long term treatment of the underlying biology.

Presentation Overview

- 01** **Why Lifestyle Therapy is sometimes not enough – The Why**
- 02** **Obesity Pharmacotherapy – The What**
- 03** **Initiation & Maintenance – The When & How**
- 04** **Choosing The Appropriate Medication– The Who & Where**
- 05** **Take Home Message**

Why Lifestyle Change is Sometimes Not Enough

The Why

The Behaviors:

Eating Too Much,
Not Exercising Enough



The Biology:

Increased Hunger/Appetite
Decreased Satiety
Inefficient Energy Use

Which comes first?

Regardless of the Cause of Obesity...

Once obesity exists, then
the human metabolic
system is dysfunctioning.

The Behaviors:

Eating Too Much,
Not Exercising Enough



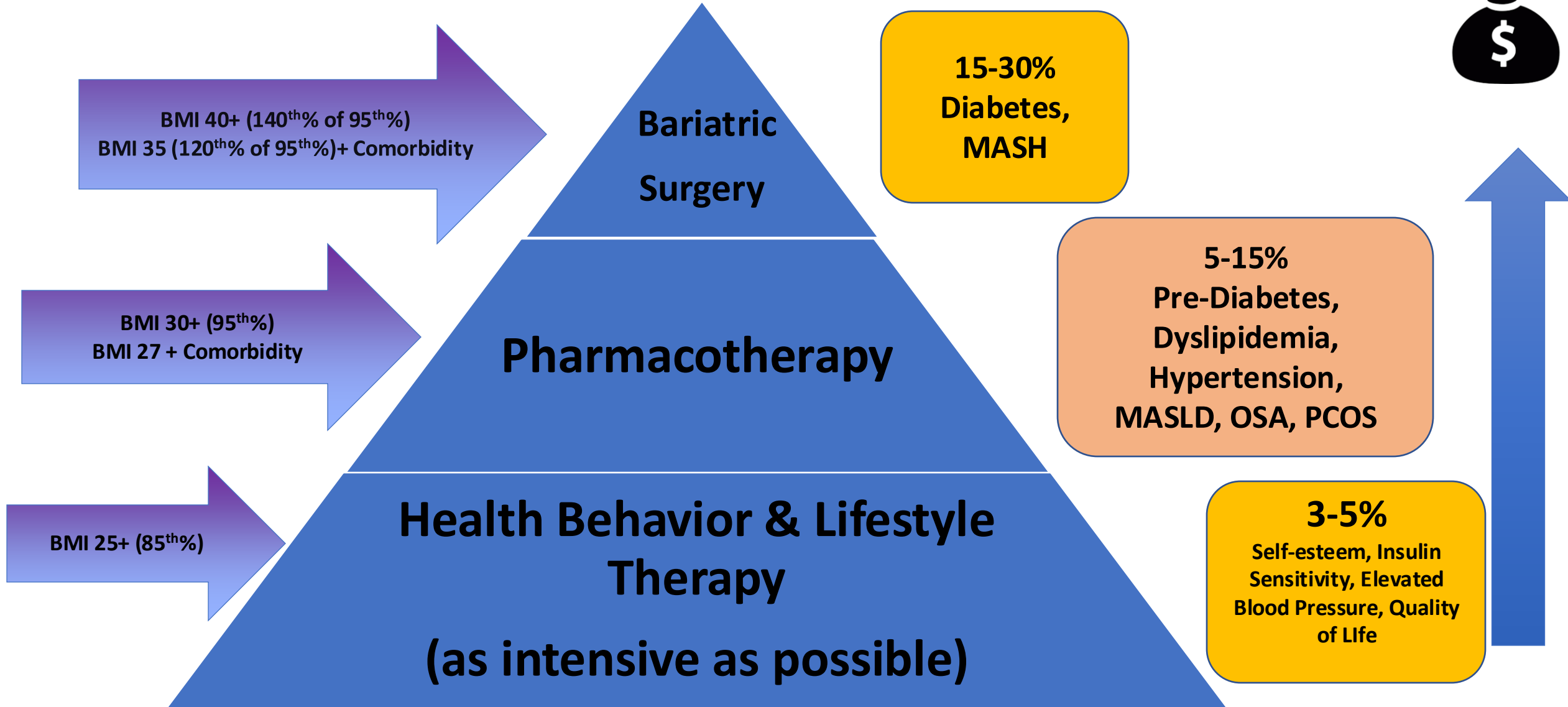
The Biology:

Increased Hunger/Appetite
Decreased Satiety
Inefficient Energy Use



Where
should we
focus our
treatment?

Treatment Pyramid



2023 AAP Pediatric Obesity Guidelines

KAS 12. Pediatricians and other PHCPs should offer adolescents 12 y and older with obesity (BMI $\geq$ 95th percentile) wt loss pharmacotherapy, according to medication indications, risks, and benefits, as an adjunct to health behavior and lifestyle treatment.

Consensus Recommendation: PHCPs **may offer** children ages 8 through 11 y of age with obesity wt loss pharmacotherapy, according to medication indications, risks, and benefits, as an adjunct to health behavior and lifestyle treatment.

Hampf SE, Hassink SG, Skinner AC, Armstrong SC, Barlow SE, Bolling CF, Avila Edwards KC, Eneli I, Hamre R, Joseph MM, Lunsford D, Mendonca E, Michalsky MP, Mirza N, Ochoa ER, Sharifi M, Staiano AE, Weedn AE, Flinn SK, Lindros J, Okechukwu K. Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents With Obesity. *Pediatrics*. 2023 Feb 1;151(2):e2022060640. doi: 10.1542/peds.2022-060640. Erratum in: *Pediatrics*. 2024 Jan 1;153(1):e2023064612. doi: 10.1542/peds.2023-064612. PMID: 36622115.

Obesity Pharmacotherapy

The What

Be the Reason: Annual Childhood Obesity Conference



FDA Approved Adolescent Obesity Medications

Semaglutide

- 12 yrs. +
- Weekly injection

Phentermine/
Topiramate

- 12 yrs. +
- Oral capsule daily

Liraglutide

- 12+ yrs.
- Daily Injection

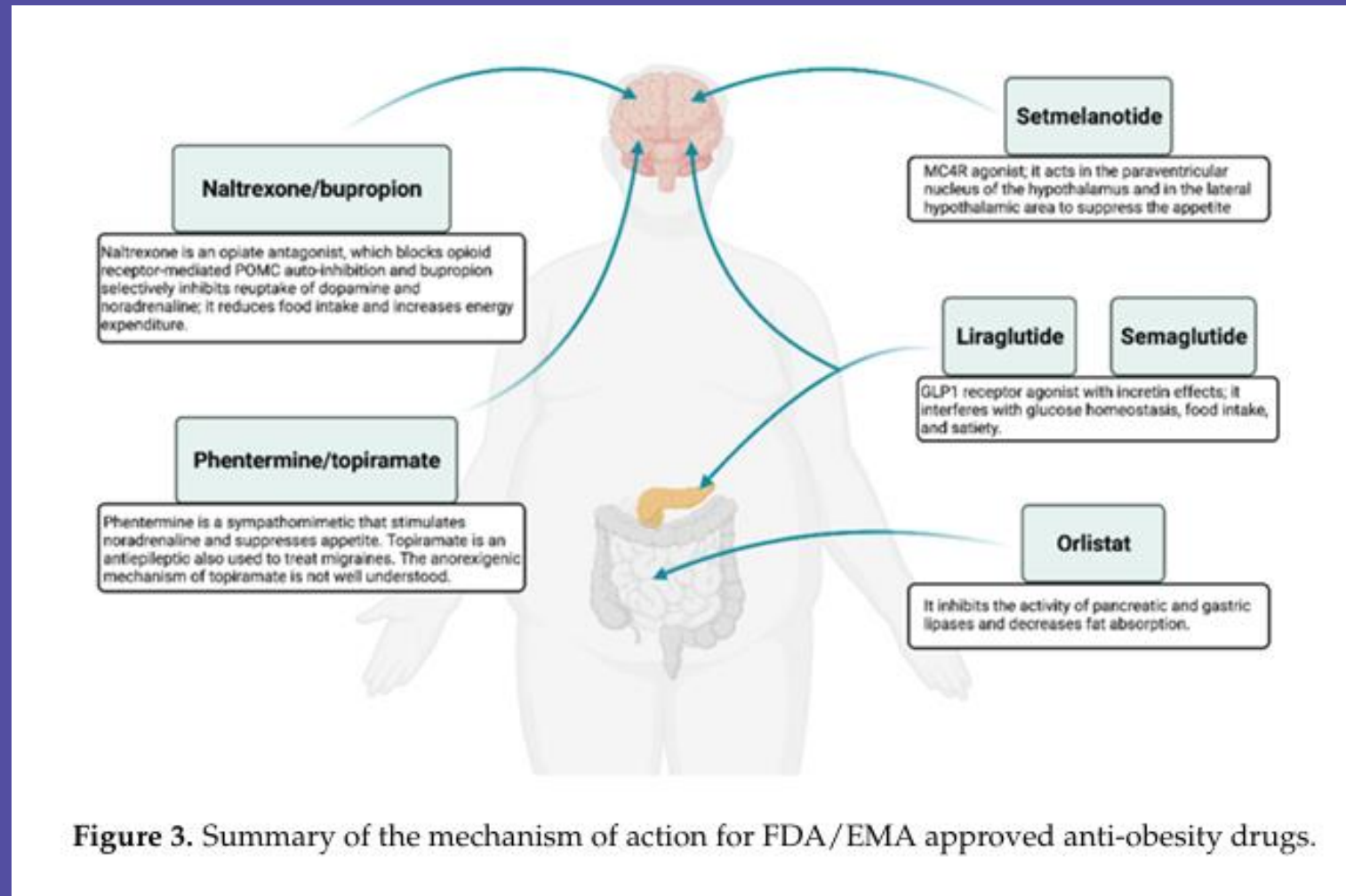
Phentermine

- 17+ yrs.
- Oral Capsule or Tablet
- Short-Term 90 days

~~Orlistat~~

- ~~• 12+ yrs.~~
- ~~• Oral Tablet TID~~

Obesity Medication Pathophysiology



Gjermani E, Kirstein AS, Kolbig F, Kirchhof M, Bundalian L, Katzmann JL, Laufs U, Blüher M, Garten A, Le Duc D. Obesity-An Update on the Basic Pathophysiology and Review of Recent Therapeutic Advances. *Biomolecules*. 2021 Sep 29;11(10):1426. doi: 10.3390/biom11101426. PMID: 34680059; PMCID: PMC8533625.

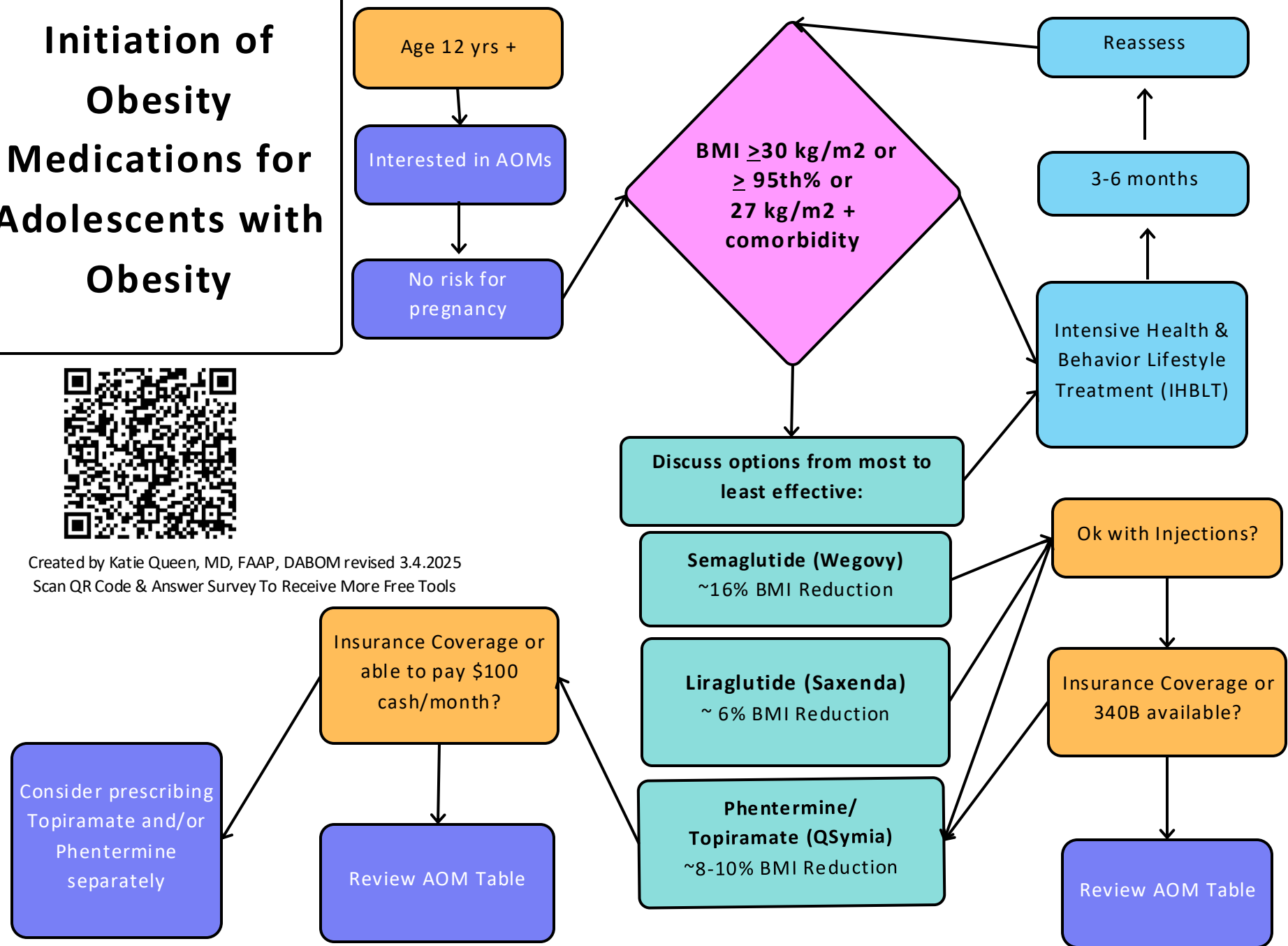
Initiation & Maintenance

The When & How

Initiation of Obesity Medications for Adolescents with Obesity



Created by Katie Queen, MD, FAAP, DABOM revised 3.4.2025
Scan QR Code & Answer Survey To Receive More Free Tools



FDA Approved Adolescent Obesity Medication Table

Created by Katie Queen, MD, FAAP, DABOM katiequeen3@gmail.com, revised 3.4.2025

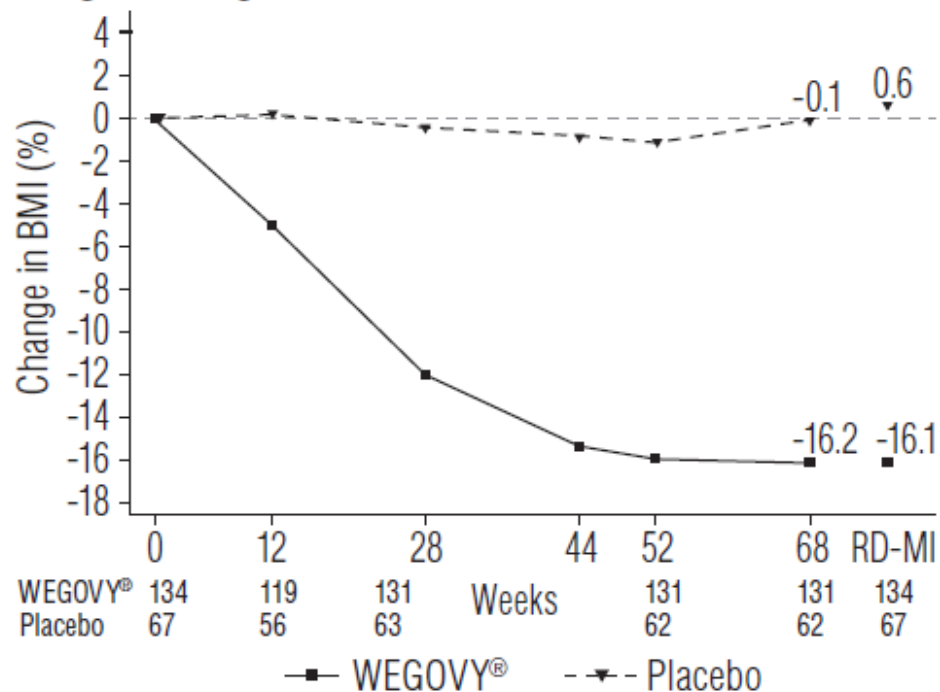
Medication & Dosing	Mechanism of action	Mean BMI reduction	Contraindications	Precautions/notes	Good For:	Side effects
Semaglutide ~ 0.25 mg weekly x 1 month 0.5 mg weekly x 1 month 1 mg weekly x 1 month 1.7 mg weekly x 1 month 2.4 mg weekly x 1 month	~ Binds and activates GLP-1 receptors in brain, gut, pancreas, heart to reduce hunger, improve satiety ~ Improves insulin sensitivity	~16%	~ Personal or FHx MEN2, medullary thyroid cancer ~ Pregnancy ~ Nursing	~ Pancreatitis ~ Gallbladder Dz ~ Taking insulin ~ Expensive \$\$	~ Prediabetes/Diabetes ~ Strong hunger (hungry brain) ~ Poor Satiety (hungry gut) ~ NAFLD	~ Nausea/Vomiting ~ Diarrhea/Constipation ~ Headache ~ Dyspepsia, Abd Pain ~ Fatigue/Dizziness ~ Injection site rxn
Phentermine/Topiramate ER 3.75 mg Ph/23 mg T QAM - Increase to 7.5 mg Ph/46 mg T after 2 weeks - If <3 % wt loss at 3 months, increase to 11.25 mg Ph/69 mg T x 2 wks then - Max 15 mg Ph/92 mg T - Can NOT stop abruptly, must wean off higher doses	~ Sympathomimetic, GABA receptor modulation ~ Carbonic anhydrase inhibition ~ Reduces hunger and cravings	~8-10%	~ Cardiovascular Dz ~ Uncontrolled HTN ~ MAOI Use ~ Hyperthyroid ~ Glaucoma ~ Hx Drug Abuse ~ Agitated State ~ Pregnancy ~ Nursing ~ Hypersensitivity Hx	~ Controlled Substance Class IV ~ Poor sleep ~ Other stimulant use ~ SSRIs ~ Insulin ~ Renal impairment ~ HTN ~ Alcohol Use ~ Kidney stones ~ Metabolic acidosis (*Monitor BMP or VBG) ~ Poor cognitive function, academic problems ~ Depression/SI	~ Strong Hunger (hungry brain) ~ Poor Satiety (hungry gut) ~ Low Energy (slow burner) ~ Low SES ~ Cravings (hungry brain) ~ Binge eating symptoms ~ Atypical anti-psychotic wt gain ~ Migraines/Headaches/IIH ~ Night eating ~ Hx seizures	~ CV: PPHTN or HTN Tachycardia ~ Insomnia ~ Dry Mouth, unpleasant taste ~ Overstimulation ~ Paresthesias ~ Fatigue, Dizziness ~ Constipation ~ Cognitive challenges ~ Depression ~ Arthralgias, Ligament sprain
Liraglutide 0.6 mg daily x 1 week, then 1.2 mg daily x 1 week, then 1.8 mg daily x 1 week, then 2.4 mg daily x 1 week, then 3 mg daily x 1 week.	~ Binds and activates GLP-1 receptors in brain, gut, pancreas, heart to reduce hunger, improve satiety ~ Improves insulin sensitivity	~6%	~ Personal or FHx MEN2, medullary thyroid cancer ~ Pregnancy ~ Nursing	~ Pancreatitis ~ Gallbladder Dz ~ Taking insulin ~ Expensive \$\$	~ Prediabetes/Diabetes ~ Strong hunger (hungry brain) ~ Poor Satiety (hungry gut) ~ NAFLD	~ Nausea/Vomiting ~ Diarrhea/Constipation ~ Headache ~ Dyspepsia, Abd Pain ~ Fatigue/Dizziness ~ Injection site rxn

Choosing the Appropriate Medication

The Who & Where

Semaglutide

Figure 8. Change from Baseline (%) in BMI in Pediatric Patients with Obesity Aged 12 Years and Older in a Weight Management Trial



Observed values for patients completing each scheduled visit, and estimates with multiple imputations from retrieved dropouts (RD-MI)

Efficacy:

~16% BMI reduction

~14.7% weight loss

Also Decreases In:

~ Waist Circumference

~ SBP/DBP

~ HgBA1c

~ LDL/Triglycerides

Semaglutide Dosing

Obesity

Wegovy

≥12 yrs

Dosing:

0.25 mg weekly x 1 mth, then
0.5 mg weekly x 1 mth, then
1 mg weekly x 1 mth, then
1.7 mg weekly x 1 mth, then
2.4 mg weekly

Diabetes, Type 2

Ozempic

≥ 18 yrs

Dosing:

0.25 mg weekly x 1 mth, then
0.5 mg weekly x 1 mth, then
1 mg weekly x 1 mth, then
2 mg weekly

WEGOVY® pen parts

Expiration date

(on the back) Check that WEGOVY® has not expired.

EXP:
LOT:

Always check you have the medicine and dose that your healthcare provider prescribed. Either:

0.25 mg / 0.5 mL

0.5 mg / 0.5 mL

1 mg / 0.5 mL

1.7 mg / 0.75 mL

2.4 mg / 0.75 mL

Pen window

Check that WEGOVY® is clear and colorless. Air bubbles are normal. They do not affect your dose.

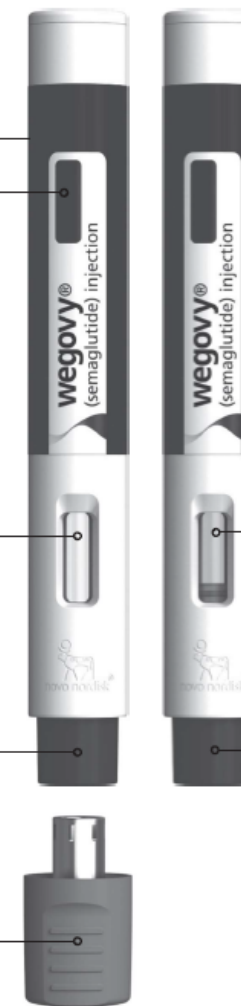
Needle cover

Needle is hidden inside.

Pen cap

Remove it just before you are ready to inject.

Before use After use



Pen window

Check that the yellow bar has stopped moving to make sure you received your full dose.

Needle cover

locks after use.

Source: Wegovy Package Insert FDA

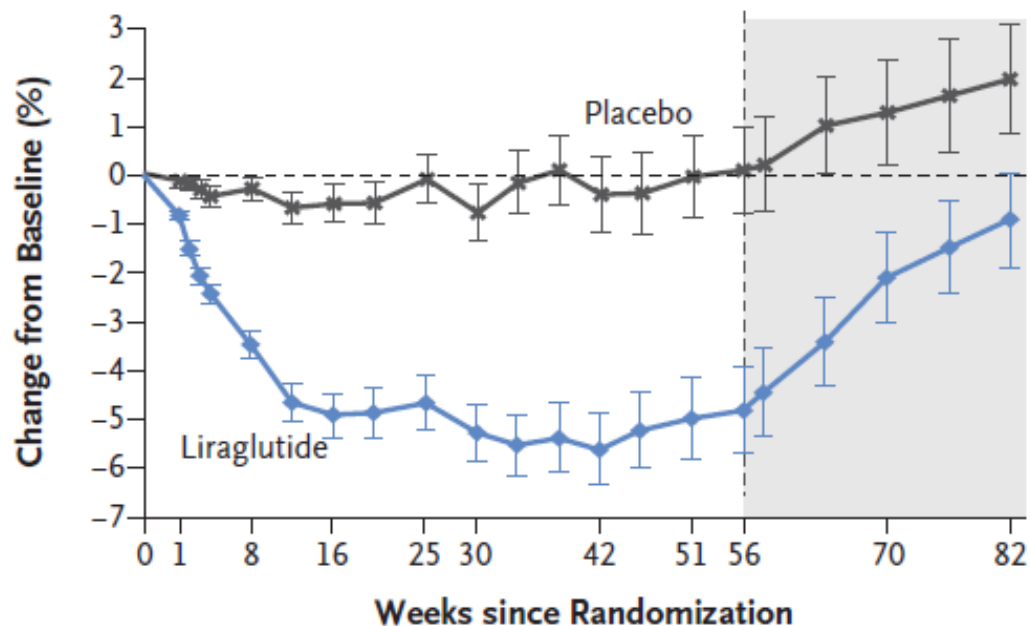
Liraglutide

Efficacy:

~6% BMI Reduction

~5% weight loss

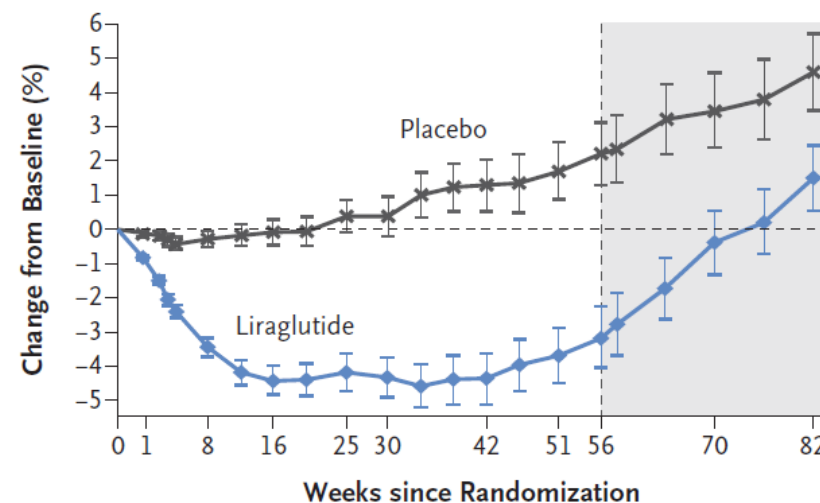
B Relative Change in BMI



No. of Participants

Placebo	126	125	123	116	116	105	101	105	97	102
Liraglutide	125	123	119	118	119	110	107	113	106	112

F Relative Change in Body Weight



No. of Participants

Placebo	126	125	123	116	116	105	101	105	97	102
Liraglutide	125	123	119	118	119	110	107	113	106	112

Also Decreases

In:

~ Waist

Circumference

~ SBP ~ HgBA1c

~ Fasting

Glucose



Liraglutide Dosing

Obesity

Saxenda

≥12 yrs

Dosing:

0.6 mg daily x 1 week, then
1.2 mg daily x 1 week, then
1.8 mg daily x 1 week, then
2.4 mg daily x 1 week, then
3 mg daily

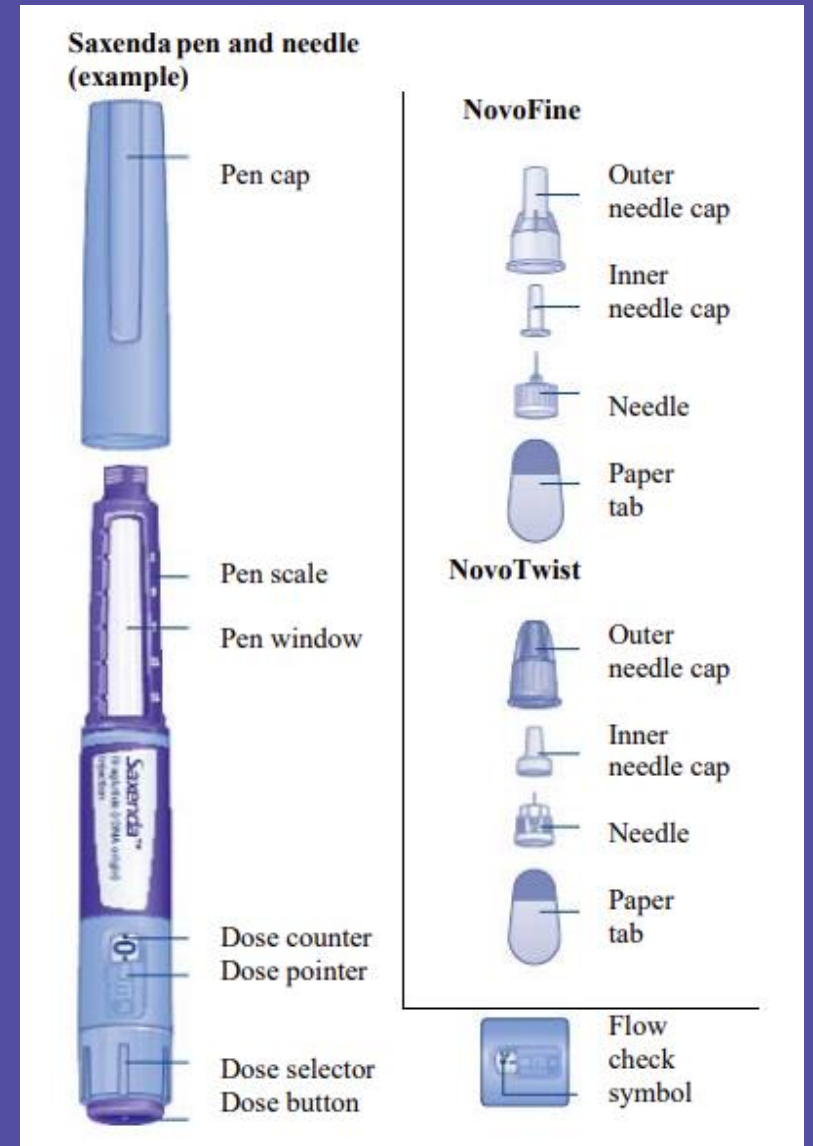
Diabetes, Type 2

Victoza

≥ 10 yrs

Dosing:

0.6 mg daily x 1 week, then
1.2 mg daily x 1 week, then
1.8 mg daily



Source: SAXENDA (liraglutide [rDNA origin] injection), (fda.gov)

GLP-1s: Semaglutide & Liraglutide

Good For:	Avoid If:	Caution If:
~ Prediabetes/Diabetes ~ Strong hunger (hungry brain) ~ Poor Satiety (hungry gut) ~ NAFLD	~ Personal or FHx medullary thyroid carcinoma (MTC) ~ MEN II ~ Pregnancy	~ Pancreatitis ~ Gallbladder Dz ~ Taking insulin (decrease by ~ 30%)

Common GLP1 Side Effects >5%:

- Nausea/Vomiting
- Diarrhea/Constipation
- Injection site reaction
- Headache
- Dyspepsia, Eructation
- Fatigue, Dizziness
- Abdominal Pain, Distension
- GERD, Gastroenteritis
- Nasopharyngitis



Eat slow, take on empty stomach



Don't Skip Meals



Focus on Hydration



Focus on Fiber & Protein

Follow Up

- Monthly x 3
- Monitor HR/BMI
- Monitor for SI
- Stop if <3% weight loss after 3 months



Injection Training



**SQ injection
abdomen, thigh, or
upper arm**



**Consider ondansetron
Rx**

Phentermine/Topiramate

Efficacy:

~ 10% BMI Reduction

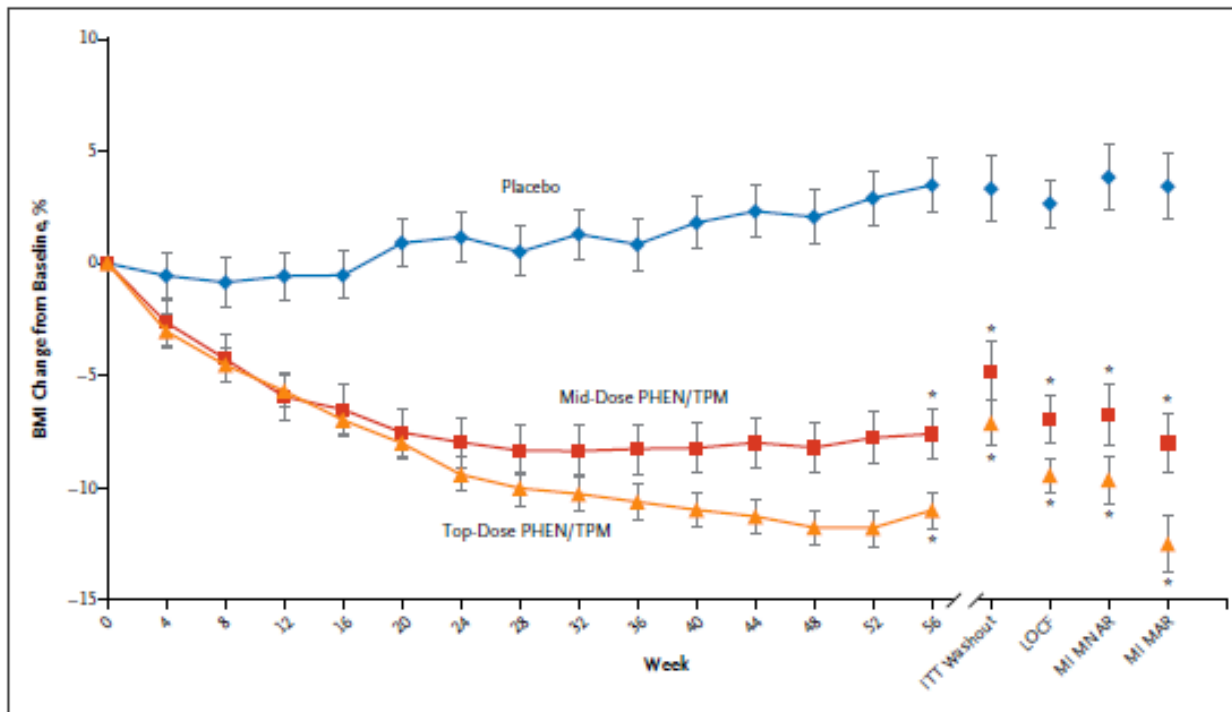


Figure 2 Percent Body-Mass Index Change Over Time.

Plot of least square means ($\pm$ SE) of percentage change in body-mass index (BMI) using observed data from baseline to week 56 by treatment group (with the primary analysis, modified intent-to-treat [ITT], and other imputation models). The mid and top doses are 7.5 mg/46 mg and 15 mg/92 mg of phentermine/topiramate (PHEN/TPM), respectively. LOCF denotes last observation carried forward, MAR missing at random, MI multiple imputation, and MNAR, missing not at random. * $P < 0.001$ versus placebo.

Also showed:
~ Increased HDL
~ Decreased TG
~ Decrease SBP

Phentermine/Topiramate (QSymia) Dosing

Weeks 1-2

- 3.75/23 mg QAM

Weeks 3-4

- 7.5/46 mg QAM

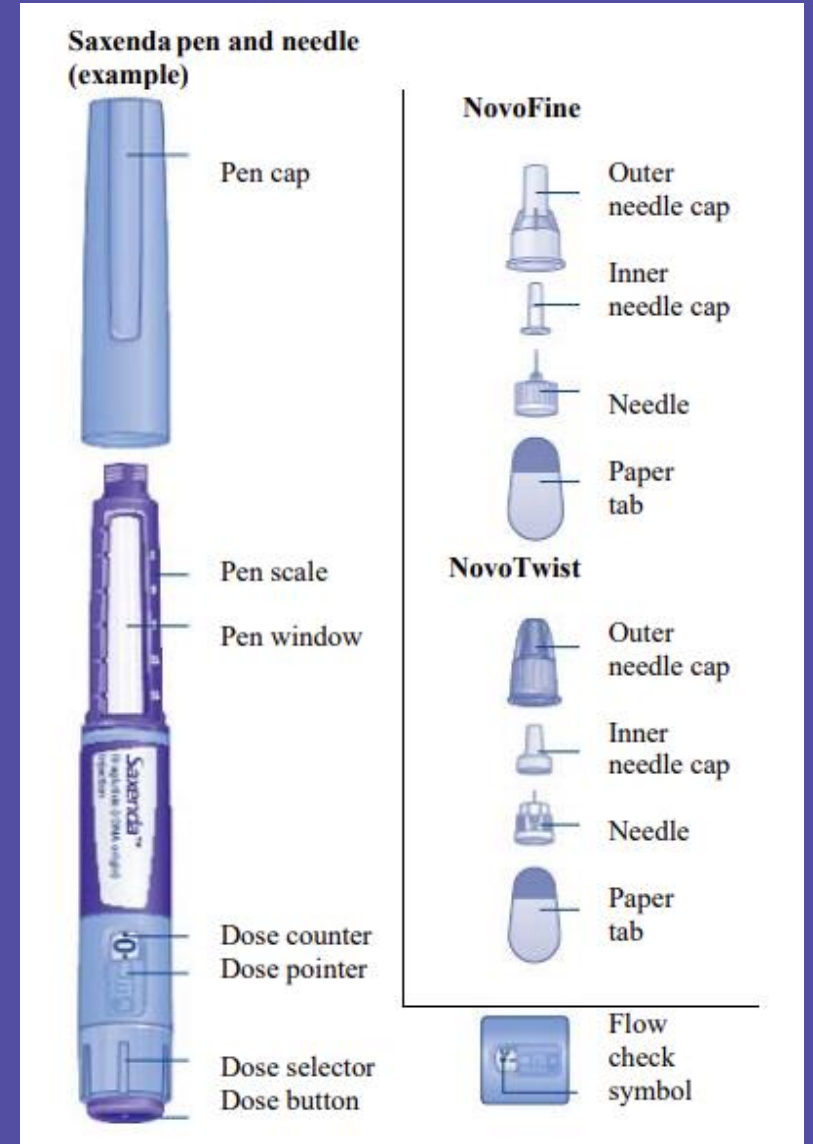
If <5% weight or BMI reduction after 12 weeks...

Weeks 13-14

- 11.25/69 mg QAM

Weeks 3-4

- 15/92 mg QAM
- *Requires taper off



Source: SAXENDA (liraglutide [rDNA origin] injection), (fda.gov)

Phentermine/Topiramate

Good For:	Avoid If:	Caution If:
~ Strong Hunger (hungry brain) ~ Poor Satiety (hungry gut) ~ Low Energy (slow burner) ~ Low SES ~ Cravings (hungry brain) ~ Binge eating symptoms ~ Atypical anti-psychotic wt gain ~ Migraines/Headaches/IIH ~ Night eating ~ Hx seizures	~ Cardiovascular Dz ~ Uncontrolled HTN ~ MAOI Use ~ Hyperthyroid ~ Glaucoma ~ Hx Drug Abuse ~ Agitated State ~ Pregnancy/Nursing ~ Hypersensitivity Hx	~ Poor sleep ~ Other stimulant use (ex. ADHD) ~ SSRIs ~ Insulin ~ Renal impairment ~ Controlled HTN or High BPs ~ Drinking alcohol ~ Kidney stones ~ Metabolic acidosis ~ Poor cognitive function, academic problems ~ Depression/SI

Potential Side Effects:

- CV: PPHTN or HTN
- Tachycardia
- Insomnia
- Dry Mouth, unpleasant taste
- Overstimulation
- Paresthesias
- Fatigue, Dizziness
- Constipation
- Cognitive challenges
- Depression
- Arthralgias, Ligament sprain

- Controlled substance, Class IV
- This is NOT Phen-Fen
- No Abuse/dependence
- + Teratogenic Potential

Follow Up

- Monthly x 3
- Monitor HR/BP/BMI
- Stop if <3% weight loss after 3 months
- Check BMP 3-6 mth after starting (Bicarb, Creatinine) & Q6-12 mths
- Decrease dose if Bicarb <15 meq/L & repeat 1 mth
- Continue to assess pregnancy risk

Check baseline CV exam, BP, HR, BMP, UPT?

Know your state prescribing rules

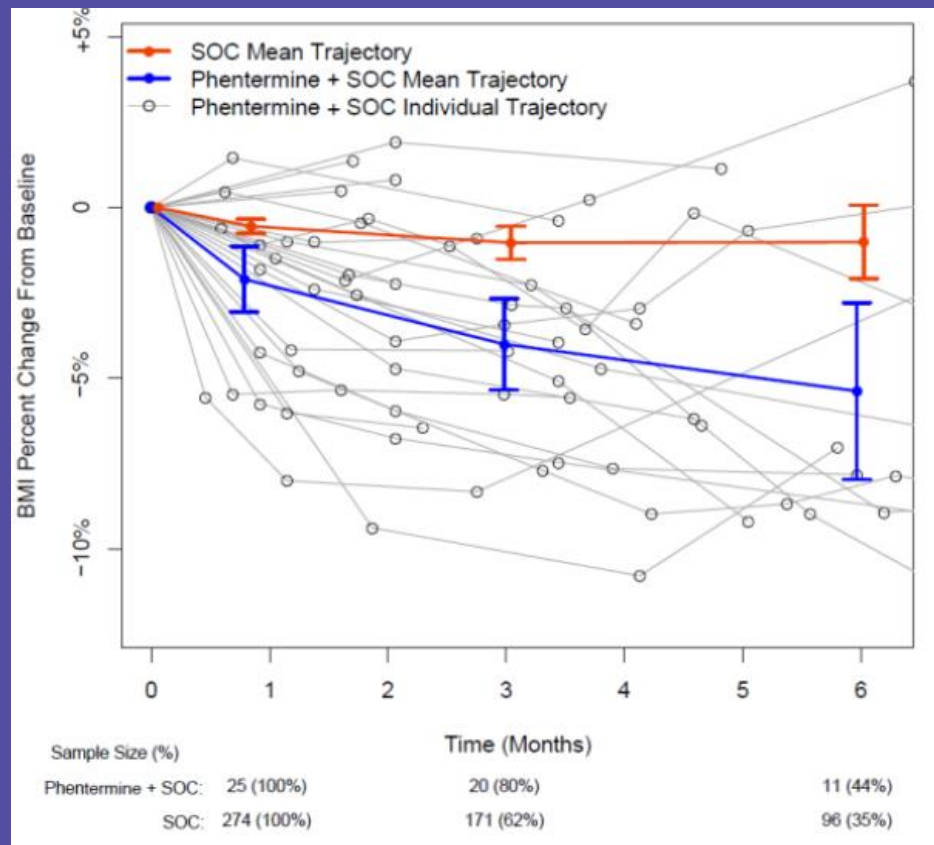
**Use Good RX for generic (<\$100)
Use Qsymia Engage for brand (\$100)**

Can build tolerance w/i weeks

Phentermine

Efficacy:

~ 5% BMI Reduction



Source: Ryder et al. Int J Obesity 2017

Also showed:
~ Increased HDL
~ Decreased TG
~ Decrease SBP

Phentermine

Good For:	Avoid If:	Caution If:
~ Strong Hunger (hungry brain) ~ Low Energy (slow burner) ~ Low SES	~ Cardiovascular Dz ~ Uncontrolled HTN ~ MAOI Use ~ Hyperthyroid ~ Glaucoma ~ Hx Drug Abuse ~ Agitated State ~ Pregnancy/Nursing ~ Hypersensitivity Hx	~ Poor sleep ~ Other stimulant use (ex. ADHD) ~ SSRIs ~ Insulin ~ Renal impairment ~ Controlled HTN or High BPs ~ Drinking alcohol

Obesity

FDA Approved >17 yrs
Short Term Use Only

Dosing: 37.5 mg QAM
*18.75 mg may be adequate

Brand Names

Adipex-P
Suprenza
Lomaira
Tablets (8,15, 37.5 mg)
Capsules (15, 30, 37.5 mg)
Generic Available

Common Questions That I Get From Patients

Can I take more than one obesity medication at a time?

How long will I have to be on medication?

What about that Black Box Warning?

- No Conclusive Human Evidence
 - Espinosa De Ycaza AE, Brito JP, McCoy RG, Shao H, Singh Ospina N. Glucagon-Like Peptide-1 Receptor Agonists and Thyroid Cancer: A Narrative Review. *Thyroid*. 2024 Apr;34(4):403-418. doi: 10.1089/thy.2023.0530. Epub 2024 Mar 26. PMID: 38343381; PMCID: PMC10998705.

WARNING: RISK OF THYROID C-CELL TUMORS
See full prescribing information for complete boxed warning.

- In rodents, semaglutide causes thyroid C-cell tumors at clinically relevant exposures. It is unknown whether WEGOVY® causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans as the human relevance of semaglutide-induced rodent thyroid C-cell tumor has not been determined (5.1, 13.1).
- WEGOVY® is contraindicated in patients with a personal or family history of MTC or in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2). Counsel patients regarding the potential risk of MTC and symptoms of thyroid tumors (4, 5.1).

Take Home Message

& Next Steps

Children & Adolescents with Obesity Deserve Comprehensive Treatment

Obesity Is A Complex, Chronic & Relapsing Medical Disease.



- When You Treat the Biology, The Behaviors Will Change.



The Biology:

Increased Hunger/Appetite

Decreased Satiety

Inefficient Energy Use



The Behaviors:

Eating Too Much,

Not Exercising

Enough



Now that you
know the
science....

It's Not Either-Or,
It's Both, AND!

LOS

**LOUISIANA
OBESITY
SOCIETY**



JOIN TODAY!

Louisianaobesitysociety.org
or use the QR code

QUESTIONS?

Contact Janna Pecquet
louisianaobesitysociety@gmail.com

Katie Queen, MD
katiequeen3@gmail.com



References

- Hampl SE, Hassink SG, Skinner AC, Armstrong SC, Barlow SE, Bolling CF, Avila Edwards KC, Eneli I, Hamre R, Joseph MM, Lunsford D, Mendonca E, Michalsky MP, Mirza N, Ochoa ER, Sharifi M, Staiano AE, Weedn AE, Flinn SK, Lindros J, Okechukwu K. Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents With Obesity. *Pediatrics*. 2023 Feb 1;151(2):e2022060640. doi: 10.1542/peds.2022-060640. Erratum in: *Pediatrics*. 2024 Jan 1;153(1):e2023064612. doi: 10.1542/peds.2023-064612. PMID: 36622115.
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- Kelly et al. Phentermine/Topiramate for the Treatment of Adolescent Obesity. *NEJM*. April 2022

Resources

- Institute for Healthy Childhood Weight
 - Clinical Practice Guideline Website
 - CPG Clinical Flow: Assessment and Evaluation
 - Childhood Obesity a Complex Disease (HC.org article)
 - Caring for Kids with Obesity: AAP Updates Evaluation & Treatment (HC.org article)
- Bright Futures: Promoting Healthy Weight Implementation Tip Sheet



Implications of GLP-1 Therapies on Muscle Health in Adolescents

Steven Heymsfield, MD

**Pennington Biomedical Research Center
Baton Rouge, LA**



Functional Roles

Metabolic Roles

Movement

Balance

Posture

Strength

**Amino acid
reserve**

**Synthesis/storage
of glutamine**

**Myokine
production**

**Immune
function**

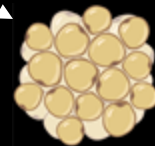
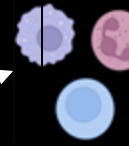
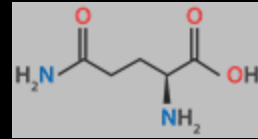
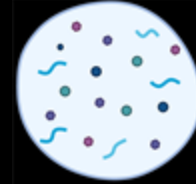
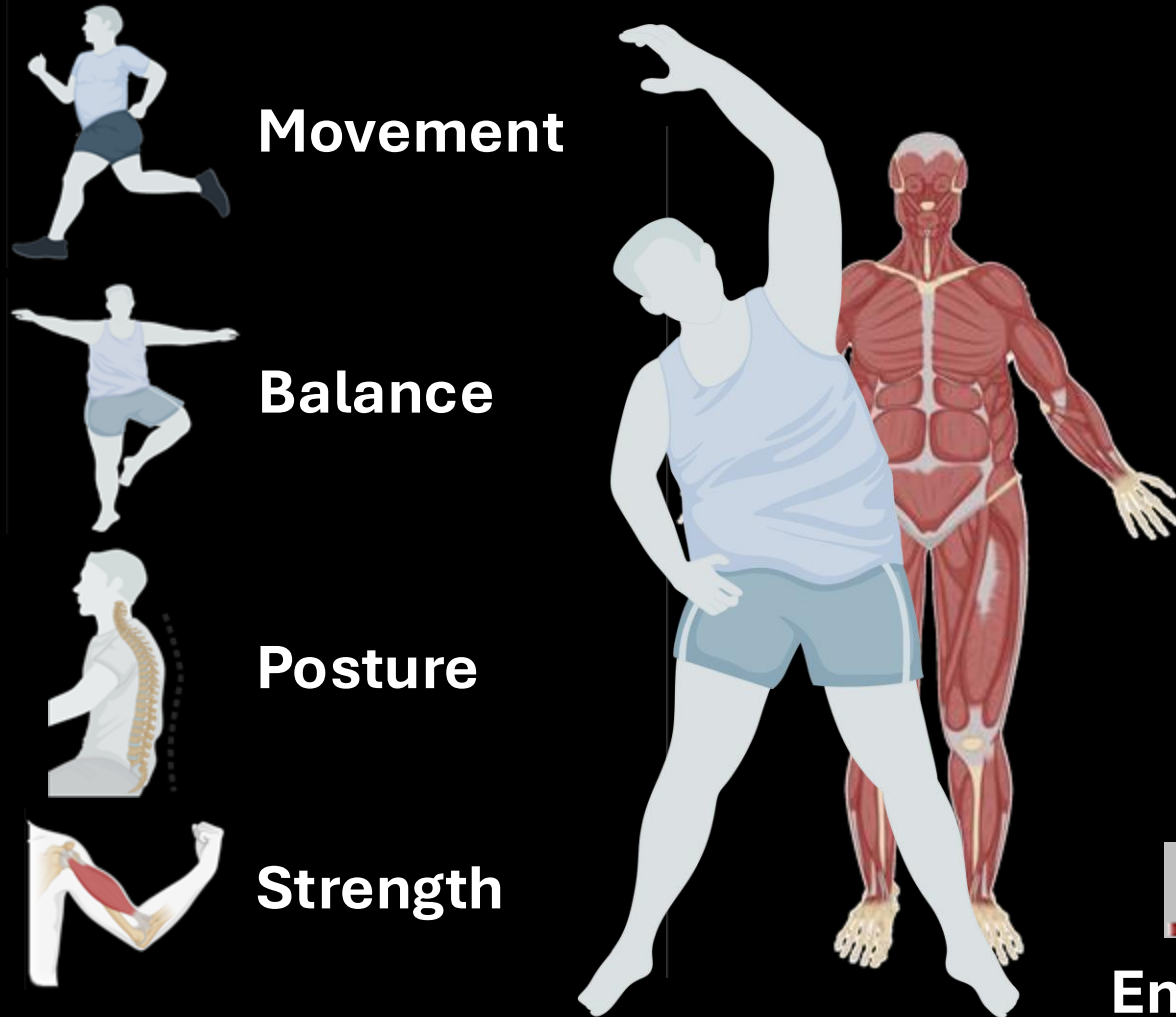
**Glycemic
regulation**

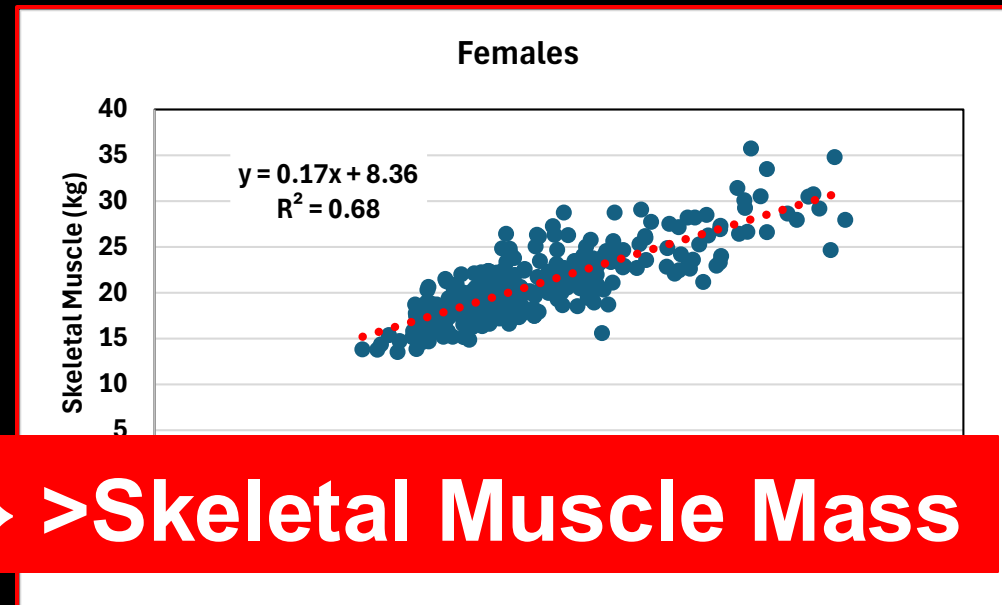
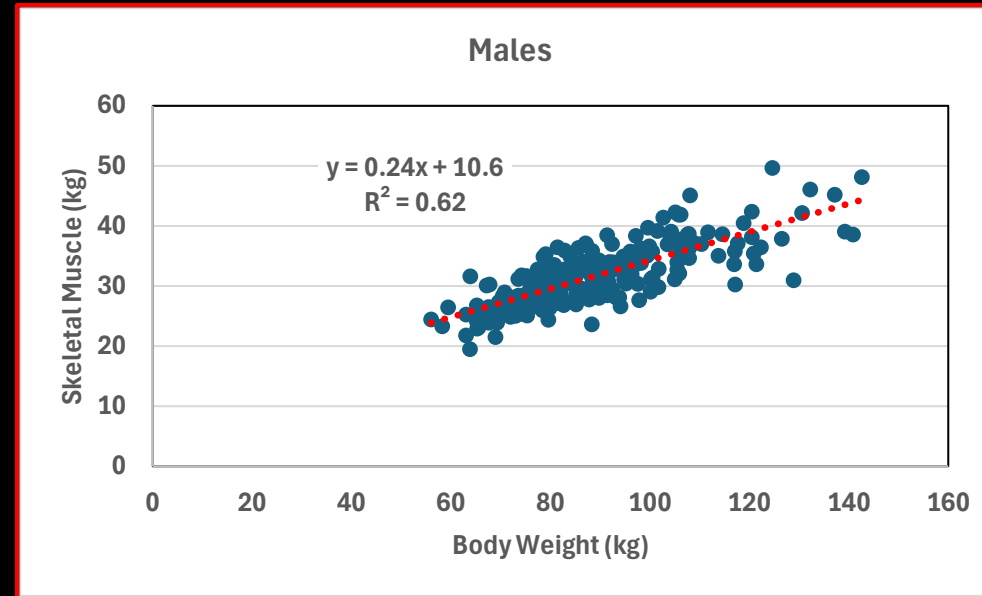
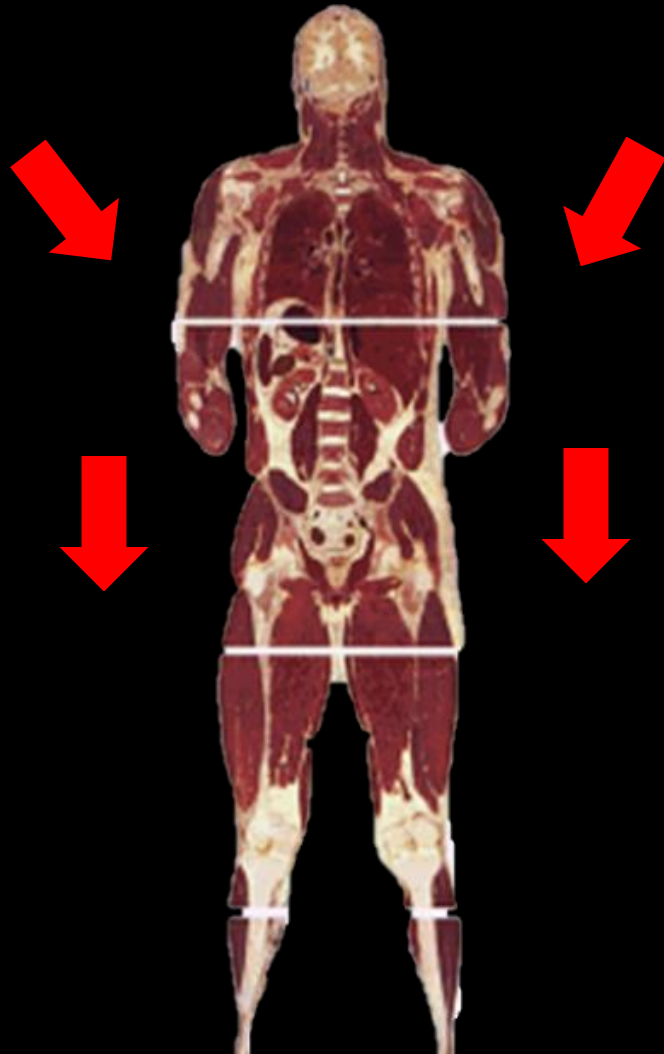
**Lipolysis/
browning**

**Bone
mineralization**

**Endothelial
function**

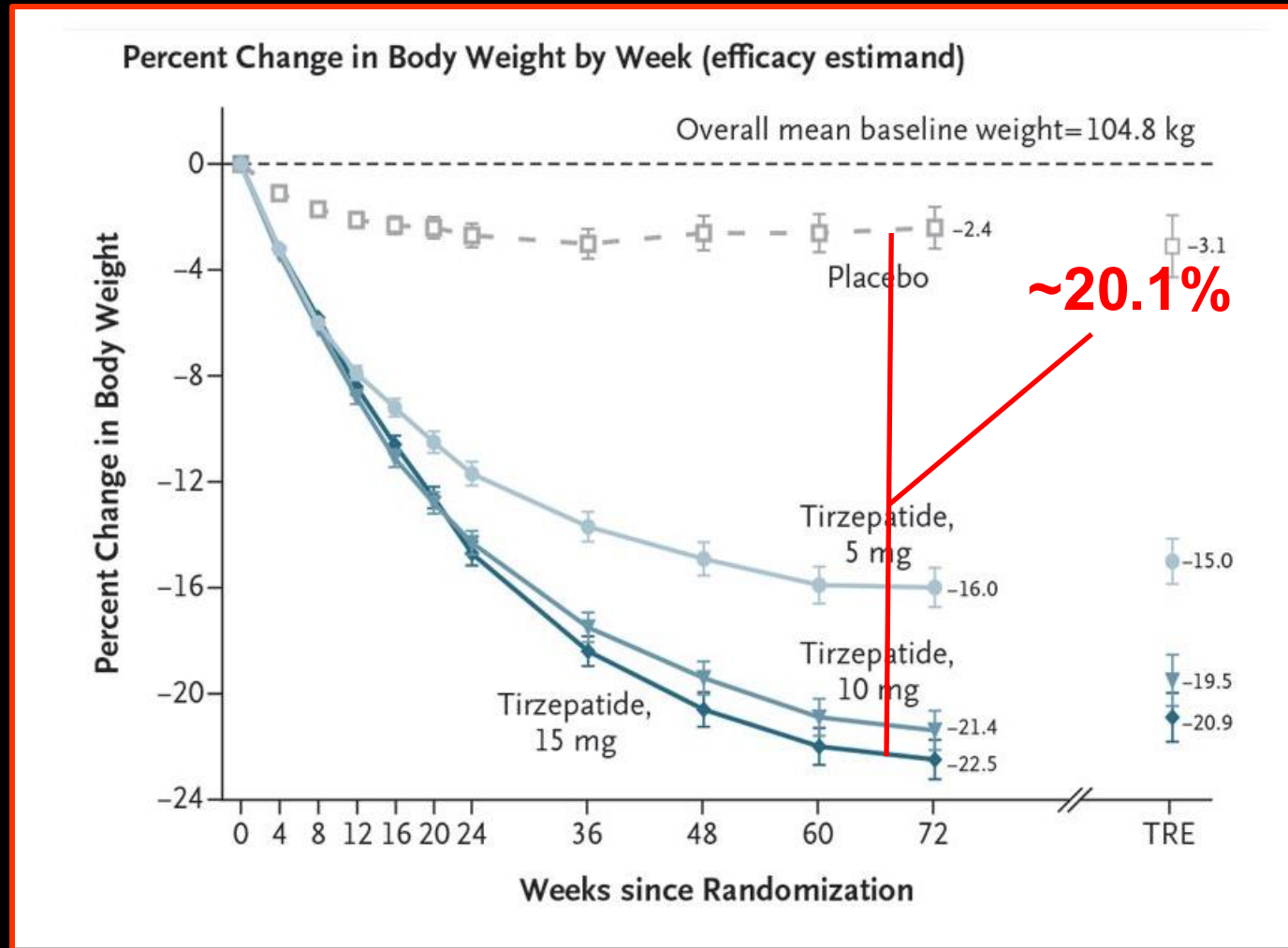
**↓Appetite
↑BDNF**



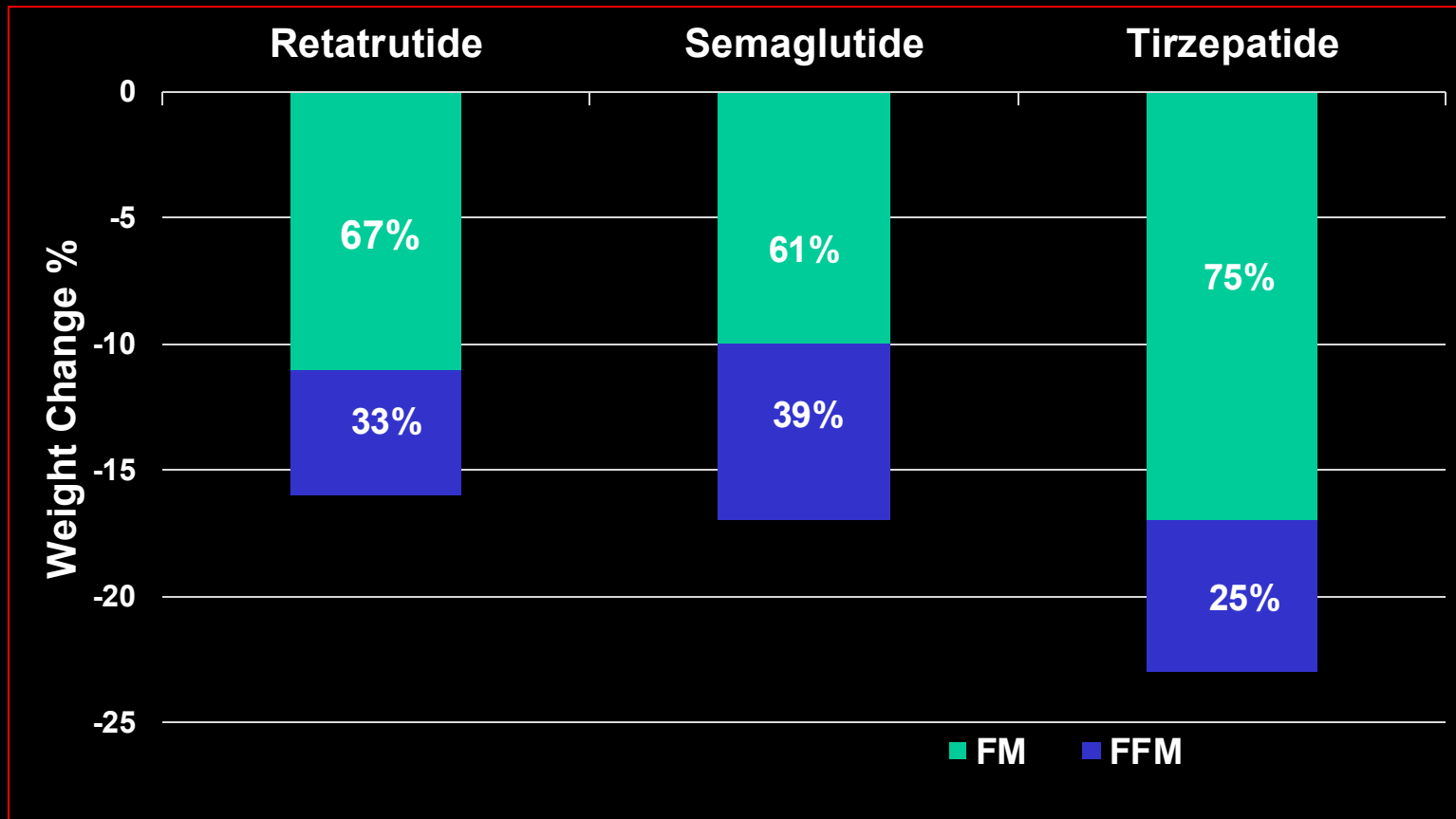


> Body Weight → > Skeletal Muscle Mass

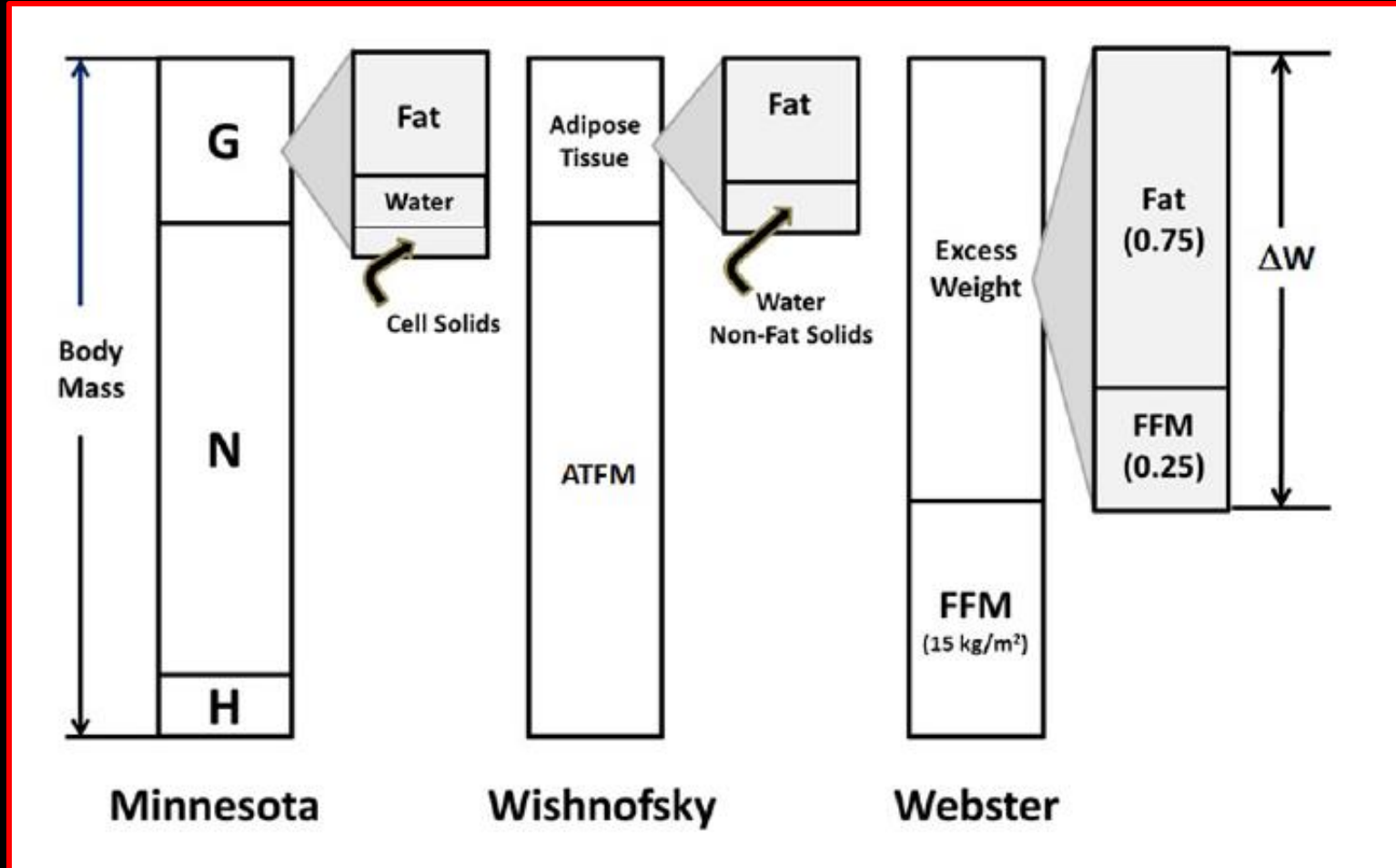
GLP-1R & Weight Loss: Tirzepatide



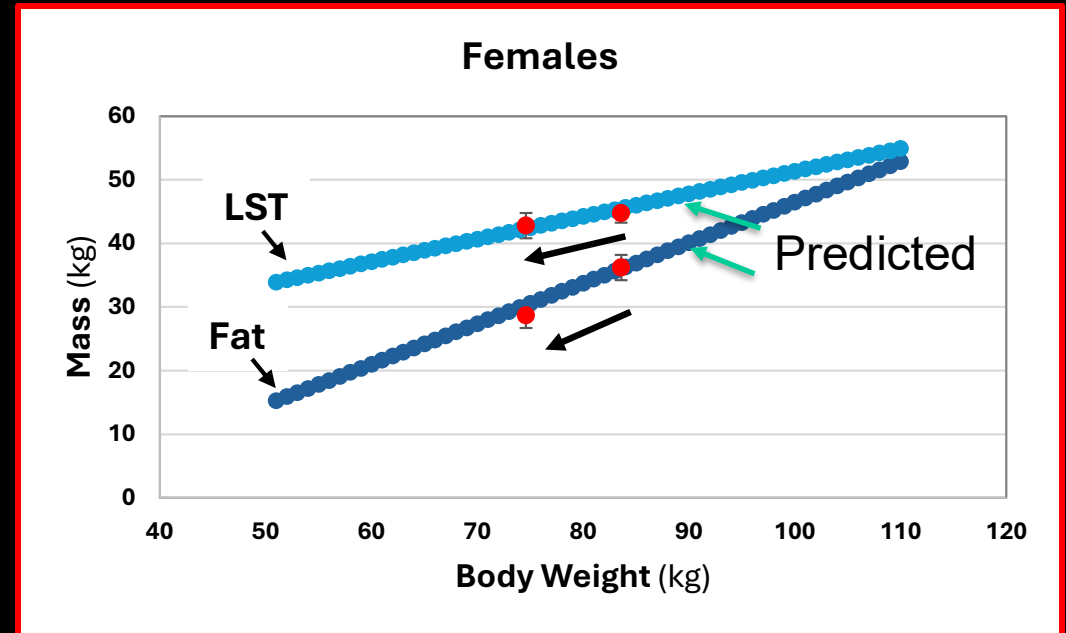
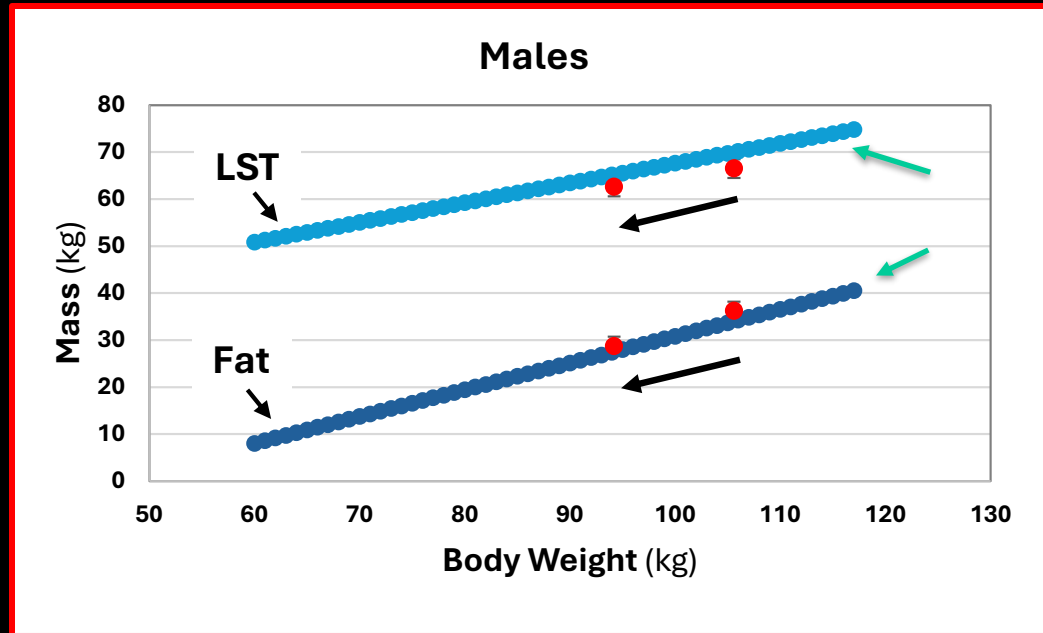
Effect of Marked Weight Loss Induced by GLP-1 Based Medicines on Body Composition



“One-Fourth FFM Rule”: Composition of Voluntary Weight Loss



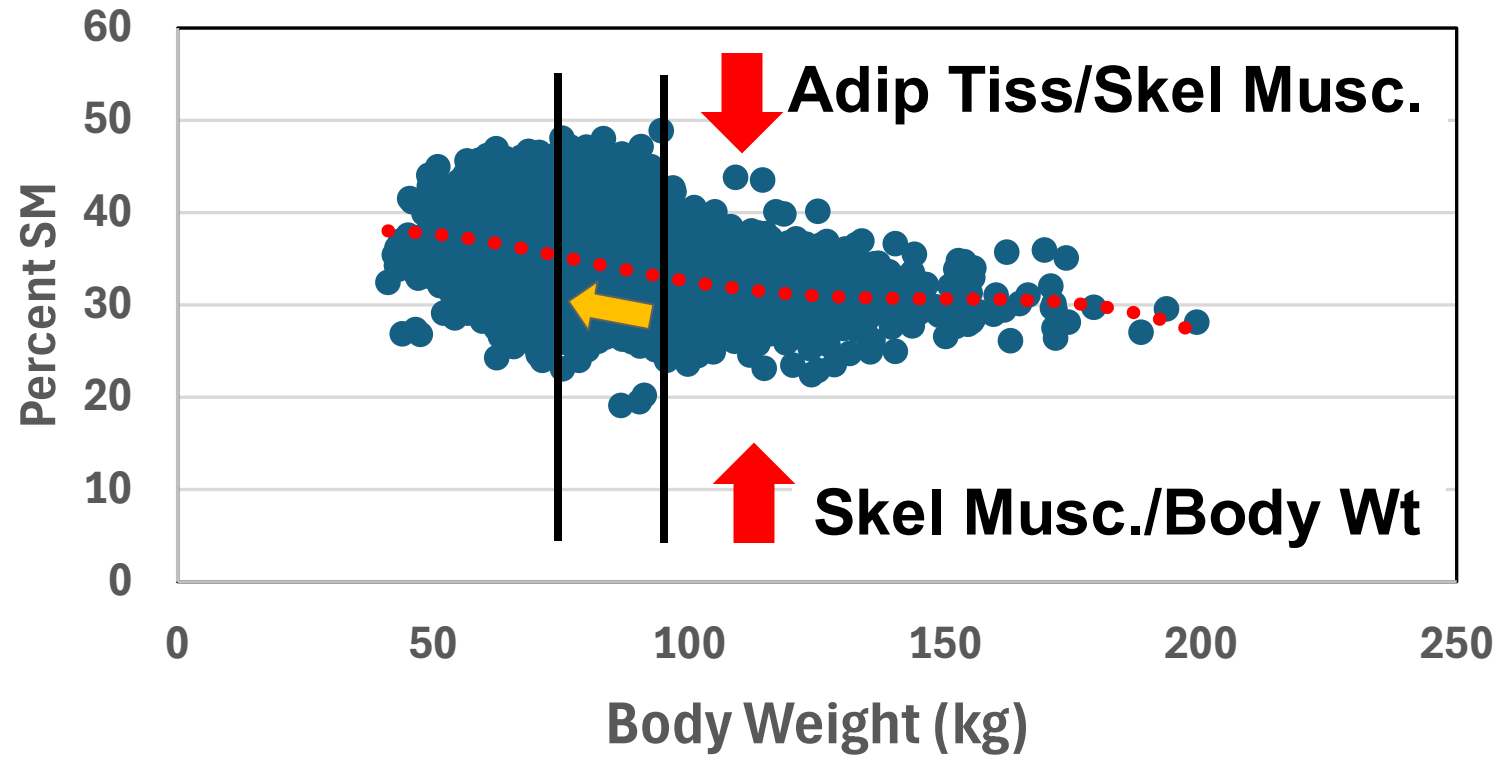
10% Weight Loss over 9 to 10 Weeks



LST, lean soft tissue mass measured with DXA

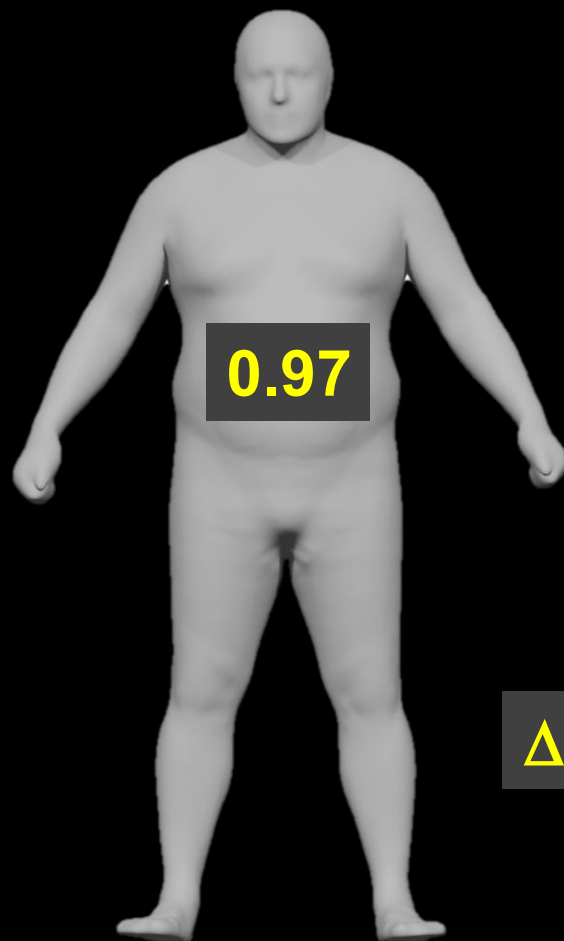
Balanced Macronutrient Diet

Percent SM versus Body Weight in Males



**Surmount 1
Tirzepatide**

Load/Capacity: Adipose Tissue/Skeletal Muscle



0.97



0.85

Δ BW = 21 kg

Baseline

72 Weeks

- **> Body Weight > Skeletal Muscle Mass**
- **Δ Body Weight: Predictable Δ s in Skeletal Muscle Mass**
- **No Independent Drug Effects so Far**
- **Functional Improvement, Greatest with Healthy Diet
and Exercise Program**



Strategies to Reduce Muscle Loss and Prevent Nutrient Deficiencies for Adolescents on GLP-1 Therapy

Catherine M. Champagne
PhD, RDN, LDN

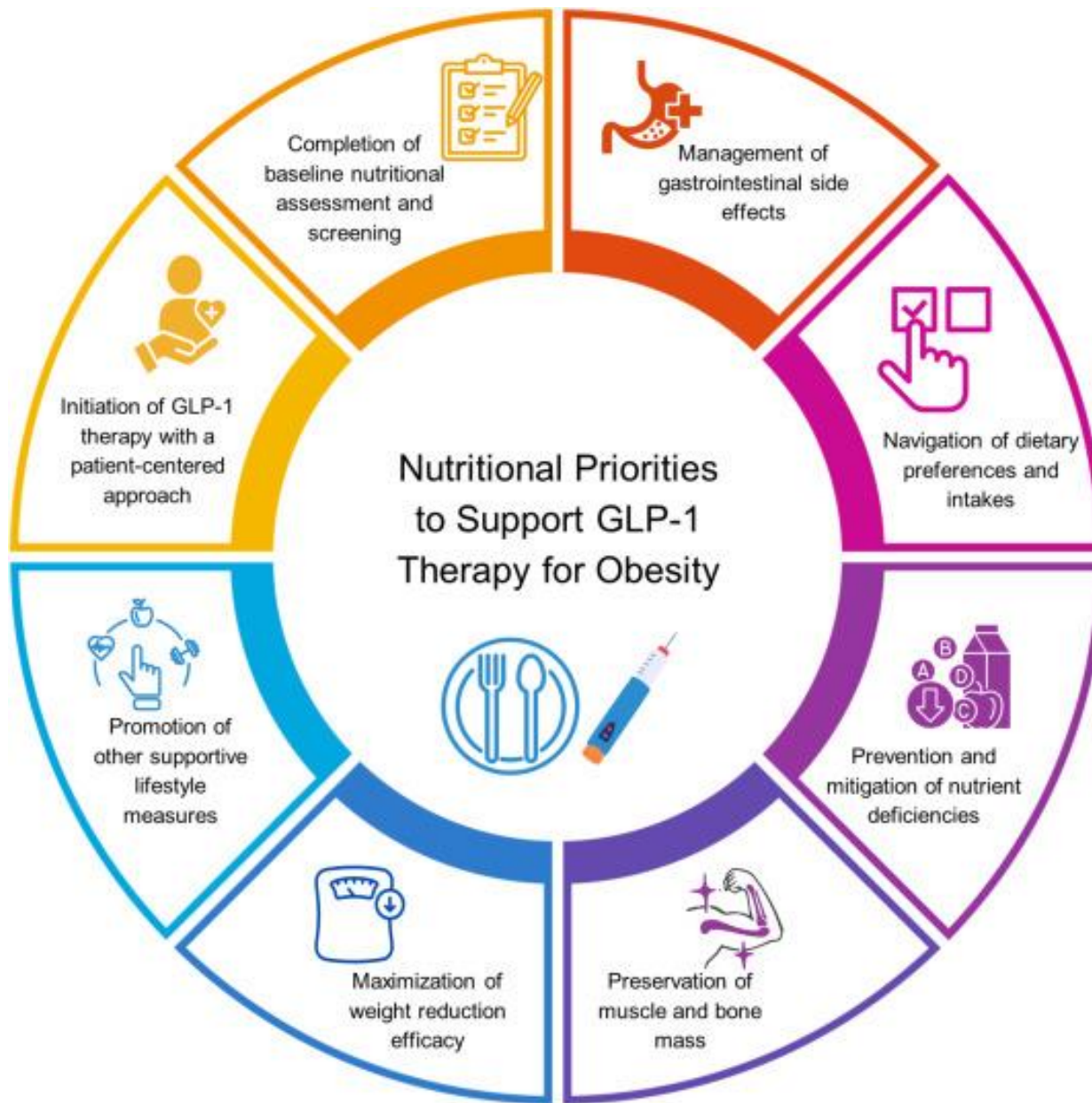
To reduce muscle loss and prevent nutrient deficiencies in adolescents taking obesity medications:



Note: 15%-60% of weight loss on GLP-1 meds may come from lean body mass; pediatric specific data are limited [Neeland et al. *Obes Metab* 2024;26(S4):16-27]

1. Prioritize high-protein, nutrient-dense foods like lean meats, fish, beans, fruits, vegetables and nuts.
2. Consume meals in smaller, more frequent portions, and stay hydrated.
3. Encourage weight-bearing exercises (resistance training) to maintain muscle mass.

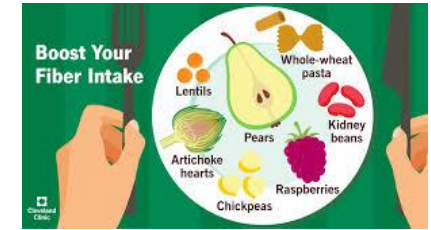




Mozaffarian et al. Nutritional priorities to support GLP-1 therapy for obesity: a joint Advisory from the American College of Lifestyle Medicine, the American Society for Nutrition, the Obesity Medicine Association, and The Obesity Society. AJCN 122 (2025) 344-367.

Key Strategies

- Prioritize protein in the diet to help maintain lean body mass.
- Gradually increase fiber content to minimize gastrointestinal side effects.
- Focus on nutrient-dense meals in smaller, more frequent portions.
- Monitor micronutrient intake to prevent deficiencies.
- Successful implementation of these dietary guidelines requires an interdisciplinary approach to optimize both short- and long-term success.



MICRONUTRIENT DAILY INTAKE	
SERVING SIZE:	DAILY
	DAILY VALUE**
RECOMMENDED	INTAKE
VITAMIN A	700-900 MCG
VITAMIN C	75-90 MG
VITAMIN D	15-20 MCG
VITAMIN E	15 MG
VITAMIN K	90-120 MCG

Kennedy C, et al. Dietary recommendations for pediatric and adolescent patients utilizing GLP-1 receptor agonists for weight management: A narrative review of current literature. Nutr Clin Pract. 2025 Jul 27. doi: 10.1002/ncp.11356. Epub ahead of print. PMID: 40714863.



Kennedy C, et al. Nutr Clin Pract. 2025 Jul 27. doi: 10.1002/ncp.11356. Epub ahead of print. PMID: 40714863.

Specific Nutritional Considerations

- 1. Protein:** Prioritize unprocessed lean meats, poultry, fish, eggs legumes, tofu, and dairy products. When protein needs cannot be met through whole foods alone, consider supplementation (protein powders, shakes, bars) with minimal added sugar (<5g/serving).
 - **Children aged 9-13 years – RDA is 34g/day (0.95g/kg/day).**
 - **Males aged 14-18 years – RDA is 52g/day (0.85g/kg/day).**
 - **Females aged 14-18 years – RDA is 46g/day (0.85g/kg/day).**
- 2. Fats:** While clinicians commonly recommend low-fat dairy products, current literature does not support low- over whole-fat for adolescents with obesity.
 - **Encourage dietary variety, incorporating healthy fat sources.**
 - **If gastrointestinal symptoms, moderating fat intake may alleviate discomfort.**
 - **Emphasize omega-3 fatty acids and extra virgin olive oil as healthy options.**



Kennedy C, et al. Nutr Clin Pract. 2025 Jul 27. doi: 10.1002/ncp.11356. Epub ahead of print. PMID: 40714863.

Specific Nutritional Considerations

3. **Carbohydrate and fiber:** Prioritize complex carbohydrates – whole grains, fruits, and vegetables high in fiber. Reduce refined grains and sugar.
 - Low-carbohydrate and ketogenic diets are not recommended.
 - Focus on balance and moderation, incorporating whole grains and complex carbohydrates.
 - Dietary fiber should be a key component, as those with obesity tend to consume less.
4. **Fluids:** Aim for at least 64 fluid ounces of water, noncaloric beverages, and noncaffeinated herbal teas. Minimize sugar-sweetened beverages.
5. **Micronutrient considerations:** Micronutrient deficiencies are common in adolescents with obesity and may worsen during weight loss
 - Vitamin D deficiency is particularly prevalent.
 - Deficiencies of iron, calcium, vitamin E, and vitamin C also seen in children with obesity.
 - Adolescents on GLP-1 medications require close monitoring for deficiencies and may require supplementation if dietary intake is inadequate.



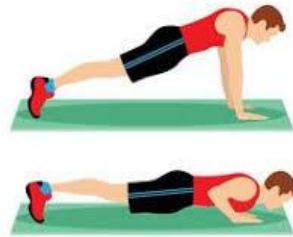
Kennedy C, et al. Nutr Clin Pract. 2025 Jul 27. doi: 10.1002/ncp.11356. Epub ahead of print. PMID: 40714863.

Structure Your Strength Training

1. **Frequency:** Schedule 2-3 strength training sessions per week, focusing on different muscle groups on non-consecutive days.

2. **Exercise Selection:** Prioritize compound exercises such as:

- Squats
- Push-ups
- Lunges
- Row exercise
- Deadlifts



3. **Sets and Repetitions:** Begin with 2-3 sets of 10-15 repetitions for each exercise.

4. **Progression:** As you get stronger, gradually increase the weight or resistance.

5. **Recovery:** Allow adequate rest between strength training sessions to support muscle recovery and growth

Summary

- **Nutrition Counseling:** work with a Registered Dietitian to develop a personalized meal plan that addresses specific needs and potential side effects of the medication.
- **Protein:** ensure adolescents consume adequate protein through diet and consider oral nutritional supplements if needed.
- **Balanced Diet:** focus on nutrient-dense foods – fruits, vegetables, whole grains, and dairy products for essential vitamins and minerals, within caloric restrictions.
- **Resistance Training:** regular training (e.g., weightlifting, circuit training) stimulates muscle growth and prevents muscle loss during weight reduction.
- **Manage Side Effects:** gastrointestinal side effects may impact nutrient absorption or appetite.
- **Monitor Nutrient Levels:** regularly check vitamin and mineral levels for deficiencies.
- **Consider Supplements:** some, like calcium, vitamin D, or iron may be recommended for those with deficiencies or those engaging in intense physical activity.
- **Promote Healthy Habits:** encourage healthy eating habits and regular physical activity to support long-term weight management and general well being.

Diet and exercise guidance for patients taking GLP-1s

Follow our **MEAL** plan to maximize benefits while taking GLP-1s for weight loss.

Maintain muscle

- 20-30 g Protein (fish, poultry, yogurt, beans) per meal
- Protein shakes when GLP-1s severely reduce appetite

Energize and balance

- Snacks (nuts, fruits, yogurt) between meals
- Slow-digesting foods (oatmeal, sweet potatoes); healthy fats (olive oil, avocado)

Avoid GLP-1 side effects

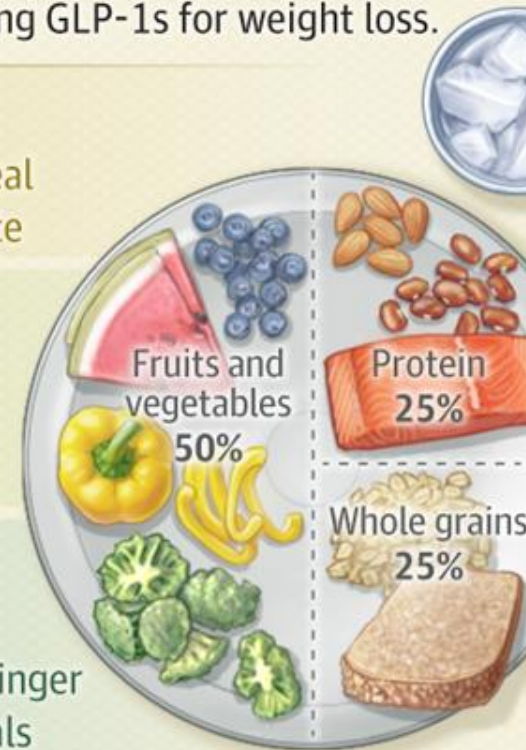
- Constipation: increase fiber and stay hydrated
- Nausea: avoid fried foods; eat whole grains and try ginger
- Heartburn: avoid spicy foods; stay upright after meals

Liquid for hydration needs

- 8-12 Cups water per day; hydrating foods (soups, cucumbers, melons)

Physical activity while taking GLP-1s

- Aerobic exercise: 150 minutes per week (brisk walking)
- Strength training: 30 minutes, 2-3 times per week (weights, resistance bands)



Mehrtash F, Dushay J, Manson JE. I Am Taking a GLP-1 Weight-Loss Medication-What Should I Know? JAMA Intern Med. 2025 Sep 1;185(9):1180. doi: 10.1001/jamainternmed.2025.1133. PMID: 40658429.