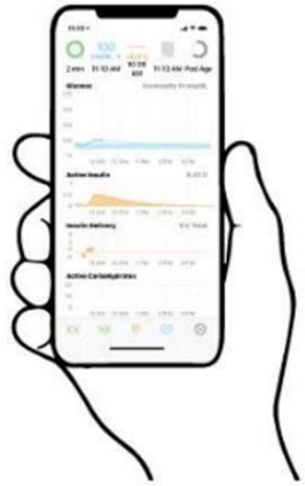
Loop AND Learn

Master Your DIY Closed-Loop Insulin Delivery System



# Bolusing for Meals

## Looping for Complex Meals

May 2021

## Part 2: How to Bolus for Complex Meals

# Disclaimer

The Loop app is a do-it-yourself closed-loop algorithm.

This presentation is provided to assist you in making your own decisions, in consultation with your health care professionals, regarding your own diabetes self-management.

You take full responsibility for building and running this system and do so at your own risk.

**Please remember that the Loop app is not FDA-approved for therapy.**

# Bolusing: the next skill in your Looping journey

We assume, at this point, that you have read LoopDocs, joined a Looping community, installed Loop and tested your settings.

The focus of this video is to learn how to bolus for complex meals:

- calculate “carbs” in your meal (carbs + %proteins + %fats)
- deliver the correct amount of insulin at the right time
- match the amount of food, with correct timing of insulin, based on the predicted curve and impact of blood glucose

# Bolusing Overview

**When Looping, basal insulin should cover daily insulin needs** and Loop will deliver more or less insulin as it tries to keep BG at target range.

- Basal rate should not cover food or special circumstances (ie. exercise, stress, illness, etc.)

**When food is added, Loop needs to be told the amount and absorption time,** so it delivers the correct amount of insulin at the right time.

- If food shows up before insulin starts acting, BG rises
- If insulin shows up before food begins to absorb, BG drops

# Let's add in protein and fat grams

For complex or low carb meals, you get better results if you consider:

- Carbohydrates
- Protein
- Fat

The goal is to eliminate BG spikes, which can be achieved in part by

- Using Loop with the correct bolus techniques (including prebolus)
- Eating low or lower carb meals
- Using inhalable insulin (Afrezza)
- Using new, faster insulin (Fiasp, Lyumjev)

# Remember that turkey sandwich?

**In Bolusing for Meals, Part 1,** we learned that, for a turkey sandwich, a 4-hour absorption time worked much better than 2.

Why? Well...because of protein and fat.

Despite what your endocrinologist might tell you, T1Ds have observed that protein and fat, in fact, DOES raise blood sugar.

**In Loop, we need to enter "carbs" - not just carbs.**

# Why are proteins and fats important?

**Proteins**

- Converts to glucose via gluconeogenesis
- Eaten with no carbs, converts to glucose faster

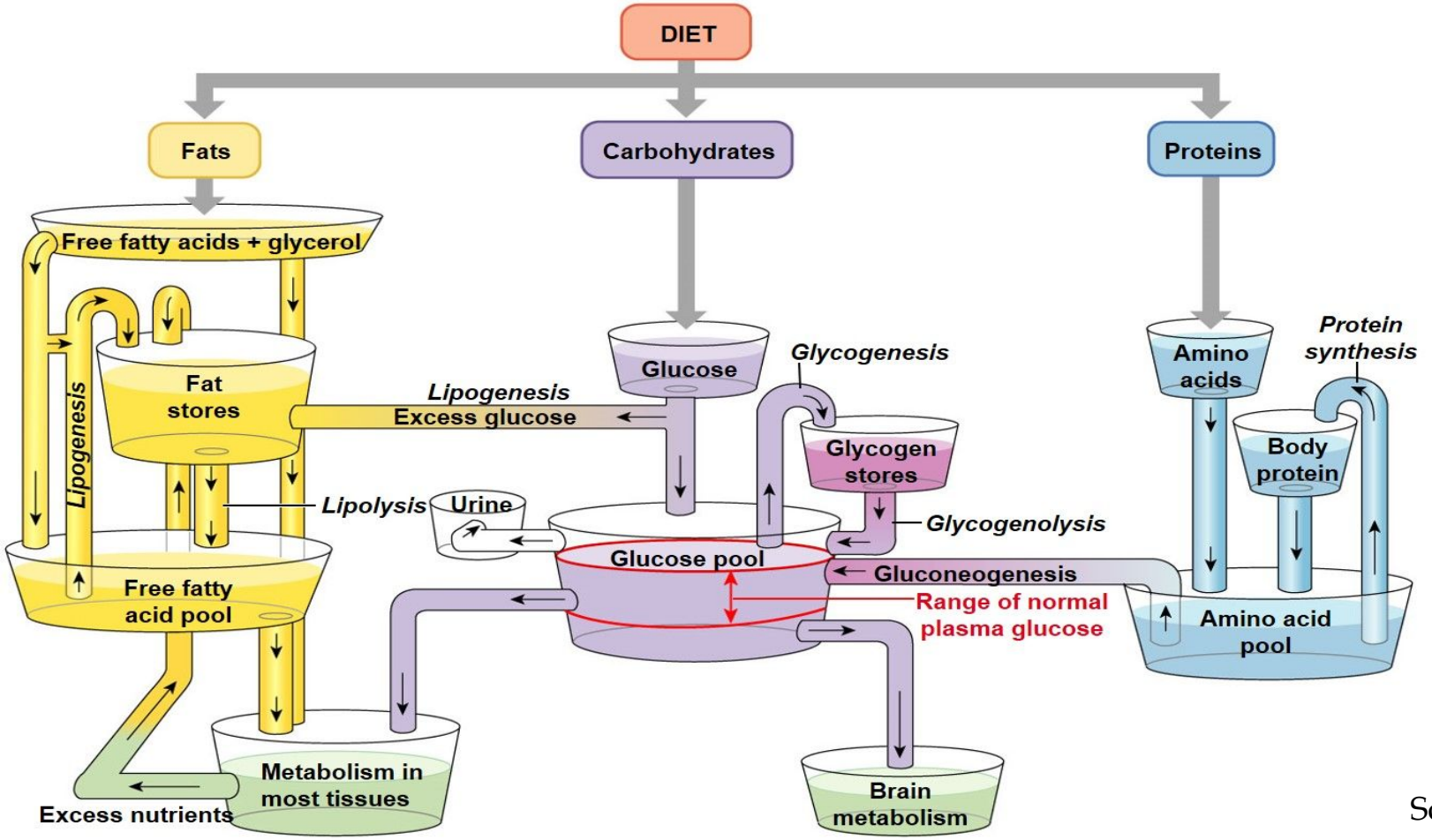
**Fats**

- Converts to glucose via gluconeogenesis and fatty acids
- Slows the absorption of carbs

**Pro tips**

- Activity levels both before and after the meal, may affect absorption
- Alcohol consumption may affect absorption of carbs

# Gluconeogenesis: the science behind food bolusing



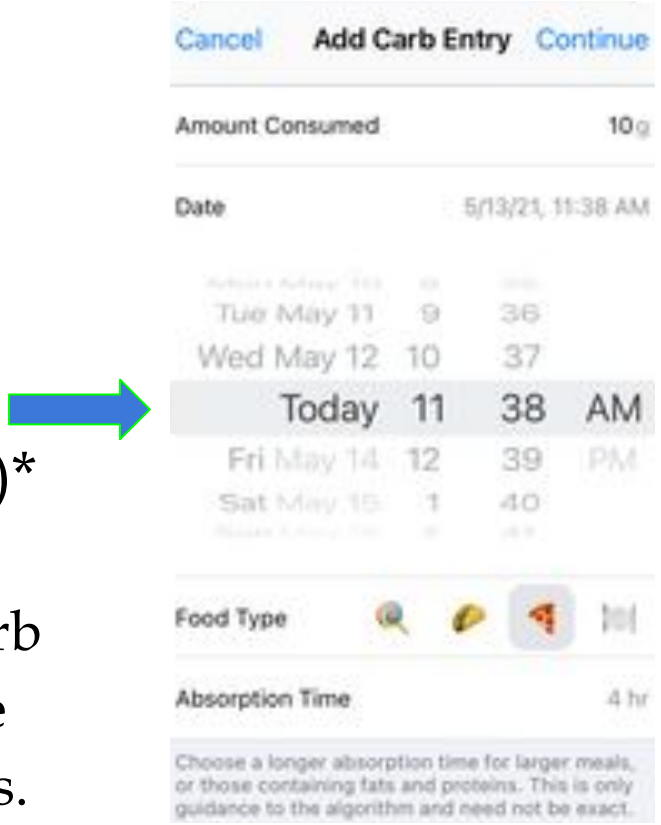

Source: Chegg.com

# Meal entries for proteins

**Let's add in the calculation for PROTEIN grams**

- Enter as Carb grams, typically as 25% of Protein grams
- Use an Absorption Time of 4+ hours
- Start the food absorption in 1-2 hours. (Roll clock forward when entering)

This is a starting point … your diabetes may vary (YDMV)*



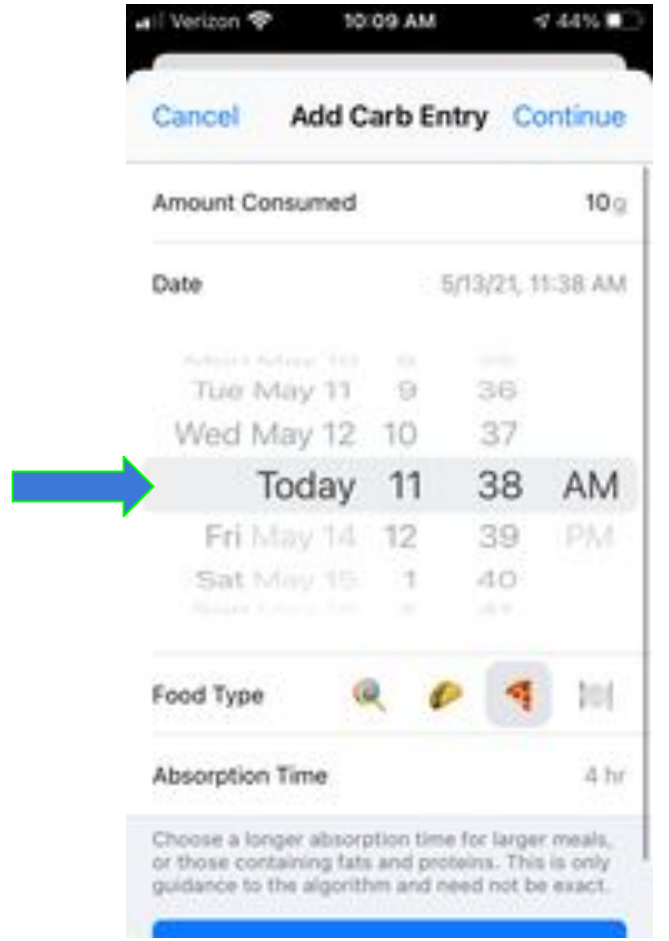

*Many pump users, without realizing it, use their basal rate and carb ratios to control the protein/fat rise of their meals. It is better to use this bolus technique rather than have incorrect basal and carb ratios.

# Meal entries for fats

**Let's add in the calculation for FAT grams**

- Enter as Carb grams, typically as 10% of Fat grams
- Use an Absorption Time of 4+ hours
- Start the food absorption in 1-2 hours. (Roll clock forward when entering)

This is a starting point … your diabetes may vary (YDMV)



# Let's revisit our friend, the turkey sandwich

A turkey sandwich:

- 2 slices of whole grain bread
- 4 oz roasted turkey
- 2 oz swiss cheese
- Lettuce
- 2 tsps of mayonnaise

# How we might bolus for our turkey sandwich

| Food Item | Carb Grams | Protein Grams | Fat Grams |
|---|---|---|---|
| 2 slices of whole grain bread | 40 | 10 | 0 |
| 4 oz roasted turkey | 2 | 22 | 2 |
| 2 oz swiss cheese | 2 | 16 | 16 |
| 2 tsps of mayonnaise | 0 | 0 | 6 |
| | 44 | 48 | 24 |

Source: MyFitnessPal.com

# Let's calculate the bolus

| | Carb Grams | Protein Grams | Fat Grams | |
|---|---|---|---|---|
| | 44 | 48 | 24 | |
| Carb multiplier | x 100% | x 25% | x 10% | |
| Total Carb Grams | **44** | **12** | **2** | **58** |

This is a starting point … your diabetes may vary (YDMV)

# Let's breakdown the bolus entry

**Prebolus**

- Use PreMeal or Override button (lower BG target) one hour before you eat
- Give a partial bolus for your meal, 15-20 minutes before you eat

**Record your meal using TWO carb entries**

- 44 grams CARB, starting NOW, for 3 hours
- 14 grams CARB equivalent, starting 1.5 hours in the future, for 5 hours

** **NOTE:** If your meal includes larger amounts of fats, you may want to use three entries or a longer absorption time. This is a starting point - YDMV (Your Diabetes May Vary)

# Time to Analyze: What do we see?

**Analyze**

1. When did your meal start to absorb?
2. How long did absorption take?
3. How many grams did Loop observe?

**Adjustments**

1. Do you need to adjust your prebolus strategy?
2. Do you need to adjust your absorption time?
3. Do you need to adjust your fat and protein percentages?
4. Do you need to check portion sizes by using a food scale?

# Resources

**LoopDocs:** https://loopkit.github.io/loopdocs/operation/features/carbs/

**Loop Basal & ISF:** https://youtu.be/AgSZp7juPc4

**ISF & Carb Absorption:** https://youtu.be/fZx1VRKj9fY

**Facebook LoopandLearn:** https://www.facebook.com/groups/LOOPandLEARN

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