



Loop
CamAPS | FX



Utilising mylife Loop powered by CamAPS FX when exercising with type 1 diabetes



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Exercising with type 1 diabetes

It is well known that exercise is a vital part of a healthy lifestyle and is proven to increase insulin sensitivity in the body. 150 minutes of exercise per week is recommended for all adults. Just 30 minutes of structured exercise a day can show an improved time in range¹. For someone with type 1 diabetes it can be difficult to manage variable glucose levels during exercise.

Why do glucose levels vary during exercise?

- Differences in the types of exercise which cause glucose levels to increase or decrease
- Individual variation – need to discover what works for you best
- Internal physiological factors – for example changes in other hormones like adrenaline
- Increased risk of hypoglycaemia – during and after exercise glucose levels can drop
- Consumption of extra carbohydrates (CHO) and snacks to prevent hypoglycaemia – it can be difficult to know how many grams and what type of CHO
- Insulin on board during the exercise – it can be very difficult to keep glucose levels up during exercising with a lot of insulin on board
- Composition of the meal or snack eaten before exercising – if the CHO is slow or fast absorbing, also foods high in fibre, fat or protein can slow down CHO digestion
- Unplanned activity – less influence on glucose levels prior to starting exercise
- Glucose levels can behave differently in competitions and matches than in training or more sedentary days¹





Three variables that can be adjusted to keep glucose in range when exercising with type 1 diabetes²

- **Insulin** – adjusting the amount before, during and after exercise to accommodate the situation
- **Carbohydrates** – the body's main source of energy, knowing how much is required is important
- **Type of exercise and intensity of exercise** – knowing how the exercise will affect glucose levels

mylife Loop provides users with many features which can be utilised during exercise to help with these variables.

Intensity and different types of exercise

Aerobic exercise which increases heartrate, such as running, is known to increase the risk of hypoglycaemia, and this risk increases with greater intensity and duration of the activity. However, short periods of very high-intensity interval training, or resistance such as weightlifting can cause a rise in glucose level.

In most cases though, all types of physical activity will increase insulin sensitivity, causing lower glucose levels. Therefore, correcting high glucose levels around exercising should be done with caution.¹

Knowing the effect a type of exercise has on glucose levels enables a person to be able to predict and adjust in the correct manner and allows them to utilise this knowledge to their advantage. For example, if a person knows their glucose levels would usually rise from a particular exercise such as sprinting, then it might suit best to start with this exercise and follow by an aerobic exercise which decreases glucose levels.¹





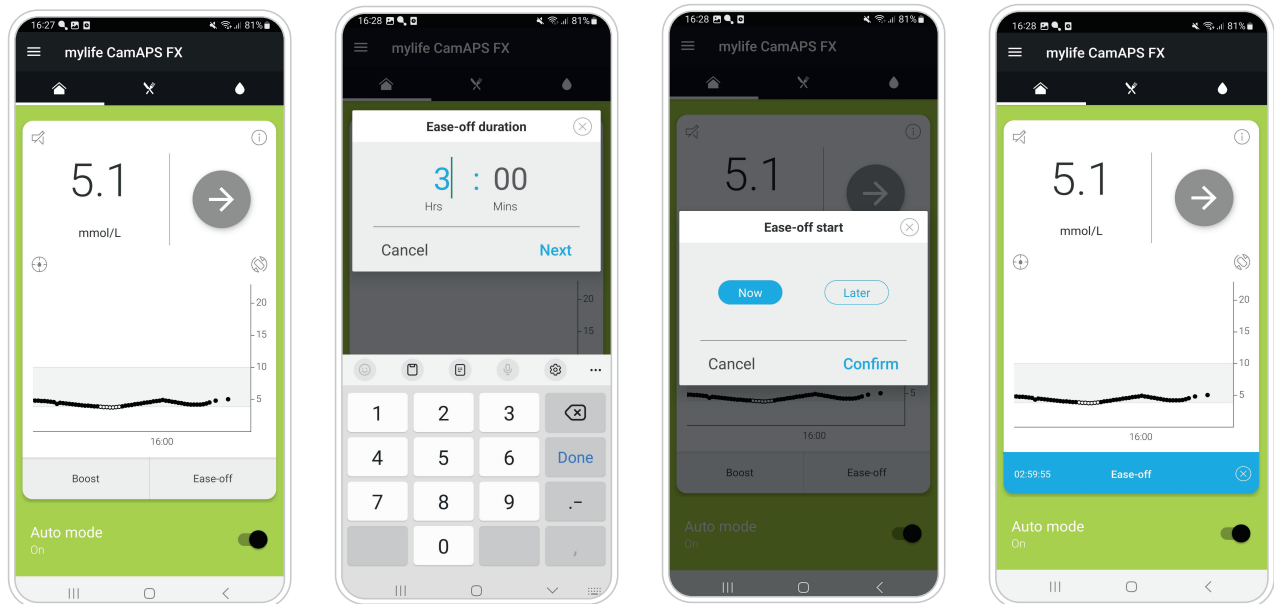
Using the features in the mylife CamAPS FX app for easier glucose control during exercise

“Ease-off”

- Aim to not just treat hypoglycaemia but to prevent it. “Ease-off” can help prevent hypoglycaemia as it reduces insulin delivery depending on glucose levels and trends by raising the personal glucose target, softening the algorithm’s calculations and stopping insulin delivery earlier to reduce the risk of hypoglycaemia.³
- “Ease-off” can be started immediately or programmed to come on later and can be stopped at any time.

How to use “Ease-off”:

1. Tap the “Ease-off” mode on the main screen
2. A box will appear asking for duration. Enter duration, any time between 10 mins and 23h 59mins
3. Select to start now or later (“Ease-off” can be pre-programmed up to 24 hours in advance) and tap “Confirm”
4. To cancel tap the “x” on the bar shown

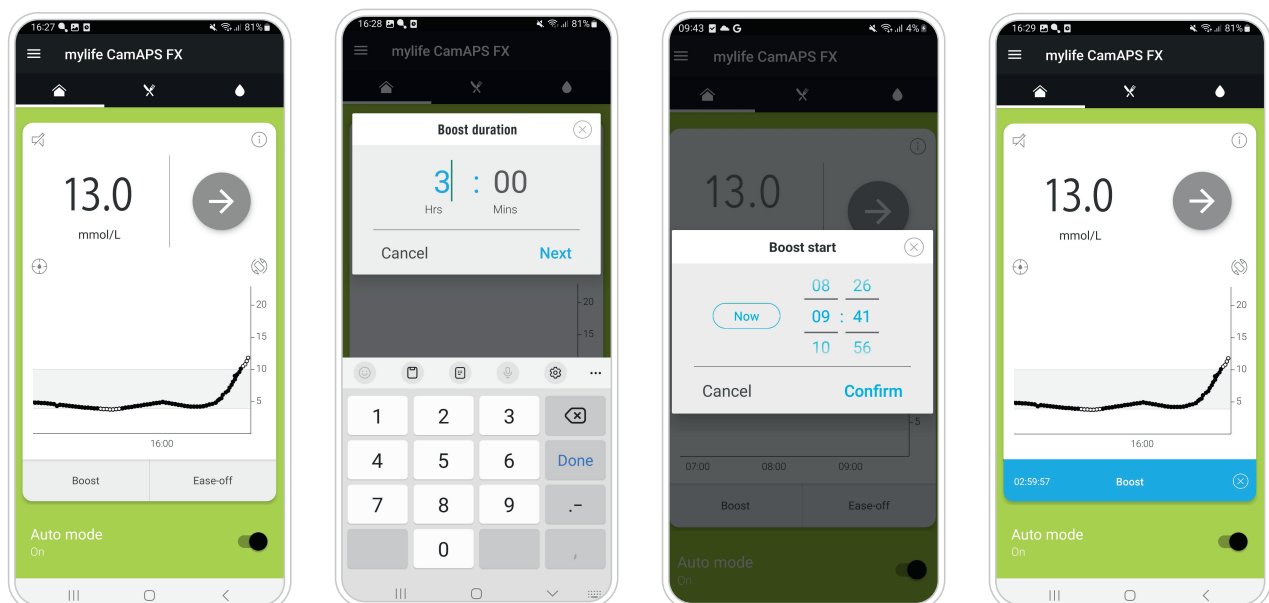


“Boost”

- “Boost” is the opposite to “Ease-off”, it informs the algorithm to be more intense if required. “Boost” can deliver more insulin when glucose levels are above target.
- “Boost” is likely not useful for some types of exercise. However, there are some scenarios where glucose levels could rise and remain high, such as an anaerobic activity, with increased adrenaline or if the Ypsopump has been off the body for a period of time. Using “Boost” can be a safer option than correcting with a bolus, as it will increase insulin delivery only if needed, and reduce insulin delivery if glucose levels start to fall.

How to use “Boost”:

1. Tap the “Boost” mode on the main screen
2. A box will pop up asking for duration. Enter duration, any time between 10min and 12h 59min
3. Select to start now or later (“Boost” can be pre-programmed up to 24 hours in advance) and tap “Confirm”
4. “Boost” will stop when the selected time runs out. To cancel at any time just tap the “x” on the bar shown

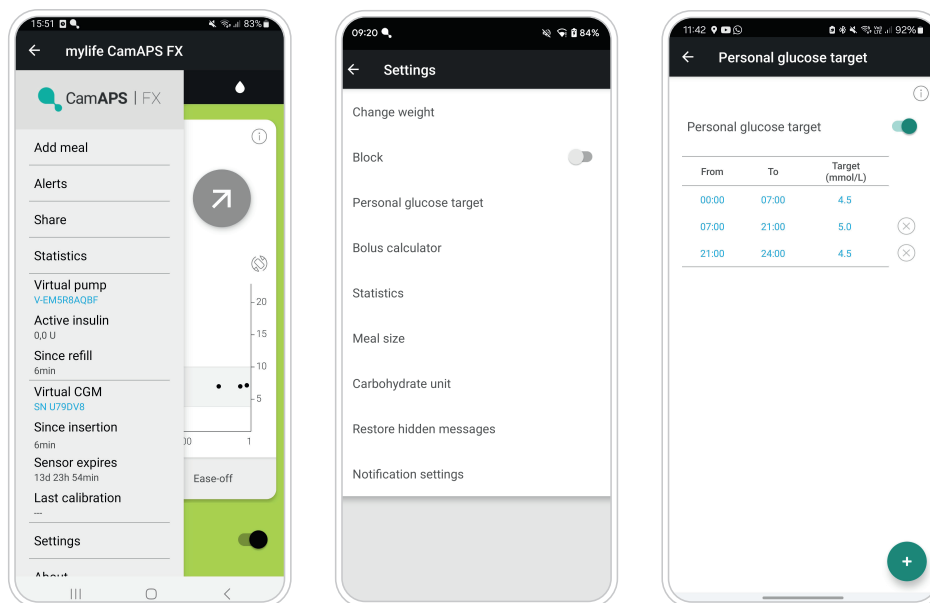


Personal glucose target (PGT)

- The preferred glucose level for exercise is very individual and varies depending on the type and duration of exercise. Some research suggests between 7 mmol/L (126 mg/dL) and 10 mmol/L (180 mg/dL).⁴
- mylife Loop is the only Automated Insulin Delivery (AID) system to provide highly personable glucose target; Programmable in 30-minute time segments over 24 hours, from 4.4 mmol/L (80 mg/dL) to 11 mmol/L (198 mg/dL).
- Utilise this setting as an add on to “Ease-off” or “Boost” to keep glucose levels at your desired target before, during and after exercise.
- Adjusting the PGT might be especially useful for active holidays, when there is more exercise than usual, for a longer period of time. It is important the PGT is changed back on return.

To access the PGT settings:

1. To set the PGT open the mylife CamAPS FX app's main menu.
2. Go to “Settings” and “Personal Glucose Target”
3. Slide the toggle to the right to turn on this feature. Ensure it is switched on, if not the default is 5.8 mmol/L (104 mg/dL)
4. When switched on it will show one time block from 00:00 to 00:00
5. To add a time block, use the + in the bottom right corner
6. To change the PGT on a time block already there, tap on time block



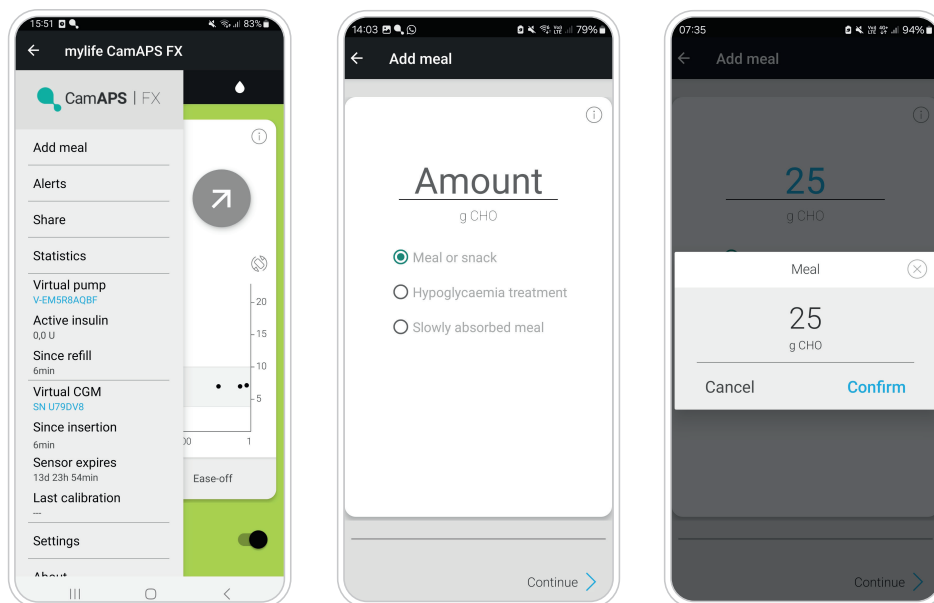
“Add meal”

“Add meal” is a function in the mylife CamAPS FX app which provides more options around carbohydrate management. There are 3 options:

- “Meal or snack” – this option allows the user to type in CHO which they are going to eat but not bolus for. This informs mylife CamAPS FX that there are extra carbs being eaten and it will adjust the insulin delivery to cover the carbs but only when/if glucose rises. This is likely to be the most useful for exercise so the user can notify the algorithm that extra CHO was eaten but a bolus is not currently required. It is recommended not to use this option for large meals with a lot of CHO.
- “Hypoglycaemia treatment” – this function allows the user to inform mylife CamAPS FX that a hypo has been treated by typing in the grams of CHO given, the mylife CamAPS FX then can be gentler for this period of time. It is recommended to stop exercise when hypoglycemia occurs until glucose levels are back in range.
- “Slowly absorbed meals” (SAM) – may be used for meals high in CHO, fat and protein where the digestion is slower. With this option the bolus delivery can be split. For example 60 % of the dose may be given as a regular bolus by typing 60 % of the CHO to be eaten into the knife and fork. The rest of the 40 % of CHO is typed into “add meal” as SAM. This provides an option to prevent initial hypos with a big bolus but also to help manage high glucose levels hours after eating. mylife CamAPS FX will deliver additional insulin, if required, every 30 minutes for the next 3–4 hours in response to rising glucose levels. May not be helpful when planning exercise but could be used in meals post exercise.

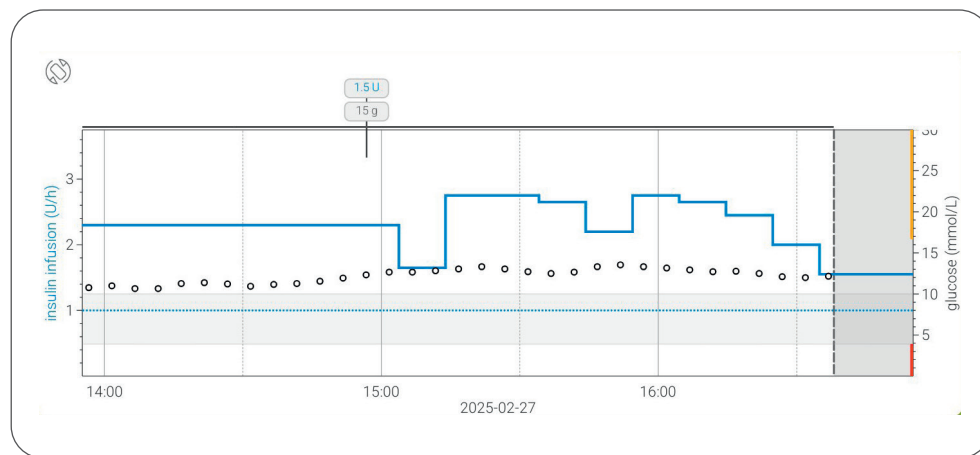
To access Add meal:

1. Go to the “Add meal” tab of the main menu of the mylife CamAPS FX app
2. Enter the amount of carbohydrates and choose between meal or snack, hypoglycaemia treatment or slowly absorbed meal. Tap “Continue” and confirm



Insulin on Board (IOB)

- Considering IOB may be the single most important factor in preventing hypoglycaemia during exercise. If there is a large amount of insulin recently administered before starting an activity, this insulin will be very powerful and decrease glucose levels. The user may have to consume many CHO to counteract this.²
- On mylife CamAPS FX, the amount of IOB can be seen by tapping the information icon on the home screen this, shows previous bolus insulin given. To consider total IOB and potential risk of hypoglycaemia, turn the phone to landscape mode and trace back insulin delivery and glucose levels in the last 2 to 4 hours.





How to manage exercise with mylife CamAPS FX²

According to the most recent guidelines, there are 5 key strategies to consider before exercise:

- **Glucose target** – Consider what is an optimum glucose level for this type of exercise, in mylife CamAPS FX use “Ease-off” or “Boost” depending on the effect of the exercise, to alter the glucose level 1 to 2 hours before exercise. If required PGT can also be adjusted however, this may be more useful for lengthy unusual activity such as a ski trip.
- **Exercising within 2 hours of eating a carbohydrate containing meal** – Use “Ease-off” as well as reduce the bolus for the meal by 25 % to 33 % for exercise which lowers glucose levels.
- **Consume fast acting CHO** – according to the glucose levels and trend arrows take 3g to 20g, avoid over consumption as this could result in increased basal delivery, and in turn lead to hypoglycemia.
- If exercise is unplanned utilise “**Ease-off**” and, if required, **adjust PGT** as soon as possible for glucose lowering exercises, as well as consuming CHO if required. If PGT is adjusted it is important it is changed back after the exercise.
- Exercising with low amounts of insulin on board will help to avoid hypoglycaemia, for example before meals and first thing in the morning.²



Recommendations for **before** exercise²

Before exercise	Planned exercise	Unplanned
Exercise that lowers glucose levels e.g. aerobic	<ul style="list-style-type: none"> ● Set “Ease-off” and if required, increase PGT 1 to 2 hours before exercise ● Reduce prandial insulin dose by 25 % to 33 % if eating within 2 hours of starting exercise 	<ul style="list-style-type: none"> ● Set “Ease-off” and if required, increase PGT as soon as possible ● Consume 10 to 20g of CHO if glucose levels are below 7 mmol/L (126 mg/dL). Increase grams of CHO based on IOB
Exercise that increases glucose levels e.g. anaerobic	<ul style="list-style-type: none"> ● If needed set “Boost”, and if required, lower PGT when starting exercise ● No change to prandial insulin dose may be necessary 	<ul style="list-style-type: none"> ● If needed set “Boost” and if required lower PGT when starting exercise ● No extra CHO required

Note: If hyperglycaemia is present before or during exercise, stop and assess Diabetic ketoacidosis (DKA) risk. Check for ketones and follow clinical guidelines for ketone management or seek clinical support.



Recommendations for **during** exercise²

It is advised to monitor glucose levels every 20 to 30 mins while exercising. If glucose levels are dropping, extra CHO may need to be consumed to prevent hypoglycaemia, according to the trend CGM arrow. See table below.²

During Exercise

↓	↘	→	↗	↑
<ul style="list-style-type: none"> Consume 12 to 20g of CHO if glucose levels are below 7 mmol/L (126 md/dL) Ensure "Ease-off" is turned on 	<ul style="list-style-type: none"> Consume 6 to 12g of CHO if glucose levels are below 7 mmol/L (126 md/dL) Ensure "Ease-off" is turned on 	<ul style="list-style-type: none"> Consume 3 to 6g of CHO if glucose levels are below 7 mmol/L (126 mg/dL) Ensure "Ease-off" is turned on 	<ul style="list-style-type: none"> No extra CHO required 	<ul style="list-style-type: none"> No extra CHO required If "Ease-off" is on, consider turning it off.

Note: If the pump is removed during the exercise, it is important to suspend insulin delivery on the pump.



Recommendations for **after** exercise

- It can be very individual how glucose levels behave after exercise. Again, the type and duration can affect this.
- High glucose levels after exercising: The higher levels may come down without extra insulin, therefore, it is mainly advised to be cautious when correcting high glucose levels after exercise. Research suggests trying 50 % of usual correction or using "Boost".⁴
- Lower glucose levels after exercising – For some people low glucose levels can persist for hours after exercising. "Ease-off" can be kept on in this situation as well as having extra CHO and reducing the bolus for meals and snacks. It is also suggested to slightly raise the hypoglycaemia alert threshold during this time period.⁴ Additionally, correcting high glucose levels close to bedtime after an active day, should be avoided since it may increase the risk of post-exercise nocturnal hypoglycaemia.⁴



Where to begin with adjustments for exercise! Tip – remember TRY

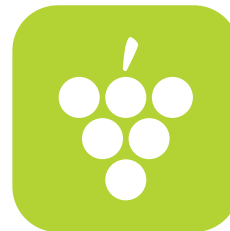
Target glucose level



Range of the exercise



Your current glucose level



Exercise example: Park run at 10am on a Saturday morning.

- Target glucose level**
 Running usually reduces glucose levels, therefore “Ease-off” will be started at 8 am (2 hours before starting exercise).
- Range of the exercise**
 The run will last an hour, therefore “Ease-off” will be set for 3 hours to cover before and during exercise.
- Your current glucose level**
 Breakfast will be at 8:30am which is less than 2 hours before the run. Because of this, a reduction of 25 % will be taken from bolus. Depending on glucose level at the start of the run, some fast-acting CHO may be consumed. As glucose can continue to drop after exercise, glucose levels will be checked after the run and “Ease-off” may be put on again, if levels are lower or dropping. “Ease off” can be turned on again or programed for longer initially to stay on after the exercise if glucose levels are falling.

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