Case Study 7.1:

Meal Announcement (Advanced HCL):

autoISF w/o carb inputs, but reduced bolus, for a 5y-old

The following statements refer to the very personal experience of an individual case (boy, start *towards* FCL in Oct. 2022 at the age of 4), and do not represent any recommendations for action!

Setup:

- AccuCheck Insight, Dexcom G6 (unfortunately no stable and reliable values with all other sensors), Looperhandy Unihertz Jelly Star, insulin: Lyumjev

- xDrip and AAPS (dev variant +autoISF): each latest version.

- Signal path: G6 > xDrip > local broadcast to AAPS, upload to Nightscout

- Alarms: only in xDrip to all connected parent followers due to remote snoozing of alarms. Child cell phone silent at night (except AAPS error messages e.g. "Pump not available"), BG alarms only for parents.

!!! Important!!! Before all tests, it must be ensured that the **alarm management** works reliably! It will certainly happen again and again that the system delivers (far) too much insulin - this must be recognized in time to counteract with emergency carbs. Please follow the instructions for cautious entry towards FCL/MA in the general section of the FCL e-book!

Differences when switching from the normal AAPS Loop to Advanced_HCL w/autoISF: none. All values (IC, ISF, basal) exactly adopted.

General assessment:

A "real" FCL without any pre-bolus or announcement did not work for us. The postprandial rises after completely unannounced meals seem too intense, and inevitably lead to hyperglycaemia, which can be prolonged. To investigate the causes, special diets would have to be tested (low carb, low glyx...). For us, a conscious and balanced diet is essential (mixed diet, but lots of whole grains, lots of vegetables, little sugar - but exceptions on special occasions), so we have given up the goal of a real FCL (for the time being).

For us, the following approach leads to a total TIR of 85%:

- **Breakfast: complete meal bolus in classic form** (pre-delivery of insulin 18 minutes, calculation 100% via the bolus calculator)

- **Other meals: Pre-delivery of an estimated insulin value of 50%-80% of the bolus insulin as we typically administered in the past** Hybrid Closed Loop. No carb inputs. Let AAPS (SMB+UAM, w/autoISF) take care of keeping bg in range.

Manual corrections

- Some meals (like Pizza) come with longer bg plateaus. In this case, a **larger pre-bolus** is given

> *Comment Bernie:* …. and for the late effects from the cheese, **dura_ISF** driven SMBs kick in.

- We cannot confirm the statements in the FCL e book (in the sense of "manual insulin administration hinders the loop, and does more harm than good")

Typical problem scenarios and possible solutions:

SMB is too low and cannot slow down the steep rise in BG at an early stage:

- Tightening the insulin profile or autoISF restrictions/parameters - more insulin

SMB comes too late:

- Increase in autoISF parameters (accel weight, but possibly also basic insulin profile)

SMB too high

- If insulin requirement is unusually low: this is recognized very well by the loop and regulated early; reduction of the pre-bolus?

- If the insulin requirement is unusually high: longer plateaus and rises -> increase the entire profile in 5% or 10% steps

Loop tuning:

Frankly speaking, I have never yet gotten the emulator to the point of being able to recognize meaningful conclusions from my own data

Instead: Observe BG curves. Make a note in Nightscout in case of abnormalities and emergency carbs. In the case of "systematic" deviations, then identify situations in which a cause can be clearly assigned

Conclusion:

We could not make a "real" FCL work for our child.

But with a flat-rate estimated **pre-bolus**, everyday life is very well possible **completely without** weighing and **calculating carbohydrates**, at TIR between 80 and 90%.

The "freedom" we have gained is a huge step forward - many thanks to Gerhard and everyone involved!

> *Comment Bernie:* That is nice to hear, and **it might be the best solution** for many kids.
> See also conclusions in section 7.3.3 and in section 7.8 of the FCL e book.

(Translated from German with DeepL.com / free version*, and edited*)