6. Temporary Modulation for Exercise and lighter (In-)Activity   V 2.5

Please note that with autoISF 3.0 you are in an early-dev. environment, where the user interface is **not optimized for safety** of users who stray away from intended ways to use. Good safety features exist, but these are only as good as the development-oriented user understands and implements them.

This is not a medical product, refer to disclaimer in <u>section 0</u>

6.1 Dynamic iobTH and sensitivity ratio

    6.1.1 Manual (direct) iobTH modulation

    6.1.2 Automations for iobTH modulation

    6.1.3 Dynamic iobTH

6.2 Temp. % profile switch

6.3 DIY cockpit based on User action Automations

6.4 Improved FCL cockpit

    6.4.1 Manual (direct) iobTH modulation

    6.4.2 pre-sets for 4 kinds of exercise

    6.4.3 optional meal pre-sets

    6.4.4 optional hypo management pre-sets

6.5 Mastering the exercise after meal challenge

    6.5.1 Manual mode

    6.5.2 DIY cockpit button for User action Automation

    6.5.3 Using pre-sets in improved FCL cockpit

6.6 Activity monitor based on stepcounter

Available related case studies:

Case study 6.2: Biking day with hi carb lunch; …………………… …DIY cockpit

Preliminary remarks

This section is **no easy read** because it attempts to describe *all options* to deal with various types of exercise.

- Fortunately, you might need *none* of them

- you can set any of them up at your leisure, one at a time, for any of your occasional or regular exercise events

- then pick one or two of the described options, how to go about it.

33   • As long you were not able yet to define better ways, you should always be able to
34   manage bg during sports with extra snacks.

35

36 Staying in contact with the related discord/github community should help greatly to find
37 suitable ways to manage your type(s) of exercise
38 Please report *your* experience by supplying a [case study.](#) Looking at case studies that relate
39 to *your* kinds of exercise might be easier to digest than working your way through all the
40 options laid out in this section.

41

6.1 Dynamic iobTH and sensitivity ratio in „exercise mode"

42

43

44 iobTH is a threshold you can set, above which AAPS will no longer deliver additional SMBs.

45

46 For exercise, we like to limit how high iob can go, therefore automatic "dynamic" reduction of
47 your default iobTH (= iobMAX x iobTH%) is a benefit, notably as you can individually tune it.

48

49   Note: When transitioning to autoISF 3.0 from a previous version, de-activate (but keep for
50   a while) the Automations you had for iobTH in previous autoISF versions. autoISF 3.0
51   totally changes how iobTH is accessed and modulated. (This can affect your automatic
52   meal management, too).

53

54 In autoISF 3.0 and later, a default setting for iobTH is made in AAPS preferences, defined
55 there as fraction (e.g. 0.6) of your set maxIOB:

56   /OpenAPS_SMB/autoISF_settings/Full_Loop_settings: iob_threshold_percent,

57   =>   default iobTH = iobMAX x iob_threshold_percent

58

6.1.1 Manual (direct) iobTH modulation

59

60

61 „Manual" routes to temporarily change iobTH would be

62

63   • changing the setting for the new parameter „iob_threshold_percent „

64   • or changing the setting for iobMAX

65   in /Preferences.

66   This is <u>not</u> a preferred route for temporary adjustment, because it would not automatically
67   revert to default, after use.

68   A future improved FCL cockpit (-> <u>section 5.3</u>) may also give direct access to

69   • override iobTH temporarily, at any point of time.

70

71   6.1.2 Automations for temporary iobTH modulation

72

73   You can define Automations that sets a different iobTH under pre-defined conditions, or for a
74   defined period of minutes to hours.

75   If your Automation has the User action box clicked, you get a grey button into your
76   AAPS home screen from which you can activate that changed iobTH manually.

77   Note that this is the iobTH you tell the loop to use in place of the default iobTH

78   ● it will still be modulated further if %profile and TT are set (see below).
79

80   **Caution**: If (as in autoISF 3.0) setting a different iobTH or bgAccel_ISF_weight can not be
81   done temporarily (i.e. with a duration attached) you **must** define a suitable **additional Auto-
mation that** must be active in tandem, that **restores the default**
82   **set iobTH** or bgAccel-ISF_weight **again**. Else, once your
83   Automation sets in, it will *forever* shift this important parameter
setting!
84
85   If for instance you have several Automations that, in combination
with a set elevated TT also set a lower iobTH: Don't be fooled,
86   the duration only applies to the TT. You need an extra
Automation for all of them.
87
88   I picked out the highest of the altered iobTH values that these
Automations can set (45_percent), and then I can automatically
89   restore my default desired 60% via this one:
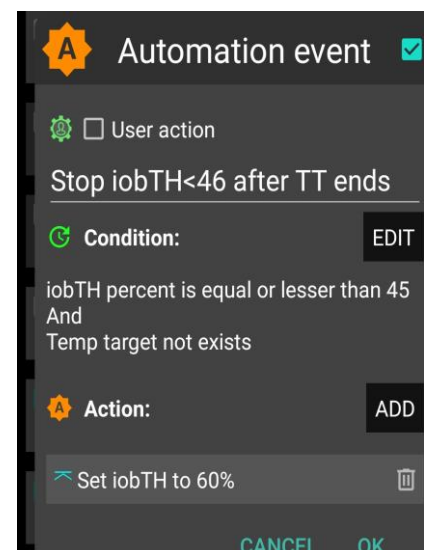
90 **Caution:** Watch out for another potential stumbling block, because many Automations only
91 work under the condition that no TT is already running.

92

93 6.1.3 Dynamic iobTH: Fully automated iobTH modulation via setting a temp. glucose target

94

95 Note that in AAPS preferences, you need to set high TT raises sensitivity = TRUE.

96 Then, setting a temporary glucose target (TT), modulates iobTH the same way as it modulate
97 sensitivity (ISF). sensitivity).

98

99 When. *additionally*. the exercise button is ON (lit yellow), iobTH gets reduced *particularly*
100 strong, and ISF *particularly* weakened (as desired for exercise).

101 That effect is the stronger (**ISF gets the weaker, iobTH the lower**), **the lower you set the**
102 **half-basal exercise target** for your exercise mode in AAPS/preferences/OpenAPS SMB:

103

104 The following table shows, for a profile target of 100 mg/dl, these *particular effects*:

105 • @ half_basal_exercise_target you set in AAPS/preferences/OpenAPS SMB

106 Choose a low number if you later want a high dynamic range of sensitivity modulation

107 • and @ your current exercise TT that you set on the day you do the respective
108 exercise, with an eye on how you wish sensitivity auto-adjusted.
109 Higher TT = lesser insulin delivered

110 Note that:

111 • temp. basal = profile basal * sens.ratio

112 *Example:* At a half-basal_exercise_target *of 120,* setting a TT *of 120* gives only half
113 (0.5) of profile basal (hence the name of the parameter)

114 • temp.ISF = profile ISF / sens.ratio

115 • temp.iobTH = set iobTH * sens.ratio

116

117

118   The following table gives some examples for resulting sensitivity ratios.

Half basal ex.target	180	150	120
TT	sens.ratio	sens.ratio	sens.ratio
100	1	1	1
120	0,8	0,71	0,5
140	0,67	0,56	0,33
160	0,57	0,45	0,25
180	0,50	0,38	0,20

119

120 The exact calculation for *any* combination of profile target, set TT, and half-
121 basal_exercise_target is given in section 3.3

122 You do not really have to deal with these details, though. Just sit back in your cockpit, and
123 watch the effects of various inputs on iobTH and %sens on your AAPS home screen

124

125 Try to determine good settings for the kinds of exercise that you frequently engage in.

126

127 Later, just press the grey DIY button, or the TT button, and make an exercise-related entry
128 there (sections 6.2 or 6.3; case study 6.2). This will automatically switch the exercise button
129 to yellow (ON), and it lowers basal and iobTH as (in your experience) suitable.

130

131 Note that

132   (1) setting a TT often shuts out other Automations. Choose the duration wisely (and
133   also the sequence, in which all your Automations are listed).

134   (2) (assuming, you use the even/odd differentiation for SMB on/off:) Consciously
135   decide whether you set an even or an odd numbered TT.

136   • Pick **odd,** if you do not want SMBs during exercise. (Despite you softened
137   ISF, SMBs still might „attack" a sports snack too strongly).

138   However, odd cannot be set too early, when your meal digestion still requires
139   SMBs. Likewise, you might want the option for a few automatically delivered

140   SMBs against unforeseen spikes (e.g. from excitement) also later. An
141   **Automation** that switches from odd to even for a couple of minutes might
142   sneak in a desired SMB or two .

143   However, you are probably out of luck because an already set odd (or
144   any) TT would <u>preclude</u> such Automation from kicking in. Then you
145   need to develop additional ideas, another detour, like to first define an
146   Automation that briefly shuts your odd TT down.

147   • Working with an **even** TT can sometimes be preferable, notably of course if
148   your exercise is one that can get you totally excited, with glucose spikes.
149   While this mode generally does allow SMBs, the loop softens the ISF (by the
150   sens.factor like in the table given above), and will temp. shut SMBs down,
151   when **iobTH** (which also got lowered by the sens. factor) is exceeded.

152   Whether odd or even TT is better depends on the kinds of exercise you are doing,
153   and probably depends on the protein and fat load of your meal and snacks, as well.

154

155   (3) Timing can be critical as to when you do this exercise announcement, especially
156   relative to a preceding hi-carb meal. Then you want the reduced iobTH in place latest
157   after you received the first SMB. See <u>section 6.4</u> and <u>case study 6.2</u>

158

159   You always can see the valid iobTH your loop is working with in your AAPS home screen,
160   next to the current iob status.

161

162   You can use any of the above discussed methods, or also the one that now follows in <u>section</u>
163   <u>6.2</u>, to further tweek iobTH temporarily, should you see a need.

164

6.2 Temporary % profile switch

A complementary measure you can take from the AAPS home screen is to set a **reduced temp.% profile sensitivity.**

This setting would **multiply** with the results in above table and <u>further reduce basal and iobTH </u>(whenever exercise button AND profile button both are yellow).

Temp. reduction of basal will proportionally also reduce the *max. allowed* size of SMBs (which is two hours worth of basal x SMB_range_extention, see <u>section 2.1</u>)

Note that the **time windows** for doing this profile switch (which was the main ingredient of going into exercise in hybrid closed loop) can differ from your TT-related exercise settings. Using all available tools then allows a nearly surgical approach to what you want to achieve for and during your favorite exercise(s).

- Often the %profile modulation is used for several hours if not days to accommodate "long waved" sensitivity swings (See e.g. in <u>case study 6.2</u>).

- Instead, or even additionally, the percentage might be modified for just a couple of minutes, or for one special snack or meal duration, to "nudge" the proportionally modulated aggressiveness of the FCL (see <u>section 5.2.3</u>).

You can prepare yourself for anything you see coming up, or potentially coming up, in your daily life, so, from the comfort of your cockpit you get ready for it within just a second or two, doing a few „clicks".

6.3 Managing exercise via Cockpit inputs

6.3.1 Basic Settings for Exercise

Coming from FCL with no TT set (both top fields, TT and exercise, are grey), you best prepare for an intended exercise by **pressing the TT field** of your AAPS main screen (your looping cockpit; presented in <u>section 5.2</u>).

There, you can **freely select** TT and duration.

Alternatively, you can press on **one of 4 offered** exercise **presets**. (Note: This, and many

other – in this green color - described cockpit features are yet to be developed)

197

198 When you do either one, the exercise button in the top middle of your AAPS main screen will

199 turn yellow: (It also does turn yellow, or remains yellow, whenever you make a new selection

200 or input in these fields (or when you just press on the exercise button, when a TT is set.)

201

202 6.3.2 „Dynamic" exercise mode off = traditional AAPS exercise mode (YGY)

203

204 When the dynamic exercise mode is off, you still have the instruments for *exercise*

205 *management just as you always had it in the past* = a combination of manually softened

206 aggressiveness via setting a temp. %profile change, and orienting corrections towards an

207 elevated TT.

208

209 By selecting an odd numbered TT you now have the *additional option* to shut SMBs

210 temporarily off, too.

211

212 *If improved cockpit is launched,* the top part of the dialogue box looks about like this when

213 the exercise field is grey:
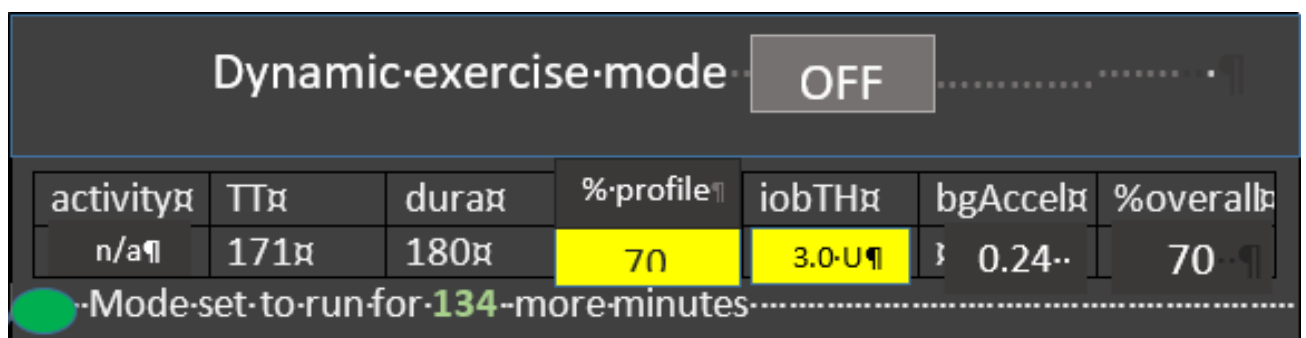
214

215

216

217

218

219

220

% profile can be changed:

- either here => neighboring %profile button turns yellow too (with the % info on it); or
- under the %profile button; or
- it had already been changed using AAPS / Action / Profile switch

In all 3 cases, you see the number < 100 or >100 in the middle of above table, on a yellow colored field, too.

In this "YGY" mode, the % temp. set profile is the effectively applied "%overall" sensitivity

TT and duration can be entered or changed (= traditional mode to set exercise targets).

If there is a desire to try, for the **remaining duration,** a different iobTH or bgAccel_ISF-weight, this can be overridden in the table; field turns yellow, and the algorithm uses temp. iobTH and/or temp bgAccel_ISF_weight as modified in the exercise button (and reports this also in the SMB tab).

> *In the dialogue box pictured above, 70% profile was set for 3 hours, and the default*
> *iobTH of 60% * 10 U was cut by 50% down to 3.0 U.*

The effective iobTH shows also in the AAPS home screen, next to the actual iob (*e.g. „1.2 U < 3.0 U")*

The remaining duration shows below the table (*in the example: 134 minutes* and counting down).

TT and % profile will also show on the yellow labels of the neighboring %profile (left top of AAPS home screen) and TT (right side), respectively.

The middle (exercise) field remains grey because the automatic sensitivity tuning (that would use TT and half-basal exercise target) are off.

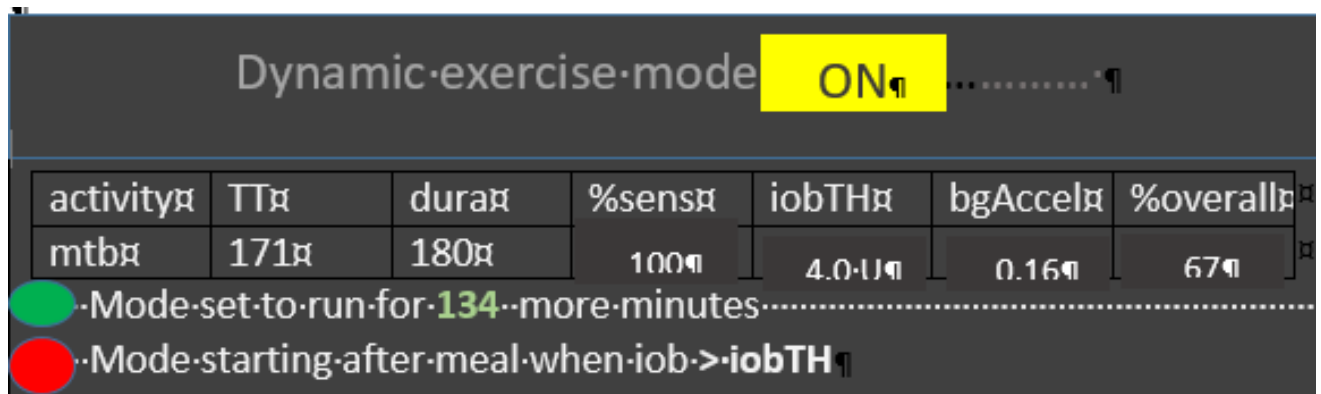251 ### 6.3.3 Dynamic exercise mode ON (GYY or YYY)

252

253   By pressing the yellow exercise button on the AAPS home screen, *you have the*
254   *option* to switch the **dynamic exercise mode ON**, in which case the middle
255   field/exercise button of your AAPS main screen will go from grey to yellow.

256

257 In a version update you could do your setting for the upcoming exercise under the **dialogue**
258 **box of the TT button**

259 Then, when you look into the exercise button in the middle of your FCL cockpit the dynamic
260 exercise mode will automatically be „ON", and all entries made:

261

Dynamic·exercise·mode   **ON¶**   ············¶

activity¤	TT¤	dura¤	%sens¤	iobTH¤	bgAccel¤	%overall¤
mtb¤	171¤	180¤	100¶	4.0·U¶	0.16¶	67¶

🟢 ·Mode·set·to·run·for·**134**··more·minutes···································
🔴 ·Mode·starting·after·meal·when·iob·>·**iobTH**¶

262 The data for the kind of exercise (*here mtb; could also be n/a or ?)* are coming from prior
263 selections made in the dialogue box of the neigboring TT field. There, as well as in this
264 window here, the resulting iobTH and bgAccel_ISF_weight are shown. Also the overall
265 aggressiveness (% overall insulin sensitivity factor) is calculated.

266 The **middle field** of the table in this dialogue box, **% profile"** either picks up the % set under
267 the %profile button, or an input can be made here, in the exercise button domain, which will:

268   ●   turn the neighboring %profile button on yellow and show that inputted % on it, too

269   ●   be multiplied with the result from the exercise mode settings per se, and change
270   the % overall, accordingly.

271 So, if this middle field of above table (dialogue box of exercise button) contains a figure other
272 than 100, the input field becomes yellow, and you are operating with a combination of
273 traditional PLUS new exercise mode (with all three top buttons of your FCL cockpit yellow).
274 This maximally will soften aggressiveness, for which you get an idea by the last calculated
275 figure.

276 The mode is either running already (*for another 134 of the total 180 minute in the picture*) as
277 also the label on the neighboring yellow TT field will show *171 (134, and counting down)*,

278 Or (*see at the red dot in picture above*), it is scheduled to run, after insulination for a started
279 meal surpasses iobTH (*as in table*).

280   Note that, when the TT expires or is changed, your overriding input (if you made any)
281   is automatically erased, forgotten.

282

283 6.3.4 Dynamic exercise mode ON plus %profile change (YYY)

284

285 The **middle field** of the table in the dynamic exercise mode dialogue box (see above), **%**
286 **profile"** either picks up the % set under the %profile button, or an input can be made here, in
287 the exercise button domain, which will:

288   ● turn the neighboring %profile button on yellow and show that inputted % on it, too

289   ● be multiplied with the result from the exercise mode settings per se, and change
290   the % overall, accordingly.

291 So, if this middle field of above table (dialogue box of exercise button) contains a figure other
292 than 100, input field becomes yellow, and you are operating with a combination of traditional
293 plus new exercise mode (with all three top buttons of your FCL cockpit yellow). This
294 maximally will soften aggressiveness, for which you get an idea by the last calculated figure.

295

296 It is advisable to find good settings within the dynamic exercise mode and NOT use profile
297 switches on top – unless the profile switch is meant, also outside of the temporary exercise
298 context, to provide for other, „longer waved", health or hormonal situations.

299

300 Also, that middle field offers easy access for temporarily tweaking the aggressiveness
301 without immediately changing core settings like the half-basal-exercise target etc.

302

6.4 Option to pre-set for 4 kinds of exercise or meals (for 1 button operation)

6.4.1 iob_threshold_percent

In AAPS preferences/OpenAPS SMB/autoISF settings / Full Loop Settings, the default iob_threshold_percent used for the normal meal spectrum is defined.

In an updated later autoISF version you might be able to diffentiate there for up to 4 meal clusters (see next section)

6.4.2 Pre-settings for (up to) 4 kinds of exercise:

In AAPS preferences/OpenAPS SMB/autoISF settings / Full Loop Settings: follows next input fields for pre-settings you can define for (up to) 4 kinds of exercise:

The following table gives an example of settings you may find well-suited for 4 of your favourite exercises

#1-4	give name (max 3 characters)	duration for TT ((min)	TT (AC) (mg/dl)	% profile	iobTH	bgAcce:weight	Approx % ins reduct.
1	wlk	60	111	100			
2	grd	120	131	90			
3	bik	300	151	90			
4	mtb	180	171	70			

Input fields (during tuning phase to determine good settings) are only the columns 2-5.
The last 3 columns will be calculated from TT and %profile inputs, using also the half-basal exercise target and the default weight setting. In this setting.

The last is only an approximation to get a feel for a reasonable setting of the other parameters.

Here in preferences they should never be overridden, but TT or % profile should be adjusted to reach desired result when tuning for FCL.

325 Likewise, you find tables to make pre-settings for meals and for hypo treatments:

326

327 6.4.3 Pre-settings for (up to) 4 kinds of meals:

328

329 In AAPS preferences/OpenAPS SMB/autoISF settings / **Full Loop Settings**: follows next:

330 Input fields for pre-settings you can define for (up to) 4 kinds of meals. For instance:

TT# 1-4	give name (3 letters)	TT (Eating Soon) (mg/dl)e	Duration for TT (min)	iobTH (0---130% and < iobMAX)	bgAcce factor 200…0%	
1	hiC	72	120	110	110	
2	loC	74	180	67	67	
3	piz	76	300	100	100	
4	snk	78	60	100	50	

331

332 Input fields (during tuning phase to determine good settings) are all columns

333 Difference in TT is fairly unimportant (unless you do not give a name and memorize the set
334 TT number instead, for which meal type it codes.

335   Logic why not having a % profile column here: %profile switch should be set extra,
336   potentially for another time period *(e.g. „reserved" for periods of exercise, or for entire*
337   *days of altered insulin sensitivity, for instance due to illness, fasting, extensive sports*
338   *week.)*

339

340

341

342 In AAPS preferences/OpenAPS SMB/autoISF settings / **Full Loop Settings**: follows next:

343 Input fields for pre-settings you can define for (up to) 4 kinds of HYPO treatment. Example:

TT (ES) (mg/dl)	give name (3 letters)	TT (AC) (mg/dl)	Duration for TT (AC) (min)	bgTH (mg/dl)	
1	Hy1	131	55	none	
2	Hy2	131	55	200	

344

345 Input fields (during tuning phase to determine good settings) are all columns, 2-5.

346 Choosing an odd-numbered TT is recommended as it can shut-out SMBs (with the

347 appropriate setting in preferences/Open APS SMB/autoISF settings/smb_delivery

348 settings/"enable alternatiuve activation…".

349

350 Those of us who tend to over-treat hypos may prefer to set Hy2 (unless for night snacks->

351 Hy1): Reverting to standard loop aggressiveness with SMBs after/if a certain bg level

352 („threshold", similar to our iobTH for meals) is surpassed, and we want our loop to react

353 again with SMBs before the set duration expires.

354

355 ## 6.5 Mastering Exercise after a Meal

356

357 In Hybrid Closed Loop, we gave less insulin at meals (a reduced bolus) before exercise.

358 Since we now get our meal insulin automatically from the loop, we would have to at least

359 somehow tell it that exercise follows this time.

360 Simply setting an exercise profile *before* the meal would make our full closed loop too weak
361 in the "treatment" of the first glucose rise. What we want is, to get our (already, compared to
362 HCL, delayed) meal insulin delivered as fast as possible by SMBs. It just should be capped
363 at the desired iob reduction.

364

365 6.5.1 Manual mode requires 2 user interventions

366

367 What we can do, is (1) **reduce** the **iobTH** (*e.g. by one third).*

368   ● *In the example we were using, this would mean to reduce by 2 U to iobTH* = 4U.*

369   ● Do that estimate for your data, and think back how you did bolus reduction in hybrid
370   closed loop before same exercise.

371   ● Likewise, you can use your profile ISF, *e.g. 30 mg/dl/U* and „translate" by how much
372   (2U * 30 mg/dl/U = 60 mg/dl) this „pulls you away from going into a hypo".

373   ● Using your IC (e.g. 8g/U) you can also translate the iobTH reduction (2 U) into a
374   „snack equivalent" (*2U * 8 g/U = 16* g) that you „replace" by thinking ahead and
375   „budgeting" for some exercise with your iobTH modulation.

376 In this senario, our loop delivers SMB insulin as fast as always, only that when the last SMB
377 has passed the iobTH, the loop only has elevated %TBR to work with, meaning it cannot
378 raise iob by much any longer. This provides an elevated glucose level on which we enter
379 exercise, and saves us hypo danger or snack need (as calculated in above examples).

380

381 After this reduced iobTH is reached, step (2) must follow = an increased exercise **bg target**
382 is set (see section 6.2).

383

384 The problem with this approach is that it requires **two** user interventions, first **setting the**
385 **lower iobTH**, later (**and** this *in a time-critical manner*, after iobTH is exceeded), to **input a**
386 **exercise TT** or activate a related setting.

387 To eliminate this problem, the following refined solutions are suggested:

388

389

390 ## 6.5.2 DIY cockpit: Using pre-set meal / exercise settings from a User action Automation

391

392 The „DIY cockpit" user interface allows a *one-step* setting for meal + exercise that can be
393 selected in time-uncritical fashion, any time before the meal starts.

394

395 Summary from detailed example given in case study 6.2:

396

397 A sequence of 3 Automations must be set up, of which only the first one must be manually
398 triggered, in just one time-uncritical key stroke from the AAPS home screen.

399 The others come on automatically when the respective Conditions are met.

400

401 Automation #1 provides, for a meal that precedes exercise, the full loop aggressiveness, but
402 makes sure that this aggressiveness stops immediately after a (reduced) iobTH is exceeded.
403 The reduced iobTH ensures that not too much insulin is on bord for exercise after the meal.
404 Also it provides an elevated bg level at (re-)start of exercise.

405

406 In this Automation, the box "User action" should be permanently ticked. This will
407 automatically provide a grey button on the bottom of the AAPS home screen ("DIY cockpit")
408 that can be freely named (= headline of Automation #1).

409

410 When the reduced iobTH is exceeded, two things need to be provided :

411   (1) a milder running FCL (reduced exercise %profile, after the meal rise had been
412   managed based on 100% profile boosted further by bgAccel_ISF driven full
413   loop aggressiveness) => Automation #2 sets e.g. 70% profile and ends TT

414   (2) setting an exercise TT (not possible with Automation #2. But *after* it ended the
415   TT, an Automation #3 can immediately follow and set the desired exercise
416   TT=125 (which implies the exercise mode

417 Note that Automations 2 and 3 are fully automatic, no User action is involved. See case
418 study 6.2 for an example

419

420 Should during the exercise a need arise to modulate the loop aggressiveness (iobTH,
421 effective ISF) that can be done within 1-2 seconds also right from the AAPS home screen
422 („FCL cockpit") by setting a higher or lower temp. %profile, and/or by setting a higher or
423 lower temp. exerciseTT.

424 To make the loop temporarily act a bit more aggressive, switching the exercise button OFF
425 (from yellow to grey) could also be considered

426

427 Defining User action - Automations to build your FCL cockpit

428

429 If you want to develop your **DIY User Interface**, make sure you define suitable settings that
430 reflect **your** personal insulin sensitivity and data patterns.

431

432 As mentioned in other places, Automations can be tricky as to whether they actually will ever
433 work, because the loop goes through the exact **sequence of all your active Automations**,
434 and might be switched into a direction that no longer is compatible with the conditions that
435 must be a given, for the Automation you think that should kick in.

436

437 To have a clean AAPS home screen (and also to prevent unnecessary accidential
438 activation), define reasonable time windows for each of your shelved special routines, or
439 keep them entirely dormant (de-activated) in the list of all your Automations, and activate
440 them only for the day when you think you might need them

441

442 6.5.3 Improved cockpit: Using pre-set meal / exercise combination from TT dialogue box

443

444 The improved „FCL cockpit" User Interface (when available) also allows a one-step setting
445 for meal + exercise that can be selected in time-uncritical fashion, any time before the meal
446 starts.

447 It manages the meal with an appropriately reduced iobTH, and is programmed to
448 automatically activate the exercise settings when iobTH is exceeded:

449

450 If in addition to meal, one of the 4 pre-programmed exercises is <u>also</u> selected from the

451 bottom of the TT dialogue box, *(for example, in case of biking after a hi carb lunch, hiC + bik,*

452 *see* <u>section 5.3.3.1</u>*.)* then meal gets superseded /overridden with condition „duration = until

453 when iobTH is first time exceeded". Plus, that is the other important point, the activity-related

454 reduced iobTH is taken over for the meal, too.

455

456 All this happens from the AAPS home screen and associated dialogue box from the TT field

457 there.

458 Actual valid settings can at any time point be seen in the AAPS home screen (see <u>section</u>

459 <u>5.3.3.1</u> on extra data fields, above).

460

461 When your FCL is in this meal + exercise mode, you first see at the TT field (<u>section 5.3.3.1</u>)

462 of your AAPS main screen:

… and when iobTH is the first time exceeded, this automatically switches to:

463

464

465 That 1-step setting can either be freely done according to <u>section 6.2</u>

466 **Or** you can just press one of your frequent meal **and** frequent exercise „codes", as described

467 in <u>sections 6.3.2 and 6.3.3</u>

468 *Example: For mountain biking after pizza lunch* press two buttons*, piz and mtb,* in the

469 dialogue box of your AAPS home screen's TT field. That's all (…after, one time, you figured

470 out what settings suit that scenario, and you put it into /preferences, see <u>sections 6.3.2 and</u>

471 <u>6.3.3</u>).

6.5.4 Laissez-faire alternative

You could also just use an exercise setting and accept a reduced loop aggressiveness already before meal start. You would go a bit higher in your glucose peak. As, in principle, a higher glucose level is desirable for starting exercise, this can be a viable route, too.

This depends on your meal's carb load also, and should be viable if you do the often recommended protein-rich meal before exercise.

> Note that making the exercise setting <u>after</u> meal start is problematic in case the first SMBs already exceeded the iob you see as limit for starting your exercise (which is not the limit for the meal *per se*).

6.6 Activity Monitor

An optional feature for times without serious exercise, but still suspected **effects on insulin sensitivity (max +20% to minus 30%)** is the **activity monitor**.

It can be generally activated under /preferences/OpenAPS SMB/Activity modifies sensitivity)

If the user

- has scaling factors set there (in preferences/OpenAPS SMB/Activity modifies sensitivity)

- has **no TT running**

- (and, regarding nighttime: did not opt for „ignore_inactivity_overnight")

then AAPS automatically modulates for sensitivity changes **based on movement intensity** for the last minutes to 1 hour time frame.

Personalized tuning of the two scaling factors is necessary in your FCL set-up phase. For details see

The Activity Monitor can also be used (overridden/ used for tuning the scaling factors) from a dialogue box *(if already launched)* coming up from the exercise button (top middle of AAPS home screen).

Note that Activity Monitor only works if <u>no</u> exercise (or other) TT is active (which would influence insulin sensitivity ratio much stronger than the tweeking done by the Activity Monitor, for slighter everyday effects).

In this dialogue box (connected *in a future update* with the exercise button), the two scaling parameters (set as default by the user during initial set-up in preferences) are displayed, and can be temp. over written. (These settings will expire and revert to default as set in /preferences, whenever the Activity Monitor closes (goes auto-off, or is pushed off)).
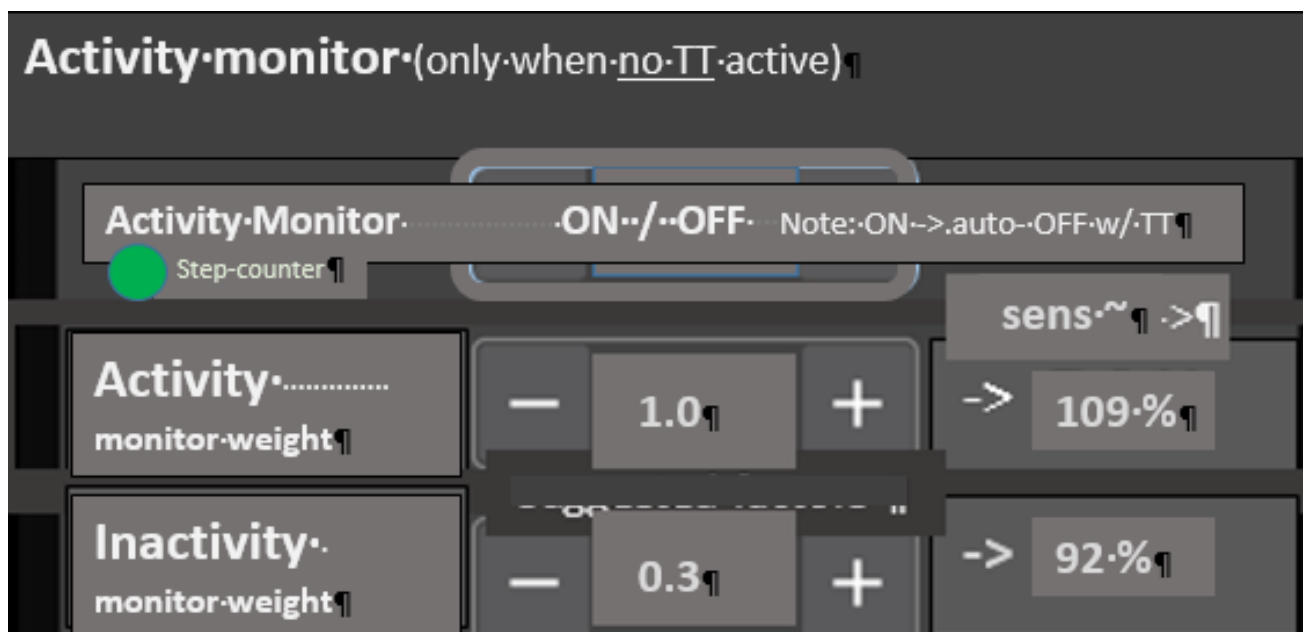
The resulting sensitivity effect is the roughly expected effect of requiring >100% insulin if moving around a bit (activity), or needing a lesser %age when being very stationary.

It is displayed in the right side column of the dialogue box *(if already launched)* to give the user a feeling for the expected effects from her/his „weight" inputs.

The exact impact is calculated by the loop and shown on top of the autoISF results in the SMB tab (every 5 minutes).