

Swim training with heart rate

Using the PoolMateHR watch to
improve your swim training

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swimovate

Swim training with the PoolMateHR

Training using heart rate has long been recognised as an excellent way to improve fitness and monitor training for running, cycling and many other sports. Until now heart rate monitors that work in the water have been limited and swimmers have traditionally not taken advantage of heart rate training methods. With the development of the PoolMateHR you can now get the full benefits of heart rate monitoring combined with lap and stroke counting. With the right training sessions and a little background knowledge you have the potential to really transform your swim fitness and get the very best from each swim session.

With extensive research and the help of swim coaches Mark Kleanthous (www.ironmate.co.uk) who devised the workouts and Ray Gibbs (www.swimcanarywharf.co.uk) for his excellent drills, we have put together this booklet for you to help improve your swim training. Good luck.

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Contents

How your heart rate differs in the pool.....	4
Heart rate training zones.....	6
Swim heart rate max (SMHR) and zones	9
WORKOUTS	13
1, Race/Recovery	13
2, Hypoxic.....	15
3, Prevent slowing down during swim.....	17
4, Tickle the Threshold Workout	20
Super Sprint Swim Training (400m).....	23
1, Complete Beginner swim work out	23
2, Complete a 400m sprint distance pool swim without stopping	24
3, Go faster during a 400m sprint distance pool swim.....	26
Olympic Distance Swim Training with a PoolMateHR	28
1, Complete a 1500m Olympic distance swim	28
2, Go faster next time in a 1500m swim	30
Drills for Frontcrawl.....	33
1, Kick on side.....	33
2, Advanced single arm.....	34
3, Noodle arms	35
4, Perfect three.....	36

How your heart rate differs in the pool

Heart rates when swimming are usually significantly less than when undertaking other sports on dry land. You may have noticed you feel to be working really hard in the pool but if you measure your heart rate it is much lower than you expect if you are used to monitoring your heart rate when running for example.

This is thought to be a result of several factors, first, the body is in a horizontal position so your heart does not have to work as hard to pump blood around the body against the effects of gravity. Second, the cooling effect of the water reduces body temperature and decreases stress on the circulation. Thirdly, the dive reflex is known to lower heart rate and blood pressure which is a neurological response to immersion in water.

So how does this affect you?

The change between aquatic heart rate levels and dry land levels can be estimated. McArdle et al. 1971, suggested aquatic heart rate was 13% lower than dry land, Sova 1991, suggested a 17 beat per minute (bpm) deduction was appropriate. Recent research from Brazil (Kruel et al) suggest a comparison test you can undertake easily.

Stand still at the side of the pool for 3 minutes then take your heart rate. Get in the pool and stand in the pool at armpit

depth for 3 minutes then take your heart rate again.

The **aquatic heart rate deduction** is determined by subtracting these two values.

If we use the commonly known formula of “220 – your age”, the maximum heart rate in the pool will be “220 – your age – aquatic deduction”.

e.g. for a 40 year old

Maximum heart rate on dry land = 220 – age = **180 bpm**

Heart rate when standing out of pool = 101 bpm

Heart rate when armpit deep in pool = 90 bpm

Aquatic deduction = 101 – 90 = 11 bpm

Maximum heart rate in the pool = 220 – age – aquatic deduction = 220 – 40 – 11 = **169 bpm**

We will use this calculation in this booklet and refer to this as SMHR. Use the chart on pages 9 and 10 to estimate your maximum swim heart rate (MSHR) and heart rate bands for each of the 5 zones which are explained next.

Caution

Exercising may include some risks. Consult a doctor before starting any exercise program. Note that medications for heart conditions, blood pressure, psychological conditions, asthma, breathing, etc., as well as some energy drinks, alcohol, and nicotine may also affect heart rate.

It is important to be sensitive to your body's responses during training. **If you feel unexpected pain or excessive fatigue when training, it is recommended that you stop the training or continue at a lighter intensity.**

Heart rate training zones

Heart rate training zones are commonly used to target different aspects of training (MHR is maximum heart rate).

ZONE 1 = 65% of MHR (recovery, warm up & cool down)

ZONE 2 = 65% -72% of MHR (endurance events)

ZONE 3 = 73% -80% of MHR (high aerobic activity)

ZONE 4 = 84%-90% of MHR (lactate threshold)

ZONE 5 = 91% -100% of MHR (sprinting and anaerobic)

ZONE 1 = 65% of MHR

ACTIVE RECOVERY (also known as 65% -73% of Lactate Threshold (LT))

In zone 1 you are burning fat for energy. This should be the zone you train in for recovery workouts, warm up and cooling down and over distance easy sessions.

This is the best zone to build up endurance for ultra distance races such as Ironman or 10K swims and should be an important part of your training. It promotes recovery from high intensity and glycogen depleting over distance training. Train in this zone for 1-3 hours and you will improve your fat burning ability. You will feel hungry after these sessions.

Training in zone 1 is paramount for our cardiovascular systems allowing our bodies to transport oxygen to and remove carbon dioxide from the muscles. The more training

in this zone to more efficient we become.
Most of your training should therefore be in this Zone.

ZONE 2 = 65% -72% of MHR

AEROBIC (also known as 75% -85% of Lactate threshold (LT))

Train in this zone and you will use a mixture of fat and glycogen (carbohydrates) for energy.
Staying in zone 2 for long swims improves the ability to transport oxygen by increasing the size and number of mitochondria and capillaries. You will also learn to use fat more as a stored fuel source.
This should be moderate paced endurance swimming.
Train in this zone for 30-90 minutes.

ZONE 3 = 73% -80% of MHR

THRESHOLD (also known as 85%-95% of Lactate threshold (LT))

Train in this zone and use up mostly glycogen and improve your ability to burn up carbohydrates. This is good for 1500m swimming.
Training duration should be 5-15 minute intervals with the same time as recovery or 20-60 minute CONTINUOUS red line hard efforts.

ZONE 4 = 84%-90% of MHR

LACTATE THRESHOLD (aka 95% -105% of Lactate threshold)

This is an important zone to train in during your build up to racing as it improves your ability to cope with lactate acid and will raise your lactate threshold. It can take 72 hours to recover from this type of training.

Training example – 10-12 x 100m repetitions (not flat out) with 50m active slow recovery allowing HR to drop to 70% of max before repeating.

Objective is to increase stroke volume and maximal aerobic capacity and improve lactate tolerance also known as buffering capacity ability.

If the rate of lactate being produced exceeds the amount being removed it is hard to maintain this level of intensity for very long.

ZONE 5 = 91% -100% of MHR

VO2 (aka 105% of Lactate Threshold)

When in zone 5 your are training very hard anaerobically. Hard short efforts will increase your V02 MAX.

Duration of training should be intensive 30-60 seconds intervals with 60 -150 seconds rest until you are completely recovered.

Objective is to increase anaerobic capacity and buffering capacity.

Swim heart rate max (SMHR) and zones

Age	Out of the pool max HR	In the pool Swim max HR	Zone 1 Recovery 60%	Zone 2 Endurance 71%	Zone 3 Lactate 76%	Zone 4 Intervals 81%	Zone 5 A Threshold/Endurance 91%	Zone 5 B Anaerobic/Endurance 94%	98%
20	200	189	113	132	144	151	172	178	185
21	199	188	113	132	143	150	171	177	184
22	198	187	112	131	142	150	170	176	183
23	197	186	112	130	141	149	169	175	182
24	196	185	111	130	141	148	168	174	181
25	195	184	110	129	140	147	167	173	180
26	194	183	110	128	139	146	167	172	179
27	193	182	109	127	138	146	166	171	178
28	192	181	109	127	138	147	166	170	177
29	191	180	108	126	137	146	164	169	176
30	190	179	107	125	136	145	163	168	175
31	189	178	107	125	135	144	162	167	174
32	188	177	106	124	135	143	161	166	173
33	187	176	106	123	134	141	160	165	172
34	186	175	105	123	133	140	159	165	172
35	185	174	104	122	132	139	158	164	171
36	184	173	104	121	131	138	157	163	170
37	183	172	103	120	130	139	157	162	169
38	182	171	103	120	130	137	156	161	168
39	181	170	102	119	129	136	155	160	167
40	180	169	101	118	128	135	154	159	166
41	179	168	101	118	128	134	153	158	165
42	178	167	100	117	127	134	152	157	164
43	177	166	100	116	126	133	151	156	163
44	176	165	99	116	125	132	150	155	162
45	175	164	98	115	125	131	149	154	161
46	174	163	98	114	124	130	148	153	160
47	173	162	97	113	123	130	147	152	159
48	172	161	97	113	122	129	146	151	158
49	171	160	96	112	122	128	145	150	157

Age	Out of the pool pool need R	Initial pool Swim need R	Zone 1 Recovery 60%	Zone 2 Endurance 71%	Zone 3 Endurance 80%	Zone 4 Interval 81%	Zone 5 A Threshold Endurance 91%	Zone 5 B Anaerobic Endurance 96%	Zone 5 C Anaerobic Capacity 99%	100%
50	170	159	95	111	121	127	143	149	156	159
51	169	158	95	111	120	126	142	149	156	158
52	168	157	94	110	119	126	141	148	155	157
53	167	156	94	109	119	125	140	147	154	156
54	166	155	93	109	118	124	140	146	153	155
55	165	154	92	108	117	123	139	145	151	154
56	164	153	92	107	116	122	138	144	150	153
57	163	152	91	106	115	122	137	143	149	152
58	162	151	91	106	115	121	136	142	148	151
59	161	150	90	105	114	120	135	141	147	150
60	160	149	89	104	113	119	134	140	146	149
61	159	148	88	104	112	118	133	139	145	148
62	158	147	88	103	112	118	132	138	144	147
63	157	146	88	102	111	117	131	137	143	146
64	156	145	87	102	109	116	131	136	142	145
65	155	144	86	101	109	115	130	135	141	144
66	154	143	86	100	107	114	129	134	140	143
67	153	142	85	99	107	114	128	133	139	142
68	152	141	85	99	106	113	127	133	138	141
69	151	140	84	98	105	112	126	132	137	140
70	150	139	83	97	104	111	125	131	136	139
71	149	138	83	97	103	110	124	130	135	138

Tip, Write your Swim Maximum Heart Rate and that for each zone on your kick board or pull buoy so you have it with you in the pool

Heart rate based swim workouts

Equipment – Swim heart rate chart, swim costume, goggles, swim cap, drink to keep hydrated and of course don't forget your PoolMateHR.

SMHR = Swim Maximum Heart Rate

It is a good idea to include drills after the warm up and before the cool down in every session, see the drills section for our favourite drills that really make a difference.

Swim Pace Calculator (using your 100m pace to work out triathlon race pace)

100 METERS	SUPER SPRINT	SPRINT	OLYMPIC	HALF IRON	IRON
100	400	750	1500	1931	3862
mm:ss	mm:ss	mm:ss	mm:ss	hh:mm:ss	hh:mm:ss
01:00	04:00	07:30	15:00	00:19:19	00:38:37
01:04	04:16	08:00	16:00	00:20:36	00:41:12
01:08	04:32	08:30	17:00	00:21:53	00:43:46
01:12	04:48	09:00	18:00	00:23:10	00:46:21
01:16	05:04	09:30	19:00	00:24:28	00:48:55
01:20	05:20	10:00	20:00	00:25:45	00:51:30
01:24	05:36	10:30	21:00	00:27:02	00:54:04
01:28	05:52	11:00	22:00	00:28:19	00:56:39
01:32	06:08	11:30	23:00	00:29:37	00:59:13
01:36	06:24	12:00	24:00	00:30:54	01:01:48
01:40	06:40	12:30	25:00	00:32:11	01:04:22
01:44	06:56	13:00	26:00	00:33:28	01:06:57
01:48	07:12	13:30	27:00	00:34:46	01:09:31

01:52	07:28	14:00	28:00	00:36:03	01:12:06
01:56	07:44	14:30	29:00	00:37:20	01:14:40
02:00	08:00	15:00	30:00	00:38:37	01:17:15
02:04	08:16	15:30	31:00	00:39:55	01:19:49
02:08	08:32	16:00	32:00	00:41:12	01:22:24
02:12	08:48	16:30	33:00	00:42:29	01:24:58
02:16	09:04	17:00	34:00	00:43:46	01:27:33
02:20	09:20	17:30	35:00	00:45:04	01:30:07
02:24	09:36	18:00	36:00	00:46:21	01:32:42
02:28	09:52	18:30	37:00	00:47:38	01:35:16
02:32	10:08	19:00	38:00	00:48:55	01:37:51
02:36	10:24	19:30	39:00	00:50:13	01:40:25
02:40	10:40	20:00	40:00	00:51:30	01:43:00
02:44	10:56	20:30	41:00	00:52:47	01:45:34
02:48	11:12	21:00	42:00	00:54:04	01:48:09
02:52	11:28	21:30	43:00	00:55:22	01:50:43
02:56	11:44	22:00	44:00	00:56:39	01:53:18
03:00	12:00	22:30	45:00	00:57:56	01:55:52
03:04	12:16	23:00	46:00	00:59:13	01:58:27
03:08	12:32	23:30	47:00	01:00:31	02:01:01
03:12	12:48	24:00	48:00	01:01:48	02:03:36
03:16	13:04	24:30	49:00	01:03:05	02:06:10
03:20	13:20	25:00	50:00	01:04:22	02:08:45
03:24	13:36	25:30	51:00	01:05:40	02:11:19
03:28	13:52	26:00	52:00	01:06:57	02:13:54
03:32	14:08	26:30	53:00	01:08:14	02:16:28
03:36	14:24	27:00	54:00	01:09:31	02:19:03
03:40	14:40	27:30	55:00	01:10:49	02:21:37
03:44	14:56	28:00	56:00	01:12:06	02:24:12
03:48	15:12	28:30	57:00	01:13:23	02:26:46
03:52	15:28	29:00	58:00	01:14:40	02:29:21
03:56	15:44	29:30	59:00	01:15:58	02:31:55

WORKOUTS

1, Race/Recovery- to help you cruise at race speed

Warm up 500m (8 x 50m)

#1 to 4 under 70% SMHR- Take a long stroke and aim for the least number you normally take.

#5 to 8 build from 75% SMHR to 80% SMHR- Aim for 1-3 more strokes than you would normally take.

Recover between each 50m allowing HR to drop below 60% (See chart, e.g. a 30 year old needs to allow HR to drop below 103 before repeating).

Main set -See pace chart guide for pace per 100m

Start your PoolMateHR watch and keep recording your total time.

Swim 15 x 100m at race pace.

For example if you want to swim 1500m in exactly 30:00 that is 2 minutes per 100m. You need to complete 15 x 100m all close to 2:00 or 30 seconds per 25m.

Start each 100m when your heart rate is dropped to below 70% of your SMHR then start the next one.

Improvement is when you take less total time for the 1500m including recoveries.

For example a typical swimmer whose target time is 30 minutes for the 1500m might take a total time of 44 minutes to complete this main set (including recovery times).

Repeat this workout every 2-4 weeks. The better you are at pacing yourself and the fitter you are then expect your total time will be reduced. This workout has many fitness benefits including faster pacing per 100m and improved recovery rates between each interval which will ultimately help you swim a more even pace and faster 1500m

Mistakes to avoid

Don't go off to fast. Aim to swim an evenly paced session.

Cool down 300m

The cool down is to supply oxygen rich blood and remove fatigue from the working muscles and speed up the recovery process for the next workout

12 x 25m - Recovery after each 25m is the same time taken as each lap (if you take 30 seconds take 30 seconds rest).

#1- 4 under 75% SMHR

#5- 8 under 70% SMHR

#9- 12 under 65% SMHR

2, Hypoxic

This workout is designed to create lots of small amounts of fatigue while avoiding over training and improving your streamlining technique.

Warm up 500m (100m & repeat 5 times)

Swim 25m let HR drop to 70%, swim 25m let HR drop to 70%,
kick 25m let HR drop to 70%, kick 25m let HR drop to 60%.
Repeat 5 times.

If in doubt of swim max HR use the Pool Mate Swim Max HR chart as a guide.

Main set up to 900-1500m

Start your PoolMateHR watch and keep recording your total time, monitor your heart rate.

Your number one priority is to keep your heart rate below 85% and swim as fast as you can, but you must keep your heart rate below this level at all times. Start the next swim when it drops below 70%.

Key Focus

The purpose here is to nurture a balanced stroke, learn to control breathing and avoid shallow panting. Hypoxic swimming can improve your streamlining by you finding a more economical way to move through the water.

This workout is not suitable for people over 40 who are new to sport. As we get older our ability to expand our lung diminishes. Go easy.

- Swim 50m Breathing every 3 strokes @ 75-85% (Easy to Medium effort) if you get tense you lose the objective of a relaxed smooth swim stroke, wait till HR drops to below 70% of SMHR
- Swim 50m breathing every 5 strokes then allow HR to drop to 70%
- Swim 50m breathing every 7 strokes. (150m)

Allow heart rate to drop to 70% SMHR. Repeat the above again until you have covered 300m before taking an extra 90 second rest.

Repeat the above 3 to 5 times ((150m x 2) x 3 = 900m or (150m x 2) x 5 = 1500m)

This PoolMateHR swim workout has been specially prepared so you improve your stroke efficiency. If you cannot complete the above slow down, breath deeper and use a pull buoy.

Mistakes to avoid

Avoid swimming 50m too quickly so you can take adequately deep breaths.

This is a great workout when you are mentally tired and can not push yourself. It helps get you use to fatigue experienced during a competition

Cool down 400m

The cool down is to supply oxygen rich blood and remove fatigue from the working muscles and speed up the recovery process for the next workout

16 x 25m

#1-4 under 75% SMHR

#5-8 under 70% SMHR

#9-12 under 65% SMHR

#13-16 under 60% SMHR

Recovery after each 25m is when your heart rate has dropped below 60%

3, Prevent slowing down during swim

This workout is designed to help pacing. "The person who slows down last is the winner"

Warm up 500m (100m & repeat 5 times)

Swim 25m let HR drop to 70%, swim 25m let HR drop to 70%,
kick 25m let HR drop to 70%, kick 25m let HR drop to 60%.
Repeat 5 times.

Main set up to 750-1500m

Start your PoolMateHR watch and keep recording your total time, monitor your heart rate.

Your number one priority is to go faster NOT try harder as you progress. Some of these distances are odd and you won't know how to pace yourself. You have no comparison for these distances so you have to pace yourself.

Swim 225m wait till HR drops to 70%

Swim 175m (slightly faster than before) wait till HR drops to 70%

Swim 125m (slightly faster) wait till HR drops to 70%

Swim 100m (slightly faster) wait till HR drops to 70%

Swim 75m (slightly faster) wait till HR drops to 70%

Swim 50m (slightly faster still) wait till HR drops to 70%

Key focus is to complete each swim at slightly faster pace than the previous. Even 1-2 seconds per 100m quicker is OK, see example below

Distance	Target per 25m	total time
225m	30 seconds	04:30
175m	29 seconds	03:23
125m	28 seconds	02:20
100m	27 seconds	01:48
75m	26 seconds	01:18

(Example average target pace 225m @ 2:00 per 100m (30 seconds per 25m) then go a second or two quicker per 25m for 175m then quicker again) If you go slower you either lose pace judgement or your stroke breaks down when you try harder.

Take extra 60 seconds rest and repeat above and try and improve by going quicker for each shorter segment.

Mistakes to avoid

Avoid fast strokes as you try and increase your pace.

Cool down 400m

The cool down is to supply oxygen rich blood and remove fatigue from the working muscles and speed up the recovery process for the next workout

16 x 25m - Recovery after each 25m is when you heart rate has dropped below 60%

#1-4 under 75% SMHR

#5-8 Drill set -Fingers open under 70% SMHR

#9-12 Drill set trail fingers along the top of water during recovery phase aim to keep HR under 65% SMHR

#13-16 under 60% SMHR

Recovery after each 25m is when your heart rate has dropped below 60%

4, Tickle the Threshold Workout

This workout is designed to create lots of small amounts of fatigue and avoiding over training.

Warm up 600m (75m, 50m, 25m repeat 4 times)

Recovery is when heart rate has dropped to 70%

75m @ 80% effort (8 out of 10 effort)

50m @ 85% effort (8.5 out of 10 effort)

25m @ 90% effort (9 out of 10 effort)

Repeat above 75m, 50m & 25m 4 times

Main set 1500m

Start your PoolMateHR watch and keep recording your total time, monitor your heart rate.

Your number one priority is to keep your heart rate below 85% and swim as fast as you can & start the next set when it drops below 70%

#125m swim wait HR to drop to 70%

#100m swim wait till HR drops to 70%

#75m swim wait till HR drops to 70%

#50m swim wait till HR drops to 70%

#25m swim wait till HR drops to 70%

After completing all 5 of the above take extra 60 seconds then repeat 4 times

The above workout will result in a good average pace for the main set and avoid you slowing down.

Mistakes to avoid

Keep track of your stroke count and make sure you do not take 10% more strokes per length when you are getting tired. Key focus is on keeping HR within 70% at recovery and 85% at end of each set.

Cool down 400m

16 x 25m

#1-4 under 75% SMHR

#5-8 under 70% SMHR

#9-12 under 65% SMHR

#13-16 under 60% SMHR

Recovery after each 25m is when your heart rate has dropped below 60%

Super Sprint Swim Training (400m)

Whatever your swim fitness ability and aspirations below you will find a range of swim workouts designed just for you. For the person looking to complete the 400m to the person looking to do it non-stop or the person looking to go faster next time. Using heart rate is a far more accurate way to train.

If you have extra time complete swim drills after warm up and after main set before cool down.

1, Complete Beginner swim work out

Swim work out to be able to complete a 400m sprint distance pool swim

Warm up 200m (8 x 25m)

#1 @ 75% effort then #2 @ 80% then #3 @ 85% then #4 @ 90%

Recovery for all of above is once HR has dropped to 70% of SMHR. Repeat

Main set total distance 400m

4 x 25m – Aim to swim them all the same time +/- 1.0 seconds

Use your PoolMateHR and once your HR has dropped to 60% of Swim Max HR (See chart) repeat until you have completed 4 x 25m

Take extra 2 minutes before repeating up to 4 times in total (total distance 4 x 25m repeated 4 times = 400m)

Cool down 300m (12 x 25m)

The cool down is to supply oxygen rich blood and remove fatigue from the working muscles and speed up the recovery process for the next workout

#1-4 under 75% SMHR

#5-8 under 70% SMHR

#9-12 under 65% of SMHR

Recovery after each 25m is time taken as recovery (if you take 30 seconds take 30 seconds rest)

2, Complete a 400m sprint distance pool swim without stopping

Warm up 200m (8 x 25m)

#1 @ 75% effort then #2 @ 80% then #3 @ 85% then #4 @ 90%

Recovery for all of above is once HR has dropped to 70% of SMHR. Repeat

Main set total distance 500m

Part 1 - 4 x 25m – Aim to swim each 25m all the same time +/- 1.0 seconds (100m)

Use your PoolMateHR and once your HR has dropped to 60% of SMHR repeat . Take extra 1 minute after HR has dropped to 60% before completing part 2.

Part 2 -2 x 50m – swim each at same pace and recover to 60%. Take extra 1 minute rest before completing part 3.

Part 3 -4 x 25m – swim each at same pace and recover to 60%. Take extra 1 minute rest before completing part 4.

Part 4 -1 x 100m – swim each at same pace and recover to 60%. Take extra 1 minute rest before completing part 5.

Part 5 - 4 x 25m – swim each at same pace and recover to 60%.

Cool down 300m (12 x 25m)

Recovery after each 25m is time taken as recovery (if you take 30 seconds take 30 seconds rest)

#1-4 under 75% SMHR

#5-8 under 70% SMHR

#9-12 under 65% of SMHR

3, Go faster during a 400m sprint distance pool swim

Warm up 200m (8 x 25m)

#1 @ 75% effort then #2 @ 80% then #3 @ 85% then #4 @ 90%

Recovery for all of above is once HR has dropped to 70% of SMHR. Repeat

Main set total distance 1,000m

Part 1 - 8 x 25m – Aim to swim them all the same time +/- 1.0 seconds (200m). Use your PoolMateHR and once your HR has dropped to 70% of SMHR repeat.

Take extra 1 minute after HR has dropped to 60%

Part 2 - 2 x 50m – Aim to swim each 50m +/- 1.0 seconds and repeat when your HR has dropped to 70% SMHR (100m)

4 x 25m – Aim to swim all 25m in similar times +/- 1.0 seconds. Once your HR has dropped to 70% SMHR repeat (100m)

After 4th 25m and after HR has dropped to 60% Take extra 1 minute before completing part 3

Part 3 - 2 x 100m – Aim to swim each 25m +/- 1.0 seconds and repeat (200m)

After HR has dropped to 60% wait 1 minute and complete part 4

Part 4 - 2 x 200m – Aim to swim them all the same time +/- 1.0 seconds (400m)

Cool down 300m (12 x 25m)

The cool down is to supply oxygen rich blood and remove fatigue from the working muscles and speed up the recovery process for the next workout

#1-4 under 75% SMHR

#5-8 under 70% SMHR

#9-12 under 65% of SMHR

Recovery after each 25m is time taken as recovery (if you take 30 seconds take 30 seconds rest)

Olympic Distance Swim Training with a PoolMateHR

Here are 2 sessions for different abilities of Olympic distance triathletes

1, Complete a 1500m Olympic distance swim

This workout will prepare you to comfortably cover for your Olympic distance triathlon swim

Warm up 350m (8 x 25m)

#1 @ 55% effort then #2 @ 60% then #3 @ 65% then #4 @ 70% then #5-#6 @ 75% & #7-#8 @ 80% effort

1 x 50m @ 80% then 1 x 100m build from 75% for the first 50m then holding @ 80% for the final 50m.

Recovery for all of above is once HR has dropped to 70% SMHR

Main set 1,000m to 1,500m (depending on current fitness levels)

Start your PoolMate watch and keep recording your total time and monitor your heart rate.

Swim 10-15 x 100m at a pace you can hold for 1500m without stopping recover and repeat.

Start each 100m when your heart rate drops to 60% of your estimated maximum swim heart rate.

Improvement is when you take less total time for the 1500m including recovery times.

Repeat this workout every 2-4 weeks. The better you are at pacing yourself and the fitter you are then expect your total time will be reduced. For example a typical swimmer whose target time is 30 Minutes might take a total time of 44 minutes to complete 1500m from start to finish including recovery time waiting for heart rate to drop back to 70% before repeating all 15 x 100m

This workout has many fitness benefits including faster pace per 100m improved recovery rates between each interval, which will ultimately help you swim a more even pace and faster 1500m.

If you are not rested when completing this session, or start too fast then expect it to take longer for your HR to drop back to 60%

Mistakes to avoid

Don't go off to fast for the first few paced swims. You need to aim to swim each segment at your target race pace.

Cool down 300m

The cool down is to supply oxygen rich blood and remove fatigue from the working muscles and speed up the recovery process for the next workout

12 x 25m (or lengths)

#1>#4 under 75% SMHR

#5>8 under 70% SMHR

#9>#12 under 65% of SMHR

Recovery after each 25m is time taken as recovery (if you take 30 seconds take 30 seconds rest)

2, Go faster next time in a 1500m swim

This workout will get you ready to go faster next time

Warm up 600m

First 4 x 25m @ 60% effort next 4 @ 65% effort next 4 @ 70% effort next 4 @ 75% effort

2 x 50m @ 80%

1 x 100m @ 80-85%

Repeat. Recovery for all of above is once HR has dropped to 70% SMHR

Main set 1,000m to 2,000m (depending on current fitness levels)

10-20 x 100m at a pace you can hold for 1500m without stopping recover and repeat.

Start each 100m when your heart rate drops to 60% of your estimated maximum swim heart rate, and then start the next one.

On the odd 100ms (for example #1, #3, #5, #7 etc) start strong and make the final 25m as powerful as possible. On the even ones (#2, #4, #6 etc) start fast and hold on, coping with fatigue.

This swim work out should be completed every 7-14 days to help you be competitive during the 1500m swim on race day and have enough energy to cycle and run afterwards

This workout has many fitness benefits including faster pace per 100m improved recovery rates and by covering up to 2,000m you will have done some over distance to allow you to hold the pace and avoid slowing down.

Mistakes to avoid

Vary from building to fast starts as advised above, establish what areas of weakness you have and work on them next time.

If you can manage up to 20 x 100m then you have sufficient endurance and have to work on speed. If you find you are slowing down or your HR takes a lot longer to drop you are either trying too hard or need endurance or a combination of both.

Cool down 400m

The cool down is to supply oxygen rich blood and remove fatigue from the working muscles and speed up the recovery process for the next workout. Keep good technique so when you swim next time

16 x 25m

#1-8 under 75% SMHR

#9-12 under 70% SMHR

#13-16 under 65% SMHR

Recovery after each 25m is time taken as recovery (if you take 30 seconds take 30 seconds rest)

Drills for Frontcrawl

There is a huge advantage in regular technique coaching sessions so if you have the opportunity we would highly recommend this. Drills can make a huge difference to your swimming if you do them correctly. The following drills were put together by Ray Gibbs swimcanarywharf.co.uk to improve my swimming- and they have. We would advise everyone to have their stroke analysed individually to get the best drills for them. These drills will help your body position, catch, timing and recovery if done correctly and regularly.

Carry out all of these using short swim fins, fins help you keep moving smoothly through the water with minimal effort so you can concentrate on body position, rotation, arm and head motion etc. Do them slowly and concentrate on your technique, the slower the better here.

Try to complete at least 4 lengths of each drill after your warm up and before your cool down in each session.

1, Kick on side

- Wearing fins, stretch one arm in front, the other should be relaxed by your side. Make sure the palm is flat, parallel with the surface of the water and fingers are relaxed and not pointing upwards.

- Your extended arm's shoulder should be brushing your chin. Look down your arm towards your fingers so your eyes are parallel to the surface of the water and your body should be rotated so you are on your side at 45 to 60 degrees. Your opposite arm's shoulder should be behind you, out of the water.
- You should be kicking on your side, not flat. Rotate your head sideways to breathe every 4-6 seconds taking care not to alter your body position.

Kick 25m, rest, repeat on your other side.

This drill teaches the holy grail of freestyle swimming, body position. Concentrate on moving your body through the smallest "hole" possible in the water to create the least resistance.

2, Advanced single arm

This drill concentrates , one arm at a time on your catch. This will allow you to push the maximum amount of water during your stroke and propel you forwards.

- Assume the kick on side position as explained previously and kick for a couple of breaths. This will stabilise your position in the water. Then take your outstretched arm and slowly bend your arm from the elbow towards your mid line until your forearm makes a 90 degree angle with your upper arm and

your forearm is parallel to the end of the pool. This is the catch.

- Hold for 2 seconds, slowly release your arm and take it back to the outstretched position, bend the elbow again until your forearm is at right angles to the surface once more, hold and repeat once more.
- Once your arm is in the catch position for the third time, hold for 2 seconds then, keeping your forearm parallel to the end of the pool as long as possible, move from your shoulder outwards and backwards until your hand brushes your thigh. Throw your arm over your head to enter the water again and complete the stroke.
- Kick on side with arm outstretched and breathe a couple of times before repeating.

Rest. Next lap, repeat with your other arm leading.

Take it slow and only breathe when kicking, concentrate on maintaining a 45-60 degree body angle.

3, Noodle arms

This drill concentrates on your recovery arm when it is out of the water. Lots of swimmers have tense arms during the recovery phase which leads to several problems. A major one is a tendency for the entry arm to cross over the mid line (imagine a line is drawn vertically up from the top of your head). This can result in a fish tail effect where the swimmer

is wasting energy swaying from side to side rather than propelling themselves forward.

It can also result in the hand entering the water too early causing unnecessary drag.

Swim with fins, imagine your recovery arm and hand is a limp wet noodle, completely relaxed from the shoulder. On the recovery part of your stroke, throw it forward from the shoulder as far as you can. Don't worry about hand entry, if you throw it forward enough it will enter in the best place.

4, Perfect three

This drill combines the previous drills. Assume the kick on side position as explained previously and kick for a couple of breaths. This will stabilise your position in the water. Then take 3 strokes (left, right, left, or vice versa) without breathing. Breathe once you are back in the kick on side position and resume kicking until you have taken 2 breaths, repeat the 3 strokes.

The idea here is to make those 3 strokes perfect each time,

- Concentrate on rotating your body to at least a 45 degree angle on each stroke, keep this rotation angle until the last possible moment.

- Keep your leading arm stretched out, palm flat and the shoulder close to your chin
- Keep your head facing forwards and looking down your arm.
- Opposite shoulder should be out of the water behind you.
- Bend your outstretched arm from the elbow towards your mid line until your forearm makes a 90 degree angle with your upper arm and your forearm is parallel to the end of the pool.
- Then, keeping your forearm parallel to the end of the pool, move from your shoulder outwards and backwards, sweep back with your arm and rotate your torso quickly to the other side. Make sure you get the catch before you rotate your torso to the other side.
- Make sure you keep your head neutral- facing forwards, eyes parallel to the surface.

Once you can do 3 perfect strokes you just need to repeat this on every stroke you do.

