

Free Guide



That Will Increase Your Comfort, Optimize Your Power And Improve Your Run Off The Bike

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Foreword by Nick Croft.

1991 Australian Triathlete of the Year

Head Coach - Multisport Consultants

"Some athletes feel they are not fast enough to get a bike fit or position change or maybe think a professional bike fit will be too expensive. Well, consider this: the speed gains of any changes you make to improve the aerodynamics of the bike/rider are greater the longer these changes have to express themselves. The longer you are on the bike course, a better bike fit and setup has to help you save time. Slower riders actually have more to gain from an improved fit than faster riders. At MSC Sport we exclusively use Michael Baker at Custom Bike Fit for our own personal bike set ups and recommend all our athletes do so as well if they are looking to get the most out of themselves on the bike.



From our association over time our athletes have performed better since having a bike fit and not only cycled faster with more power and efficiency, but run better off the bike with less discomfort in the aero position. There's a lot of information about bike fit out there – just like coaching so this can be confusing.

Michael Baker uses the latest Retul technology that is at the forefront in bike fit today. A fully tricked-out tri bike is useless if your body presents a sail to the wind. At the end of the day triathlon is a non-drafting sport. No matter the terrain, we are always pushing our own way through the wind. Therefore, being aero and comfortable in that position to run well off the bike is crucial."



About The Author.

Michael Baker competed in his first triathlon in 1992; he's a veteran of over 100 races from sprint through to Ironman distance, a certified Retul bike fitter, level 1 Triathlon Coach, owner and founder of Custom Bike Fit. He lives in the 'triathlon and multisport mecca' of Australia known as the QLD Sunshine Coast – home to the iconic Noosa and Mooloolaba triathlons and venue of the 2016 IM 70.3 World Championships.

Michael has helped literally thousands of athletes reach their triathlon goals by optimizing their comfort, power and speed on the bike. With over 20 year's



practical experience as an athlete, utilizing best in class technology from Retul, he is fast becoming recognised as one of the sports premier authorities on triathlon bike fitting.

Michael loves to help people, you can connect with Michael in a number of ways:



www.custombikefit.com



https://www.youtube.com/channel/UCuz6lDv5S0cD7opWOjgYdDg



https://www.facebook.com/CustomBikeFit/



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Bike Fit Tip No 1: Cleat Position.

Have you ever experienced numb toes or burning feet? It's one of the most common complaints amongst cyclists, particularly when they're spending more than a couple of hours on the bike. It's uncomfortable, it's debilitating and if you're a triathlete and you need those feet for the run, it can seriously derail your race.



Cleat moved back towards the heel and aligned with the centre of the shoe.

When I bike fit, one of the first things I do is look at the rider's cleat position. Some riders have them all the way forward, some are set mid-way and some have the right and left cleats in two completely different positions! Just aligning your cleats so that they match can have significant benefits, but if you want to prevent your toes from going numb, and your feet from burning the best thing to do is to move your cleats all the way back.



Moving the cleats closer to the heel of your shoe takes pressure off the forefoot. In most instances this will alleviate foot pain and it's a nil cost solution. If, however, the pain persists there are two other things you can try, but they come at a cost:

- **1.** Switch to a shoe that allows for the cleat to come further back (I use the Specialized Trivent Expert shoes, the Bont Riot TR is also an excellent option)
- 2. Switch to a larger platform pedal to more evenly distribute the pressure across your feet (Keywin are my top pick, Time Xpresso, and Shimano also seem to do the trick)

In the future I believe mid foot cleat position will be the norm for triathletes. Not only does mid foot cleat position alleviate the pressure across your feet, it also reduces flexion of the lower limb, helps the rider deliver more power and it's been shown to improve with run speed and sustainability off the bike.



Bike Fit Tip No 2: Opening Up Your Hip Angle.

There are lots of things that could possibly derail your run and they're not all bike fit related. Riding too hard, neglecting hydration, nutrition and sodium intake are all common mistakes, but the one key bike fit metric you must address if you want to run well is opening your hip angle when in the 'closed' position.





Your 'Hip Angle Closed' is measured at the top of the pedal stroke – 12 o'clock or Top Dead Centre. This is a metric which, for most, over time will change. However, the range should remain the same, and for the majority that's 45-55 degrees. If you're carrying a little extra weight, or if you have poor flexibility or very little core and/or upper body strength the more 'open' you are the more comfortable you'll likely be (closer to 55 degrees). The better your strength, flexibility and general fitness the further you can close this – to a point.

There's a correlation between a rider's hip angle and their back angle. The aim is to get low (to reduce frontal surface area and drag) but you don't want to do this at the cost of closing off the hip angle as that can bind up your hips, put excess pressure on the lower back and impede the production of power.



To the right (top) we see a picture of a rider with their hip angle closed off. There are a bunch of other issues (seat too high, no skeletal support of the upper body, the hands have dropped, etc.) but let's focus on that closed hip angle because it this that's inhibiting his breathing, production of power and causes him to dismount doubled over, unable to stand up straight and run.

There are lots of thing a fitter can do or recommend to open the hip angle up, the most simple and common 1st course of action is to move the saddle forward. In the case of this rider I changed the position of the seat post clamp (forward) and then changed the saddle to an ISM Prologue.

If your hip angle is closed off move your saddle forward. You'll breath better, get more power and be able to stand up straight when you start to run.



Bike Fit Tip No 3: Setting Saddle Height.

The power phase of the pedal stroke starts just after Top Dead Centre (12 o'clock) and finishes just before Bottom Dead Centre (between 5 and 6 o'clock). This is the period of greatest muscle activity. It's during this power phase that you should feel constant contact with the pedal.

If you're getting to 5 o'clock and feel no pressure on the pedal, then your seat is probably too high. You'll likely feel as though you're reaching for the pedals at the bottom of the stroke. Long term consequences could be overuse injuries in your



hamstrings, calf and achillies. Conversely, if your seat is too low you'll likely experience an overloading of the quads. It usually takes a little time to feel this, but the harder you push the quicker the fatigue sets in, and nobody pushes harder for longer than when it matters most – on race day!



The best way to determine correct saddle height is by capturing the rider in motion whilst he or she rides her bike (I use the Retul 3D motion capture system), however, with no more than a camera and a few strategically placed markers you (with the help of a partner) can get within a few mm of your optimal saddle height.

Markers should be placed on the Greater Trochanter (Hip), Lateral Femoral Condyle (Knee) and Lateral Malleolus (Ankle). Film the rider in

motion on an indoor cycle trainer (preferably under load at the riders perceived exertion of 7/10) and then view the video. With the pedal at 6 o'clock (as pictured right) an angle has formed at the bottom – this is the Knee Angle Extension and the correct range for triathlon is 38-42 degrees. Setting the correct saddle height will improve rider comfort, prevent injury, maximize efficiency and insure you're delivering power to the pedal throughout the phase.



Bike Fit Tip No 4: Alleviating Neck & Shoulder Pain.

Pain at the base of the neck and across the shoulders is, in the majority of cases, due to lack of skeletal support for the upper body. What I mean by this is that your upper body should be supported by the aero bar arm rests (or elbow rests as I call them).



In the time trial position, having clipped in and sat down, the rider should next place his or her elbows on the pads and their hands at the end of the extensions. If you have to stretch to achieve this position, you'll experience pain. If you pull your elbows back (so that they're hanging off the



back of the pads, you'll again experience pain. It's not something that occurs immediately, dependent upon your physical strength and conditioning it may take an hour or two to set in, but once there it's there to stay and can often accompany you on the first few km's of the run.

There's a mantra which I repeat to my triathlon bike fit clients, it starts – 'elbows to pads and hands higher than elbows'.

You can see here that the riders upper body weight is being supported by the arm (elbow) pads. In my experience (and I've listened to lots of feedback) this is the most comfortable position.

The second part of the mantra is – 'place your hands at the end of the extensions and play the piano'.

In order to get your hands up, rest them and 'play the piano' you'll need Ski-Bend extensions. Raising the hands closes off the distance between the hands and head, thereby reducing frontal surface area and aerodynamic drag (in short, you'll go quicker). The other thing the Ski-Bends do is lock the rider into position. I often hear triathletes complain about sliding back and forth on their saddle – this can be a saddle issue but it can also be an unforeseen consequence of having Straight or S-Bend extensions. As the riders tires so too does their core. If your extensions don't kick up, you'll have to grip them rather than place your hands and simply use them as an anchor point. This is why I accentuate the point – 'play the piano'. Gripping causes tension, and that tension can stay with you long after you dismount the bike.

Your hands should be relaxed and used predominantly to change the gears. Sure, when the road is rough you 'hang on' but when the surface is smooth you simply rest them, this will remove any tension through the forearms and potentially the shoulders and you'll find those first few km's of the run to be far more enjoyable.

The best bars I've come across are by Profile Design - they allow for independent movement of the arm pads and extensions. Profile have a broad range to suit both time trial bikes and road bikes where clip-on bars need to be fitted. My favoured extensions are the Ski-Bend T1, T3 and T4.



Bike Fit Tip No 5: Setting Up The Bike For Race Day.

It doesn't matter whether you race at the front, middle or back of the pack; speed is basic to performance at all levels. Many triathletes equate speed with pain - swimming, cycling and running fast can both get you out of breath and cause your muscles to ache. In the cycle leg of a triathlon in particular, there are some very simple strategies that anyone can employ to both increase speed on the bike and conserve energy for use on the run.

In this section I'll cover my top 3 strategies, some will cost you nothing, some may set you back a few dollars, all of them are easy to deploy and will help you maximize your speed on race day. These are tips that I have learnt in my 20+ years of triathlon racing, in my profession as a bike fitter and in training myself, and others, using power on the bike.

1. Reducing Mechanical Drag and Rolling Resistance

Your bike is subject to 3 main sources of drag, the first 2 of these are mechanical drag and tyre drag (otherwise known as rolling resistance). Mechanical drag occurs in the bearings (wheel hubs, bottom bracket) and in the drive chain. You can minimize mechanical drag by simply having the bike serviced regularly and by cleaning the chain, chain rings and cassette. An added benefit of keeping your bike well maintained and clean is that you are far less likely to have a mechanical issue on race day. Keep your bike clean!



Air-filled tyres have a flat spot where they touch the ground which causes friction. This friction, happening constantly and rapidly, adds up and slows the bike down. This is referred to as tyre drag or rolling resistance. For racing on normal public roads, you should pump your tyres to



between 100 and 120 psi. If the roads are dry and relatively smooth I opt for the higher pressure being 120psi, if the road surface is wet and/or uneven I will reduce the tyre pressure to between 100 and 110psi.

Many cyclists believe that pumping the tyres up really hard will reduce rolling resistance, but the thing is you also need to consider bumps in the road. High pressure tyres can minimize tyre friction, but they do so at the cost of bouncing over tiny bumps instead of "squishing" over them. Every bounce causes the bike to divert some of its kinetic energy into an up-and-down direction instead of forward, and that energy is effectively lost. So, a nicely rolling tyre needs to strike a balance between being pumped up enough to minimize the contact patch drag, and not so much as to have it losing speed to the tiny constant bumps encountered.

If your tyres are rated to a pressure of 180psi it's because they been designed for use on the velodrome. This isn't the pressure you want to pump them to on race day!

2. Reducing Aerodynamic Drag: Where To Place Your Water Bottles

The largest drag force on a bike rider going at racing speeds is wind resistance, or aerodynamic drag. A rider's position on the bike is the major contributing factor to aerodynamic drag; this can be greatly reduced with a Custom Bike Fit. Use of bike equipment such as deep-rimmed and disc wheels and aero helmets will also reduce drag but these items can be expensive. The cheapest way to obtain 'free speed' is simply to be strategic about how you carry your water bottles.



The most aerodynamic place to carry a water bottle is

between the aero bars mounted horizontally. In fact, a standard round bottle mounted horizontally between the rider's arms actually reduces drag. This set up is not only faster than any other option, but faster than no bottle at all! Adding the horizontal bottle between the rider's arms delivers a power saving of 5.6 watts when riding at 40km/h. That's a time saving of >2mins in an Ironman >1min in a 70.3 and >30 sec in an Olympic distance triathlon. And don't worry if you're not that fast, the slower you ride the more time you'll save!



The next best place to position bottles is behind the saddle, a single bottle behind the rider is more aerodynamic than two bottles. There's no significant variation in drag depending on the position of the bottles behind the saddle, high or low, near or far, so place the bottles where you can best access them. These rear mount systems are also good for storage of tires, inner tubes, inflators etc. as long as they don't stick out and grab air.

3. Clothing: What to Wear For Speed and Comfort

The clothing you wear on race day can be as important in terms of aerodynamics and related time savings as either an aero helmet or race wheels – and it usually comes at a fraction of the cost. A trend has developed amongst both pro and age group Ironman athletes to wear what can only be described as a 'skin suit'. I've been using these for the past 2 years and the most comfortable I've come across is the Fusion Speed Suit which has been optimized for comfort across all 3 legs of a triathlon, the swim, the bike and the run. Let's face it, you have to wear something on race day so why not go fast, be comfortable and look good!



