



Institute of
Ergonomics &
Human Factors

An Ergonomics Guide To CYCLING



Bike styles



There are many different bike styles to choose from. Think about what you want to use your bike for.

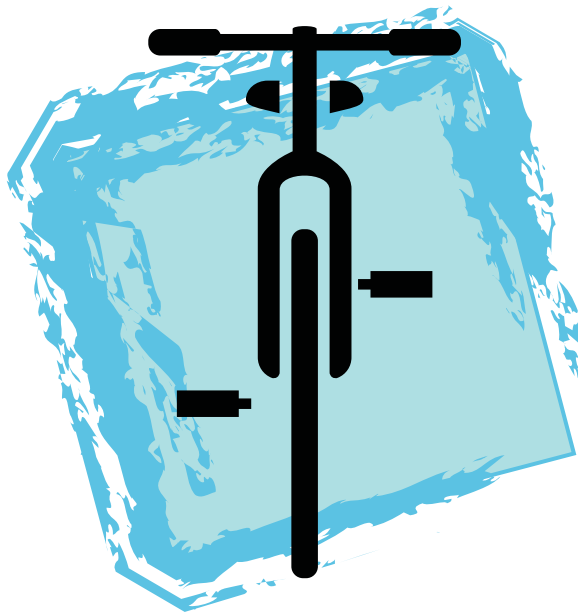
Road racing bikes are excellent for covering longer distances at higher speeds but are less likely to be suitable for commuting.

Mountain bikes can be used off road and feature wider tyres, and can have disc brakes and suspension. They also have flat rather than dropped handlebars. The downside to them is that they require more effort to ride on the road and are generally heavier.

Hybrid bikes sit between road and mountain bikes. These bikes have the riding position of a mountain bike - more upright and therefore comfortable - but with narrower tyres which improve performance on the road. These can be the best bikes for commuting.

Everyone is different and different styles suit different people. Talking to a good bike shop owner about the use of the bike will help you choose the correct style.

Setting up your bike



Bicycles have a number of adjustments to ensure that they can accommodate a variety of body sizes and shapes. There are three main points of contact which are important to adjust to ensure the correct body to bike fit.

There are no clear guidelines on **handlebar height**. This varies with the type of bike and riding activity. As a rule handlebars should not be too low as this can stress the lower back and cause discomfort. Generally the higher the handlebar, the more upright the body is positioned and so the comfier the riding position should be.

Perhaps the most obvious way to alter the fit of a bike is by adjusting the **height of the saddle**. If it's too low it will increase the effort required to pedal. If it's too high, so your leg is straight when you pedal, then it could strain your knees or hips. Research has found that the optimum height for the saddle should be 109% of your inside leg length. This is measured standing from the groin to the floor without shoes or socks just as you would for measuring trousers.

You should position the ball of your foot directly over the axle of the **pedal**. If you have cleats and cycling shoes you should ensure this position is accurate when aligning your shoe and pedal. If you are wearing normal trainers try to maintain this foot position. Remember that this is related to your saddle height. If that's right it's easier to maintain good posture on the bike.

Health and safety

Cycling is good for your health and a good way to have enjoyable exercise. Regular cycling can help lose weight, reduce stress and improve fitness. It has added benefits of low impact on joints and can help tone your body.

Such is the benefit of cycling on the body, ergonomists have investigated the use of cycling as a form of exercise for the desk bound office worker. They investigated the energy consumption and errors in typing when using a specially designed cycling workstation. They found that pedaling at “a very light intensity” (38 watts) burned an extra 155 calories an hour. Pedaling for 10 minutes every hour for 8 hours over a 5 day week would burn an additional 1000 calories. Importantly there wasn’t an increase in errors whilst typing! This shows the benefit of cycling, and how doing a little can have a positive effect on your body.



The right clothing is important for optimum performance and it’s important to have the correct clothing for the conditions. Waterproof clothing is good when it’s raining but you can also get hot wearing this. Therefore, layers are the best way to regulate your body temperature appropriately when cycling. Although cycling-specific clothing can be expensive, it also makes being out on the bike more comfortable, for example, by wearing padded shorts and breathable tops. Breathable clothing helps dispel sweat from your body keeping you cool.

Being conspicuous through wearing bright clothing is one of the best ways to enhance your visibility and safety as a cyclist. It’s also good to use fluorescent bands on your ankles as these move as you pedal which shows you’re a cyclist to other road users. Ergonomics researchers looked at whether different rider outfits changed driver the distance between the car and cyclist during overtaking. Interestingly, wearing clothing like professional cyclists makes no difference to the overtaking behaviour of motorists compared to how they drive around novice cyclists wearing fluorescent clothing.

You should always wear a helmet. Back in 1996 researchers found that cyclists who wore safety helmets were just as likely to be involved in accidents but were three times less likely to have received head injury. Further, any head injuries sustained were much less severe. The general advice from most sources is to buy the most expensive helmet you can afford, making sure it's also a comfortable fit and meets the required standards.

Interestingly, researchers found that cyclists wearing helmets were significantly more likely to use collision prevention methods such as lights and fluorescent clothing in reduced visibility. This might be because of higher risk awareness and greater knowledge of safe cycling practices.

When we ride a bike, we ride in an environment that varies with the miles we cover. For example, in one ride we might cover pavement, a cycle route, a busy road and a country lane. Through our **situational awareness** we develop and maintain our understanding of what's going on around us. This might include how much traffic there is on the route, whether the road surface is smooth, rough or loose, and what the road characteristics are, for example, whether there is a cycle lane, crossroads or T-junction. We are also aware of whether there are other road users such as other cyclists, cars, or pedestrians and what actions they are likely to take.

At junctions drivers focus on traffic lights and the front of their vehicle whereas cyclists focus on traffic in and around the junction. The problem is that drivers tend not to consider the areas behind or to the left and right of them. Drivers develop fixed search strategies based on where other cars operate rather than cyclists. Because there are fewer cyclists, drivers don't develop routines for searching for them at junctions. Therefore these are the areas where cyclists need to take additional care.

At roundabouts both drivers and cyclists focus on other traffic. On main roads cyclists focus on lanes and traffic from behind while drivers focus on speed as well as traffic. Understanding the difference in road users' situational awareness means that, as a cyclist, you can start to consider what other users are thinking and how they might behave.



Find out more

Cycling research

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Ergonomics

Ergonomics is a discipline that is all about ensuring ease of use, comfort and safety for people. The methods and thinking from ergonomics, also known as human factors, can be applied to virtually everything that is designed and made by us.

Ergonomics strives for inclusive design so as many people as possible are able to use a product, service or environment.

To find out more about ergonomics, visit the website of the Institute of Ergonomics & Human Factors at www.ergonomics.org.uk.



This guidance was written by Dr Jamie Mackrill, Research Fellow, WMG, University of Warwick and designed and published by the Institute of Ergonomics & Human Factors.