BY MARK S. BUTLER, MD

Preventing Biking Injuries

The Covid pandemic changed our lives in many different ways. For many, the pandemic created more time at home and provided people time to get outside and exercise. Gone were the days of group exercise programs in the gym and many of us converted to solo exercise programs, mostly of an outdoor nature. One form of exercise that became very popular was bicycle riding. Within the first few months of the pandemic bicycle shops were emptied of all inventory and clients were bringing bicycles in for repair that had not been used for 20 years. Associated with increased bicycle riding activity was an increase in riding-related complaints that began to appear in the orthopedic office.

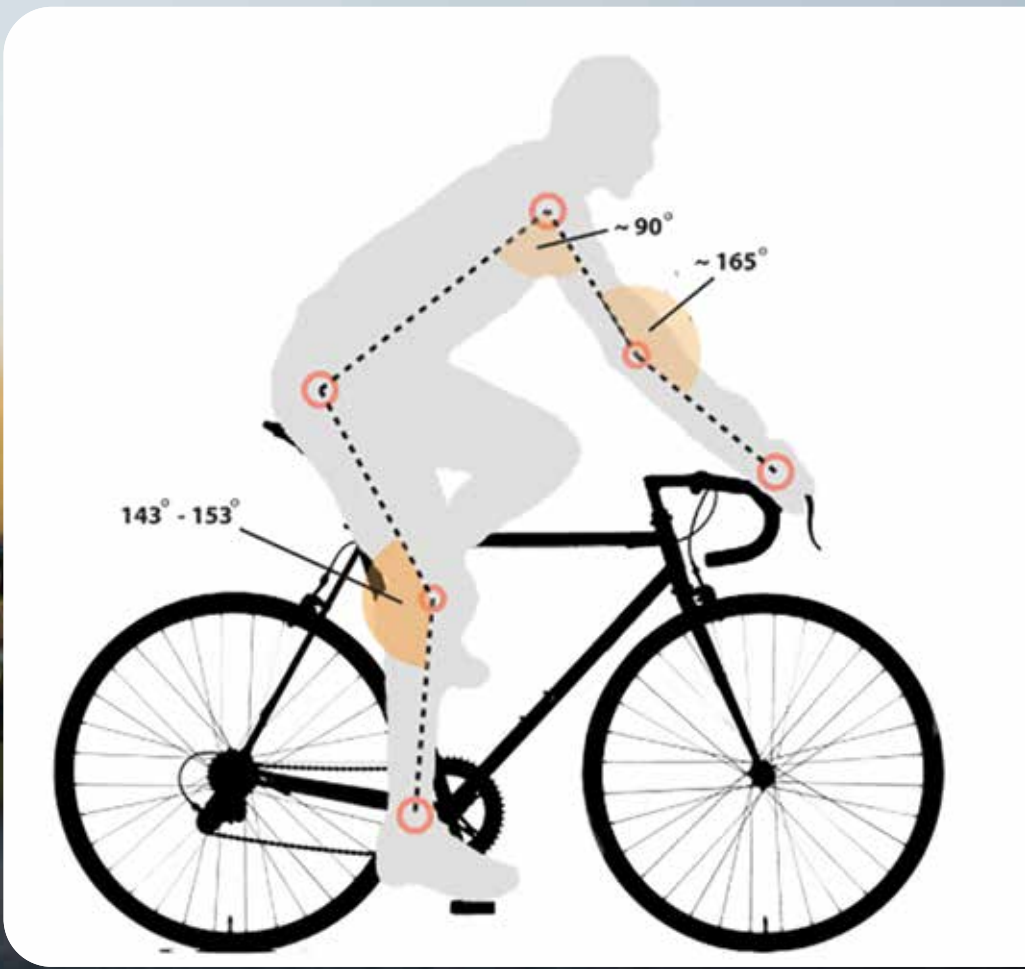
The common complaints associated with bicycle riding that present to the orthopedic surgeon's office include the following: Neck or cervical pain, wrist, hand and finger pain with numbness, low back or lumbar pain, pain associated with saddle impingement, foot pain complaints, and most commonly pain in the front of the knee joint. Most of the aforementioned complaints can be exacerbated by an ill-fitted bicycle and this short article intends to address some of the minor changes in bicycle fit that can have a profound impact on the comfort of bicycle riding as well as help to reduce the pain that may be associated with riding. Most of these adjustments are easily performed by the bicyclist rather than a technician and, even when there is a change in some of the components of the bicycle needed to make adjustments, they are inexpensive and readily obtainable at the bike shop.

The intention of these recommendations is directed toward road bicycles and stationary cycles, but may also apply to off-road mountain bikes.

Adjustment of the drive train section of the bicycle

The fitting of the bicycle starts at the drive train or rear of the bicycle. These adjustments will affect the adjustment of the cockpit or front end of the bicycle and therefore must be completed first. When one mounts the bicycle the first adjustment that is most obvious is that of the seat height. The seat height affects the ability to pedal with power and comfort. Improper seat adjustment can create both pains from the saddle and anterior knee pain. When one is sitting properly on the saddle the leg at the bottom of the paddle stroke should have a few degrees of flexion left at the knee. If the knee is fully straight and the cyclist is stretching to reach the bottom of the paddle stroke because the saddle is slightly too high, this will cause a rocking effect on the saddle. The back and forth rocking of the pelvis while sitting will create impingement and saddle pain will occur in short order. This discomfort will often cause the rider to give up quickly. If this seat height is adjusted too low, the knee remains in a high degree of flexion through most of the paddle stroke and this can lead to patellofemoral or front of the knee pain. These problems are easily rectified with the proper adjustment of seat height. Moving the seat height may take several trials with one-half-inch changes until the proper adjustment while riding is accomplished.

The second adjustment associated with the saddle is the forward or backward position of the saddle that is mounted on the seat post. This adjustment is often ignored but can make a profound impact in the reduction of knee pain. The saddle which is adjusted too far forward also contributes to the high flexion position of the knee while pedaling and can contribute to anterior knee pain in the same way as noted above with an improper seat height adjustment. In most cases, the cyclist has



adjusted the seat too far forward on the rails so that they can reach the handlebar. The proper adjustment technique starts by comfortably sitting on the saddle and having an assistant steady the cyclist. The rider then brings the paddles parallel to the ground and looks down the front edge of the forward knee. The rider should be able to see his or her foot. If the saddle is adjusted too far forward the cyclist will not see the forward foot. This may be the most important single adjustment often ignored by cyclists. The adjustment is very easy as the saddle is on a rail and can be easily adjusted forward or backward with a single loosening of the screw.

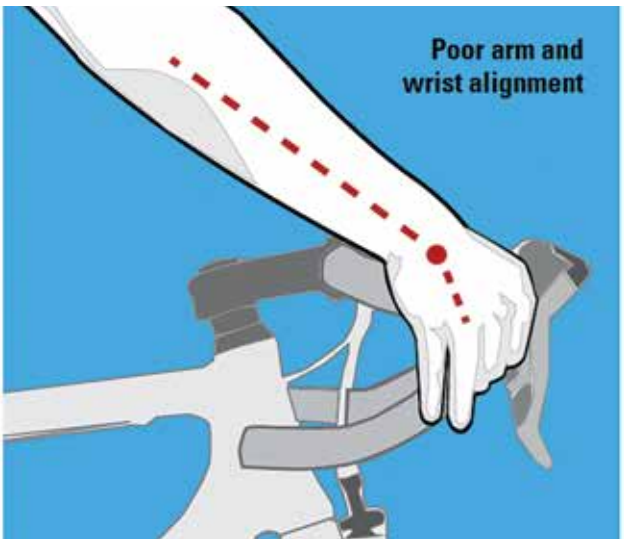
Foot pain is another problem often associated with improper adjustment of the bicycle. In most cases, the rider complains of pain on the ball of the foot after riding longer distances. This is caused by pressure transmitted from the paddle through the shoe onto the forefoot. The first and possibly the most important adjustment for forefoot pain is to purchase a properly fitted bicycle shoe. Bicycle shoes have a hard sole that distributes pressure from the paddle along the entire foot and therefore reduces this point pressure at the ball the foot.

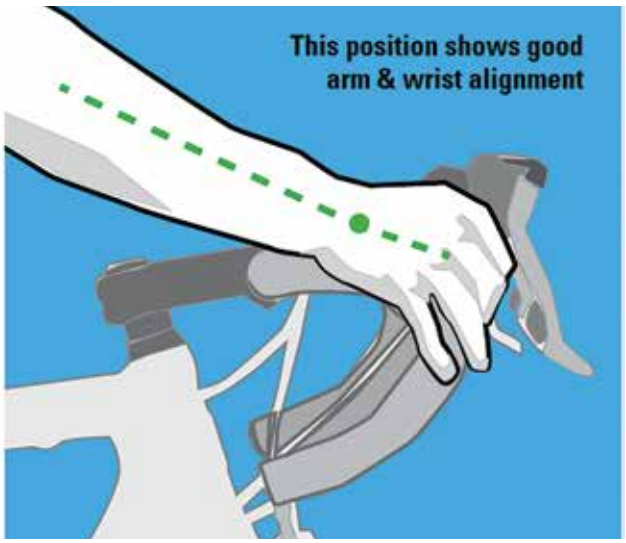
There are 2 types of bicycle shoes easily found in any bicycle shop. The recommendation for most casual riders is a mountain bike shoe. This shoe has lugs on the sole that recess the pedal cleat and allow a cyclist to get off the bike and walk comfortably. This is the shoe recommended for cyclists using standard flat pedals. A road bike shoe has the pedal cleat mounted directly on the sole of the shoe which can make walking more difficult and put the cyclist at risk of a fall. Both types of shoes alleviate the forefoot problem. The one adjustment of the bike shoe for cyclists using a clipless pedal is the position of the paddle cleat. The position should be set at the furthest position towards the heel. This will help move the pressure away from the ball the foot. There are additional adjustments of the pedal and shoe position that can be made but the assistance of a bike fitter is often necessary to accomplish this.

Before finishing the discussion of the adjustments of the drive train section of the bicycle we must cover the issue of saddle pain. If one is cycling with an ill-fitting saddle for any distance it is likely the rider will experience pain in the areas where the saddle contacts the "sit bone" or ischium of the pelvis. There are two steps to aid in the resolution of this problem. First is the purchase of bicycling shorts which have padding in the appropriate places to help reduce pressure sores on the saddle. The second and often more expensive choice for the rider is to change the saddle. Bicycle saddles are available in many shapes and can accommodate different individuals. There are male and female-specific saddles that differ based on the geometry of a gender-specific pelvis. A good bicycle shop will have a library of saddles that can be tested before the purchase of this relatively expensive but important component of the bicycle.

Adjustment of the cockpit or front end of the bicycle

Once the cyclist has properly adjusted the drive train section of the bicycle they can then work on adjusting the front, which is





referred to as the cockpit of the bike. This includes adjustment of the handlebar height, width, forward, and apposition. One of the most common complaints associated with bicycle riding is that of neck pain. This is particularly important in the older rider who may be extending the neck for long periods. This can irritate even mildly arthritic cervical spine joints. The extended position contributes to neck and upper shoulder pain, which can limit the amount of time a cyclist, spends riding.

Minor adjustments of the handlebar position can have a profound impact and minimize neck pain. The first adjustment of the handlebars is made when the cyclist is comfortably sitting on the saddle and reaching forward to grip the handlebar. The distance between the saddle and the handlebars is easily adjustable by the stem. The stem is the piece of the bicycle that holds the handlebars and attaches to the front fork of the bicycle. The stem can be adjusted for height and distance which is important for older cyclists. A standard stem can often put the rider into a stretched-out position to reach the handlebars. Changing the position of the handlebars to allow the cyclist to sit more upright will put less stress on the neck and lower back. The adjustment requires a shorter and more upright stem to thereby reduce the distance between the saddle and the handlebars. Changing the stem may require the assistance of the bike shop but is not very costly and very important for long-term comfort while riding.

Cyclists that ride longer distances often complain of hand and finger numbness. These symptoms are associated with compression of the median nerve. This important nerve passes on the palm side of the wrist as it enters the hand and fingers. When the cyclist holds the handlebars and creates pressure on the nerve it puts the nerve "to sleep" and causes a tingling feeling in the fingers. One of the simplest remedies is to buy a set of cycling gloves. There is padding at the heel of the glove which reduces the pressure on the nerve while riding. An additional, inexpensive solution, is to change the handlebar tape to a more padded version. There are gel pads that can be placed in strategic positions along the handlebars, underneath the bar tape, which can additionally reduce the pressure on the nerve.

An additional adjustment in the front end of the bicycle which has a great impact on the comfort while cycling is the position of the brake hoods. If the brake hoods are adjusted too far forward the cyclist must lean forward to reach the brake handles. This position creates additional strain on the hands, neck, and lower back. A simple rotation of the handlebars to bring the brake hoods to a more upright position and closer to the rider can reduce these complaints.

Bike riding is a great way to enjoy the outdoors as well as to improve your physical fitness and general well-being. Understanding how to make simple adjustments to your bike can help to minimize or eliminate potential problems that may cause discomfort during bike riding. If you don't feel comfortable adjusting your bike, we encourage you to seek assistance from a bike mechanic at your local biking store. At UOA, we encourage people to get out, be active and enjoy biking. We encourage you to keep your Life in Motion.

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