

CAPE COD SPORTS MEDICINE INC.

ORTHOPEDIC SURGEON

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CYCLING

It's time to review some bike basics. These can be divided up into three categories: the bike, riding equipment and safe riding guidelines. Whether you're using a racing bike, road bike, touring bike, mountain bike, reclining bike or even a stationary cycle, you are at risk for injury. With a bike style to fit anyone's fancy and the development of a comprehensive bike trail system it is not surprising that cycling is one of the fastest growing outdoor sports. People ride for both exercise and pleasure...and the get injured doing both.



The Bike

A good bike like a good pair of shoes needs to be "fitted" to the individual. In picking what style of bike, one should consider how they would use the bicycle. Are you interested in training & racing? A racing bike with its inherent stiff frame and low profile will fit you. Are you going to use the bike for trips, camping etc where you'll expect to haul gear on your bike and encounter variable terrain? Then a touring bike will fit you. The mountain bike category has been divided to an all-terrain model and a general road model. The all-terrain model as expected, is rugged, heavier and very sturdy. Innovations like shock absorbers in front & rear forks or even in the seat post, cushion the ride over rough terrain. Due to a demand for several of these features on a bike to be used on bike paths and roads, many manufacturers have introduced modified all-terrain models with lighter weight, and less aggressive tires. The body position of these newer models favors a more upright posture, putting less strain on the Cervical and Lumbar spine.

Selecting the proper frame size should be your first priority. The fit of your body on the frame is determined by the size. The right frame will have you comfortably engaging the pedals with a non-stressful slightly forward lean to the handlebars. The seat should be adjusted so that there is a 20-degree bend in the knee when in the fully depressed pedal position, with the ball of the foot flat against the pedal. At the upstroke, the knee should not bend more than 100 degrees. An observer riding behind you should see your pelvis remaining level on the seat, and not a sea-saw motion with your pedal strokes.

Handlebars are the second most important item when selecting a bike. Today there are a wide variety of handlebar styles to choose from. Recently the trend is toward handlebars that allow a more upright posture. Soft, vibration-dampening grips ease the strain on the hand and help prevent carpal tunnel syndrome. Easy access from the handlebar to the brake is a must. A good rearview mirror is also important especially when riding in-groups or on a bike path.



Other equipment on the bike that should be fitted to the individual includes the saddle or seat. The recent trend is to make them slightly wider toward the back to engage the ilium bone. The newer seats are available with gel padding, air bladders or foam. A shock absorber built into the seat post can make the ride very smooth and cause less back strain. Riding shoes that clip-in to the pedal attempt to make the stroke more efficient by providing a mechanism to apply power on the upstroke. These are more important for the serious racer or cyclist. The wheels are very important. The spokes and hub need to be "tuned" to provide an aerodynamic spinning motion. Even

on older bikes, the wheels should be adjusted on a yearly basis. This allows the bike to ride in a straight line without instability. Your bike dealer will tune your wheels on a special apparatus for a minimal fee in 5 or 10 minutes. Reflective gear should be incorporated into the bike frame to be visualized from all angles at night.

Riding Equipment

The most important piece of equipment for cycling, regardless of location (trails, roadway or even your backyard) should be the HELMET. The most serious injuries

reported yearly are head injuries from people not wearing helmets. Parents should set the example for their children by wearing helmets. There have been several studies by the National Transportation Safety Board supporting the use of helmets. My experience of treating one twelve year old child paralyzed from the neck down, injured in a bicycle accident without a helmet has made me a strong advocate for helmet use by everyone. Even last year on the Tour de France, (who unfortunately has not adopted helmets as a requirement) the most serious injury was a cervical neck fracture in an un-helmeted rider. The helmet should be approved by either ANSI or Snell and should carry a rating. The helmet itself should fit snug and comfortable with a chinstrap that won't dislodge at impact. Your bicycle store can help you fit your helmet with adjustable pads.



Protective clothing can vary with the weather and the rider's experience. The foot should be covered with a sneaker or riding shoe. Sandals should not be worn when riding, as the toes can get caught in a freely spinning wheel after a fall. Younger and less experienced riders should use kneepads, elbow pads and palm pads. Reflective vest of lightweight material is available for better visualization at dusk or early morning. Protective eyewear or goggles should be utilized if riding fast, or near a sandy beach or where there may be flying insects such as found on many bike paths.

Safe Riding Guidelines

Choosing the "where" and "how" to ride is the best protection against accidents. Many communities have developed bike paths along old, unused railways. Bike clubs form organized rides as a group. Riding with a more experienced rider will make you a better & safer rider. Check with your local bike store for the name of a riding club near you. The rule or standard when riding a bike on the road is to go with the flow of traffic, by staying to the right. On the road the cyclist is expected to obey all street signals & signs as if they were in a vehicle. On the bike path, or on the road, when overtaking someone always pass to his or her left and call out clearly: "passing on your left". This is also especially important when passing pedestrians walking in the same direction. It is important that you acquire a riding rhythm or cadence to operate your cycle smoothly and be more predictable to the other cyclist or motor vehicles on the road. Stops should be calculated to allow a gentle slowing well in advance of the intersection and then slowly pedal your way to it. The standard pedal rate is between 80 to 100 strokes per minute regardless of terrain. Gears and sprockets are utilized to keep your pedal rhythm at the target rate. In beginning to cycle, select a terrain that will allow you to maintain your target rate of 80-100 strokes per minute, and ride in 10-minute increments, slowly increasing your riding time. This type of cycling insures a good aerobic workout. Overuse or "cranking" is the leading causes of muscle strains and tendonitis in cycling. Learning proper bike riding technique will avoid this. Your heart rate when pedaling in rhythm should be calculated using the following formula:

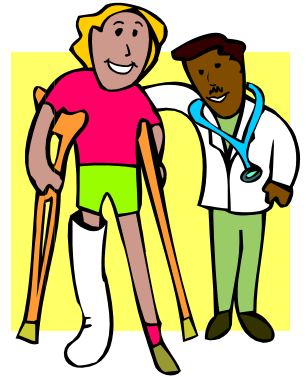


$$0.6 \times (220 - \text{Age})$$

As you become more in-shape, it should be expected that increased pedal speed or more resistance (i.e. hills) would be required to maintain your pulse in this range.

Injuries

Most bike injuries are either from a fall/accident or from overuse. When involved in a fall, it is best to keep your feet & legs close to the bike frame and go down with the bike as a unit, thereby spreading the force over more area, and avoiding torque forces about the lower extremity and hip joints. In an accident the main concern should be in protecting the head & neck. Long bone fractures heal with treatment...spinal cord injuries do not! Avoiding falls & accidents can be achieved by safe bike handling skills, proper clothing & equipment. Overuse injuries occur commonly in the knees, hands and feet in relative order. Knee strains are best avoided by proper pedaling a correctly adjusted bike. The pedaling motion is a spinning motion rather than a push-pull or push-rest motion. Do not "push through the pain". See your Doctor if the problem keeps re-occurring or does not resolve with rest over a few days.



Cycling is enjoying resurgence both as a family activity and a good aerobic exercise venue. It should be safe and enjoyable. Since the late 1800's when first invented, the bicycle has brought fun and enjoyment to millions. Using the above tips will help you master the most efficient machine man ever invented.