

## Bicycle Brakes

Remember when you were a kid, and you first dared to ride your bike down that really steep hill in your neighbourhood? The ride down can be a rush. Stopping isn't always so much fun. Bicycle control relies on two elements: steering and brakes. If either of these is missing, you are an out of control cyclist, hazardous to yourself and others.

History's first bicycles had no brakes. Band-aids hadn't yet been invented, so the next logical step was to devise a stopping system. Thus, brakes were born to help riders slow down and stop, and bicycles suddenly became more popular. By increasing frictional force on the wheels, cyclists were able to slow down and stop.

The first widely used braking system was called "the plunger". It first appeared on the high-wheeled bicycles that were popular in the 1800s. The plunger operated on a simple principle. To slow down a bicycle, a lever was either pressed down or pulled up, causing a metal shoe to press against the outer side of the tire. Of course, the friction created caused excess wear and tear on the tire. Cyclists found that the plunger did not work well with pneumatic tires, even after covering the metal shoe with rubber. Wet surfaces were another drawback, as water decreased the friction between the brake shoe and tire, reducing the braking power.

The next major development in bicycle brakes was the "coaster brake". Most of us have used coaster brakes, still popular in pint-size toddler bikes and tricycles. Some utility bicycles and cruisers also use coaster brakes. The concept behind coaster brakes is simple reverse motion. When the pedals are moved in a reverse direction, the brake mechanism inside the hub of the wheel pushes outward, creating friction and slowing down the bike. Coaster brakes are quite strong and tend to lock up and skid the rear wheel when engaged, so they're great choices for sidewalk burnouts.

Most of today's mountain, road and stunt bikes use caliper rim brakes. By pulling a lever, a cable is tightened. This cable then forces the brake pads or shoes to press against the inner rim of the wheel, stopping the bike. Caliper bicycle brakes are light and relatively inexpensive, but they do come with their own set of problems. Not hugely efficient on rainy days, wet brakes take twice as long to stop a bicycle because the water reduces friction between the brake and the wheel. Caliper brakes work best when pressure is applied gently.

It is important to balance the braking between the front and rear brakes while riding. If too much brake pressure is applied to the front wheel, your momentum and body inertia will take you right over the handlebars.

Over the decades, braking systems and materials have changed, but the fundamentals of slowing and stopping a bicycle have not. Bicycle brakes are still based on the concept of friction, and are still vitally important to your safety.