



Pedal Retention Primer

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Pedal retention is identified as one of four mandatory pieces of safety equipment, and is required of all who participate in IPMBA training. IPMBA strongly recommends that operational guidelines likewise mandate pedal retention for any public safety cyclists while operating in an on-duty capacity.

The primary purpose of pedal retention is to keep the cyclist's feet on the pedals while negotiating obstacles. Pedal retention keeps the feet engaged with the bicycle on steep descents and in crash situations. The proper use of pedal retention can prevent or lessen the severity of injuries.

As a secondary benefit, pedal retention improves pedaling efficiency as it enables the cyclist to engage both the quadriceps and the hamstrings in the pedaling action. Exerting equal force throughout the revolution helps reduce muscle fatigue and imbalance and conserves energy.

Pedal retention can be divided into four categories: toe clips with straps, (strapless) mini-clips, PowerGrips, and clipless systems such as SPD and others. Each pedal system has pluses and minuses for public safety cycling.

Toe Clips

Toe clips were originally designed to be used with cleats mounted on the bottom of the shoe. The cleat gripped the back portion of the pedal and the strap was used to hold the cleat tightly in place. The plastic portion (originally thin metal) was merely a device to hold the strap open.

The quick-release buckle enabled the rider to quickly release the strap to remove their shoe when necessary. The plastic portion that wraps around the toe and top of the foot was not meant to be used without a strap, as it is too flimsy and can bend, snag the ground and otherwise not work well.

To be used correctly, a toe clip must retain the strap, but the strap must be kept very loose. Having a loose strap allows the foot to enter and exit more safely. One problem can occur when the foot is turned sideways, as happens with a crossover dismount. Turning the foot sideways causes the strap to get tighter. That tightness may trap the foot and hold it to the pedal. This is why IPMBA training stresses the importance of disengaging pedal retention prior to exiting the bike. Once the pedal is flipped upside down, another problem can occur. The pedal and strap often scrape the ground and make noise, or the strap may catch onto something on the ground.

The final problem – which may be the biggest one – is the resistance to and fear some riders have about using them. They fear not being able to remove their foot if something happens. This is almost always overcome with practice and usage and time.

Mini-Clips

Mini-clips are designed to be used without straps. They use a stiffer plastic and are shorter for ease of entry. They cannot trap one's foot. They hold the foot in the proper position on the pedal and help keep it there while negotiating obstacles. They actually come in sizes for best fit.



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While they seem to be a perfect compromise, they do have some drawbacks. Because they are stiffer, they can snag things on the ground when they are flipped and used upside down. They do not allow the rider the additional power benefit of “pedaling circles.”

There is very little required to feel comfortable using them. Learning to flip the clip up and insert and remove the foot without looking is the only training and practice required.

Clipless Pedals

Clipless pedals require special shoes with recessed cleats. When properly adjusted, they do a terrific job of holding the cyclist’s feet on the pedals. They provide the most effective pedal surface contact throughout the pedal stroke which affords the rider the ability to “power through” and pedal circles.

However, there is a major learning curve in learning to release one’s foot, and mishaps almost always happen with them. Unless a student is very experienced, they should never be allowed in a basic IPMBA class. Depending on the pedal system used, when a rider clips out to do a crossover dismount, there may be very little actual pedal to stand on. That either necessitates some modification in technique and position, or makes them unstable. Public safety cyclists using clipless systems should use models which still have a pedal platform included.

Aside from the amount of practice required to master them, they have one other problem for police riders. The recessed cleat in the shoe eventually becomes exposed and the cleat can be heard while walking, which makes walking silently on a building search or any other sort of quiet approach on a hard surface impossible. If the user has to run, the cleat can be very slippery and dangerous. This limitation is easily overcome through monitoring of the condition of the shoes and replacing them as necessary, although this can be expensive.

PowerGrips™

In the opinion of this author, PowerGrips have proven to be the best of all worlds. They have a fairly short learning curve, can easily be adjusted as footwear changes, are quiet when used flipped upside down, and – as the name implies – they enable the rider to “power through” the stroke and pedal circles.

Placing the toe into the loop in a somewhat “pigeon-toed” manner positions the strap at its loosest. That is also the natural position of the foot when doing a crossover dismount. Instead of tightening in that position, as does a strapped toe clip, the PowerGrips are actually at their loosest point, which makes them safer for dismounts. The PowerGrips can be set quite loose for easy entry and exit, but when the heel is rotated in towards the bike they become much tighter, securing the foot to the pedal and allowing power to be applied throughout more of the pedal stroke.

For ultimate safety, PowerGrips should still be flipped over prior to dismounts, but when they are, they are much quieter should they brush the ground. However, they could still snag something.

If a rider needs to quickly mount and pursue someone, and does not wish to take the time to “clip in”, the pedal can still be effectively used by standing on top of the flexible PowerGrips loop.

Unlike clipless pedal systems, PowerGrips allow all types of shoes to be used, including waterproof winter boots.



Training and Practice

All of these systems require some degree of training and practice to make using them second nature. While they may seem impractical to inexperienced riders who do not understand the reason for or the value of pedal retention, they are very practical from a safety standpoint.

Without pedal retention, public safety cyclists find some essential techniques – such as the angled (or parallel) curb ascent – impractical. While riding parallel to the curb, the rider lifts the front tire up onto the curb. The street-side foot is then ratcheted up into a power pedal position.

That ratcheting is near impossible, and very awkward, without some sort of pedal retention.

Without pedal retention, the rider would literally need to remove their foot from the pedal, place the top of the foot underneath the pedal and lift it up in order to move it into position to power away. So NOT having pedal retention restricts some of the practical everyday techniques the police cyclists need and use.

Some police officers still resist wearing a seatbelt because they feel it restricts their freedom of movement in a crisis. I can also introduce you to a police officer who was uncomfortable with his toe clips and decided to descend a flight of stairs while standing on the bottom of the pedals.

About halfway down, his foot slipped forward off of the pedal, sending his body forward. His “bottom” hit the nose of his saddle with enough force to bend his seat post! I can still hear the sickening sound he made from the pain. What is dangerous is not using pedal retention of any kind.

Although pedal retention feels awkward initially, the toe clip drills used in the IPMBA courses are designed to help riders overcome their discomfort. After mastering the basics of clipping in and out of the selected retention devices, riders must continue to practice disengaging during routine dismounts, under stress conditions, and during crash survival exercises in order to maximize their efficiency and minimize risk.

Kirby is one of IPMBA's founding members and an author of both the Complete Guide to Police Cycling and the Complete Guide to Public Safety Cycling. Since his retirement from the police department, he has established a bike consulting/expert witness company and is logging lots of miles. He can be reached at kirbyp42@aol.com.

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