

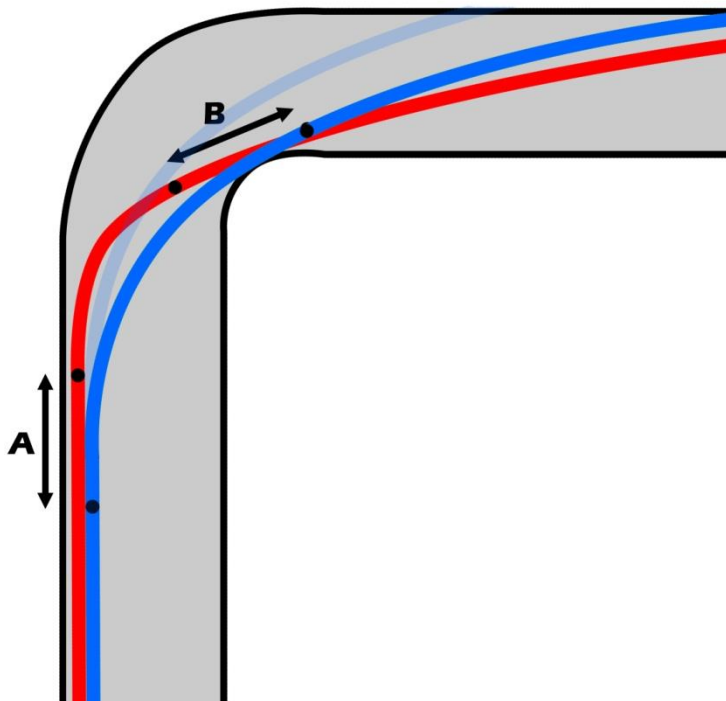


2016 Penguin Riding Series #3 - Quick Turns

It was a complaint that I have heard many times before. One of my students who had been racing for a few years and had hit a plateau. He was running towards the front of the Amateur class, but wasn't quite at the pace to win. Every time one rider moved up to Expert, the next weekend another seemed to drop the time needed to move to the front. He was stuck at a lap time and frustrated.

This rider had a good baseline of skills; good body position, loose on the bars and a solid set of reference points around the track. After riding with him a couple laps, I quickly realized that the problem was that he was *too smooth*. Simply put, the time that it took to go from fully upright to full lean was too long. At first glance, his trek through the corner looked fine. As he neared his turn points he would slowly ease off the brakes and his perfectly composed chassis would lean over and carve to the apex. As he rolled through the middle of the corner he would finish his turn and then gradually apply the throttle as his bike stood up.

When we look at his trip through the corner more closely a major problem is uncovered. To illustrate, let's look at two riders who enter a given corner and are traveling 67mph when a turn is initiated. This speed translated to about 100 feet per second. If Rider #1 (Red) takes 0.5 seconds to go from fully upright to full lean and rider #2 (Blue) takes a full second, then rider #2 consumes 50 feet more racetrack to get to the turn done. My student was just like the rider we will call Blue, and the ideal rider we will call Red. A diagram of this hypothetical entrance is below to illustrate.



Each rider has a pair of black dots on their line that represents when the turn starts and stops. If Blue tries to use the same turn in point as Red, he will miss the apex. This is shown by a silhouetted blue line that misses the apex by several feet and then runs off the track at the exit. This would be the result if Blue came into the corner and attempted to use the same turn point as Red.

Since Blue does not want to miss the apex and run off the track, he will instead start his turn point earlier until he no longer misses the apex. Unfortunately, this effectively shortens the available braking zone by the distance A (about 25 feet). Since Blue still needs to slow down to the same speed as Red at the apex, Blue must now start braking 25 feet earlier in order to make the corner.

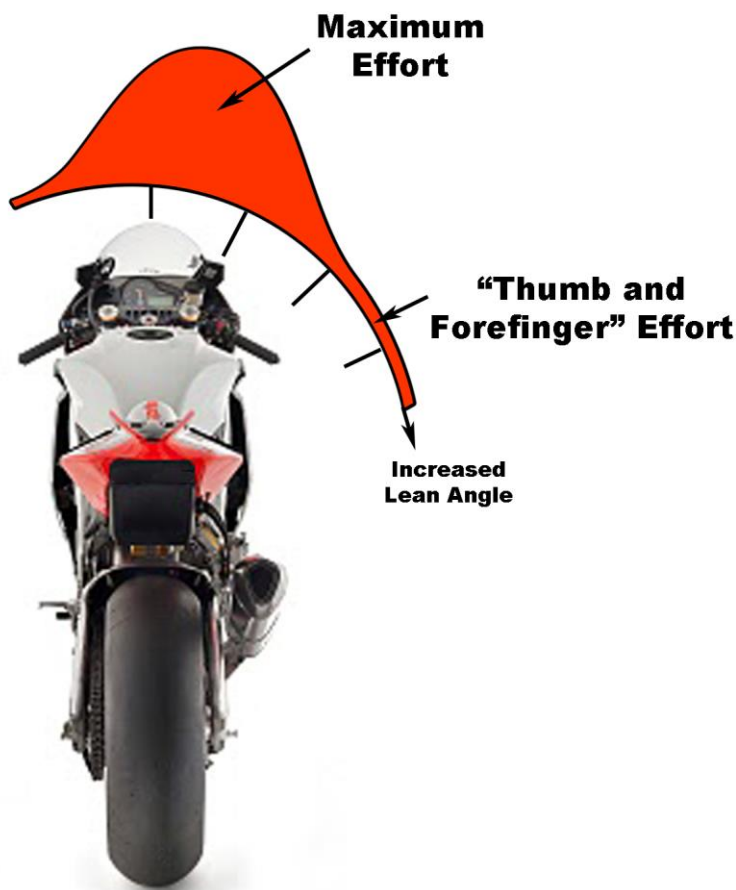
Unfortunately, the problems for Blue don't end there. Since Red gets his direction change done quickly, he is able to release

bar input and get back on the throttle early. You will notice that while both riders have the same apex

point, they are pointed in slightly different directions when they get there. The trajectory of Blue at the apex requires him to continue to turn until just after the apex. This delays the start of his drive down the next straightaway by the distance B (the other 25 feet), causing Blue to be several mph slower than Red for the next 1000 feet down the straight. Going back to analyzing my student, the lack of drive was the biggest thing holding him back from getting to the next level.

At the Penguin School, one of the concepts that we teach is that the fast line is nearly always the line with the lowest risk. It is clear from the previous diagram that Red spends less time on the edge of the tire than Blue. For the 50 extra feet that Blue is turning he has a lesser ability to change lines, make adjustments or add extra braking to avoid an obstacle. In addition, there is no additional risk in turning the bike more quickly when done properly.

The faster the entrance of the corner, the more racetrack the motorcycle consumes during turn in and the more important it is to get the bike to full lean as quickly as possible. Due to gyroscopic stability, the bike can also handle much greater bar inputs at high speeds. Going back to the rider that I was working with in the beginning of the story, we picked out two of the faster corners of the track to work on this skill first. Before a rider starts to work on turning quickly, it is critical that he has become proficient enough with his body position that he is able to completely relax his arms at full lean. Without this mandatory skill, taking the next step in this process can be problematic.



Since my student was comfortable at full lean and able to ride loose, I knew that he was ready to start implementing quick turns. Since all turns are initiated with bar input, the process of turning more quickly begins simply with using a little more force in the bars when the bike is upright. There are two important points to note when you start this process; (1) it only takes a small increase in force to make the bike turn more quickly and (2) the only place that the bike needs more bar input is **when the bike is nearly upright** (see diagram), and that as the bike leans in your hands must completely relax.

I counseled my rider that the first time he tried to increase his initial bar effort that he would likely apex the corner far too early. This is exactly the feedback that we are looking for. If a rider can easily get to the apex of a corner early, then that is a clear indication that the motorcycle is not near the limit of traction. With this data a rider can confidently push the turn in point deeper into the corner and also know that they can carry more entrance speed.

As with all things, there is a limit to how much bar effort is prudent. The point of this technique is to be quick and precise with your turns, but not overly aggressive. If riders use too much force the bike will

need time to settle from the input, delaying the drive. The final adjustments to entrance speed, turn point and bar effort come by analyzing the most critical point of every corner - the point of throttle application. In a drive focused corner like the example above, the rider should be able to crack the gas on just before the apex. Riders will continue to add entrance speed and increase turn rate until they are no longer able to get back on the gas at the pre-determined point.

After two sessions working on a specific corner, my student was also able to stop his bar input well before the apex. This changed his drive off the next corner dramatically and resulted in a full second drop in his times. The moral of his story came from his comment after his change, in which he noted that he not only was faster but he also felt like he was at lower risk of a high side through the entire exit. All it took was a little extra bar effort over center and then an adjustment to his turn point. Next time you find yourself having to turn through or past the apex of a corner leading to a straight, give this a try - the results can be great for both your lap times and your confidence.

Until next time - ride fast, ride safe!