

Swing Plane Part One

This is the first of what I believe will be a three-part series on the swing plane. Let's get started.

Swing plane. It is important. You can have the fastest, most blazing-est bat speed ever, and if your swing plane doesn't intersect with the pitch you will never make contact. Before we start examining hitters and their swing planes, I think it is prudent to make some important notes to keep in mind when looking at the swings.

- **Each hitter's swing plane is unique.** Each hitter has an optimal swing plane for him/her. Tons of factors go into determining a hitter's swing plane from build, approach, movement quality, etc. We don't see every golf swing being identical on the PGA, so we shouldn't expect that either in baseball. I bring this up as a cautionary point. With the explosion of video-based instruction, it is easy to get trapped trying to emulate a certain player. We will see some common principles in the hitters I show, but each player should strive to find the optimal swing path for them.
- **The swing plane is largely determined by pitch location and speed.** Again, nothing revolutionary, just keep in mind that in hitting we are reacting to a pitched ball. This is obviously different than say pitching, where we strive to make the motion grooved and similar each time (I think, I'm not really a pitching guy). In Part Three of this series I will show adjustments hitters make based on pitch location.
- **Swing plane is a three dimensional thing.** Each hitter's swing plane has unique features that need to be viewed from both the front and side view. The top, rear, and behind view are also very helpful. I bring this up because I encourage people to watch more video from the front (pitcher's) view. The front view shows the timing between the pitcher and the hitter, which is - you know - kinda important. It also shows us the pitch location and movement. We also get a better look at how the barrel moves. So yeah, watch video from the front view. Speaking of which, we will focus on the front view for this article, and spend more time on the side view in the second article.

Enough with the chatty-chat-chat-chat. Let's look at some hitters. Below are a couple of swings on fastballs right down the middle. Focus on a couple things. One, the barrel. It's important. Two, notice how even though these swings are from different years, the "meat" of Adrian Gonzalez's swing is identical. Gonzalez's swing plane is basically imprinted on his DNA. (Click on the videos to go through them frame-by-frame if you wish.)

<https://gfy.com/gifs/detail/JoyfulSereneHatchetfish>

Alright, allow me to describe Gonzalez's barrel path. As Gonzalez strides toward the pitcher, he brings the barrel to a more vertical position in reference to his starting position. Ted Williams discussed the importance of this movement in his book **The Science of Hitting** and I will paraphrase it. Basically by putting the barrel in a more vertical position, the bat becomes lighter in the sense it has less torque

away from the hitting zone (I have a more detailed article about this [here](#)). The movement also engages the upper back muscles of the rear side to provide strong acceleration once the swing starts.

The movement does have some potential drawbacks however, mainly that the bat is not on plane with the pitch. No part of the extended bat (barrel to handle to arms) is in line with the expected pitch path. The movement in fact *lengthens* the barrel's path to the ball. This added length comes with the potential for more barrel acceleration which can lead to more power if directed. Gonzalez is a great example of this "barrel tip." Some hitters use less in favor of a more contact-oriented approach (Joe Mauer, Alberto Callaspo) some guys utilize more barrel tip to maximize acceleration (Josh Donaldson, David Ortiz). I definitely think some barrel tip in favor of barrel acceleration is worth the trade-off for added swing path length. It is up to each player to find the right amount for them, instead of just copying their favorite hitter. Adding some barrel tip can bring some bat speed that can help with both contact power. But it has to be controlled.

OK. So Gonzalez is going through his stride and has moved the barrel off the plane of the pitch. His next move will be to move the barrel onto the plane of the pitch, preferably with some power. Let's take a look again.

<https://gfycat.com/gifs/detail/TidyJitteryIvorygull>

Let's highlight a couple frames just a few clicks apart in the swing. The first one is as Gonzalez is finishing his stride with the barrel more vertical.



Now Gonzalez two frames before contact.



Watch the video again to see Gonzalez's movements. Gonzalez has to direct his swing to get the barrel behind the ball. He needs to get the barrel flatter from the vertical position. He does this by raising his lead arm and lowering his rear arm to torque the handle and flatten the barrel. A term I have used to describe this movement is "trying to shear the handle." Notice how the front side opens with the lead arm rising while rear arm lowers or rows back. These opposing forces on the handle get the barrel turning quickly on plane. (For an instructional video on "shearing the handle" check out [this video](#). If you want more info on the nitty-gritty of the kinesiology movements read [this series](#) on shoulder articulations.)

Moving into contact, we can see the continuation of the movements Gonzalez started earlier. Contact deserves some special attention.



Gonzalez has done a great job of getting the barrel behind the ball. It's pretty obvious from these frames that Gonzalez isn't chopping down on the ball or trying to hit ground balls. If you look closely, we can see that Gonzalez's wrists have not rolled over (in fact, we will see they are actually supinating - palm down to palm up. More on this in the next post.)

Let's watch the swings again this time in full speed and make some general comments in regard to Gonzalez's swing path.

We can sum it up pretty quickly - get the barrel behind the ball. Barry Bonds talks about "catching" the ball with the barrel. We can see that with Gonzalez. If there was a basket on Gonzalez's barrel,

Gonzalez gives himself the best chance to catch the pitch by getting the barrel behind the sinking pitch. Catchers don't receive pitches by taking a downward stab at it, and the same principle applies to hitting. Shear the handle to turn the barrel behind the ball.

We also saw a combination of lead and rear side movements to direct the swing path. If either side does not function properly the barrel will either remain too steep or flatten out too much. We will see shortly hitters use different amounts of lead and rear side to set up their swing path.

How about Josh Donaldson. Below are a couple home run swings on fastballs down the middle.

What do we notice? Very similar movements to Gonzalez. As Donaldson strides toward the pitcher he moves the barrel past the plane of the pitch. Donaldson works the barrel back on path as his body starts to turn. He rips the handle apart to turn the barrel to get behind the pitch. Let's look at a few special frames. Here is Donaldson finishing his stride. Notice the magnitude of his barrel tip is larger than Gonzalez.



Now as Donaldson is two frames before contact he has flattened the barrel by lowering the rear arm and raising the front arm. Again, the magnitude of the flattening is greater than Gonzalez's. With the barrel tip and extra flattening, Donaldson's barrel path is longer than Gonzalez's in this plane.



Now at contact. The similarities - barrel behind the ball, wrists not rolled over (rear hand underneath handle). The difference - lead hand much lower showing a flatter swing path.



Let's repeat this process with Buster Posey.

Now again as Posey is completing his stride.



Here a couple frames before contact.



Finally at contact.



Notice the stark difference between the contact position of Donaldson and Posey. See how unlike Donaldson, Posey doesn't turn his lead elbow up much or row with the rear shoulder. The handle stays further away from his body, causing a steeper swing plane. We can also see that Posey's barrel path is shorter than both Gonzalez and especially Donaldson. Notice even on a pitch above Posey's belt he still keeps his hands significantly above the barrel. He really has to work to get his hands through on this plane.



I had a lot of requests for examples on swing plane. Let's go through a few of them quickly. Try to get a feel for what each hitter is doing to dictate their swing plane. Below is Anthony Rendon. I'd say his swing plane is pretty neutral. Again watch the timing between the barrel tip and initiation of the swing.

<https://gfycat.com/gifs/detail/popularrigidichneumonfly>

Now here is Anthony Rizzo. One Anthony to another. What do you think? I don't see much rear side rowing to bring the handle close to the body. His barrel is just a touch steep off neutral.

<https://gfycat.com/gifs/detail/MammothBigBufflehead>

We can see that Rizzo and Donaldson have some similarities in the lower body function, but quite different barrel paths.



How about Ryan Braun. Braun's swing path is very interesting. Braun doesn't stride with a lot of hip hinge to lower the barrel. On top of that, he REALLY turns over the lead arm until the front shoulder girdle is nearly completely protracted with a ton of corresponding rear side rowing. Take a look.

<https://gfycat.com/gifs/detail/UnripePoshHorsefly>

Notice just before contact Braun adds some side bend needed to lower the barrel. See how he finishes leaning over the plate. Pretty amazing.

<https://gfycat.com/gifs/detail/ThankfulSpecificJoey>

That was a lot of video. We saw a lot of similarities but also a lot of differences. Let's highlight some key variables for the swing plane from the pitcher's perspective.

1. Hip hinge/side bend. I probably didn't spend as much time on this as should have, but we saw varying degrees of hip hinge and side bend in the hitters. Hip hinge lowers the barrel, reducing the tendency to come in with a steep path. Meanwhile side bend tilts the shoulder plane and encourages a steep path. Braun is a neat case in that he has little hip hinge but still starts his swing pretty flat due to tons of lead arm turnover. We saw the late side bend to reduce the flatness of his swing and lower the barrel.

2. Lead arm. Really the biggest factor for setting the swing plane from the front side is the interaction between the lead and rear side. So let's start with the lead arm. The more the lead arm rises and turns elbow up, typically the more flat the swing plane will be. We saw this with Donaldson and the opposite with Posey.

3. Rear arm. The more the rear arm rows or "creates depth" the more the handle will move closer to the hitter, flattening the barrel's path.

The more the lead arm turns up (internal or medial shoulder joint rotation) with associated rear arm rowing the more I classify the hitter as a *top hand* or *rear arm* hitter. This simply means they are

utilizing the rear side more to control and power the swing. The more the lead shoulder joint medially rotates the more it becomes in a position of weakness - you don't throw a Frisbee backhanded with your thumb pointed down. From above, Donaldson is a guy I would classify as a top hand hitter. Jose Bautista is another guy who really lets the lead arm rotate inward and gets the barrel flat early. I would say he is a top hand hitter. He gets the front arm turned over as much as anyone in the game.



Contrary, the less the lead arm turns up the stronger it is and in more control of the swing path. Buster Posey above is a great example of a guy who I call a *bottom hand* or *lead arm* hitter. Take a look at this shot of Posey from the dugout behind him. See how he does very little rowing to engage the rear upper back.

<https://gfycat.com/gifs/detail/FlashylcyArctichare>

Again from the front we see the more steep swing plane with hands way above the barrel.



Don't get me wrong, Posey isn't pushing from the rear side. If you have read [this article](#) on the rear shoulder girdle function, you know hitters need to keep the rear shoulder joint from slipping into internal rotation early. Posey does this, but doesn't exhibit near the magnitude of external rotation of Donaldson or Bautista.

Now that we know how these variables interact with the swing plane, we can make adjustments based on swing video, motion tracker analysis, or results. Hitting a lot of balls on the ground or slicing balls to the opposite side? More than likely you are coming in steep and need to flatten the path with more rowing. Hitting a lot of topplers or infield popups? Quite possible you are coming in pretty flat and may need to look at how much we are turning over the lead arm. Crush high pitches but have no chance at low pitches? May need to add some hip hinge and/or side bend to lower the barrel's path. Next time will combine the knowledge we gained with this article with the info on the side view to help get a feel for where a hitter's contact point should be - this is really cool.

I'll end this session on the swing plane from the front view by admitting I didn't spend a lot of time talking about how the swing is in fact a slight uppercut. We did see that each hitter got the barrel behind the ball and to do that they indeed swing with an uppercut. I don't spend a lot of time talking about the swing being an uppercut because 1) I consider it a given and 2) I don't think it should be the focus of the swing. We will see in the third part of this series that based on pitch location the swing will have more or less uppercut to it. I believe the focus of the swing should be to get the barrel behind

the ball. From there we can strive to achieve a swing that gives us the greatest chance of accomplishing this. The variables listed here are just a subset of an extensive list each hitter must optimize to achieve their highest level of success. Remember, just because your favorite hitter has a steep or flat swing plane DOES NOT mean it is right for you.

Tune in next time when we look at the factors that help shape the swing plane when viewed from the side.