

# Corner 3s – The Following Possession

An Open Topic Submission

By vancouver gRizzlies

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## Introduction

The basketball analytics community has been integral in the rise in the understanding of the value of the corner 3. Simply put corner 3s are closer and worth more points which means they are inherently better shots to take. While we agree with this reasoning, we know that there is an aspect of the corner 3 that has not yet been analyzed. Basketball is a continuous sport and we hypothesize that a corner 3 may negatively affect a team's transition defense. Therefore, we propose analyzing possessions after a shot is taken from a specific location, particularly corner 3s, to see whether that location has a higher likelihood of creating a fast break.

We hypothesize that possessions following a missed corner 3 will be more valuable for the team defending the corner 3. This is likely because the player shooting the corner 3 is stuck in the corner, creating a longer distance for the shooter to travel to contest a fast break going back the other way. Secondly, longer shots create longer rebounds which would contribute to more fast breaks. Long rebounds move the ball farther up the court for the team transitioning onto offense and make it easier for them to create fast break opportunities.

We will compare the percentage of missed corner 3s that end in fast breaks to the percentage of missed shots that end in fast breaks taken from other positions on the court. This comparison will indicate whether the location of the shot influences the occurrence of a fast break. We anticipate that missed corner 3s will create more opportunities for the opponent to create a fast break. Our findings will enable us to recommend to teams, coaches and players of all skill levels, different defensive strategies depending on the location of a shot.

## Data Analysis

Given the data provided from the NBA, we used the Hackathon\_play\_by\_play.txt, Hackathon\_sv\_shot\_summary\_2014-15.txt, and Hackathon\_sv\_shot\_summary\_2015-16.txt datasets as the basis of our data. Since only shot data from the 2014-15 and 2015-16 seasons were provided, the play by play data for those seasons were used.

We classified fast breaks as shot attempts or free throw attempts that occurred within 7 seconds (of game time) after the missed 3-point shot. We analyzed the raw number of fast breaks over converted fast breaks as it is simpler and there would be lesser variance based on the actual player attempting the shot.

Due to the data we had, corner 3s were quantified by finding all 3 pointers that were between 22' and 24' 5". We recognize that this data set may include non-corner 3-pointers, as the top of the 3-point line has a radius of 23' 9"; however, this is done to take into account for any variations in spacing by the shooter, and we determined that it was unlikely for a shot right along the line. We do acknowledge that if we were to extend this study, we would preferably use the raw SportVU data to ensure that we correctly identify correct shot locations.

Since the point of this analysis is to compare the frequency of fast-break resulting from missed corner three pointers compared to other shots, we first had to classify missed shots into the following categories:

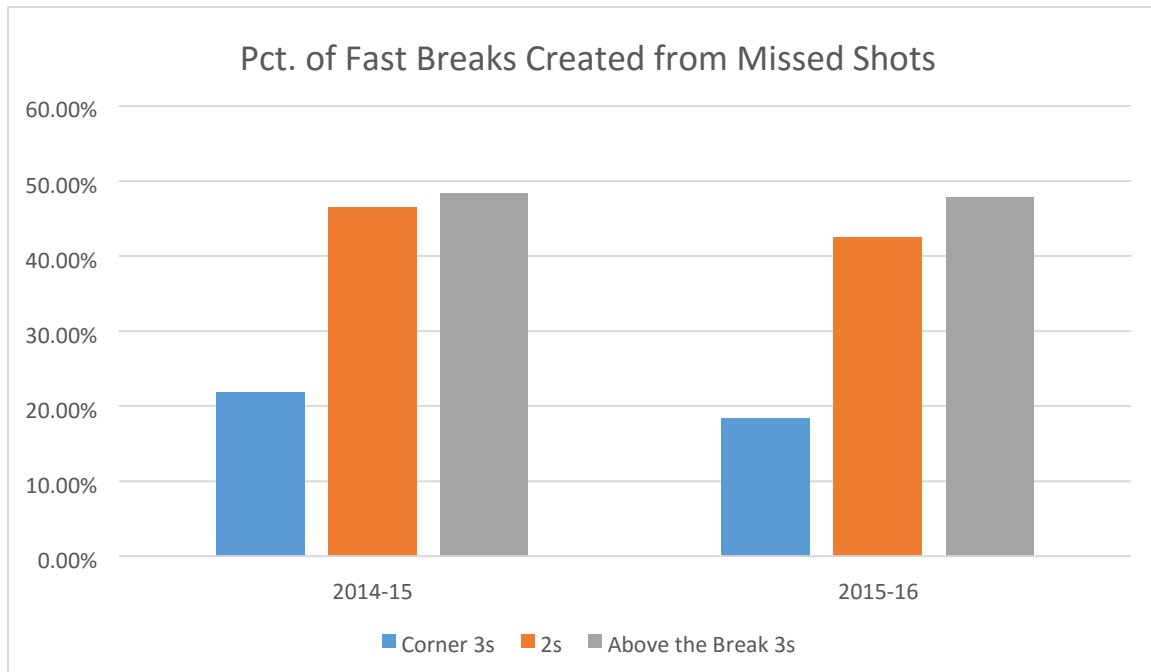
- Missed two pointers
- Missed corner three pointers
- Missed non-corner three pointers

Then, for every missed-shot event in the play-by-play, we loaded all the events that are occurred within seven seconds after the missed shot into a buffer. The buffer was then scanned for shot attempts not originating from the team that originally missed the shot, in order to count the number of fast breaks that occurred after a missed shot. We also checked if the ball gets turned over within these seven seconds to ensure it was only a fast break from the team defending the corner 3.

We counted the statistic across both the 2014-15 and 2015-16 seasons. By logging every missed two, above the break three, and corner three, as well as the number of subsequent fast-break plays, we create a relation between fast-break return likelihood as a function of the type of shot missed.

## Discussion

Year	Type of Shot	# Of Missed Shots	# Of Fast Breaks	Pct. of Missed Shots Leading to Fast Breaks
2014-2015	Corner 3s	1323	289	21.84%
2014-2015	2s	82,462	38,321	46.47%
2014-2015	Above the Break 3s	38,553	18,664	48.41%
2015-2016	Corner 3s	1,399	258	18.44%
2015-2016	2s	80,844	34,320	42.52%
2015-2016	Above the Break 3s	41,149	17,190	43.52%



We ran our code across the 2014-2015 and 2015-2016 seasons and found that overall our findings were fairly consistent across both seasons which makes us more confident that our process was implemented correctly. Surprisingly though, we found that corner 3s led to a lower percentage of fast breaks than 2 point shots and 3 point shots taken from above the break.

Firstly, we will compare corner 3s to other 2 point shots. We theorize that the reason that missed 2s create a higher percentage of fast break opportunities for the opposing team is because the shooter taking the corner 3 is rarely alone in the corner. If the shooter has to run back a farther distance on defense his defender has to also run a farther distance to transition into offense.

Second, it makes sense that corner 3s create less fast breaks than above the break 3s for a couple of reasons. The position of the rebound is one important difference between the 2 shots. Corner 3s missed both long and short will usually be rebounded around the baseline. This creates a longer distance for the transitioning team to push the ball in transition and does not create much of an advantage. However, above the break threes that miss short will have the ball rebounded farther away from the court in a perfect position to create fast breaks. The rebounder will also likely be faster and be better at handling the ball when it is rebounded further out. Therefore, the fast break will be able to be started quicker and more efficiently. Additionally, the position of the offensive players on corner 3s should be roughly the same as for above the break 3s. This positioning usually has 4 players spaced evenly apart on the perimeter and 1 closer to the hoop. This is important since the player shooting the basketball is focused on following through on his shot and is not often ready to defend a transition opportunity. This means that a corner 3 will usually have at least 2 players above the break ready to run back on defense and an above the break 3 will only have 1. This creates a big difference on preventing the fast break opportunity.

## Conclusion

Our analysis proved our hypothesis wrong; however, we still feel like we have found useful and practical applications in a field that has not been researched in depth. As our research points out that corner 3s have a lesser chance of created a fast break for the defending team we are now informed that corner 3s are even more valuable than previously thought. As our research is new, we would love to look into more of our assumptions and explanations for our analysis. To improve our analysis for future projects, we would use the spatial SportVU data to better classify corner 3s. Additionally, we would improve our classifications of fast break opportunities by looking at Sport VU data and looking at instances where an odd-man rush is created after a missed shot. Finally, we would like to investigate of fast break efficiency is influenced by the previous possessions shot location. We explained our findings using assumptions from our coaching and playing experience. We would also like to investigate these explanations further, by accounting for different teams' scheme for offensive rebounding. Verifying that missed corner 3s are in fact rebounded closer to the baseline whereas missed above the break 3s are rebounded in the middle of the court. Additionally, we would like to check the positions of offensive players depending on the location of the shot and whether this affects who defends the fast break opportunity in transition. Finally, to finish our analysis we would like to see if shot location has an effect on offensive rebounding percentage.

We feel confident in recommending a higher volume of corner 3s and deem them even more valuable than previously thought. In regards to strategy, we would recommend a more focused effort to get back in transition defense on above the break 3s.