

# Analysis of MMA Fighter Khabib Nurmagomedov's Ground Dominance

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## Introduction

Mixed martial arts (MMA) has recently gained wide popularity thanks to the help of the Ultimate Fighting Championship (UFC). The UFC seeks to find the best martial arts fighter by pitting two fighters of the same weight class against each other in either a title fight which is a five 5 minute round bout or a non-title fight which consists of three 5 minute rounds.. Since some fights are stopped before the end of the last round, due to at least one fighter's inability to continue safely, it is important to judge each round independently when evaluating a fight, as the three judges of each match do when filling out their scorecards. Likewise, each round in a fight served as observation opportunities for this analysis. Moreover, the increase in skill shown in title fights leads many UFC fans to marvel at champions who consistently retain their titles, especially those who remain undefeated in the UFC such as Khabib Nurmagomedov. Khabib, a 32 year old Russian, is a dominant wrestler and the current Lightweight champion holding a 28-0-0 record. Since he is such an interesting figure in the MMA fandom, renowned for his takedown ability and ground control, this analysis seeks to quantitatively and qualitatively determine the effect of his wrestling-based style on his opponents.

Opponent	Round	Way of Victory	Takedowns Landed	Opponent Strikes Before Takedown	Opponent Strikes After Takedown	Type of Strike Before Takedown	Ground Control Time of Opponent (seconds)	Did Opponent Get Up After Takedown?
Porier	3	Sub	3	2	0	Feint right hand	100	No
Porier	2	NA	3	11	4	Feint left hook	75	No
Porier	1	NA	1	4	0	Feint left hook	111	No
McGregor	4	Sub	1	6	0	Feint left hook	114	No
McGregor	3	NA	0	34	NA	NA	2	NA

In order to discover this effect, ten of Khabib's fights were chosen and each round in those fights individually dissected to fill a dataset containing the following variables: Opponent (who Khabib fought), Round (the round in question for any particular fight), Way of Victory (the official ruling at the end of the fight either submission, unanimous decision, or knockout), Takedowns landed (Khabib's successful takedowns), Opponents strikes before takedown (total number of strikes the opponent landed before a takedown), Opponents strikes after takedown (total number of strikes the opponent landed while on the ground due to Khabib's takedown), type of strike before takedown (The way Khabib attacked to set up a takedown), ground control time(time on ground in seconds), and whether or not the opponent got up after takedown. Data was collected on September 27, 2020 by designating members of the team to one or two variables, to control for judgment calls and counting errors, watching each full match, and meticulously recording the information in a spreadsheet. As mentioned before, observations, or rows in the data, are the rounds started in each of his fights. This resulted in a total of 30 observations. Collecting data in this manner allows for analysis of the effectiveness of Khabib's takedown strategy not only in each fight but overall against different fighters.

## Summary

	Possible Values	Count	Relative Frequency (%)
Opponent	Portier	3	10%
	McGregor	4	13.33%
	Jaquinta	5	16.67%
	Barboza	3	10%
	Trujillo	3	10%
	Tavares	1	3.33%
	Johnson	3	10%
	Horchler	2	6.67%
	Dos Anjos	3	10%
Round	Healy	3	10%
	1	10	33.33%
	2	9	30%
	3	8	26.67%
	4	2	6.67%
Did opponent get up?	5	1	3.33%
	Yes	11	36.67%
	No	15	50%
Way of Victory	NA	4	13.33%
	Dec	5	50%
	Sub	3	30%
	KO	2	20%

Table 1: Categorical Variables

	Takedowns Landed	Opponent Strikes Before Takedown	Opponent Strikes After Takedown	Ground Control Time of Opponent (seconds)
Minimum	0	0	0	0
Maximum	13	62	7	248
Mean	2.46667	11.86667	1.3077	134.9667
Standard Deviation	2.763473	14.18774	1.69135	74.4346
NA count	0	0	4	0

Table 2: Numerical Variables

In table 1 we provide information regarding our categorical variables - opponent (# of rounds in fight), round, whether or not the opponent got up after a takedown and way of victory (Decision, Submission, Knockout/TKO). Table 2 shows data regarding our numerical variables - Takedowns Landed by Khabib, strikes landed by the opponent before and after being taken down, and total time Khabib had control of the opponent on the ground.

On further analysis we found that there were significant differences between the average time that Khabib was able to keep his opponent on the ground (ground control time) by round. Figure 1 below shows that the average ground control times for round 3 were on average lower than the ground control times for rounds 1 and 2. Less can be said about the ground control times for rounds 4 and 5 due to the fact that of Khabib's five championship fights (up to five rounds), only two of them made it to the 4th round, and only one made it to the 5th.

Round	Count	Min	Max	Mean	Standard Deviation	Lower CI	Upper CI
1	10	0	248	169.1	72.79	123.984	214.216
2	9	75	244	160.22	60.4	120.759	199.681
3	8	0	159	80.875	58.49	40.343	121.407
4	2	0	114	57	80.61	NA	NA
5	1	155	155	155	NA	NA	NA

Table 3: Summary Statistics of Ground Control Times by Round

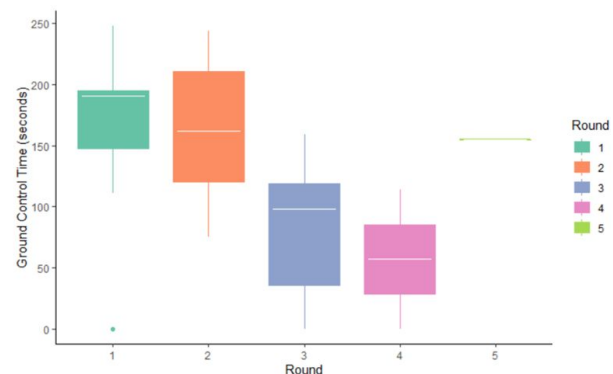
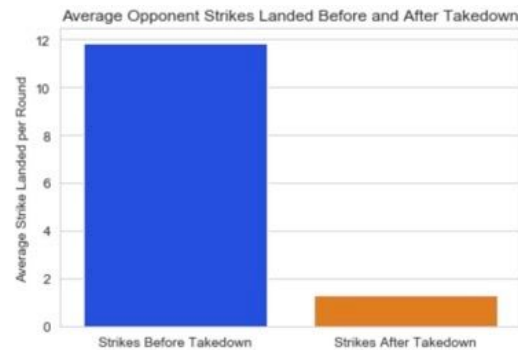


Figure 1: Distribution of Ground Control Time by Round

We also observed the differences between the average number of opponent strikes before he was taken down by Khabib and the average number of strikes after he was taken down. In figure 2 below we observe that there was a significant difference between those two averages, with the average number of strikes before takedown significantly larger than the number of strikes after.



*Figure 2: Average Opponent Strikes Before and After Takedown*

## Insights

After thoroughly understanding and analyzing the data collected, we had a much deeper understanding of Mixed Martial Arts and its crucial components. It was also interesting to see some possible flaws that Khabib might have in his game that may be more difficult to point out while watching his dominant performances. There are two main takeaways from the data that may help an opponent of Khabib prepare specifically for his possible weaknesses.

One of the most feared aspects of MMA is the feeling of being exhausted in the cage against somebody who feels fresher than you do. Wrestling is the most draining art that can be used in MMA, so it is a gamble when one utilizes it. A fighter could shoot for a takedown and complete it successfully, or have the takedown defended and expend a large amount of energy for an unsuccessful attempt. Either way, it takes a tremendous amount of conditioning and stamina to be able to mix in wrestling with striking and be able to go the distance of the fight. Khabib is the most feared wrestler in the entire roster. His ability to be so tenacious with his takedowns requires him to have perfect technique and seemingly never-ending cardio. His opponents, on the other hand, prepare for months to beat his style, but ultimately they become too exhausted in their fight to offer any sort of retaliation to Khabib's attacks. The nature of a "Khabib takedown" is also different from anybody else's. He quickly shoots, takes his opponent down, keeps the opponent down, transfers all of his weight on the back of his opponent (making his opponent carry all of his weight), and punches while threatening submissions. Whoever faces him always has to worry about so much when they get taken down, they either get beat up on the ground or submitted, and it's highly difficult to defend both threats at the same time. If these fighters manage to get up or make it into the next round, they are severely diminished for the remainder of the fight. Looking at Figure 2, there is about a 12x difference in the output of Khabib's opponents per round from before they get taken down as compared to after. This indicates that once Khabib shoots and his opponent hits the mat, they are ultimately prevented from being effective in the fight.

On the flip side, the fighters that Khabib faces have had a bit more success defending his takedowns after the second round. This could be due to a few factors: either Khabib slows down

or his opponents find patterns in his technique to escape his holds. Either way, these fighters end up losing because their energy was sapped in the first two rounds, but it is still important to note that it is not impossible to form a gameplan to take advantage of these opportunities. We see this more clearly in Figure 1. Using anova, we found that there is a statistical difference between the means of the times Khabib had his opponents on the ground by round with a p-value of .0155. A TukeyHSD test shows that the biggest difference between means is between round 1 and 2 and rounds 1 and 3, with round 3 being considerably lower than the other two rounds. This implies that in Khabib's last 10 fights, on average he had his opponent on the ground for less time during the 3rd round than the first two rounds. This shows that there would be more time in the final round for his opponent to get more strikes in and potentially win by knockout, this is assuming that his opponent isn't completely tired from the first two rounds and has enough energy to try to knock Khabib out in the final round of regular competition. Of course, this would take serious conditioning because even when Khabib is unsuccessful on his takedown attempts, he is still fresh enough to strike better than his opponents when they are tired. Maybe if Khabib had to rematch one of his previous opponents, they will have a better idea of how to stuff his takedowns and land their shots. Khabib has never had to rematch any of his opponents, and therefore he may have to deal with this challenge in the future. However, his wrestling is so dominant, it is the ultimate-equalizer in any fight, against any style, and therefore, it will always be a tall ask to dethrone him.

An obvious thing our team could have done differently in our analysis of Khabib's grappling technique is using all of his career fights for the data we collected rather than just the 10 that we used. When analyzing any type of data it is always better to collect as much data as you can to better represent the whole and considering that Khabib has only fought in 28 total fights in his UFC career it would not have been too challenging to collect all of this data. We spent a lot of time comparing Khabib's statistics on and off the ground but it would have been interesting to look a little deeper into what works most effectively when he is on the ground. We mentioned that his two main strategies when he does get his opponent to the ground is to either throw punches while they are on the ground or threaten submission. This would require a more in depth look at his ground time when watching the fights but when we know that getting to the ground is his most effective technique, it would be very helpful for him to know which strategy on the ground creates more successful outcomes for him in fights. We also could have collected data for Khabib's strikes before and after takedown and compared those to his opponents strikes before and after takedown. This would make it clear to us how aggressive Khabib is when striking or if he primarily focuses on getting his opponent to the ground and attempting submission which does not require striking. Furthermore, we could determine whether or not Khabib has any success on his feet by comparing his and his opponents strikes before takedown.