

NFL Ready

1
2 In college football, many players have the intentions of making it into the big leagues, the NFL. However not all
3 college players are guaranteed entrance into the National Football League. It takes superior players that excel over
4 others to make it to this elite group. Many college players seek to be selected in the NFL draft; an event where the NFL
5 elects those college players who are eligible teams to be on their teams. But how do these players get selected? Most
6 of these players are watched throughout their seasons and deemed star players, but usually there is no calculation on
7 their performance besides their running speeds, their 40 yard dash time. Sometimes these calculations do not work for
8 every position, especially quarterbacks. Quarterbacks can be elite by their passing and rushing yards, even their lack of
9 interceptions. But what about their passing speed? When looking at a college player's passing speed, it can be seen
10 that the faster the throw by a quarterback the better they are. Looking at these college quarterbacks' passing velocity
11 through physics, it can be seen if a college quarterback should play in the NFL. These statistics found through kinematics
12 can be compared to NFL elite quarterbacks to see similarities and to compare their maximum throwing speeds. If a
13 college quarterback's throwing velocity is closely related to that of an NFL quarterback, then they should be fit to play in
14 the NFL.

15 In this experiment, the college quarterback of choice looked at is Marcus Mariota, to see if he fit in the NFL as a
16 professional quarterback. It is important to compare him to a quarterback of high status in the NFL. This experiment will
17 use Peyton Manning as a comparison because of his broken records, most touchdowns in the NFL and his MVP award.
18 When starting to compare the two, both are analyzed for the same thing; their throwing speed to determine their max
19 throwing velocity. This experiment runs into many limitations. Both specimens have thrown over hundreds of passes
20 and not all passes will be analyzed, which is a limitation. The players also have games where they play in weather
21 conditions that effect their throwing capabilities, such as wind or precipitation. Wind can highly affect a quarterback's
22 throwing velocity. However in this experiment these factors will not be put into consideration because there by a large
23 sample of passes analyzed within numerous games with varying conditions.

24 When starting evaluation of these players, video footage had to be found of both. First Marcus Mariota was
25 analyzed. Mariota, a current junior playing at Oregon has been in the news over the past couple of years for his great
26 performance. In 2012, he completed 230 passes for 32 touchdowns and 2677 yards. He improved in 2013 with a

1 completion of 245 passes for 31 touchdowns and 3665 yards. SO far in 2014 he has completed 150 passes for 24
2 touchdowns and 2283 yards. It can be seen through these stats that Mariota is a great candidate for this experiment.
3 He is a star player that is still excelling. This experiment will analyze a select few of these 625 passes that he has
4 completed to determine his max throwing speed to see if he is capable of playing in the NFL (Football | NCAA | Player
5 Stats).

6 When analyzing the footage of Marcus Mariota, nine different throws were analyzed. For each throw, the
7 displacement of the ball was analyzed which was determined by the markers on the football field and then converted to
8 meters since a football field is in yards. The time of the balls flight in the air was also recorded which was done by a
9 stopwatch (Marcus Mariota Highlights).

10 The data for the 8 throws were:

11 1st Throw 9.144 meters in .96 seconds.

12 2nd Throw 17.37 meters in 1.06 seconds.

13 3rd Throw 47.55 meters in 2.13 seconds.

14 4th Throw 29.26 meters in 1.86 seconds.

15 5th Throw 23.77 meters in 1.13 seconds.

16 6th Throw 16.46 meters in 1.05 seconds.

17 7th Throw 10.06 meters in .91 seconds.

18 8th Throw 32.92 meters in 1.78 seconds.

19 9th Throw 29.26 meters in 1.48 seconds.

20 All of these throws came from different games that Mariota threw in. When calculating his maximum throwing speed, it
21 was important to take calculations for numerous throws. To figure out the max throwing speed, 2-dimensional
22 kinematics had to be used due to gravity. First the data had to be split into two components; its vertical speed and its
23 horizontal speed. The horizontal speed was found by simply dividing the displacement by the time spent in the air. So
24 for the first throw, to find V_x , the displacement of 9.144 meters was divided by the time of .96 seconds, which would
25 give the horizontal speed of 9.525 m/s^2 . To figure out the vertical speed, gravity had to be taken into consideration.
26 Important equations for 2-dimensional kinematics is $X_f = X_0 + V_0t + 1/2at^2$. When finding the vertical speed however we can
27 simply multiply 1/2 of the hang time by gravity, which is assumed to 9.8 m/s^2 . So for the first throw the vertical speed
28 would be 4.70 m/s. To find the total speed, both vertical and horizontal speeds are used. Both speeds are squared and
29 then the square root is taken of the sum of the two. This was done for all of the nine throws recorded for Mariota. It
30 was found through calculations that Mariota's maximum throwing speed from the data was 24.64m/s.

31 Peyton Manning, a number one draft pick in the 1998 NFL Draft, can be seen as a great NFL quarterback. He has

1 played for two teams since his draft, the Indianapolis Colts and the Denver Broncos. He has many awards and career
2 highlights. He has won the Superbowl, been Superbowl mvp, 13 time probowl champ, 7 time 1st team all pro, 4 time NFL
3 passing touchdown leader and many more. As of week 8, 2014 in the NFL season, Manning has completed 5,706 passes
4 for 513 touchdowns and 67,098 yards (Peyton Manning). These statistics give credit to Peyton Manning for being one of
5 the best NFL quarterbacks. If Marcus Mariota's max throwing speed compares closely to that of Peyton Manning, it can
6 be concluded that he is suitable for the NFL.

7 Analyzing Peyton Manning's throwing speed used the same method as analyzing Mariota's. Video footage was
8 analyzed for eight different throws. Each throw was recorded for its displacement and it's time in the air (Peyton
9 Manning Highlights).

10 1st Throw 34.75 meters in 1.28 seconds.

11 2nd Throw 39.32 meters in 2.20 seconds.

12 3rd Throw 32.92 meters in 1.56 seconds.

13 4th Throw 14.63 meters in 1.06 seconds.

14 5th Throw 38.40 meters in 2.17 seconds.

15 6th Throw 11.89 meters in .97 seconds.

16 7th Throw 16.46 meters in 1.05 seconds.

17 8th Throw 35.66 meters in 1.36 seconds.

18 9th Throw 25.60 meters in 1.48 seconds.

19 All of these recorded data went through the same calculation as Mariota's data. Peyton Manning was recorded with a
20 maximum speed of 27.87 m/s.

21 Looking at the data, a close correlation can be seen through Marcus Mariota's throwing speed and Peyton
22 Manning's throwing speed. If a college quarterbacks max throwing speed is similar to that of a NFL quarterbacks
23 throwing speed, then they are fit to play in the NFL. This is true for Marcus Mariota; he had a max throwing speed of
24 24.64 m/s, which was only a percent difference of 12% to Peyton Manning's max throwing speed of 27.87 m/s. This
25 difference is not much for these 2 players when comparing an elite NFL quarterback to that of a college quarterback.
26 The data of these two players and the comparisons of Mariota and Peyton's max throwing speed shows that Mariota
27 has the ability to play in the NFL.

28 Work Cited

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