# A Characterization of Hand and Wrist Injuries and Associated Risk Factors in National Basketball Association Athletes

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INTRODUCTION:

Hand and wrist function is essential to basketball ability, however injuries to the hand and wrist are not well-characterized in National Basketball Association (NBA) players. Factors associated with overall player efficiency after hand and wrist injuries also have not been evaluated in NBA players. The primary purpose of this study is to characterize the nature of in-game hand and wrist injuries in the NBA players. The secondary purpose is to analyze the factors associated with equal or increased player performance, measured by player efficiency rating (PER) and true shooting percentage (TS%), two years after sustaining a hand and wrist injury.

METHODS:

Injury data from seasons 2015-16 to 2020-21, with exclusion of the 2020-21 due to abbreviated COVID-19 play, was retrieved and extracted from a public online database, Pro Sports Transactions. Injury characteristics and NBA player demographic information were assessed utilizing descriptive statistics. Multivariable logistic regression analyses were performed to identify risk factors associated with equal or increased PER and TS% two years after injury.

RESULTS:

There were 214 reported hand and wrist injuries, and of these injuries 173 (81%) were classified as structural. The most common injury types were a strain or sprain (0.63 per 1000 GEs), followed by fractures (0.37 per 1000 GEs). In poisson regression models, older age (RR, 0.89 [95% CI, 0.84-0.95]) and more years in NBA played were modestly associated with relative risk of having a decreased PER at 2 years after injury. Increased weight (RR, 1.02 [95% CI, 1 − 1.05]) and increased BMI (RR, 1.14 [95% CI, 1.01 − 1.29]) were also modestly associated with having a decreased PER and TS%, respectively at two years after injury.

DISCUSSION AND CONCLUSION:

Strains/sprains and fractures are the two most common hand and wrist injuries sustained by NBA players. NBA players sustaining hand and wrist injuries, regardless of dominant or nondominant hand and wrist, are likely to return to baseline overall player efficiency based on PER and TS% within two years of injury.

## Table 1. Injury Characteristics

| | Overall (N=214) |
| --- | --- |
| **Dominant Side Injury** | 140 (65.4%) |
| **Injury Location** | |
| finger | 33 (15.4%) |
| hand | 49 (22.9%) |
| thumb | 46 (21.5%) |
| wrist | 86 (40.2%) |
| **Injury Type** | |
| contusion | 16 (7.5%) |
| dislocation | 6 (2.8%) |
| fracture | 51 (23.8%) |
| Other | 5 (2.3%) |
| soreness | 41 (19.2%) |
| sprain/strain | 86 (40.2%) |
| torn ligament | 9 (4.2%) |
| **Season ending injury** | 15 (7.0%) |
| **All games missed due to injury** | |
| Median (Q1, Q3) | 4.000 (2.000, 12.000) |

## Table 2. Player Characteristics

| Overall (N=153) | |
| --- | --- |
| **Age** | |
| Mean (SD) | 26.1 (4.1) |
| Median (Q1, Q3) | 25.0 (23.0, 29.0) |
| **Height** | |
| Mean (SD) | 2.0 (0.1) |
| Median (Q1, Q3) | 2.0 (2.0, 2.1) |
| **Weight** | |
| Mean (SD) | 100.5 (11.2) |
| Median (Q1, Q3) | 100.0 (92.0, 108.0) |
| **BMI** | |
| Mean (SD) | 24.9 (1.7) |
| Median (Q1, Q3) | 25.0 (23.8, 26.0) |
| **Year in NBA** | |
| Mean (SD) | 5.8 (4.1) |
| Median (Q1, Q3) | 5.0 (2.0, 8.0) |
| **Total Minutes Per Game** | |
| Mean (SD) | 23.6 (7.6) |
| Median (Q1, Q3) | 23.5 (17.5, 30.1) |
| **Hand** | |
| Left | 12 (7.8%) |
| Right | 141 (92.2%) |
| **Position** | |
| Center | 35 (22.9%) |
| Power Forward | 28 (18.3%) |
| Point Guard | 28 (18.3%) |
| Small Forward | 28 (18.3%) |
| Shooting Guard | 34 (22.2%) |
| **Player Efficiency Rating (PER)** | |
| Mean (SD) | 15.1 (5.0) |
| Median (Q1, Q3) | 14.3 (11.9, 17.6) |
| **Total Shooting Percentage (TS%)** | |
| Mean (SD) | 0.6 (0.1) |
| Median (Q1, Q3) | 0.5 (0.5, 0.6) |

## Table 3. Associations with having an equal or higher player efficiency rating (PER) at 2 years

| | PER at 2 years < Baseline (N=50) | PER at 2 year >= Baseline (N=40) | Relative Risk (RR) | p value |
| --- | --- | --- | --- | --- |
| **Position** | | | | |
| Center | 10 (20.0%) | 9 (22.5%) | reference | reference |
| Power Forward | 11 (22.0%) | 4 (10.0%) | 0.5(0.19 - 1.28) | 0.146 |
| Point Guard | 11 (22.0%) | 4 (10.0%) | 0.46(0.19 - 1.14) | 0.094 |
| Small Forward | 7 (14.0%) | 13 (32.5%) | 1.01(0.52 - 1.97) | 0.969 |
| Shooting Guard | 11 (22.0%) | 10 (25.0%) | 0.72(0.33 - 1.56) | 0.402 |
| **Age** | 28.0 (25.0, 31.0) | 25.0 (23.0, 28.0) | 0.89(0.84 - 0.95) | <0.001 |
| **Height** | 2.0 (1.9, 2.1) | 2.0 (2.0, 2.1) | 9.7(0.46 - 203.03) | 0.143 |
| **Weight** | 99.5 (88.0, 108.0) | 101.0 (96.0, 108.2) | 1.02(1 - 1.05) | 0.032 |
| **BMI** | 25.0 (23.8, 26.1) | 25.3 (24.7, 26.0) | 1.15(0.99 - 1.32) | 0.065 |
| **Year in NBA** | 7.0 (5.0, 11.0) | 4.0 (3.0, 7.2) | 0.89(0.83 - 0.96) | 0.002 |
| **Total Minutes Per Game** | 27.2 (21.1, 31.9) | 26.6 (20.2, 31.7) | 1.01(0.98 - 1.05) | 0.49 |
| **Dominant Sided Injury** | 28 (56.0%) | 26 (65.0%) | 1.11(0.68 - 1.8) | 0.673 |
| **Injury Location** | | | | |
| finger | 7 (14.0%) | 6 (15.0%) | reference | reference |
| hand | 13 (26.0%) | 13 (32.5%) | 1.33(0.69 - 2.58) | 0.392 |
| thumb | 9 (18.0%) | 8 (20.0%) | 0.95(0.43 - 2.09) | 0.901 |
| wrist | 21 (42.0%) | 13 (32.5%) | 0.79(0.39 - 1.61) | 0.519 |

RRs from Zou's Modified poisson regression models adjusted for baseline PER. Values are n(%) and median(IQR).

## Table 4. Associations with having an equal or higher true shooting percentage (TS%) at 2 years

| | TS% at 2 years < Baseline (N=40) | TS% at 2 year >= Baseline (N=49) | Relative Risk (RR) | p value |
| --- | --- | --- | --- | --- |
| **Position** | | | | |
| Center | 9 (22.5%) | 10 (20.4%) | reference | reference |
| Power Forward | 7 (17.5%) | 7 (14.3%) | 0.88(0.45 - 1.72) | 0.714 |
| Point Guard | 6 (15.0%) | 9 (18.4%) | 0.85(0.49 - 1.48) | 0.569 |
| Small Forward | 9 (22.5%) | 11 (22.4%) | 0.88(0.51 - 1.51) | 0.642 |
| Shooting Guard | 9 (22.5%) | 12 (24.5%) | 0.85(0.51 - 1.44) | 0.554 |
| **Age** | 27.0 (25.0, 30.2) | 27.0 (23.0, 29.0) | 0.96(0.92 - 1.01) | 0.138 |
| **Height** | 2.0 (2.0, 2.1) | 2.0 (1.9, 2.1) | 1.39(0.15 - 13.13) | 0.775 |
| **Weight** | 99.0 (91.0, 108.0) | 100.0 (95.0, 111.0) | 1.01(0.99 - 1.03) | 0.194 |
| **BMI** | 24.9 (23.8, 25.7) | 25.6 (24.5, 26.2) | 1.14(1.01 - 1.29) | 0.036 |
| **Year in NBA** | 6.0 (5.0, 10.2) | 5.0 (3.0, 8.0) | 0.95(0.9 - 1) | 0.064 |
| **Total Minutes Per Game** | 27.2 (21.2, 32.0) | 27.0 (20.3, 31.6) | 1(0.97 - 1.03) | 0.935 |
| **Dominant Sided Injury** | 23 (57.5%) | 31 (63.3%) | 1(0.68 - 1.47) | 0.988 |
| **Injury Location** | | | | |
| finger | 6 (15.0%) | 7 (14.3%) | reference | reference |
| hand | 12 (30.0%) | 13 (26.5%) | 1.04(0.56 - 1.93) | 0.913 |
| thumb | 9 (22.5%) | 8 (16.3%) | 0.79(0.38 - 1.62) | 0.513 |
| wrist | 13 (32.5%) | 21 (42.9%) | 1.05(0.58 - 1.91) | 0.875 |

RRs from Zou's Modified poisson regression models adjusted for baseline TS%. Values are n(%) and median(IQR)