Are there any Globe Trotter Body Swappers to Figure out Who's Who in NBA Lineups?

Michael Tzen
Assistant Director for Statistics at
UCLA's California Center for Population Research

Co-Globe Trotter: Aaron Danielson
https://www.aaronjdanielson.com/

any_descrip	score	scoremargin	locationx	locationy	period	pctimestring
Bledsoe Free Throw 2 of 2 (16 PTS)_NA_NA	105 - 83	-22	NA	NA	4	3:07
NA_NA_Gay Running Dunk (22 PTS) (Barnes	107 - 83	-24	0	3	4	3:04
Booker Out of Bounds - Bad Pass Turnover Tu	NA	NA	NA	NA	4	2:54
SUB: Ulis FOR Bledsoe_NA_NA	NA	NA	NA	NA	4	2:54
Len P.FOUL (P4.PN) (E.Lewis)_NA_NA	NA	NA	NA	NA	4	2:42
NA_NA_Cousins Free Throw 1 of 2 (24 PTS)	108 - 83	-25	NA	NA	4	2:42
NA_NA_SUB: Tolliver FOR Barnes	NA	NA	NA	NA	4	2:42
NA_NA_SUB: Temple FOR Gay	NA	NA	NA	NA	4	2:42
NA_NA_MISS Cousins Free Throw 2 of 2	NA	NA	NA	NA	4	2:42
Bender REBOUND (Off:1 Def:1)_NA_NA	NA	NA	NA	NA	4	2:42
Booker 1' Driving Layup (15 PTS)_NA_NA	108 - 85	-23	-12	8	4	2:24
NA_NA_Kings Timeout: Short (Reg.4 Short 1)	NA	NA	NA	NA	4	2:17
NA_NA_SUB: Cauley-Stein FOR Cousins	NA	NA	NA	NA	4	2:17
NA_NA_SUB: Richardson FOR Afflalo	NA	NA	NA	NA	4	2:17
NA_NA_Temple 16' Jump Shot (12 PTS) (Caul	110 - 85	-25	43	149	4	2:09
Bender 15' Jump Shot (10 PTS)_NA_NA	110 - 87	-23	92	120	4	1:45
NA_NA_Lawson 26' 3PT Jump Shot (9 PTS) (Ca	113 - 87	-26	-214	144	4	1:30
Chriss 19' Pullup Jump Shot (7 PTS)_NA_NA	113 - 89	-24	104	164	4	1:18

any_descrip	score	scoremargin	locationx	locationy	period	pctimestring
Bledsoe Free Thr...	105 - 83	-22	NA	NA	4	2:07
NA_NA_Gay Ru...						
Booker Out of Bo...						
SUB: Ulis FOR Ble...						
Len P.FOUL (P4.P...						
NA_NA_Cousins						
NA_NA_SUB: Tol...						
NA_NA_SUB: Ter...						
NA_NA_MISS Co...						
Bender REBOUN...						
Booker 1' Driving...						
NA_NA_Kings Ti...						
NA_NA_SUB: Ca...						
NA_NA_SUB: Ric...						
NA_NA_Temple...						
Bender 15' Jump...						
NA_NA_Lawson 26' 3PT Jump Shot (9 PTS) (Ca	113 - 87	-26	-214	144	4	1:30
Chriss 19' Pullup Jump Shot (7 PTS)_NA_NA	113 - 89	-24	104	164	4	1:18

https://stats.nba.com/stats/playbyplay?GameID=0021601205&StartPeriod=0&EndPeriod=12

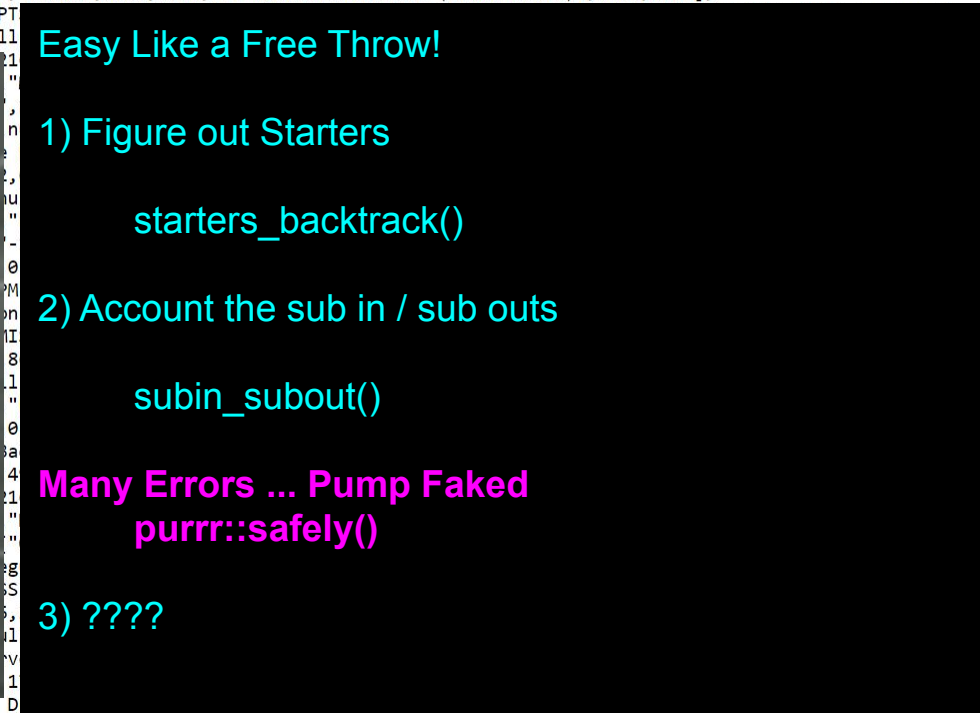https://stats.nba.com/stats/playbyplayv2?GameID=0021601205&StartPeriod=0&EndPeriod=12

{"resource":"playbyplay","parameters":{"GameID":"0021601205","StartPeriod":0,"EndPeriod":12},"resultSets":[{"
["GAME_ID","EVENTNUM","EVENTMSGTYPE","EVENTMSGACTIONTYPE","PERIOD","WCTIMESTRING","PCTIMESTRING","HOMEDESCRIP
GIN"],"rowSet":[["0021601205",0,12,0,1,"7:42 PM","12:00",null,null,null,null,null],["0021601205",1,10,0,1,"7:42 PM","12:00","Jump Ball Whiteside vs. Frye: Tip to
Dragic",null,null,null,null],["0021601205",2,6,2,1,"7:42 PM","11:46",null,null,"Frye S.FOUL (P1.T1) (H.Workman)",null,null],["0021601205",3,3,11,1,"7:43 PM","11:46","MISS
Whiteside Free Throw 1 of 2",null,null,null,null],["0021601205",4,4,1,1,"7:43 PM","11:46","HEAT Rebound",null,null,null,null],["0021601205",5,3,12,1,"7:43 PM","11:46","MISS
Whiteside Free Throw 2 of 2",null,null,null,null],["0021601205",7,4,0,1,"7:43 PM","11:45",null,null,"D. Williams REBOUND (Off:0 Def:1)",null,null],
["0021601205",8,1,63,1,"7:43 PM","11:28",null,null,"Love 12' Fadeaway Jumper (2 PT
Jump Shot",null,null,null,null],["0021601205",10,4,0,1,"7:43 PM","11:14",null,null

```
get_api_json = function(game_id){
  cat(game_id)
  cat('\n')
  cat(which(game_ids==game_id))
  cat('\n')
  Sys.sleep(3.0)

  pbp_url = paste0(
    "https://stats.nba.com/stats/playbyplay?GameID=",
    game_id,
    "&StartPeriod=0&EndPeriod=12"
  )
  json = rjson::fromJSON(file = pbp_url, method = "C")
  return(json)
}
```

(J.Capers)",null,null],["0021601205",62,8,0,1,"7:54 PM","4:41","SUB: Johnson FOR D
Shot",null,null,null,null],["0021601205",64,4,0,1,"7:54 PM","4:29",null,null,"Frye REBOUND (Off:Def:2)",null,null],["0021601205",65,1,1,1,"7:55 PM","4:20",null,null,"Frye
15' Jump Shot (9 PTS) (D. Williams 4 AST)","25 - 17","-8"],["0021601205",66,1,1,1,"7:55 PM","4:03","Whiteside 2' Jump Shot (6 PTS) (Johnson 4 AST)",null,null,"25 - 19","-6"],

{"resource":"playbyplay","parameters":{"GameID":"0021601205","StartPeriod":0,"EndPeriod":12},"resultSets":[{"
["GAME_ID","EVENTNUM","EVENTMSGTYPE","EVENTMSGACTIONTYPE","PERIOD","WCTIMESTRING","PCTIMESTRING","HOMEDESCRIP...,"SCORE","SCOREMAR
GIN"],"rowSet":[["0021601205",0,12,0,1,"7:42 PM","12:00",null,null,null,null,null],["0021601205",1,10,0,1,"7:42 PM","12:00","Jump Ball Whiteside vs. Frye: Tip to
Dragic",null,null,null,null],["0021601205",2,6,2,1,"7:42 PM","11:46",null,null,"Frye S.FOUL (P1.T1) (H.Workman)",null,null],["0021601205",3,3,11,1,"7:43 PM","11:46","MISS
Whiteside Free Throw 1 of 2",null,null,null,null],["0021601205",4,4,1,1,"7:43 PM","11:46","HEAT Rebound",null,null,null,null],["0021601205",5,3,12,1,"7:43 PM","11:46","MISS
Whiteside Free Throw 2 of 2",null,null,null,null],["0021601205",7,4,0,1,"7:43 PM","11:45",null,null,"D. Williams REBOUND (Off:0 Def:1)",null,null],
["0021601205",8,1,63,1,"7:43 PM","11:28",null,null,"Love 12' Fadeaway Jumper (2 PT
Jump Shot",null,null,null,null],["0021601205",10,4,0,1,"7:43 PM","11:14",null,null

Easy Like a Free Throw!

1) Figure out Starters

   starters_backtrack()

2) Account the sub in / sub outs

   subin_subout()

Many Errors ... Pump Faked
   purrr::safely()

3) ????

(J.Capers)",null,null],["0021601205",62,8,0,1,"7:54 PM","4:41","SUB: Johnson FOR D
Shot",null,null,null,null],["0021601205",64,4,0,1,"7:54 PM","4:29",null,null,"Frye REBOUND (Off:0 Def:2)",null,null],["0021601205",65,1,1,1,"7:55 PM","4:20",null,null,"Frye
15' Jump Shot (9 PTS) (D. Williams 4 AST)","25 - 17","-8"],["0021601205",66,1,1,1,"7:55 PM","4:03","Whiteside 2' Jump Shot (6 PTS) (Johnson 4 AST)",null,null,"25 - 19","-6"],

{"resource":"playbyplay","parameters":{"GameID":"0021601205","StartPeriod":0,"EndPeriod":12},"resultSets":[{"name":"
["GAME_ID","EVENTNUM","EVENTMSGTYPE","EVENTMSGACTIONTYPE","PERIOD","WCTIMESTRING","PCTIMESTRING","HOMEDESCR "SCORE","SCOREMAR
GIN"],"rowSet":[["0021601205",0,12,0,1,"7:42 PM","12:00",null,null,null,null,null,null,null],["0021601205",1,10,0,1,"43 PM","12:00","Jump Ball Whiteside vs. Frye: Tip to
Dragic",null,null,null,null],["0021601205",2,6,2,1,"7:42 PM","11:46",null,null,"Frye S.FOUL (P1.T1) (H.Workman)",null,null],["0021601205",3,3,11,1,"7:43 PM","11:46","MISS
Whiteside Free Throw 1 of 2",null,null,null,null],["0021601205",4,4,1,1,"7:43 PM","11:46","HEAT Rebound",null,null,null,null],["0021601205",5,3,12,1,"7:43 PM","11:46","MISS
Whiteside Free Throw 2 of 2",null,null,null,null],["0021601205",7,4,0,1,"7:43 PM","11:45",null,null,"D. Williams REBOUND (Off:0 Def:1)",null,null],
["0021601205",8,1,63,1,"7:43 PM","11:28",null,null,"Love 12' Fadeaway Jumper (2 PT
Jump Shot",null,null,null,null],["0021601205",10,4,0,1,"7:43 PM","11:14",null,null

Errors for teams w/ teammates named the same

Harris_DAL
Johnson_LAC
Johnson_MIA
Jones_CLE
Williams_CLE
Williams_HOU
Young_IND

Rk		Age
1	James Harden	27
2	Trevor Ariza	31
3	Eric Gordon	28
4	Patrick Beverley	28
5	Ryan Anderson	28
6	Lou Williams	30
7	Clint Capela	22
8	Troy Williams	22
9	Sam Dekker	22
10	Montrezl Harrell	23

(J.Capers)",null,null],["0021601205",62,8,0,1,"7:54 PM","4:41","SUB: Johnson FOR D
Shot",null,null,null,null],["0021601205",64,4,0,1,"7:54 PM","4:29",null,null,"Frye REBOUND (Off:0 Def:2)",null,null],["0021601205",65,1,1,1,"7:55 PM","4:20",null,null,"Frye
15' Jump Shot (9 PTS) (D. Williams 4 AST)","25 - 17","-8"],["0021601205",66,1,1,1,"7:55 PM","4:03","Whiteside 2' Jump Shot (6 PTS) (Johnson 19 AST)",null,null,"25 - 19","-6"],

HOMEDESCRIPTION	VISITORDESCRIPTION	SCORE
Whiteside Alley Oop Dunk (2 PTS) (McGruder 1 AST)	NA	14 - 15
NA	D. Williams 24' 3PT Jump Shot (5 PTS)	17 - 15
Whiteside Dunk (4 PTS) (Johnson 3 AST)	NA	17 - 17
NA	Frye 25' 3PT Jump Shot (7 PTS) (D. Williams 2 AST)	20 - 17
HEAT Timeout: Regular (Full 1 Short 0)	NA	NA
NA	NA	NA
MISS McGruder 25' 3PT Jump Shot	NA	NA
NA	Shumpert REBOUND (Off:0 Def:2)	NA
NA	MISS Shumpert 6' Jump Bank Shot	NA
Whiteside REBOUND (Off:0 Def:2)	NA	NA
MISS Dragic 16' Jump Shot	NA	NA
NA	Korver REBOUND (Off:0 Def:1)	NA
NA	Smith 25' 3PT Jump Shot (5 PTS) (D. Williams 3 AST)	23 - 17
NA	Frye Violation:Kicked Ball (J.Capers)	NA
SUB: Johnson FOR Dragic	NA	NA
MISS Johnson 19' Jump Shot	NA	NA
NA	Frye REBOUND (Off:0 Def:2)	NA
NA	Frye 15' Jump Shot (9 PTS) (D. Williams 4 AST)	25 - 17
Whiteside 2' Jump Shot (6 PTS) (Johnson 4 AST)	NA	25 - 19
NA	D. Williams 2' Driving Finger Roll Layup (7 PTS)	27 - 19

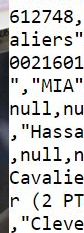| HOMEDESCRIPTION	VISITORDESCRIPTION	SCORE
Whiteside Alley Oop Dunk (2 PTS) (McGruder 1 AST)	NA	14 - 15
NA	D. Williams 24' 3PT Jump Shot (5 PTS)	17 - 15
Whiteside Dunk (4 PTS) (Johnson 3 AST)	NA	17 - 17
NA	Frye 25' 3PT Jump Shot (7 PTS) (D. Williams 2 AST)	20 - 17
HEAT Timeout: Regular (Full 1 Short 0)	NA	NA
NA	NA	NA
MISS McGruder 25' 3PT Jump Shot	NA	NA
NA	Shumpert REBOUND (Off:0 Def:2)	NA
NA	MISS Shumpert 6' Jump Bank Shot	NA
Whiteside REBOUND (Off:0 Def:2)	NA	NA
MISS Dragic 16' Jump Shot	NA	NA
NA	Korver REBOUND (Off:0 Def:1)	NA
NA	Smith 25' 3PT Jump Shot (5 PTS) (D. Williams 3 AST)	23 - 17
NA	Frye Violation:Kicked Ball (J.Capers)	NA
SUB: Johnson FOR Dragic	NA	NA
MISS Johnson 19' Jump Shot	NA	NA
NA	Frye REBOUND (Off:0 Def:2)	NA
NA	Frye 15' Jump Shot (9 PTS) (D. Williams 4 AST)	25 - 17
Whiteside 2' Jump Shot (6 PTS) (Johnson 4 AST)	NA	25 - 19
NA	D. Williams 2' Driving Finger Roll Layup (7 PTS)	27 - 19

HOMEDESCRIPTION	VISITORDESCRIPTION	SCORE
Whiteside Alley Oop Dunk (2 PTS) (McGruder 1 AST)	NA	14 - 15
NA	D. Williams 24' 3PT Jump Shot (5 PTS)	17 - 15
Whiteside Dunk (4 PTS) (Johnson 3 AST)	NA	17 - 17
NA	Frye 25' 3PT Jump Shot (7 PTS) (D. Williams 2 AST)	20 - 17
HEAT Timeout: Regular (Full 1 Short 0)	NA	NA
NA	NA	NA
MISS McGruder 25' 3PT Jump Shot	NA	NA
NA	Shumpert REBOUND (Off:0 Def:2)	NA
NA	MISS Shumpert 6' Jump Bank Shot	NA
Whiteside REBOUND (Off:0 Def:2)	NA	NA
MISS Dragic 16' Jump Shot	NA	NA
NA	Korver REBOUND (Off:0 Def:1)	NA
NA	Smith 25' 3PT Jump Shot (5 PTS) (D. Williams 3 AST)	23 - 17
NA	Frye Violation:Kicked Ball (J.Capers)	NA
SUB: Johnson FOR Dragic	NA	NA
MISS Johnson 19' Jump Shot	NA	NA
NA	Frye REBOUND (Off:0 Def:2)	NA
NA	Frye 15' Jump Shot (9 PTS) (D. Williams 4 AST)	25 - 17
Whiteside 2' Jump Shot (6 PTS) (Johnson 4 AST)	NA	25 - 19
NA	D. Williams 2' Driving Finger Roll Layup (7 PTS)	27 - 19

??????????????

What can we do?

??????????????

??????????????

HOMEDESCRIPTION	VISITORDESCRIPTION	SCORE	PLAYER1_ID	PLAYER1_NAME	PLAYER2_ID	PLAYER2_NAME
Whiteside Alley Oop Dunk (2 PTS) (McGruder 1 AST)	NA	14 - 15	202355	Hassan Whiteside	203585	Rodney McGruder
NA	D. Williams 24' 3PT Jump Shot (5 PTS)	17 - 15	101114	Deron Williams	0	NA
Whiteside Dunk (4 PTS) (Johnson 3 AST)	NA	17 - 17	202355	Hassan Whiteside	201949	James Johnson
NA	Frye 25' 3PT Jump Shot (7 PTS) (D. Williams 2 AST)	20 - 17	101112	Channing Frye	101114	Deron Williams
HEAT Timeout: Regular (Full 1 Short 0)	NA	NA	1610612748	NA	0	NA
NA	NA	NA	48	NA	0	NA
MISS McGruder 25' 3PT Jump Shot	NA	NA	203585	Rodney McGruder	0	NA
NA	Shumpert REBOUND (Off:0 Def:2)	NA	202697	Iman Shumpert	0	NA
NA	MISS Shumpert 6' Jump Bank Shot	NA	202697	Iman Shumpert	0	NA
Whiteside REBOUND (Off:0 Def:2)	NA	NA	202355	Hassan Whiteside	0	NA
MISS Dragic 16' Jump Shot	NA	NA	201609	Goran Dragic	0	NA
NA	Korver REBOUND (Off:0 Def:1)	NA	2594	Kyle Korver	0	NA
NA	Smith 25' 3PT Jump Shot (5 PTS) (D. Williams 3 AST)	23 - 17	2747	JR Smith	101114	Deron Williams
NA	Frye Violation:Kicked Ball (J.Capers)	NA	101112	Channing Frye	0	NA
SUB: Johnson FOR Dragic	NA	NA	201609	Goran Dragic	204020	Tyler Johnson
MISS Johnson 19' Jump Shot	NA	NA	204020	Tyler Johnson	0	NA
NA	Frye REBOUND (Off:0 Def:2)	NA	101112	Channing Frye	0	NA
NA	Frye 15' Jump Shot (9 PTS) (D. Williams 4 AST)	25 - 17	101112	Channing Frye	101114	Deron Williams
Whiteside 2' Jump Shot (6 PTS) (Johnson 4 AST)	NA	25 - 19	202355	Hassan Whiteside	201949	James Johnson
NA	D. Williams 2' Driving Finger Roll Layup (7 PTS)	27 - 19	101114	Deron Williams	0	NA

_ID   1/7

{"resource":"playbyplay","parameters":{"GameID":"0021601205","StartPeriod":0,"EndPeriod":12},"resultSets":[{"
["GAME_ID","EVENTNUM","EVENTMSGTYPE","EVENTMSGACTIONTYPE","PERIOD","WCTIMESTRING","PCTIMESTRING","HOMEDESCRIP
GIN","PERSON1TYPE","PLAYER1_ID","PLAYER1_NAME","PLAYER1_TEAM_ID","PLAYER1_TEAM_CITY","PLAYER1_TEAM_NICKNAME","PLAYER1_TEAM_ABBREVIATION","PERSON2TYPE","PLAYER2_ID","PLAYER2_N
AME","PLAYER2_TEAM_ID","PLAYER2_TEAM_CITY","PLAYER2_TEAM_NICKNAME","PLAYER2_TEAM_ABBREVIATION","PERSON3TYPE","PLAYER3_ID","PLAYER3_NAME","PLAYER3_TEAM_ID","PLAYER3_TEAM_CITY",
"PLAYER3_TEAM_NICKNAME","PLAYER3_TEAM_ABBREVIATION"],"rowSet":[["0021601205",0,12,0,1,"7:42
PM","12:00",null,null,null,null,null,0,0,null,null,null,null,null,0,0,null,null,null,null,null,0,0,null,null,null,null,null],["0021601205",1,10,0,1,"7:42","12:00","Jump
Ball Whiteside vs. Frye: Tip to Dragic",null,null,null,null,4,202355,"Hassan White

```
get_api_json = function(game_id){
  cat(game_id)
  cat('\n')
  cat(which(game_ids==game_id))
  cat('\n')
  Sys.sleep(3.0)

  pbp_url = paste0(
    "https://stats.nba.com/stats/playbyplayv2?GameID=",
    game_id,
    "&StartPeriod=0&EndPeriod=12"
  )
  json = rjson::fromJSON(file = pbp_url, method = "C")
  return(json)
}
```

SFU https://github.com/nsandholtz/lpl/blob/master/get_shot_data.R#L86

```r
86    for (j in 1:3) {
87        # check for subs and remove the appropriate player if necessary
88        if (j == 1) {
89
90          events = pbp_df[i, ] %>%
91            dplyr::select(dplyr::matches("DESCRIPTION")) %>%
92            as.character()
93          subs = any(grepl("SUB", events))
94
95          if (subs) {
96            player_id = pbp_df[i, ] %>%
97              dplyr::select(dplyr::matches(sprintf("PLAYER%s_ID", j))) %>%
98              dplyr::pull()
99            player_team = pbp_df[i, ] %>%
100             dplyr::select(dplyr::matches(sprintf("PLAYER%s_TEAM_ABBREVIATION",j))) %>%
101             dplyr::pull()
```

Thank You: michael@ccpr.ucla.edu @MKJCKTZN

Best Case scenario, use player IDs (nba api v2) like
https://github.com/nsandholtz/lpl/blob/master/get_shot_data.R#L86

Jacob and Nate
http://jwmortensen.com/
https://www.linkedin.com/in/nathan-sandholtz/

If you must rely only on player names (historical data sources) like
https://www.basketball-reference.com/boxscores/pbp/199611010BOS.html

Then logic it together: dedup names + figure out starters + in/out sub