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The Role of Tattoos in Football: Behavioural Patterns and Success:

An Analysis of the FIFA World Cup 2018

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Abstract

Epidemiologic studies suggest tattooed individuals are more extroverted, aggressive, and risk-taking. Whether these personality traits affect athletic performance is uncertain. We compared behavioral patterns and rates of success of football players at the FIFA World Cup 2018 by tattoo status.

In this cross sectional study, 32.7% of football players had visible tattoos (241/736), mostly on arms (97.1%). Tattooed footballers played on average longer (208 vs. 160 minutes; p<0.001), received more cards (0.38 vs. 0.27; p <0.001), and committed more fouls per player (2.64 vs. 2.2; p <0.001). Tattooed players attempted more shots at goal (p =0.016), but without higher goal success (p =0.204).

The higher number of disciplinary events (being whistled for fouls, yellow or red cards), and longer playing time of tattooed football players may reflect personality traits reported in tattooed, non-athletic individuals such as dominance, extroversion, aggressiveness and risk-taking behavior.

Keywords: Tattoo, Dermatology, Football, Behavior, Success, FIFA World Cup 2018

Introduction

In recent years, there has been an increase in the number of tattooed individuals with a prevalence of 10-30% in the general population of industrialised countries\(^1\)\(^2\). This trend could also be observed amongst professional football (in the United States referred to as “soccer”) players\(^3\)\(^4\). Epidemiological studies have indicated that tattooed individuals are more extroverted, aggressive, rebellious and high risk-takers, but also more depressed and anxious
than non-tattooed individuals\textsuperscript{2,5-10}. However, it is largely unknown whether such personality traits affect their performance on the pitch; i.e. rate of goal success but also award of cards. FIFA World Cups can be regarded as quite well-standardised test conditions to compare performance patterns of these elite football players with little variability between matches in the same tournament. The performance of tattooed and non-tattooed players of the FIFA World Cup 2018 has been compared in two studies so far. At the FIFA World Cup 2018, the goal success rate of tattooed penalty takers was found to be slightly higher than that of those non-tattooed penalty takers\textsuperscript{4}. Kluger & Samimi reported that neither the number of scorers nor the number of yellow and red cards differed between tattooed and non-tattooed players\textsuperscript{3}. However, several important factors such as the time played, shots on target, rate of goal success, fouls won and conceded have not yet been taken into consideration\textsuperscript{3}. Therefore, our goal was to assess these endpoints in order to measure behavioural patterns and success of tattooed players in comparison to non-tattooed players during the FIFA World Cup 2018.

**Methods**

In this cross sectional study, descriptive statistics of each player including his age, country, position on the field, minutes played, disciplines (fouls won/conceded, yellow and red cards), shots on target and goals scored was retrieved from www.mykhel.com, a sports portal providing in-depth statistical information. Thereafter, the following search strategy was used
to identify the tattoos of each player using Google Images: “name of the player” + “tattoo” + “FIFA World Cup 2018”. The search was deemed satisfactory, once several high-quality images of each player, ideally from the front and back, was found or when the first 100 images had been screened. The number and location of the tattoos were documented. Invisible tattoos were not searched for actively but when identified were considered in the data set.

**Statistical analysis**

Stata 15 was used to perform the statistical analysis. An unpaired, two sample t-test was used to compare the mean age of the cohort and the non-parametric Mann Whitney U test for comparison of the ordinal variables (minutes played, number of cards, fouls conceded/won, shots on target and goals) because they were not normally distributed. P<0.05 was regarded as significant.

**Results**

In the 2018 FIFA World Cup in Russia, 32 teams from 5 different continents, and a total of 736 players with a mean age of 27 participated in the tournament, of which 241 (32.7%) had at least one tattoo. Of all tattooed players, 97.1% had at least one tattoo on their arms (Fig. 1). South American teams had the highest proportion of tattooed players (53.5%), followed by
Oceania (39.1%), and Europe (36%) (Fig. 2). African and Asian teams had 8.7% tattooed players each. The highest proportion of tattooed players were forwards in their field position (including strikers) making up 40%. The detailed demographics and tattoo characteristics of the players are listed in Table 1. The mean age did not differ between tattooed and non-tattooed players (p-value = 0.42). On average, tattooed players played 208.3 minutes and therefore significantly more than non-tattooed players (160.4 minutes, p = 0.0001). They also received more yellow and red cards per player (0.38 vs. 0.27, p = 0.0083). Furthermore, tattooed players committed significantly more fouls per player (2.64) compared to non-tattooed (2.2), but were also fouled more often (2.82 vs. 1.94, p = 0.0004). Tattooed players had significantly more shots on target per player, but did not score more goals. The detailed comparison between tattooed players and non-tattooed players is illustrated in Table 2.

Discussion

Epidemiological studies indicated that tattooed persons differ from non-tattooed persons with regard to certain personality traits such as aggressiveness, extroversion and risk-taking behaviour\textsuperscript{2,5-10}. Hitherto, there is little evidence whether these personality traits translate into
differences in performance in world-class sport athletes, and ultimately whether being tattooed confers an advantage or disadvantage in a competitive setting amongst athletes.

In this cohort, we found that one-third of the football players participating at the FIFA World Cup 2018 had at least one tattoo, which is more than the prevalence of tattooed people in a general population of industrialised countries \(^1\). The vast majority of tattoos were located on the arms. Interestingly, this is a site visible to others as well as the owner of the tattoo (in contrast to other sites such as the neck or back). Apart from fashionable aspects, these tattoos may therefore have a particularly important meaning for the owner. The nature of the motives of the tattoos was not analysed here, but as Kluger et al.\(^2\) suggested, in the context of non-athletes, the motives could provide insights into the intention of being tattooed such as an embellishment, self-empowerment, expression of personal values, group affiliation or religious feelings. Continental cultural aspects may also play an important role in getting a tattoo or not; whereas more than half of the players from South America were tattooed, less than 10% of players from Asia and Africa were. These findings are in accordance with the very recently reported, internationally highest, Google search volume indexes for the topic “Tattoos” in Latin America\(^1\), contrasted by a negative image of tattoos in Islamic countries or Asia (e.g. connoted with the Japanese Yakuza crime syndicate).

We found that the percentage of tattooed players increased the closer their field position was to the opponent’s goal: 40% of forwards were tattooed, but only 23.7% of keepers. This association is perhaps not surprising given that the personality traits mentioned to be more prevalent in tattooed players are also those required for the role of the players in the forward field position. In other words, extroverted, risk-taking, aggressive and outgoing players are more likely to be successful in forward positions and they are probably also more likely to get tattooed than players in defensive positions. In this vein, a representative example of aggressive behaviour displayed in tattooed forward players is Luis Suarez, currently one of
the World’s best goal scorers, who is also notorious for having bitten his opponents during tackles.

In our study, we demonstrated differences between tattooed and non-tattooed players in the time played, fouls won and conceded, cards, and shots on goal, but interestingly not in goal success, one of the most important determinants of success in football. Kluger & Samimi reported no statistically significant differences between the number of tattooed and non-tattooed scorers and the corresponding goal ratio by field players at the FIFA World Cup 2018. As situations leading to shots on goals and goals success are randomly determined (“stochastic”), the more standardised setting of penalty shots may be more adequate to address and compare goal success rates in relation to tattoos. As previously reported, we found that tattooed penalty takers had slightly higher success rates (particularly in shootouts) than non-tattooed penalty takers. However, higher numbers of penalty shots (e.g. analyses of annual statistics of the 5 top football leagues) would be necessary to further support this finding. Albeit not directly via higher goal success rates, the tattoo status may also have an impact on other outcomes: we found that tattooed players that 1. played longer, allowing them to influence the course of the game for longer, 2. conceded and won more fouls, which may have an impact on the number of standard situations and the team constellation in their own team as well as the opposition, 3. they were sanctioned with more cards, which is rather a disadvantage for their own team. Kluger & Samimi found no difference in cards - presumably because they used cards as a dichotomous variable separated by yellow and red cards, whereas we combined yellow and red cards and quantified them as the average cards per player. One can hypothesise that these three findings may be additional markers of higher risk-taking, aggressiveness and competitive personality traits and behaviour (not only towards the opponent, but maybe also in their own team to demand longer playing time) in tattooed players. Clearly, there is no causal relationship between tattoos and behaviour, they are just
the expression of a common cause (i.e. the personality traits being confounding factors). A non-standardised search in the press for “public scandals” or rebellious behaviour showed that the involved football players are very often tattooed (e.g. Diego Maradona\textsuperscript{11}, Eric Cantona\textsuperscript{12}, Marco Materazzi\textsuperscript{13}, Zlatan Ibrahimovic\textsuperscript{14}, Mario Balotelli\textsuperscript{15}, Neymar\textsuperscript{16} and Sergio Ramos\textsuperscript{17}) and also controversial figures off the pitch. At the same time many of these players attract much attention in the mass media, enjoy higher popularity and are highly coveted for marketing purposes, which makes them “alpha animals” not only amongst their peers but also in the world of celebrities and entertainment. Goal success alone may not appropriately reflect the value of such players, as they may be very successful in their position and have a huge impact on team spirit without scoring many goals themselves. Therefore, additional variables not taken into account so far such as passing rate, passing accuracy or ball control should be included in future studies addressing the impact of tattoos on success in football. Gender is a further factor that needs to be considered. Whereas the proportion of visibly tattooed female players during the 2019 FIFA Women’s World Cup in France was very similar to that we observed in male players attending the FIFA World Cup in 2018 (30\% vs. 33\% respectively), Kluger et al. found no association between having tattoos, discipline, team and individual performance including penalty success among female players of this tournament\textsuperscript{18}. In addition to biological and gender-related behavioural differences possibly explaining this discrepancy between male and female elite footballers, the reasons for having tattoos could also differ: Female footballers appeared to favour smaller and more discrete tattoos\textsuperscript{18} suggesting a rather ornamental function, whereas their male counterparts were more likely to have extensive tattoos possibly aiming to enhance dominance.

The effect of tattoos on the individual performance of elite athletes may be easier to determine when assessed in individual sports like tennis. In 2018, the prevalence of tattoos among the top 100 tennis players (11\% in women, 7\% in men) was much lower than among footballers
or the young general population\textsuperscript{19}. This may be due to the fact that tennis is traditionally regarded as an "upper class-sport" with a dress code that has been strictly observed for decades\textsuperscript{20}. Tattooed male tennis players had a better median ranking and higher points, but without statistical significance. Thus, further studies are needed to address the impact of tattoos on performance in individual sports.

Finally, tattoos could also influence the performance of athletes by so far unexplored physiological effects. For example, Luetkemeier et al. reported that tattooed skin generated less sweat and a higher sodium concentration than non-tattooed skin when stimulated with 0.5\% pilocarpine nitrate iontophoresis\textsuperscript{21}. However, in a very recent study, these findings were not reproduced by exercise-induced sweating\textsuperscript{22}. Future research should examine whether extensively tattooed athletes may have a meaningful difference in thermal strain and heat stress risk\textsuperscript{23}.

**Conclusions**

This study demonstrated that tattooed and non-tattooed football players differed in their behavioural patterns on the pitch. Tattooed players were more commonly involved in fouls and attracted more cards than non-tattooed players. Moreover, tattooed players were more commonly observed in the forward field positions and played longer. Hence, it seems plausible that tattooed players indeed have a more pronounced aggressive, extroverted, risk-taking and dominant behaviour reported, but also in non-athlete tattooed people. However, although tattooed players made more shots on goal, they did not succeed more often than non-tattooed players indicating that these personality traits did not (directly) translate into goal success. However, further studies including psychometric and neuropsychiatric assessments
are necessary to clarify the link between specific personality traits and tattoos in professional football players.

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**References**


Figure Legends
Figure 1. Location of the tattoos color-coded by frequency (values add up to >100% because some players have multiple tattoos).

Figure 2. Percentage of tattooed football players by continent (FIFA World Cup 2018 national teams)

Table 1. Demographic data of study population

<table>
<thead>
<tr>
<th></th>
<th>All players (n=736)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>27.9 (4)</td>
</tr>
<tr>
<td>Tattooed</td>
<td>241 (32.7%)</td>
</tr>
<tr>
<td>Visibly tattooed</td>
<td>235 (31.9%)</td>
</tr>
<tr>
<td>Multiple tattooed</td>
<td>173 (23.5%)</td>
</tr>
<tr>
<td>Location of tattoo</td>
<td>Tattooed players (n=241)*</td>
</tr>
<tr>
<td>- Head / neck</td>
<td>17 (7.1%)</td>
</tr>
<tr>
<td>- Trunk</td>
<td>54 (22.4%)</td>
</tr>
<tr>
<td>- Arms</td>
<td>234 (97.1%)</td>
</tr>
<tr>
<td>- Legs</td>
<td>28 (11.6%)</td>
</tr>
<tr>
<td>Continent</td>
<td>All players (n=736)</td>
</tr>
<tr>
<td>- South America</td>
<td>184 (25%)</td>
</tr>
<tr>
<td>- Europe</td>
<td>322 (43.8%)</td>
</tr>
<tr>
<td>- Africa</td>
<td>115 (15.6%)</td>
</tr>
<tr>
<td>- Asia</td>
<td>92 (12.5%)</td>
</tr>
<tr>
<td>- Oceania</td>
<td>23 (3.1%)</td>
</tr>
</tbody>
</table>
Position | All players (n=736) | Share of tattooed players
--- | --- | ---
- Keeper | 97 (13.8%) | 23/97 (23.7%)
- Defender | 238 (32.3%) | 75/238 (31.5%)
- Midfielder | 261 (35.5%) | 87/261 (33.3%)
- Forward | 140 (19%) | 56/140 (40%)

* Values in brackets add up to >100% because some players have multiple tattoos

Table 2. Comparison of tattooed and non-tattooed players

<table>
<thead>
<tr>
<th>Variables*</th>
<th>Tattooed players (n=241)</th>
<th>Non-tattooed players (n=495)</th>
<th>Mann-Whitney U test: p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>27.6</td>
<td>27.4</td>
<td>0.4175**</td>
</tr>
<tr>
<td>Minutes played</td>
<td>208.3</td>
<td>160.4</td>
<td>0.0001</td>
</tr>
<tr>
<td>Cards</td>
<td>0.38 (91/241)</td>
<td>0.27 (132/495)</td>
<td>0.0083</td>
</tr>
<tr>
<td>Fouls conceded</td>
<td>2.64 (637/241)</td>
<td>2.2 (1089/495)</td>
<td>0.0096</td>
</tr>
<tr>
<td>Fouls won</td>
<td>2.82 (680/241)</td>
<td>1.94 (961/495)</td>
<td>0.0004</td>
</tr>
<tr>
<td>Shots on target</td>
<td>0.87 (210/241)</td>
<td>0.6 (298/495)</td>
<td>0.0167</td>
</tr>
<tr>
<td>Goals</td>
<td>0.23 (55/241)</td>
<td>0.21 (102/495)</td>
<td>0.2042</td>
</tr>
</tbody>
</table>

* expressed as an average (mean) per player

** Unpaired two sample t-test using groups
Figure 1