

Survey on adverse events associated with acupuncture among American football players

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Abstract

[Objective] This study aimed to conduct a survey among American football players regarding the adverse events associated with acupuncture in athletes.

[Methods] The participants of this study included 73 American football players (29.3 ± 9.6 years old). A questionnaire survey of adverse events related to acupuncture was conducted in 20XX (February to July, August to December) among athletes who had received acupuncture owing to sports injuries. The study period was one year, and a Google survey form was used to conduct the survey at the end of the season. The players who agreed to participate in the study received the survey questions online, and the responses were obtained anonymously. The players were asked about the type of adverse events and whether it affected their physical performance. The acupuncture records, method of acupuncture, and any adverse events identified immediately after acupuncture were also recorded.

[Results] A total of 39 players underwent acupuncture during the study period. Among them, 33 responded (84.0%). A total of 117 acupuncture treatments were performed during one season. Thereafter, the number of valid responses were analyzed. No adverse events consequent to acupuncture were reported by 60.6% (n=20) of the respondents. However, 39.3% (n=13) of the players reported adverse events. The most common adverse event was skin itching in 18.2% of players (n=6). This was followed by muscle weakness in 6.1% (n=2), needle pain after removal of needles in 6.1% (n=2), bleeding in 6.1% (n=2), and anemia in 3.0% (n=1). Only one player (3.0%) reported a negative effect on physical performance. A therapist-confirmed adverse event, bleeding, was reported in case of 3.4% (n=4) of the 117 treatments.

[Discussion and Conclusion] Most adverse events of acupuncture were minor, and there were no reports of serious adverse events that warranted medical treatment. According to the acupuncture records, 117 acupuncture procedures were performed throughout the season, and bleeding was confirmed in four cases (3.4%). According to the results of the questionnaire survey and treatment record analysis, athletes may be aware of adverse events that the practitioners cannot confirm.

Key words: Sports, Acupuncture, Adverse events, Safety, American football

I. Introduction

Acupuncture and moxibustion therapy are commonly used to treat sports injuries in Japan¹⁻³⁾. The efficacy of these treatments for athletes has been reported previously¹⁻³⁾. In 2020, 42 randomized controlled trials presented evidence on the effects of acupuncture, moxibustion, and massage in sports medicine. These studies provided clear indications of the efficacy of acupuncture and moxibustion treatments⁴⁾. In addition to efficacy, information on

safety is important for athletes⁵⁾.

An adverse event is typically defined as "an undesirable medical event that occurs during or after treatment regardless of causality⁶⁾". Reported adverse events of acupuncture have been studied at university-affiliated clinics⁷⁻⁹⁾. These studies reported many minor adverse events as a result of acupuncture. Conversely, reports of adverse events associated with acupuncture specific to the field of sports are lacking. The adverse events of acupuncture may also contain those specific to athletes. A previous cross-sectional study on the

- 1)-2 What effects did you feel after the acupuncture? (Multiple answer).
- 1)-3 In which area did you receive acupuncture? (Multiple answer).
- 1)-4 When did you receive acupuncture? (Multiple answer).
- 1)-5 Did acupuncture exert a positive effect on your physical performance? (Single answer). A four-point scale was used to evaluate whether acupuncture had a positive effect on the physical performance of the player.
- 1)-6 Did the acupuncture stimulation make you feel the effect of the treatment? (Single answer).
- 1)-7 What was the amount of stimulation during the acupuncture? (Single answer). The amount of stimulation during acupuncture was evaluated at four levels.
- 1)-8 How many times did you receive acupuncture during this season? (Single answer).
- 1)-9 Did the sensation of stimulation through acupuncture remain after the treatment? (Multiple answer).
- (2) Questions for adverse events associated with acupuncture
- 2)-1 Did you experience any health problems after receiving acupuncture? (Multiple answer).
- 2)-2 Did the acupuncture affect your physical performance negatively? (Single answer).

4. Acupuncture records

Acupuncture is used to treat sports injuries. Prior to the acupuncture treatment, the head trainer and team

physician assesses the injury. Acupuncture treatment is then performed on players that were deemed to be in need of acupuncture, by an acupuncturist with more than 10 years of acupuncture experience. The acupuncture recorded the treatment and any adverse events that were identified immediately afterward.

5. Data representation and statistical processing

Data for both single answer and multiple answers are expressed as a value (percentage) divided by the number of valid responses from participants who underwent acupuncture treatment during the season.

III. Results

1. Number of valid responses

Thirty-nine players received acupuncture during the study period. Of the 39 players who received acupuncture, 33 responded (84.0%) to the survey (Fig. 1). A total of 117 acupuncture treatments were performed during one season. Therefore, the number of valid responses were analyzed. Table 2 shows the background of the 33 survey respondents.

2. Questionnaire results

(1) Questions for sports activities associated with acupuncture

The most common purpose of acupuncture was pain relief at 93.9% (n=31). This was followed by muscle tone relief at 45.5% (n=15), fatigue relief at 33.3% (n=11), range of motion improvement at 24.2% (n=8), conditioning at 9.1% (n=3), prevention

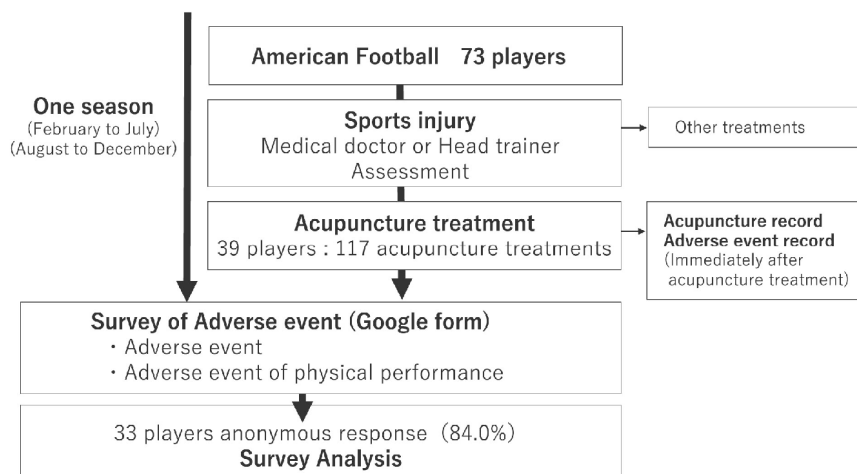


Figure 1. Survey method

The participants of this study included 73 adult American football players. A questionnaire was distributed among these athletes who had received acupuncture and moxibustion consequent to sports injuries, and a survey of adverse events related to these treatments was conducted in 20XX (February to July, August to December). The study period was one year.

Table2. Background information of the players

Age		Athletic career	
20`s	63.6 % (n=21)	1 – 5 year	9.0 % (n= 3)
30`s	27.3 % (n = 9)	5 – 10 year	42.4 % (n=14)
40`s	9.0 % (n = 3)	10 – 15 year	33.3 % (n=11)
		15 – 20 year	9.0 % (n= 3)
		20 over a year	6.1 % (n= 2)
Total	100.0 % (33)	Total	100.0 % (33)

of injury at 9.1% (n=3), and rehabilitation assistance at 3.0% (n=1). The most common effect of acupuncture observed by the players was pain relief at 78.8% (n=26). This was followed by muscle tone relief at 60.6% (n=20), improvement in range of motion at 30.3% (n=10), fatigue relief at 24.2% (n=8), conditioning at 9.1% (n=3), rehabilitation assistance at 3.0% (n=1), and ineffective treatment at 0% (n=0). The most common region of acupuncture was the lower back at 54.5% (n=18). This was followed by the buttocks at 27.3% (n=9), neck at 21.2% (n=7), knee joint at 21.2% (n=7), hip joint at 15.2% (n=5), ankle joint at 12.1% (n=4), shoulder joint at 12.1% (n=4), and thigh at 9.1% (n=3). The most common point of time to receive acupuncture was post training or match, at 39.4% (n=13). This was followed by within 24 h of training or match at 36.4% (n=12), 2-3 days pre training or match at 36.4% (n=12), more than 3 days pre training or match at 18.1% (n=6), and during the training or match at 12.1% (n=4). It was reported as very effective by 27.3% (n=9), effective by 33.3% (n=11), slightly effective by 33.3% (n=11), and ineffective by 6.1% (n=2) of the participants. Among the total respondents, both stimulation sensation and treatment effects were experienced by 75.8% (n=25); 21.2% (n=7) could confirm treatment effects but not stimulation sensation, 3.0% (n=1) could confirm stimulation sensation but not treatment effects, and neither stimulation sensation nor treatment effects were experienced by 0.0% (n=0). It was reported as very strong by 3.0% (n=1), strong by 12.1% (n=4), moderate by 84.8% (n=28), and weak by 0% (n=0). The number of acupuncture treatments a player received in a season was reported as one by 21.2% (n=7), 2-5 by 57.6% (n=19), 6-10 by 18.2% (n=4), and more than 10 by 3.0% (n=1). The stimulation sensation felt immediately after receiving acupuncture was reported to disappear soon by 81.8% (n=27), within 24 h by 15.2% (n=5), within 2-3 days by 3.0% (n=1), and after 3 days by 0% (n=0).

(2) Questions for adverse events associated with acupuncture

Adverse events because of acupuncture were not reported by 60.6% (n=20) of the respondents. However, 39.3% (n=13) of the players reported appearance of adverse events. The most common adverse event was skin itching at 18.2% (n=6). This was followed by muscle weakness at 6.1% (n=2), pain after needle removal at 6.1% (n=2), bleeding at 6.1% (n=2), and anemia at 3.0% (n=1) (Fig.1). Regarding adverse events of acupuncture treatment related to physical performance, only one player (3.0%) reported acupuncture-associated negative effect on physical performance; however, it did not impede the performance of 97.0% of the respondents (n=32) (Fig.2).

3. Acupuncture records

The most common body parts that received acupuncture were the lower back for 30.7% (n=36) and hamstrings for 30.7% (n=36) of the respondents. This was followed by the ankle joint, hip joint, lower leg, buttocks, knee joints, front of the thigh, and wrist joints for 13.6% (n=16), 7.6% (n=9), 6.8% (n=8), 4.2% (n=5), 2.5% (n=3), for 1.7% (n=2), and 1.7% (n=2), respectively, of the respondents. The timing of treatment was pre training or match for 29.0% (n=34) and post training or match for 70.9% (n=83) of the respondents. The most common acupuncture method was electroacupuncture for 46.1% (n=54) of the respondents. This was followed by a single needling technique for 45.2% (n=53), exercises acupuncture¹⁷⁾ for 15.3% (n=18), needle retention for 10.2% (n=12), and scattered needling for 4.2% (n=5) of the respondents. The therapist-confirmed adverse event was bleeding, reported in 3.4% (n=4) of the 117 treatments.

IV. Discussion

This study aimed to conduct a survey among American football players regarding the adverse events of acupuncture in athletes. The results of the survey revealed the occurrence of adverse events associated with acupuncture through a questionnaire

survey of the athletes. Not all adverse events required medical treatment. Only one player (3.0%) reported a negative effect of acupuncture on physical performance. The acupuncture records showed bleeding as the only adverse effect. However, a difference was observed between the athletes' responses and the acupuncture records.

In this study, 13 of the 33 athletes (39.3%) experienced adverse events. In a previous study of 841 athletes, 47% experienced adverse events⁹. The results of this study were almost similar to those of previous studies. Thus, our data supports the findings of the previous studies. In this study, itchy skin was the most common adverse event (18.0%). This suggests that itchy skin may be an adverse event that is specific to acupuncture in American football players. This is because in a survey of adverse events conducted at a university-affiliated acupuncture clinic, only 4 of the 391 patients (1.0%) who received acupuncture complained of itching after the treatment⁷. Acupuncture has been reported to cause microscopic tissue damage at the treatment site¹⁸. Accordingly, itching may be triggered by acupuncture. However, the acupuncture records contained no events of skin itching. This result shows that it is unlikely to have occurred immediately after acupuncture. Itching may have appeared during or after the exercise. Itchy skin is a condition in which the barrier function of the skin is compromised, and itchiness can be induced by external stimuli, whether physical, chemical, or biological¹⁹. In sports, external stimuli act easily owing to sweat. Therefore, sweat or other stimuli at the acupuncture site may have excited the nerve fibers in the epidermis and caused itching of the skin. Endo et al. reported skin contact injury owing to alcohol disinfection²⁰. They also reported

two types of allergic reactions, immediate and delayed²⁰. This suggests that itching may have been induced by alcohol as well as acupuncture needles.

Only one player reported a negative effect of acupuncture on physical performance. The player also complained of itchy skin and had been receiving acupuncture before training or match. Therefore, the uncomfortable sensation with itching may be an adverse event associated with acupuncture having a negative effect on physical performance. However, the probability of occurrence of the adverse event is similar to that reported in previous study¹⁰. In a survey conducted by Fujimoto et al., 4.0% of the players reported a negative effect of acupuncture on physical performance¹⁰. Furthermore, itching may be an adverse event that. According to our survey, the player who had a negative effect on physical performance received acupuncture in the 24 hours prior to the practice at the neck and lower back (Fig. 3). Thus, when athletes receive acupuncture within 24 hours before practice, adverse events such as itchy skin may ensue.

In this study, adverse event of "muscle weakness" was observed. A case of weakness consequent to acupuncture before a game resulted has been reported¹². Two similar cases were reported in the present study, and this is an adverse event that should be considered during in athletes. One of the two athletes received strong acupuncture stimulation in the 24 hours before practice. Thus, strong stimulation may induce muscle weakness.

Acupuncturists may have to consider the amount of stimulation when treating athletes. The results of this study were comparable to those of previous studies, in that the stimulus sensation was experienced by players. An adverse event study of acupuncture at a

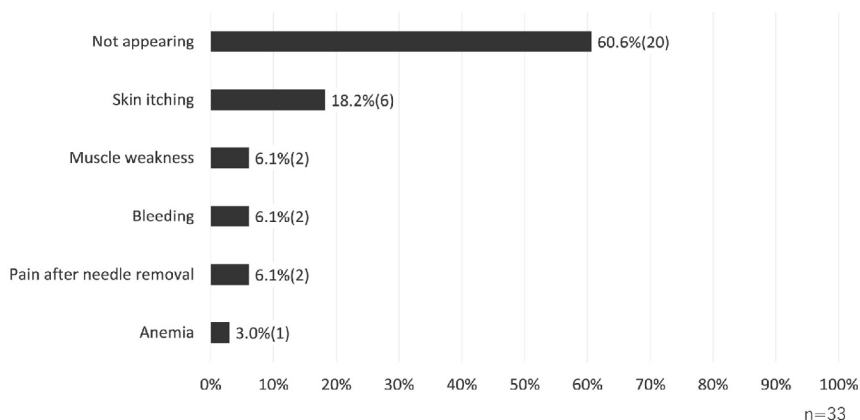


Figure 2. Adverse events after acupuncture treatment (Multiple answers)

20 players did not experience adverse events. 13 players reported having experienced adverse events. The number of adverse events was the number that occurred during the season and did not represent the frequency of occurrence.

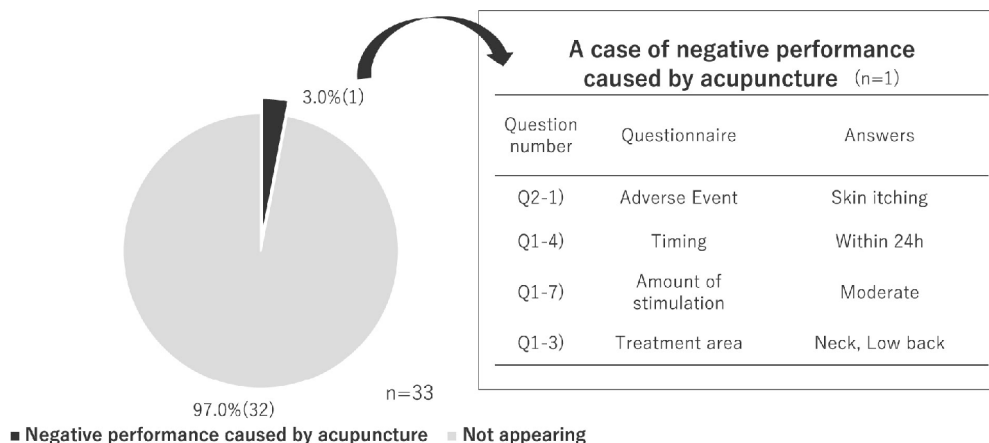


Figure 3. A case of negative performance because of acupuncture (Single answer)

Only one player (3.0%) reported a negative effect of acupuncture on physical performance. This player also reported that he had "itchy skin" as an adverse event.

university-affiliated clinic in Japan reported that a sensation of irritation remained in 3.5% of patients⁸⁾.

The frequency of residual acupuncture stimulation sensation reported in this study was comparable to those reported in previous studies.

The only adverse event that acupuncturists were able to identify throughout the season was bleeding. Interestingly, there was a difference in the number of adverse events revealed based on the athletes' questionnaire survey and acupuncture records. Thus, it is important to enquire with both players and acupuncturists because adverse events in athletes may occur during or after exercise rather than immediately after the treatment. This may lead to a difference between the acupuncture records and athletes' responses.

The study has limitations. The survey was conducted anonymously. This was because the aim was to increase the number of responses and reduce bias. However, recall bias cannot be reduced to zero, even with anonymous responses. Additionally, owing to the absence of names, it was not possible to check the results of the survey against the acupuncturist treatment chart. Therefore, in the future, correlating the participants' experience and the acupuncture records is important. This study results do not imply that acupuncture is unsafe in athletes. We believe that the results of this study are not specific to American football players but are applicable to many sports. Future studies on adverse events of acupuncture treatment in various athletes are needed, and comparisons between sports are warranted.

V. Conclusion

This study aimed to conduct a survey in American football players regarding the adverse events of acupuncture for. Acupuncture was performed for one season, and the following results were obtained:

1. "Itchy skin" was the most common adverse event of acupuncture in this study, reported by 18.2% (n=6) of the respondents, followed by muscle weakness by 6.1% (n=2) and pain after needle removal by 6.1% (n=2). These adverse events were considered as athlete characteristics.
2. Only one player (3.0%) reported a negative effect of acupuncture on physical performance.
3. Most adverse events of acupuncture were minor, and there were no reports of serious adverse events that needed medical treatment.
4. According to the treatment records, 117 acupuncture procedures were performed throughout the season, and bleeding was confirmed in four cases (3.4%).
5. From the results of the questionnaire survey and the treatment records, we conclude that athletes may be aware of adverse events that the acupuncturists cannot confirm.

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Conflict of interest

The authors report no conflicts of interest.

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