CASE REPORT
SCIENCE OF MARTIAL ARTS

The injury rate within the martial art of aikido

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Manuscript Preparation
E Funds Collection

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Abstract

Background & Study Aim: Aikido is a traditional Japanese martial art practised by approximately 1.5 million people of all ages and both genders worldwide. This study aims to discover the injury rate in a group of traditional aikido practitioners.

Material & Methods: Adult practitioners (n = 75) who attended a United Kingdom Aikikai National Course held at Ren Shin Kan Aikido Club in Dudley, West Midlands. Applied the Extended Nordic Musculoskeletal Questionnaire (NMQ-E) and to consider which factors were significant as predictors of injury. Participants were grouped according to age, gender, experience, rank and frequency of training and these were these were compared with completed questionnaires to consider any correlation between these factors and rate of injury.

Results: High correlation of injury in those individuals who trained more than three sessions per week (r = 0.96) and/or of high rank (r = 0.85) although there was no correlation between injury rate and the other factors considered. Comparisons with similar studies in other arts showed aikido to have a higher injury rate than judo, taekwondo and karate but there was no significant similarity between aikido and these arts in the common areas of injury.

Conclusions: Aikido carries a high risk of injury for participants which is related to the frequency with which individuals train as well as their level of skill (there does, appear to be an increased risk for male practitioners who are of a high rank and train more than three times weekly). However, it cannot be stated with any certainty which factors lead to increased risk of injury for practitioners.

Key words: area of injury • experience • frequency of training • risk of injury

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INTRODUCTION

Ki – the basic energy or „life-force" that flows through and exists in all thinks. ***Ki*** is the kinetic energy responsible for perception, awareness, and sense. ***Ki*** is said to determine the relation between mind and body and is a care element of all ***bud***ō arts [15].

Dan (dan'i) – a term used to denote one's technical level or grade [15].

Kyū – the series of grades that precede ***dan*** ranks. ***Ikkyū*** is the grade immediately below ***shodan*** [15].

Training session – *noun* a period of time during which an athlete trains, either alone, with a trainer or with their team [16].

Match – *noun* **1.** A contest between opponents, especially a sporting contest **2.** Somebody or something capable of competing equally with another person or thing [16].

Aikido is a traditional Japanese martial art practised by approximately 1.5 million people of all ages and both genders worldwide. It was developed in its present form during the 1930's and 40's by Morehei Ueshiba from *daito-ryu jujitsu* and is characterised by throws and pins through joint locks and holds. There are four main styles practised worldwide as follows:

Shodokan (Tomiki) aikido a fusion of aikido and judo which was developed by Kenji Tomiki as a competitive style of *aikido*. Yoshinkan aikido which was founded by Gozo Shioda and is characterised by its quasi-militaristic training regime. So, Shin Teiso or "ki" *aikido* which is a non-martial system aimed at developing inner power or "ki" and primarily aimed at health and harmonious living, developed by Koichi Tohei who was the first person awarded the rank of 10th dan in aikido.

Aikikai or traditional *aikido* which is currently headed by Ueshibas' grandson and is the largest of the four groups having approximately 1.2 million practitioners in 50 countries worldwide [1] and participants in this study all trained in *aikikai aikido*.

This study aims to discover the injury rate in a group of traditional *aikido* practitioners.

MATERIAL AND METHODS

Participants and design

There is a limited amount of information available regarding injury rates (and therefore the risk of injury) within martial arts as a whole and *aikido* specifically and this study seeks to close this gap by seeking to determine the rate of injury amongst a group of *aikido* practitioners through a period of twelve months; to compare this rate with other similar studies and; if possible; to determine the factors involved in producing this rate of injury.

A questionnaire based on the extended version of the Nordic Musculoskeletal Questionnaire (NMQ-E) [2] was distributed to all adult (18+) practitioners (n = 75) who attended the United Kingdom Aikikai National Course held at Ren Shin Kan Club in Dudley, West Midlands in January 2011. Participants were asked to record both any injuries they had ever received as well as those received in the 12 months preceding the event.

Injuries have previously been defined as either an event significant to cause the injured party to attend A&E or seek medical attention injury [3]; an event which causes a temporary break in participation or which require the assistance of a first aider during a break in play [4] or an incident which causes the individual to miss at least one training session and/or match [5]; and it was this definition which was used in this study. Therefore, participants were only asked to consider injuries that required any time off from training. In addition, any injuries that required a minimum of seven days off were classified as major, as were any injuries requiring immobilisation or surgery and concussions. Multiple injuries were considered to have occurred when the same athlete reported three or more injuries.

All reported injuries, regardless of time loss, were included in the analysis of type and body distribution of injury [6].

Results from the completed questionnaires were then considered against the age, gender and rank of the participants, their experience (number of years training), their frequency of training (number of sessions per week) and the area of injury.

Statistical analysis

The arithmetic mean, standard deviation (±) and proportion indicator (%) were calculated. The Pearson correlation coefficient was calculated for indices of selected empirical variables.

RESULTS AND DISCUSSION

Of the 75 questionnaires distributed 34 were returned giving a response rate of 45.33% one of which had missing or incomplete data meaning that analysis was only possible in 33 cases, or 44% of the sample population. Although low this response rate can be considered as acceptable as; according to [7] response rates as low as 20% can be more accurate than those with higher response rates.

Analysis of the responses showed that 25 (75%) of the respondents were male, leaving 8 female respondents and the mean age of all respondents was 41.79 ±11.71) ranging from 18 to 64 years. Sports qualifications of aikido ranged from 6th kyu; the lowest rank possible (n = 1; 3.03%) to 6th dan (n = 1; 3.03%) and most

participants had over 10 years (n = 25) of experience with a significant number (n = 10) having over 20 years' training experience. Thirty-one of the 33 participants who had been injured at some point in their career with 13 being injured in the past year and most participants had had more than one injury (n = 103) in their career with 11 of the sample receiving multiple injuries within the previous 12 months.

The total no of injuries was 103 with a mean number of 3.12 per participant range from 0 (n = 2; 6.06%) to 7 (n = 1; 3.03%). Of these 103 injuries 35 (36.05%) occurred in the 12 months prior to the study ranging from 0 (n = 2) to 4 (n = 1). The relative risk of injury was 93.94% for the group as a whole and 33.33% during a 12-month period. On average respondents missed 0.15 ±0.5 weeks of training with a range from 0 to 4 weeks.

The injuries sustained were now considered against the factors listed above with the following results.

Gender

When all injuries are considered there was a bias toward male respondents with a rate of 79.61% (n = 82) and a rate of 71.01% (n = 31) of injuries sustained with the previous 12 months. Ten respondents stopped training for more than one week (8 male 2 female) and so were considered to have suffered serious injury but no multiple injuries were reported by either gender in this time period.

This gender distinction is similar to that shown in the study by McPherson and Pickett [8] who looked at overall male injury rates in judo (73%), taekwondo (67%), karate (65%) and *aikido* (63%). These figure may be the result of more aggressive training behaviours by males or simply a reflection of the participation ratios within the various martial arts (3:1 in this study).

Age

Mean age of participants was 41.79 ±11.71 years with a range of 18 to 64 years and mean number of all injuries was 2.93 ±1.97.These injury rates spread were relatively evenly across all age groups with the Pearson co-efficient of correlation for all injuries (r = 0.46) and that for injuries in the preceding year r = 0.06 (a strong lack of correlation between age and injury rate). There were, however, a large percentage of injuries at ages 30-35 years and at 40-45 years (Figure 1).

These findings contrast sharply with other studies notably in taekwondo where [8] showed a peak between ages 18-25 years and [9] showed increased injury rates in 14-17-year-old taekwondo athletes when compared to adults

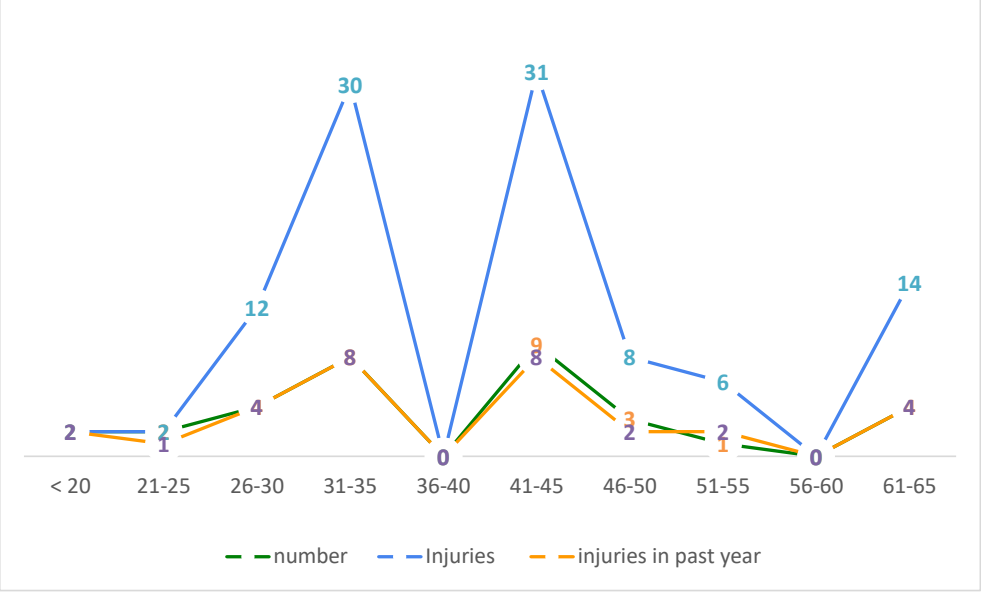

Figure 1. The distribution of body injuries in adult aikido practitioners (n = 31) from the United Kingdom.

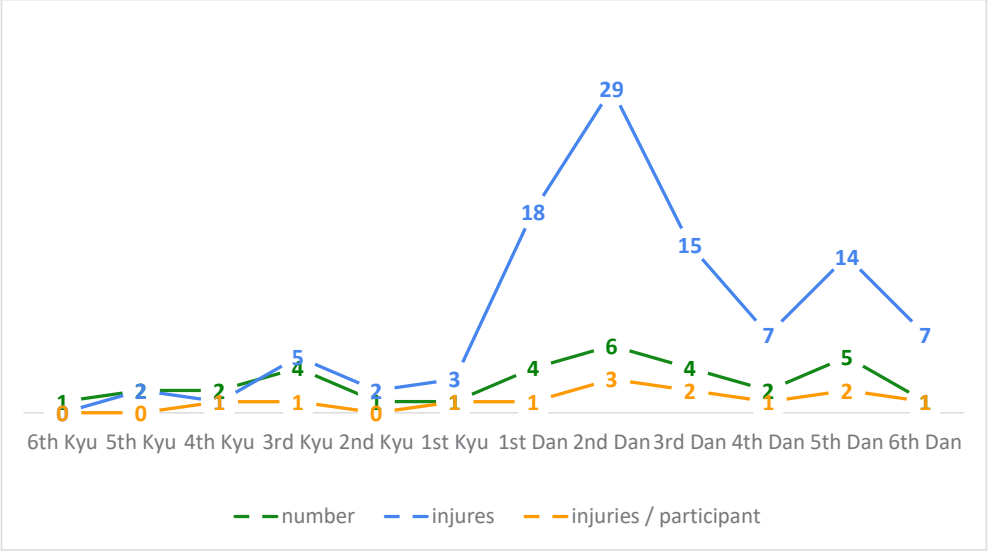

Figure 2. The distribution of body injuries in adult aikido practitioners (n = 31) from the United Kingdom in relation to their technical qualification of aikido.

(18+). This was supported by [10] who found that 41.9% of all injuries occurred in 16-20-year-old female karate athletes.

This may be explained by the non-competitive nature of traditional as the above studies considered injuries both in competition and training but also by the relatively high mean age of respondents of 41.79 years which may result in comparatively reduced training intensities.

Grade (rank)

Rank ranged from 6th kyu (n = 2) to 6th dan (n = 1) with the most frequent rank being 2nd dan (n = 6). There was a significant correlation between rank and overall injury rate with r = 0.85 (see Figure 4) and this was similar for injuries in the preceding year r = 0.79. On a cautionary note it must be noted that these results may be skewed by the fact that the one 6th dan participant had a total of 7 injuries (6.8% of the total); the highest number of any of the respondents (Figure 2).

Interestingly this finding closely relates to that of [11] who reported that 87% of elite track and field athletes had a history of ongoing chronic injury.

Frequency of training

Respondents participated in, on average, 2.6 sessions per week (range 1-5) which varied in length from 60 to 120 minutes. For those training more than 3 sessions per week showed a mean injury rate of 3 injuries/respondent versus 1.01 for those training less than three times weekly. Both the overall rate of injury and that in the preceding year had high correlation values of 0.99 and 0.94 respectively (Figure 3).

When compared to the general population both the overall risk of injury (93.94%) and that in the preceding year (33.33%) is significantly increased as individuals classed as active show a general risk of 23.9% whilst sedentary individuals have only a 14.6% risk of injury in any one year [12].

Experience

Experience is often considered by its practitioners to be a lifetimes study and this seemed to supported by the fact that a significant proportion of respondents, some 75.78% (n = 25) has been training continuously for over 10 years with 30.3% (n = 10) having more than 20 years continued participation. There was no correlation between this continued participation and injury rate (r = 0) with injuries being relatively evenly spread throughout the population (Figure 4).

Area of injury

Injuries appeared to be fairly evenly distributed throughout the body although there was a slight bias towards the upper limb which suffered

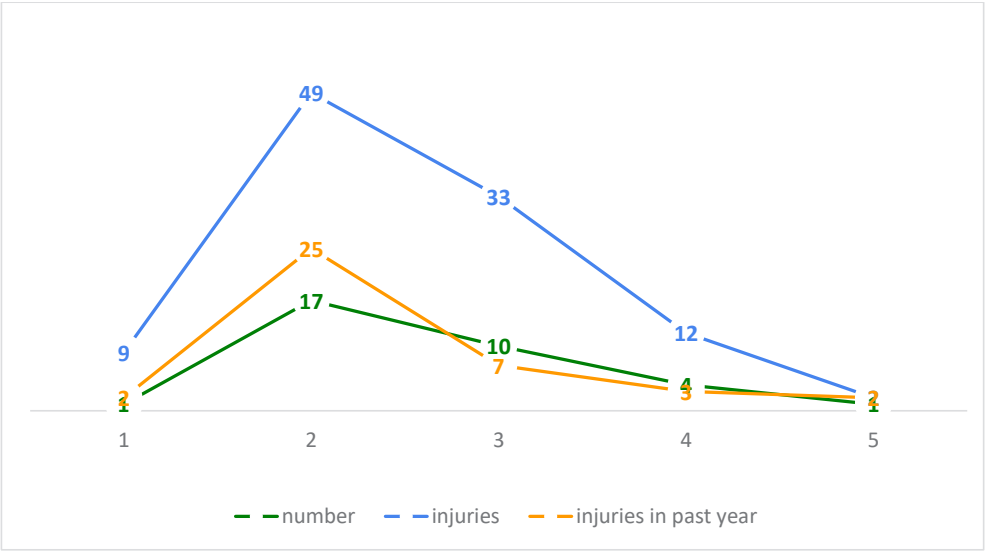

Figure 3. Frequency of training vs. injury rate in adult aikido practitioners (n = 31) from the United Kingdom.

46.06% of all injuries. Anecdotally practitioners report a high level of knee injuries (often referring to " knee") and this was partially supported by the data which showed the three most commonly injured joints to be the shoulders (n = 18; 17.14%); wrist/hand (n = 18; 17.14%) and the knee (n = 17; 16.19%). In contrast there were no reported head injuries and only 5.83% of injuries reported involved the lower back (n = 6).

Surprisingly this pattern of injury distribution is similar to that shown by American football quarterbacks where 50% of all injuries involve the upper limb [13] and snowboarders with 49.06% [14] and is distinctly different from not only other sports but other martial arts such as judo [8].

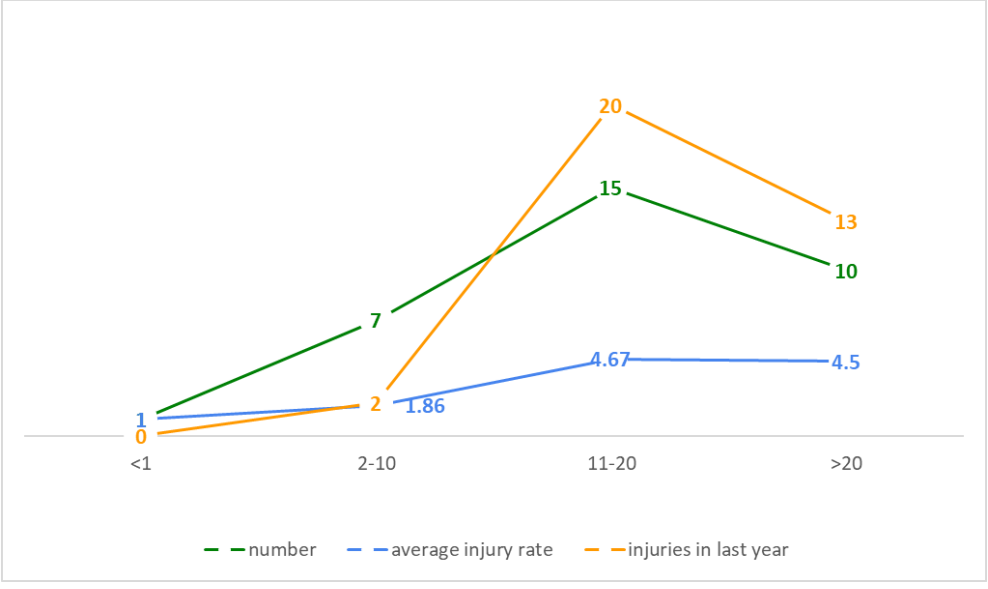

Figure 4. Experience vs. injury rate in adult aikido practitioners (n = 31) from the United Kingdom.

CONCLUSIONS

It cannot be stated with any certainty which factors lead to increased risk of injury for *aikido* practitioners. There does, however, appear to be an increased risk for male practitioners who are of a high rank and train more than three times weekly. This finding should be treated with caution since the results may be skewed by the fact that the one 6th dan participant (male) had a total of 7 injuries and this accounted for 6.8% of the total for all respondents.

Therefore, further work is needed in order to obtain a reliable knowledge of this phenomenon (the pattern of injury amongst adult *aikido* practitioners in the UK).

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