Science & Sports (2017) xxx, xxx—xxx

Disponible en ligne sur ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com

ORIGINAL ARTICLE

Determinants of performance in university taekwondo athletes

Déterminants de la performance chez des athlètes universitaires en taekwondo

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Received 5 August 2016; accepted 26 August 2017

KEYWORDS
Taekwondo;
Martial arts;
Somatotype;
Ectomorphy;
Performance

Summary
Objectives. — The purpose of this study was to determine the extent to which somatotype and taekwondo experience contributed to performance in varsity taekwondo athletes.
Material and Methods. — Subjects (38 males, 20.10 ± 1.98 years, 170.66 ± 7.17 cm, 63.31 ± 11.14 kg; 37 females, 19.52 ± 1.80 years, 158.61 ± 5.05 cm, 54.16 ± 9.06 kg) were athletes competing in a national varsity taekwondo championship. Win-loss records were used as a marker for performance. A Sex x Winners Anova was used to assess differences between men and women by competition result.
Results. — There was no Sex x Winners interaction for general taekwondo experience (omega^2 = 0.02, 95% CI: 0.00—0.24; power: 0.24), or competition-specific experience (omega^2 = 0.10, 95% CI: 0.00—0.32, power: 0.55), but the effects were not clear. Collapsed over sex, the winners had more general (5.90 ± 2.65 years vs. 2.94 ± 1.90 years, d = 1.35, 95%: 0.86—1.85) and competition-specific experience (4.95 ± 2.17 vs. 2.52 ± 1.75 years, d = 1.28, 95% CI: 0.85—1.71). There was no Sex main effect for ectomorphy: 3.055 ± 1.036 for the men vs. 2.386 ± 1.094 for the women: omega^2 = 0.06, 95% CI: 0.00—0.28; power: 0.66 but the effect was also not clear. The effect size for the pairwise comparison was d = 0.65, 95% CI: 0.41—0.88.

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http://dx.doi.org/10.1016/j.scispo.2017.08.005

Conclusion. — Somatotype in itself may not directly contribute to improved performance, but in combination with general and competition-specific taekwondo experience, it may be facilitated.

MOTS CLÉS
Taekwondo ;
Arts martiaux ;
Somatotype ;
Ectomorphe ;
Performances

Résumé
But. — Le but de cette étude était de vérifier dans quelle mesure le somatotype et l'ancienneté de pratique contribuent à expliquer le niveau de performance de sportifs universitaires en taekwondo.
Méthodes. — Les sujets (38 hommes, 20,10 ± 1,98 ans, 170,66 ± 7,17 cm, 63,31 ± 11,14 kg ; 37 femmes, 19,52 ± 1,80 ans, 158,61 ± 5,05 cm, 54,16 ± 9,06 kg) étaient des athlètes engagés en compétition dans un championnat national universitaire de taekwondo. L'analyse des « gains-pertes » de combats a permis de juger des performances réalisées par ces sportifs. Une ANOVA à deux effets prenant en compte le sexe et les gains de combats a été utilisée pour évaluer les différences entre les effets du sexe sur les résultats en compétition.
Résultat. — Les résultats de montrent pas d'interaction signification entre le sexe et les gains de combats pour l'ancienneté de pratique du taekwondo (omega^2 = 0,02, IC 95 % : 0,00 à 0,24 ; puissance : 0,24), ou pour l'ancienneté de pratique de compétitions (omega^2 = 0,10, IC à 95 % : 0,00 à 0,32, puissance : 0,55), mais les effets ne sont pas claires. Lorsqu'on fait abstraction du sexe des sportifs, les gagnants avaient une pratique plus ancienne, aussi bien de l'entraînement en taekwondo (5,90 ± 2,65 ans contre 2,94 ± 1,90 ans, d = 1,35, 95 % : 0,86 à 1,85), que de la compétition (4,95 ± 2,17 vs 2,52 ± 1,75 années, d = 1,28, IC à 95 % : 0,85 à 1,71). Le caractère ectomorphe (personne svelte, élancée, à la musculature peu développée) n'est pas influencé par le sexe (3,06 ± 1,04 pour les hommes, contre 2,39 ± 1,09 pour les femmes ; omega^2 = 0,06, IC à 95 % : 0,00—0,28 ; puissance : 0,66). La taille de l'effet était de d = 0,65, IC à 95 % : de 0,41 à 0,88.
Conclusion. — Le somatotype en tant que tel, ne semble pas contribuer directement à la qualité des performances en taekwondo ; cependant, associé à l'ancienneté de pratique générale et en compétition, le somatotype peut contribuer à expliquer les performances en taekwondo.

1. Introduction

Profiling of taekwondo athletes was initially based on mostly laboratory assessments of characteristics, and was suggested to be related to free sparring performance. For instance, Pieter et al. [1] investigated isokinetic strength in American university taekwondo participants, while Conkel et al. [2] studied the relationship between isokinetic strength, kick velocity and force in American elite taekwondo athletes. Taaffe and Pieter [3] recorded aerobic and anaerobic endurance of American elite taekwondo athletes and compared males and females in absolute terms, as well as relative to body mass and lean body mass per ratio standard. Physiological characteristics of recreational counterparts were reported by Thompson and Vinueza [4], as well as Toskovic et al. [5,6].

Research has also focused on assessing physiological variables at simulated and actual competitions. For instance, using a simulated competition model, Bouhlel et al. [7] reported an exercise heart rate of 197 ± 2 beats per minute (bpm) with a lactate value of 10.2 ± 1.2 mmol.L^{-1} at the end of the final round (3 rounds of 3 minutes with a 1-minute break in between rounds). Butios and Tasika [8] recorded an overall exercise heart rate of 158 bpm with a lactate production of 3.35 mmol. L^{-1} after multiple competitions using the same match protocol as Bouhlel et al. [7].

At an actual competition, Matsushigue et al. [9] revealed post-match lactate to be 7.5 ± 3.8 mmol.L^{-1} with an exercise heart rate of 183 ± 9 bpm. The duration of high intensity movements that included jumping kicks was 31 ± 16 seconds. Markovic et al. [10] found an exercise heart rate of 192.8 ± 3.0 bpm at the end of the match at the national championships with lactate accumulation averaging 86% (95% CI: 62—96; calculated based on the information in the text) of peak lactate production.

In addition to physiological profiling, anthropometric factors were assessed in elite American taekwondo athletes [11], while Chan et al. [12] reported somatotypes of British taekwondo club athletes with the women being more endomorphic than their male colleagues (6.3 ± 1.5 vs. 4.2 ± 1.1), which was significantly different: d = 1.68 (95% CI: 1.14—2.23) (calculated based on the information in the article). Taaffe and Pieter [3] found American elite taekwondo athletes to have somatotypes of 1.65—4.53—3.59 (males) and 2.08—3.23—3.98 (females), while Poliszczuk et al. [13] intimated Polish female semi-contact taekwondo athletes to have a somatotype of 3.50—4.44—3.18. Čular et al. [14] suggested that morphological characteristics contributed to success in taekwondo for 11.6—15.4%.

There is a paucity of somatotype research on Asian combat sports athletes in general. In the first published study on somatotypes of Filipino martial arts athletes,

Please cite this article in press as: Do Kim G, et al. Determinants of performance in university taekwondo athletes. Sci sports (2017), http://dx.doi.org/10.1016/j.scispo.2017.08.005