

ANALYSIS OF SELECTED PARAMETERS OF JUDOISTS' JUNIOR POLISH REPRESENTATION FITNESS

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Abstract:

Amongst many factors influencing high results in judo, one should enumerate fitness and effectiveness of body posture control as well as a level of chosen muscle groups' strength being effectors of concrete movements during fight.

A main goal of the research was a trial of finding relations between anaerobic power and explosive strength of legs and weight of junior judoists.

Analysis of data made it possible to present significant relations between analyzed parameters in the following cases: in female and male judoists a high weight is a negative factor influencing height of jump from knee bend position, assessing explosive strength of legs. Additionally, a high BMI influences CMJ (counter movement jump) trial results unfavorably, describing a general level of explosive strength.

INTRODUCTION

Strength development has become one of the most important elements of training for judoists, however it should not be led separately from the development of individual technique. Controlled strengthening of chosen muscles or muscles' groups, responsible for making concrete techniques, demands realization of professional strength training [2]. A very important element of the whole training process is also jumping training that influencing growth of explosive power, creates specific changes in nervous and muscle system improving a speed of reaction when fighting [12].

As one can see, speed of reaction joint with adequately directed strength is one of main factors influencing results in judo. Using experience, that points at broad perspectives using new technologies in training aspects' diagnosis, the authors made an attempt to analyze relations between legs' strength with chosen somatic features of the respondents.

The main aim of the research was a trial of finding relations between anaerobic power and explosive strength of legs and weight of junior judoists.

MATERIAL

There were 26 junior male and female judoists tested, in the age between 17 and 19 years old, additionally there were 2 younger female junior judoists (16 years old) and two female judoists to be qualified to youth category (21 years old). The research were conducted during team camp. The average of age equaled 18,1 years ($x=18,1$). Distribution of body weight of the judoists was from 48 kg up to 100 kg ($x=71,66$), however body height was from 160 cm to 188 cm ($x=173,46$ cm). BMI in the analyzed group was between 16,37 and 33,12 ($x=23,69$).

METHODS

Optojump (Microgate Engineering, Bolzano) tool was used for tests. It measures legs' strength thanks to two electronic bars that one makes a signal and the second takes it. The system detects and calculates the length of noise during communication, and the data collected make it possible to assess the length of flight and feet contact with the surface when making tests.

The participants were put to three activity tests in order to anaerobic strength measurement as well as legs' explosive strength. The participants made as many the highest jumps as possible in a free style for 15 seconds (marked as "15s jumps") in order to assess their anaerobic strength. On these basis, Optojump system calculated the length of flight and feet contact with the surface during each jump with taking into account body weight of judoist. Thanks to it, the system could give anaerobic strength for each jump expressed in W/kg.

The next trials were to analyze explosive strength of legs. The first attempt assumed individual jump from the fundamental position with hands on hips in order to exclude arms' movement when jumping. The next step was to maintain fundamental position for 1-2 seconds, jump as high as possible, and land with a normal diffraction in joints of legs maintaining neutral position for 1-2 seconds. Counter movement jump (CMJ) parameter was marked, because it presupposed a natural bend of legs before jump. During slowing down phase, the energy is accumulated in eccentrically working muscles and joints, and then it is released in the subsequent propulsion phase, when muscles work in a concentric way. The determinant of explosive strength in this case was the height of jump, expressed in centimeters.

The last attempt lied in as high as possible jump from knee bend position. The judoist was to maintain 90 degrees knee bend position for 1-2 seconds, with hands on hints, and afterwards jumping as high as possible without deepening the squat – the parameter was marked „squat jump” [1]. Changeability factor for the attempts mentioned above was appointed earlier and came to appropriately ~2%-3% [9, 11]. Recurrence of measurements made with the use of Optojump tool was researched earlier thanks to interclass correlation factor as well as changeability factor pointing excellent results on ~0.985 and ~2.7% level [6].

RESULTS

The analysis of data with the use of Pearson parametric correlation factor made it possible to show significant correlations between analyzed parameters in four cases. A high BMI in junior female judoists is a factor influencing negatively height of jump from knee bend position, assessing explosive strength of legs, what is depicted on picture 1. Similarly, high BMI influences CMJ results unfavorably, describing a general level of explosive strength (figure 2).

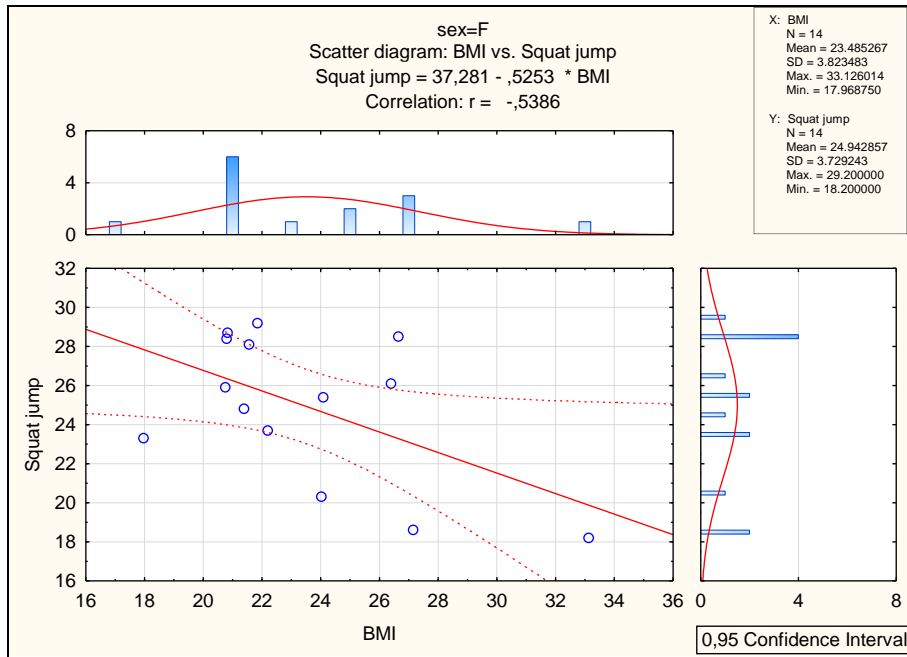


Fig. 1 BMI spread and jump's heights from knee bend position of junior female judoists

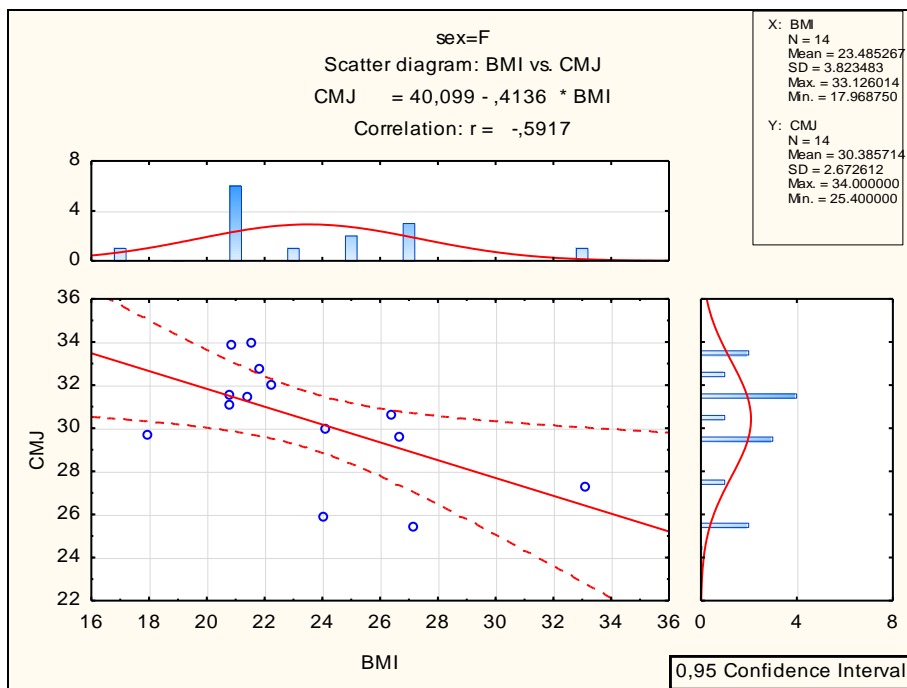


Fig. 2 BMI spread and CMJ attempts of junior female judoists

Amongst young judoists, there is a similar negative correlation between level of explosive strength (CMJ results) and BMI (figure 3) as well as jumping on lower heights from knee bend position with increase of body weight, what is depicted on picture 4.

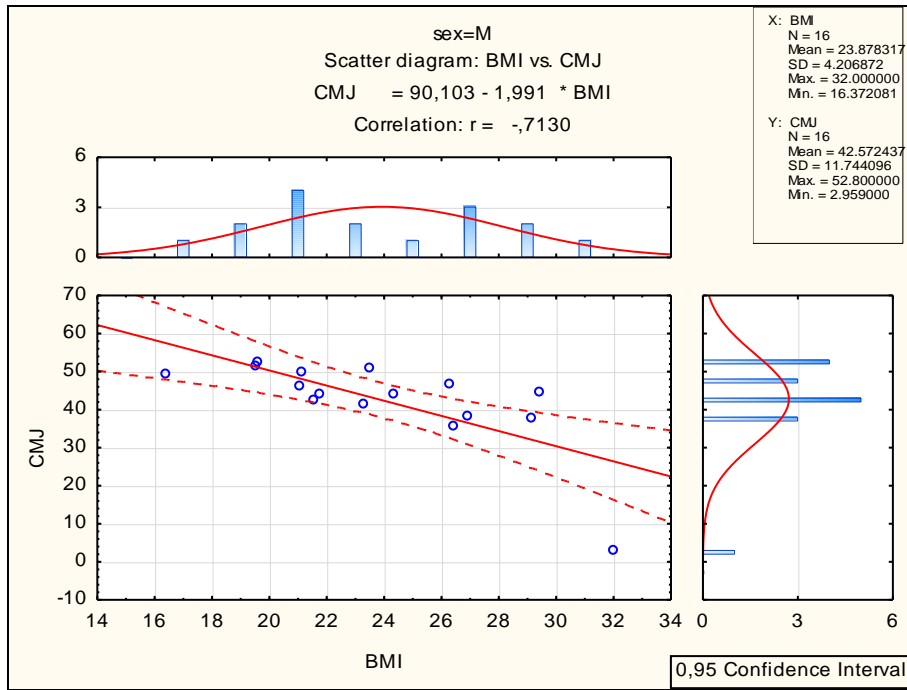


Fig. 3 Spread of CMJ explosive strength level and BMI of junior male judoists

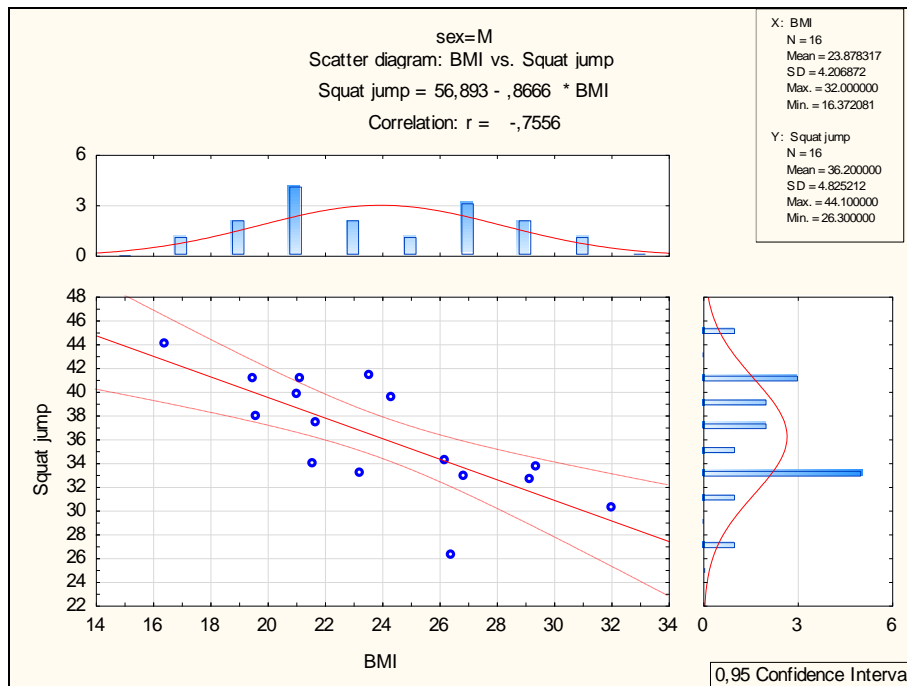


Fig. 4 Spread of explosive strength level and BMI of junior male judoists

DISCUSSION

Explosive strength of legs is undoubtedly, next to suppleness, body balance, and motor coordination, one of the most significant motor features influencing sport successes in judo [13].

Research results of the authors point at clear negative correlation between BMI and jump height achieved both in Squat Jump (SJ) and Counter Movement Jump (CMJ). These correlations revealed a statistical significance both in male and female groups.

The correlations presented above are mirrored in other authors' works. Moncef and others researchers presented a strong negative correlation between body weight and explosive

strength of leg among handball competitors. However, the authors did not see any statistically significant correlations between BMI and explosive strength assessed in CMJ [12].

In a training practice of judo, one can observe very fast or big mass loss, especially before competitions. Results of many research suggest that the situation mentioned above may cause an increase of risk of injuries, and influences results. The best example are research made by Clarys and co-authors, where negative relation between significant mass loss and isometric strength of legs was observed. It was analyzed with the use of Optojump tool amongst judoists from Belgium [2, 4, 7].

However, research results made by Koral and Dosseville did not presented statistically significant differences between jumps' heights during CMJ and SJ before and after introducing fast and sequential mass loss combinations amongst professional judoists [10].

Similar research were conducted also by Gutierrez and co-authors with the use of sauna in order to fast mass loss as a result of dehydration. The authors made tests of explosive strength of legs before going to sauna, right after sauna as well as after 1 hour hydration. It presented statistically significant decrease of results in SJ trial, but only among female judoists. However, among male judoists one could not observe any significant differences [8].

CONCLUSIONS

Body weight of judoists may influence their explosive strength of legs, and therefore it may result in sport achievements. The same situation is when the judoists loose their weight in a very short time, and it may result in their motor activity and parameters.

Continuation of research with taking into a special consideration weight categories and defined training models, may result in improvement of training process of professional judo competitors.

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