

# Judo for Children and Adolescents: Benefits of Combat Sports

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## SUMMARY

JUDO TRAINING IS AN INTERMITTENT METABOLICALLY DEMANDING ACTIVITY THAT HAS HISTORICALLY BEEN CONNECTED TO PHYSICAL EDUCATION AND DEVELOPMENT. THE HEALTH IMPACT OF PRACTICING THIS OLYMPIC SPORT AND MARTIAL ART HIGHLIGHTS THE BENEFITS OF COMBAT SPORTS FOR CHILDREN AND ADOLESCENTS. VARIOUS PHYSIOLOGICAL IMPROVEMENTS, INCLUDING THOSE IN THE AREAS OF BODY COMPOSITION, STRENGTH, AND ENDURANCE, AS WELL AS ENHANCED COGNITIVE PERFORMANCE AND LIFE SATISFACTION HAVE SHOWN TO RESULT FROM PARTICIPATION IN JUDO BY YOUNG PEOPLE.

## INTRODUCTION

Judo has fundamental ties to strength and conditioning. The founder of judo, Jigoro Kano, was an educator by trade and coupled the education of knowledge and morality with that of physical education (26). One of judo's major principles, *seiryoku zenyo*, can be translated as "the most effective use of one's spiritual and physical strength" (26). Judo, as a martial art, was developed from various schools of jiu-jitsu dating to an era preceding the samurai. Kano recognized that each of these

forms of jiu-jitsu possessed specific strengths that could be incorporated into a combination of techniques that would provide a unique method of training for young people (16). This method of training originally centered on the practice of a variety of throws, sweeps, chokes, pins, joint locks, and striking techniques (28). Judo competition has been a part of the Summer Program of the Olympic Games for men since 1964 (1992 for women) and has become one of the most highly practiced sports worldwide (30). Judo has since developed into a grappling-based sport with practitioners focusing largely on the execution of dynamic throws and quick submission attempts (8) (Figures 1–3).

Judo's seminal texts and manuals include sections devoted to strength and conditioning (10,11,28). Draeger and Inokuma published "Weight Training for Championship Judo" in 1966 (6), well before the popularity of the film documentary "Pumping Iron" in the United States. With a concentration on the importance of training the mind and body, practicing judo provides numerous health benefits for people of all ages. Jacini et al. (12) showed that judo athletes with more than 10 years of judo experience possessed higher gray matter volume in various regions of the brain associated with motor learning, planning, and execution, as well as memory and cognitive processes when compared with healthy controls. The authors hypothesized that these adaptations were the result of the

complex motor skills required during judo training. Male individuals with judo experience have also shown to have superior postural control when compared with ballet dancers in instances when visual cues are removed or instability is instituted (32).

Judo is an intermittent physically demanding activity that requires both power and flexibility (36). Basic judo training begins with learning breakfalls as a means of practicing safely. These particular techniques involve rolling to one's back when being thrown to the ground to distribute the force of the impact and has shown to be effective across the lifespan, including in the elderly (9,15). Judo technique progresses to include all muscle actions from isometric holds during grip fighting and groundwork to plyometric movements using the stretch-shortening cycle while engaging in throwing techniques (3). Repetitive movements during judo training include unloaded body weight exercise and loaded partner exercise (33). Rope training, medicine balls, kettlebells, and modified exercises using the judo uniform are commonly a part of judo strength and conditioning (5,24,37). Advanced judo competitors also use comprehensive periodized weight-training programs to enhance their time spent specifically on judo (1,3,10,31).

## KEY WORDS:

judo; combat sports; children; adolescents; martial arts



Figure 1. Example of osoto-gari (large outer reap) throwing technique.

Classifying judo as a high-intensity weight-bearing sport, Andreoli et al. (2) showed that judo athletes exhibited higher appendicular muscle mass than normative controls and greater bone mineral density values than karate athletes, water polo athletes, and a control group. Experienced judo competitors have enhanced upper body strength and have been shown to be superior in trunk extension, trunk flexion, rotational isokinetic torque, and power when compared with elite cyclists (17). With respect to lower body strength, Fagerlund and Hakkinen (7)

reported greater strength-velocity curves during squat jumping exercise in high-level judo competitors. In addition to possessing greater aerobic and anaerobic power than healthy controls, elite male and female judo athletes have shown to possess left ventricular hypertrophy, increased stroke volume, and decreased resting heart rate (21). As a result of these findings and in contrast to being classified as strength-power athletes, Laskowski et al. (21) noted that cardiac adaptations to long-term judo training are similar to those exhibited by endurance athletes.



Figure 2. Example of uchi-mata (inner thigh reap) throwing technique.

Although long-term physiological benefits of judo training have been previously reported (8), the more immediate benefits for children and young adults are now being explored. Judo has been mentioned as one of the safest contact sports for children (30). Matsumoto and Konno (27) reported a positive correlation between judo participation and both life satisfaction and quality of life in U.S. adolescent judo players. Furthermore, the well-being and life satisfaction scores from the young judo players in this study were higher than comparative nonjudo participant norms. With regard to competitive performance and technical efficacy, beginning judo training before the age of 11 years could be beneficial (23). Strength and endurance have previously been shown to be related to competitive success in 15- to 16-year-old judo athletes, whereas anthropometrical measurements were concluded to be lesser determinants (20). However, the specific strength and conditioning improvements because of practicing judo may be of particular importance to physiological development in adolescents.

Aerobic capacity in junior judo athletes has been shown to be greater than nonathletes, as well as soccer players and gymnasts (22,25). This adaptation may manifest itself in the previously described cardiac changes displayed by older judo athletes and would be of benefit during training and competition by maintenance of high-intensity activity, delayed fatigue, and enhanced recovery (8,21). The rate of motor development in young judo players has shown to be steadier than healthy controls during the ages of 11–17 years and may be at its peak during the ages of 11 to 12 and 14 to 15 years (13). During this same timeframe, young judo athletes exhibit greater handgrip strength and pull-up performance than age-matched nonjudo athletes (14). Jagiello et al. (14) hypothesized these differences, and the linear strength increases specific to the upper body are the result of the “directed loads applied in the process of the athletes’ training.”



**Figure 3.** Example of kesa-gatame (scarf hold) pinning technique.

Participation in judo has also shown to be beneficial in an even younger population. Studies by Sekulic et al. (35) and Krstulovic et al. (18) showed that 9 months of judo training in 7-year-old boys (B) and girls (G) improved shuttle run performance (B: 10%; G: 13%), sit-up endurance (B: 30%; G: 46%), sit and reach (flexibility) (B: 34%; G: 45%), and flexed arm hang (B: 72%; G: 76%) to a greater degree when compared with children engaged in recreational sporting games. Both conditions were shown to similarly augment coordination, shoulder flexibility, speed, and cardiovascular endurance. Furthermore, the judo training groups maintained body fat skinfold thickness values, whereas the recreational training groups significantly increased body fat skinfold thickness. In a follow-up publication, Krstulovic et al. (19) noted that 7-year-old male judo participants gained more weight, increased flexibility, and improved both sit-up and flexed arm hang performance more than soccer and track and field participants over the course of 9 months of training. The authors determined that judo training improves specific indices of fitness in children.

In an advancement of judo research in adolescents, Baudry and Roux (4) examined the effects of manipulating work to rest ratios of judo-specific circuit training in 15- to 18-year-old judo athletes. Six 40-second periods of

judo-specific exercise, consisting of technique, pulling, and throwing practice, were interspersed with rest periods of 40, 120, or 200 seconds, while heart rate and blood lactate were measured. The circuits using 40- and 120-second rest periods increased lactate concentrations more than the 200-second rest period circuit, while eliciting heart rate values more than 92% of maximum. The authors stated that the judo-specific circuit produced blood lactate values (approximately 10 mmol/L) similar to intermittent running or cycling (4). This study further characterizes the physiological requirements of judo training and reinforces the adaptations previously outlined in young judo players.

Kano understood the potential physical and health benefits of judo and, therefore, worked to have it included as part of Japan's physical education system (34). Judo has recently become part of the national curriculum in Japan, as outlined by the Ministry of Education, Culture, Sport, Science, and Technology (29). In support, judo is a safe contact sport for children, and the scientific literature has demonstrated that the practice of judo can improve cognitive performance, enhance motor learning, and increase the sense of well-being and life satisfaction among youth participants. Furthermore, research has shown increased cardiovascular fitness, anaerobic capacity,

flexibility, strength, power, and improved body composition with judo training.

Judo training opportunities for children and adolescents can be found in clubs and recreational centers in both urban and rural communities. These opportunities may meet the needs of individuals looking to fulfill self-defense or health-based weight management goals up to those with competitive Olympic aspirations. Judo training can provide an effective strength and conditioning base for other sports, with former junior judo champions currently excelling at various sports in the collegiate and professional ranks. With the cadet and junior world judo championships being held annually, as well as the recent organization of the Youth Olympic Games, international judo competition is available to adolescent athletes worldwide.



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