



Injury Profile of Taekwondo Athletes During Training

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ABSTRACT: This study aims to investigate the injury incident among taekwondo athletes during training sessions. Taekwondo focused on maximizing the force of the blow to a limited area using maximum high speed and impact, which included putting the body's weight behind kicks. The questionnaire divide into three sections; Section A (primary types of the injury), Section B (body parts of the injury), and Section C (mechanism of the injury). Sixty athletes participated from black belt level and were involved in taekwondo sports for more than three years and participated in tournaments in the level state and above. Data were analyzed using descriptive analysis describing the injury sustained during training, not more than 12 months back. The result showed that the most and least frequent injury was contusion and hematoma, respectively. The most frequent mechanism of the injury is receiving blows from the opponent. In conclusion, taekwondo athlete has high prevalence injuries during training and the widespread injuries are contusion, sprain, and strain.

Keywords: injury profile, Taekwondo, mechanism of injury

I. INTRODUCTION

Taekwondo is the most prominent Korean self-cautious military martial art, which encompasses eruptive, quick, and solid kicks similar to other combat sports such as karate, judo, and boxing (Iliana & Savvas, 2011). Furthermore, Taekwondo focused on maximizing the force of the blow to a limited area using maximum high speed and impact, which put the body's weight behind kicks, including rotating the body as the kick was delivered and blocking the opponent's kicks and blows.

Thus, several injuries may happen, such as contusion and laceration, ankle sprains, knee lesion, broken limb, and fracture during training drills. Before 2008, taekwondo rules to score points required capable feet or hand movements to the storage compartment and feet to the head. The rules transformed with the allocation of an electronic scoring framework for the capacity compartment hits and significant head scoring with light feet taps just without power (Viscogliosis, 2013).

Most injuries are localized to the lower extremities as taekwondo athletes use their instep foot to attack and defend (Lystad & Pollard, 2009). However, Vahid et al. (2010) found that the upper limbs as the most predisposed place of injuries which might be due to differences in the method of combat of Iranian athletes with other athletes.

Atop of that, Halabchi et al. (2007) affirmed that fractured was the least likely injury to occur on taekwondo athletes, which explained that wearing protective safety gear could contribute to the least likely to get fractured due to padding on their body. This study aims to investigate the injury incident among taekwondo athletes during training sessions.

II. Methodology

This cross-sectional study is a descriptive design study to investigate the injury profile of taekwondo athletes during training. Sixty subjects were the taekwondo athletes representing their university in 2020 and experienced Taekwondo for more than five years with at least black belt 1st Dan. The questionnaires adopted from the previous study (Lystad & Pollard, 2009) consists of three sections; Section A (primary types of the injury), Section B (body parts of the injury), and Section C (mechanism of the injury). All data were analyzed using Statistical Package for Social Science (SPSS) version 22 using descriptive, inferential statistical analysis.

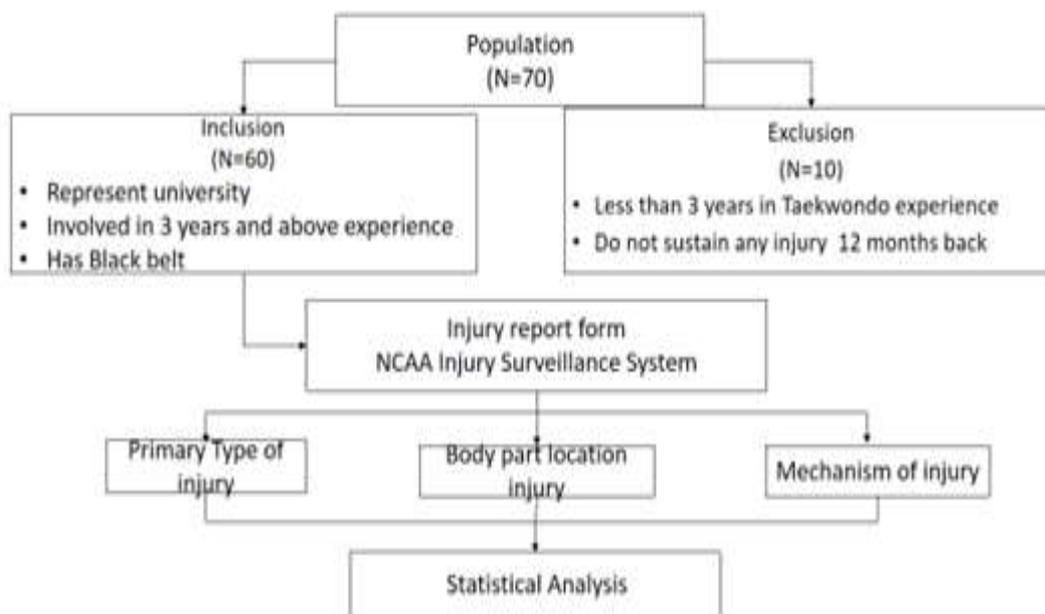


Figure 1: Flowchart of the research design

III. Results and Discussion

Table 1 shows the demographic data for Taekwondo athletes, consisting of 58.3% female and 41.7% male athletes. Sixty-five athletes participated in the study, and five athletes did not respond regarding injuries. The youngest age is 18 years old, and the eldest is 26 years old. The athlete’s mean height for male and female was 173.98±8.04 cm and 161.29±7.88cm, respectively. On the other hand, the mean weight was 65.20±18.38 kg for male and 60.14±13.14 kg for female.

Table 1: Demographic data of taekwondo athletes

Variable	Male (n=25)	Female (n=35)
Height (cm)	173.98 ± 8.04	161.29 ± 7.88
Weight (kg)	65.20 ± 18.38	60.14 ± 13.14
BMI (kgm⁻²)	21.75 ± 4.30	23.17 ± 4.96

Figure 2 demonstrates that all athletes were black belts (Dan). Most athletes had 1st Dan with 48.3%, and the lowest had 5th Dan with 1.7%.

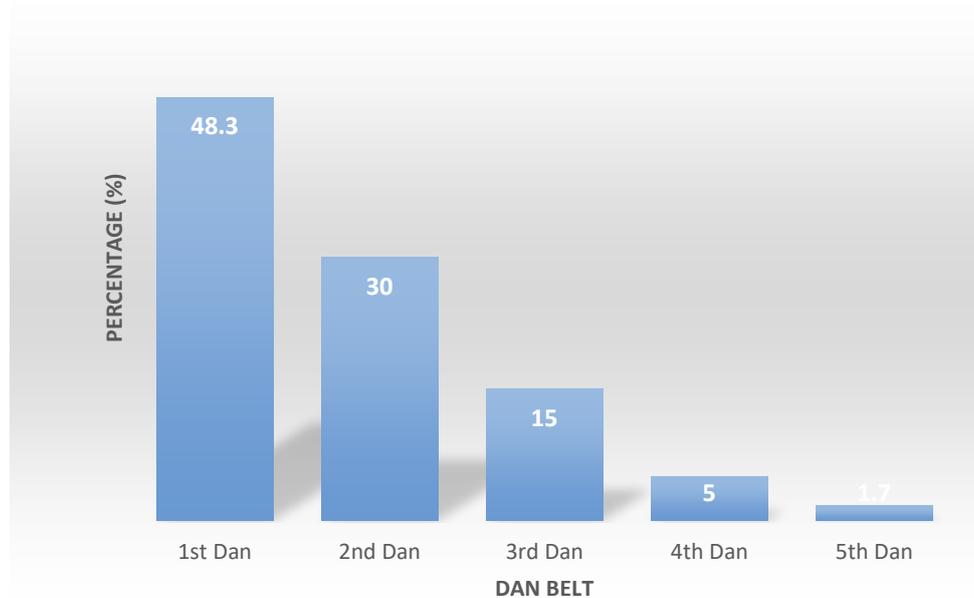


Figure 2: Black belt level of taekwondo athletes

Table 2 shows the result of participation, involvement, and training sessions in Taekwondo. From 60 athletes, the majority participated in the National tournaments with 50% (30), followed by International level 30% (18) and State with 20% (12). Most respondents were involved in Taekwondo Sport for more than ten years, with 29 athletes (48.3%). Only 13 respondents have experience 3-5 years in Taekwondo sport. The result also stated that most respondents had more than 3 hours of training sessions per week.

Table 2: Participation, Involvement and Training Session in Taekwondo

	<i>Frequency (n)</i>	<i>Percentage (%)</i>
<i>Level of tournament</i>		
State	12	20.0
National	30	50.0
International	18	30.0
<i>Taekwondo Involvement</i>		
3-5 years	13	21.7
6-10 years	18	30.0
>10 years	29	48.3
<i>Training Session (per week)</i>		
1-2 hours	14	13.3
2-3 hours	12	20.0
>3 hours	34	56.7

Table 3 showed types of injury among Taekwondo athletes during training which reported 194 injuries per person in less than 12 months. Contusions were the primary injury sustained (21.1%), followed by strains (19.1%), sprains (16.5%), and blister (5.7%). Concussions reported only 2.6%. Lastly, the hematoma injury sustained the least by athletes, which is only 0.5%.

Table 3: Types of injury among Taekwondo athletes during training

Types of Injuries	Frequency (n)	Percentage (%)
Contusion	41	21.1
Strain	37	19.1
Sprain	32	16.5
Blister	11	5.7
Inflammation	11	5.7
Abrasion	7	3.6
Haemorrhage	7	3.6
Internal Injury	7	3.6
Ligaments Complete Tear	7	3.6
Stress Fracture	6	3.1
Concussion	5	2.6
Dislocation	5	2.6
Nerve Injury	4	2.1
Tendon-Torn	4	2.1
Rupture	3	1.5
Bursitis	2	1.0
Fracture	2	1.0
Laceration	2	1.0
Hematoma	1	0.5
Total	194	100

Table 4 shows the result of types of injuries for the upper body. Of 25 types of injuries listed, the most upper body part injured was the wrist, which represented 24 respondents with a percentage of 11.3%. The slightest injury that occurred was teeth, which represented only 0.5%.

Table 4: Location of injuries for upper extremities

Location of Injuries	Frequency (n)	Percentage (%)
Wrist	24	11.3
Fingers	19	9.0
Hand	17	8.0
Forearm	16	7.5
Face	16	7.5
Nose	12	5.7
Shoulder	12	5.7
Mouth	11	5.2
Head	10	4.7
Elbow	10	4.7
Thumb	9	4.2
Eye	8	3.8
Spine	7	3.3
Scapula	7	3.3
Upper Arm	6	2.8
Stomach	5	2.4
Jaw	4	1.9
Chin	4	1.9

Breast	3	1.4
Clavicle	3	1.4
Ear	2	0.9
Neck	2	0.9
Ribs	2	0.9
Upper Back	2	0.9
Teeth	1	0.5
Total	212	100.0

Table 5 demonstrates the injured body part at the lower extremity. The ankle was the most frequent site of injury (16.4%), followed by the hip (14.7%) and knee (10.1%). The slightest injury location was a testicle with 0.4%.

Table 5: Location of injuries for lower extremities

Location of Injuries	Frequency (n)	Percentage (%)
Ankle	39	16.4
Hip	35	14.7
Knee	24	10.1
Groin	23	9.7
Foot	21	8.8
Pelvis	18	7.6
Lower Back	18	7.6
Lower Leg	16	6.7
Toe	15	6.3
Patella	8	3.4
Buttocks	8	3.4
Upper Leg	6	2.5
Heel	4	1.7
Coccyx	2	0.8
Testicles	1	0.4
Total	238	100.0

Table 6 shows the mechanism of injury among Taekwondo athletes. The highest mechanism was receiving blows with 20%, overuse (17.5%), and delivering blows (17%). Gradual onset caused 10%, followed by a sprint (8.5%), and no evidence of contact (2%).

Table 6: Mechanism of Injury

Mechanism of the Injuries	Frequency (n)	Percentage (%)
Receiving Blows	40	20.0
Overuse	35	17.5
Delivering Blows	34	17.0
Impact With Surface	25	12.5
Simultaneous Blows	25	12.5
Gradual Onset/Sudden	20	10.0
Sprint/ Running	17	8.5
No Evidence Of Contact	4	2.0
Total	200	100

The lower extremity was the most commonly injured area, followed by the upper extremity (Ji, 2016; Carlson, 2013). The most injury site for lower extremity injury was the ankle sprain due to high kicking and wrong landing (Ji, 2016). Carlson (2013) stated that the most injury sustained by the upper extremity is the wrist because Taekwondo combines punches and blocking techniques utilizing the wrist and hand. On the other hand, multiple types of primary injuries occurred to athletes, and all the injuries happened with the variable of mechanisms such as attacking, blocking an attack, fall, unblocked attack, and attacking with a punch (Dankner, Kaplan, & Barell, 2001). Mohd Salleh (2019) found that the most injury that occurred was contusion and the slightest injury was a fracture. However, there was no correlation between pain scale level and athlete performance during the tournament.

For the mechanism injury, receiving blows is the most cause the injury during training Kazemi et al., (2014; Carlson, 2013). Kazemi et al. (2014) mentioned that receiving blows happen due to the receiving kicking from the opponent, which uses the roundhouse kick technique. Carlson (2013) reported that the two most common mechanisms of injury for females were also receiving a blow and impact with a surface, possibly due to inexperienced competitors and the recreational nature of the Taekwondo in this study (Carlson, 2013).

IV. CONCLUSION

In conclusion, Taekwondo athletes had multiple injuries during the training between upper and lower extremities. The implementation of the new rules in Taekwondo did not affect the patterns of injuries. The result showed that the most injury occurred to athletes was contusion and the slightest injury was a hematoma. Taekwondo's highest mechanism of injury was receiving blows, and the lowest was no evidence of contact.

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