

Movement Analysis of Philippine Folk Dance Tinikling

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Abstract: The purpose of the study was to describe the dance movements of the folk dance Tinikling which is the most popular traditional dance and former national dance of the Philippines. The researchers adopted the movement analysis method similar to that of Mackenzie that involves the (1) description of the actual movements which occur at the joints involved; (2) the plane in which the movement occurs; and (3) the muscles producing the movement (agonist & antagonist). In addition, the researchers also had done a mechanical analysis on the lever type involved in the execution of the dance movement in terms of force, axis, and resistance. The prominent dance steps in the Philippine local dance Tinikling are the (1) running, (2) tinikling steps, (3) diagonal step, and (4) straddle jump with a turn step. The joints involved are: hip muscle which is ball and socket type of joint; and knee and ankle which are hinge joints. The major muscles involved in the dance include mostly the lower body muscle groups such as the quadriceps, hamstring, gluts, adductor muscle group, and calves. The type of lever used in performing the dance comprise majority of 1st, 2nd and 3rd class levers. Thus, the Tinikling is a viable dance which could improve the health related fitness of the performers in terms of muscular strength, muscular endurance, cardiovascular endurance and flexibility. Also, the dance could improve skill-related fitness such as power, agility, balance and coordination.

Key words:

Tinikling, folk dance, Philippines, movement analysis, mechanical

1. Introduction

Philippines is one of the most creative and rich in culture and tradition around the world. One of the traditional dance and former national dance of the Philippines is the Tinikling which originated during the Spanish

Colonial era. The tinikling dance originated in Leyte, Visayan Islands in the central Philippines. Tinikling is a dance that imitates the movement of the tikling birds as they walk between grass stems, run over tree branches, or dodge bamboo traps set by the farmers in

which the name Tinikling came from [1]. Due to the vigorous movements in the dance it is viewed as a culturally related physical activity which promotes physical fitness.

The dance consists of many hopping and leaping movements where performers are prone to repetitive and landing impact injury. Movement analysis researches are more common in sports and fitness exercises to improve technique, prevent injuries, and detect fitness associated benefits. Similarly, dance movements should also be analyzed to achieve the same purpose. According to Martin and Miller, by analyzing the musculoskeletal components in performing the dance teachers may be able to design activities to prepare the dancers more on the correct execution and prevent injuries. Analysis of movement can be done without the use of expensive equipment by visual observation of the involved joints and muscles [2, 3, 4]. The purpose of the study, therefore, is to analyze the dance movements of the Philippine folk dance Tinikling in terms of the joints, muscles involved and mechanical principles in the execution of movement to identify the health and skill related fitness benefits of the dance.

2. Methods

The study employed Martin and Miller's study design [3]. The Philippine folk dance Tinikling was described and analyzed through visual observation of the actual dance presentation. Movements were analyzed with the most practical and cheapest way without the use of expensive equipment as suggested by Mackenzie [2]. The analysis involved the (1) description of the actual movements which occur at the joints involved; (2) the plane in which the movement occurs; and (3) the muscles producing the movement (agonist & antagonist) [2, 3]. In addition, the researchers

also had done a mechanical analysis on the lever type involved in the execution of the dance movement in terms of force, axis, and resistance.

3. Results and discussion

The 3 prominent or common movements observed in the Philippine folk dance *Tinikling* are the (1) running, (2) the tinikling step, (3) tinikling-diagonal forward step, and (4) straddle jump with turns step. The biomechanical analysis and tables are provided in this section.

3.1 Analysis of running and tinikling step

Table 1 shows the biomechanical analysis of tinikling step. As shown in the table, the major joints involved in jogging are the hip, knee and ankle. The hip joint is a ball and socket type of joint which allows flexion and extension movements which take place in the sagittal plane. The active muscles are the iliopsoas (agonist for flexion; antagonist for extension) and gluteus maximus (agonist for extension; antagonist for flexion) [2]. The hip joint and muscle action in jogging is under the 3rd class lever (Axis-hip joint; Force-iliopsoas and gluteus maximus; Resistance-foot strike).

The knee is a hinge joint type allowing flexion and extension movements which take place in the sagittal plane. The muscles involved in the movement are the hamstring muscle group (agonist for flexion; antagonist for extension) and the quadriceps muscle group (agonist for extension; antagonist for flexion) [2]. The knee joint and muscle action in jogging is under the 1st class lever (Force-hamstring/quadriceps; Axis-knee; Resistance-foot strike).

Table 1. Biomechanical analysis of tinikling steps.

Joint	Type	Movement Allowed	Plane of Movement	Agonist	Antagonist	Type of Lever
Hip	Ball and socket	Flexion	Sagittal	Iliopsoas	Gluteus Maximus	3 rd class
		Extension	Sagittal	Gluteus Maximus	Iliopsoas	(AFR)
Knee	Hinge	Flexion	Sagittal	Hamstring	Quadriceps	1 st class
		Extension	Sagittal	Quadriceps	Hamstring	(FAR)
Ankle &	Hinge	Plantar Flexion	Sagittal	Gastrocnemius/Soleus	Tibialis Anterior	2 nd class (ARF)
Metarso-phalangeal joint		Dorsi Flexion	Sagittal	Tibialis Anterior	Gastrocnemius/Soleus	

For the ankle, the movements allowed are plantar flexion and dorsi flexion which take place in the sagittal plane [2]. The active muscles are the gastrocnemius/soleus (agonist for plantar flexion; antagonist for dorsi flexion) and tibialis anterior (agonist for dorsi flexion; antagonist for plantar flexion). The ankle joint and muscle action for jogging is categorized as 2nd class lever (Axis-ankle; Resistance-body weight; Force-gastrocnemius/soleus).

3.2 Analysis of Tinikling diagonal step and straddle jump with turn step

Table 2 shows the biomechanical analysis of tiniking diagonal step and straddle jump with a turn step. As shown in the table, the major joints involved in tinikling diagonal step are the hip, knee and metarso-phalangeal.

For the abduction and adduction movement of the hip on the sliding movement, the active muscles are adductor muscle group of the hip (agonist for adduction; antagonist for abduction) and gluteus medius and gluteus minimus (agonist for abduction; antagonist for adduction) [2, 3]. The hip joint and muscle action in cross step, slide close, slide close step is under the 3rd class lever (Axis – hip; Force – Adductor longus and gluteus medius; Resistance-foot strike) [3].

The knee is a hinge joint type allowing flexion and extension movements which take place in the sagittal plane.

The muscles involved in the movement are the hamstring muscle group (agonist for flexion; antagonist for extension) and the quadriceps muscle group (agonist for extension; antagonist for flexion) [2, 4].

Table 2. Biomechanical analysis of tinikling diagonal step.

Joint	Type	Movement Allowed	Plane of Movement	Agonist	Antagonist	Type of Lever
Hip	Ball and socket	Abduction	Frontal	Gluteus Medius Gluteus Minimus	Adductor Muscle Groups	3 rd class
		Adduction	Frontal	Adductor Muscle Groups	Gluteus Medius Gluteus Minimus	(AFR)
Knee	Hinge	Flexion	Sagittal	Hamstring	Quadriceps	1 st class
		Extension	Sagittal	Quadriceps	Hamstring	(FAR)
Ankle &	Hinge	Plantar Flexion	Sagittal	Gastrocnemius/ Soleus	Tibialis Anterior	2 nd class (ARF)
Metarso-phalangeal joint		Dorsi Flexion	Sagittal	Tibialis Anterior	Gastrocnemius/ Soleus	

The knee joint and muscle action in jogging is under the 1st class lever (Force-hamstring/quadriceps; Axis-knee; Resistance-foot strike) [3].

For the ankle, the movements allowed are plantar flexion and dorsi flexion which take place in the sagittal plane. The active muscles are the gastrocnemius/soleus (agonist for plantar flexion; antagonist for dorsi flexion) and tibialis anterior (agonist for dorsi flexion; antagonist for plantar flexion) [2, 4]. The ankle joint and muscle action for jogging is categorized as 2nd class lever (Axis-ankle; Resistance-body weight; Force-gastrocnemius/soleus) [3].

4. Conclusion

The prominent dance steps in the Philippine local dance Tinikling are the (1) running, (2) tinikling steps, (3) diagonal step, and (4) straddle jump with a turn step. The

joints involved are: hip muscle which is ball and socket type of joint; and knee and ankle which are hinge joints. The major muscles involved in the dance include mostly the lower body muscle groups such as the quadriceps, hamstring, gluts, adductor muscle group, and calves. The type of lever used in performing the dance comprise majority of 1st, 2nd and 3rd class levers. Thus, the Tinikling is a viable dance which could improve the health related fitness of the performers in terms of muscular strength, muscular endurance, cardiovascular endurance and flexibility. Also, the dance could improve skill-related fitness such as power, agility, balance and coordination.

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