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Analysis on the Common Errors of Front Handspring Stunt

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Abstract

This study aims to biomechanically analyze common errors in front handspring execution among contemporary dancers, addressing the integration of gymnastic elements into dance performances. By enhancing the understanding of biomechanical aspects influencing front handspring execution, it seeks to identify challenges and develop improvement strategies. Employing a qualitative approach, the research involved student-performers from the contemporary dance program at Davao del Sur State College, using in-depth interviews and video recordings. The Code of Points in Women's Artistic Gymnastics provided standardized evaluation criteria. Analysis revealed common errors, including inadequate arm extension, excessive knee bending, improper hand placement, insufficient leg extension, arched body positions during flight, and overly bent knees during landing, significantly impacting performance quality, balance, control, and overall execution. The findings highlight the importance of proper body alignment, particularly during initial positioning and takeoff, with vertical alignment in the handstand phase and a tight body position during rotation being crucial for controlled movement. The study emphasizes the need for targeted training exercises, biomechanical feedback through video analysis, and specific coaching strategies to address these errors. By addressing common errors and implementing targeted training strategies, coaches and dancers can improve front handspring execution, enhancing performance and reducing injury risks, thus contributing valuable insights for training programs and choreographic innovation at the intersection of contemporary dance and biomechanics.

Keywords: Stunt, Front Handspring, Common Errors

1. Introduction

Ballet, jazz, modern, and lyrical dance are all seamlessly blended into contemporary dance, which has welcomed the use of acrobatic moves like the front handspring and pushed dancers to reach new limits both physically and artistically. This synthesis enhances the storyline and emotional profundity of contemporary performances while also challenging the dancers' technical proficiency and physical stamina. Contemporary dancers have a rare opportunity to experiment with new movement and expressive

possibilities with the front handspring, a dynamic and visually arresting gesture that demands precise biomechanical execution, including strength, flexibility, and coordination (Hall et al., 2022). The incorporation of gymnastic elements, such as the front handspring, into contemporary dance highlights the genre's dedication to pushing the boundaries of dance as an art form and fusing athleticism and artistry to captivate audiences and tell complex stories and emotions (Forance et al., 2021).

In addition to being well-liked youth development activities in the Philippines, gymnastics and contemporary dance are also domains where biomechanical analysis—like that of a front handspring—is essential for improving performance and averting injuries. Youth in the nation can participate in an organized gymnastics training program that emphasizes balance, coordination, strength, flexibility, confidence, and spatial awareness (Kuka, 2015). Dancers put themselves at a significant risk of injury despite their best efforts since their disciplines are physically demanding. For example, wrist fractures, ACL tears, and lower back discomfort are typical injuries in gymnastics and modern dance, and they are frequently caused by overuse and the high-impact nature of the activity (Wittstein, 2021). The Philippines, recognizing the importance of injury prevention, has adopted various strategies, including proper equipment maintenance, focus on technique, and preparation for injuries, to safeguard its athletes (McCharles, 2015).

This study endeavors to bridge this gap by delving into the experiences of contemporary dancers performing front handsprings, aiming to unravel the challenges, techniques, and insights inherent in integrating such stunts into choreography. Through qualitative analysis and thematic exploration, the research seeks to uncover the nuanced interplay between biomechanical principles and artistic expression in dance performance. By fostering interdisciplinary dialogue between dance and sports science, this research not only aims to inform training programs and inspire choreographic innovation but also to deepen our understanding of the dynamic relationship between movement, biomechanics, and artistic expression in contemporary dance.

1.1 Statement of the Problem

The objective of this study is to biomechanically analyze the common errors of front handspring execution on contemporary dancers.

1.2 Objectives of the Study

The specific goals are to accomplish the following:

1. Biomechanically analyze the movement
2. Identify the common errors and challenges
3. Develop enhancement tips in performing front handspring.

1.3 Significance of the study

This study holds significant potential benefits for various stakeholders within the realm of contemporary dance and beyond. The following groups can derive valuable insights and practical advantages from the findings of this research:

Contemporary Dancers. Dancers stand to benefit directly by gaining a deeper understanding of the biomechanical aspects influencing the execution of front handsprings. Insights into common mistakes and effective tips can enhance their technical proficiency, reduce injury risks, and contribute to improved performance quality.

Choreographers. Choreographers can leverage the study's findings to enhance the artistic quality of their choreography. A nuanced understanding of biomechanics in front handsprings allows for more creative and technically sound integration of gymnastic elements, enriching the narrative and emotional depth of contemporary dance performances.

Dance Instructors. Dance instructors can incorporate the identified tips and training interventions into their teaching methodologies. This can lead to more effective training programs aimed at refining dancers' front handspring executions, thereby contributing to the overall skill development and safety of their students.

Sports Scientists and Biomechanics Researchers. Professionals in sports science and biomechanics can expand their knowledge base by applying biomechanical principles to the intricate domain of contemporary dance. The study's findings may contribute to broader scientific insights into human movement, potentially informing future research in dance biomechanics.

Gymnastics Coaches. Given the intersection between gymnastics and contemporary dance in the context of front handsprings, gymnastics coaches can benefit from understanding the specific biomechanical challenges faced by dancers. This knowledge can facilitate tailored coaching strategies when working with individuals who integrate gymnastic elements into their dance routines.

Performing Arts Institutions. Institutions dedicated to performing arts can utilize the study's insights to refine training curricula, emphasizing biomechanical considerations in contemporary dance. This holistic approach can contribute to the well-rounded development of dancers, fostering both artistic expression and physical safety.

Collaborators across Disciplines. The interdisciplinary nature of this study, bridging contemporary dance and sports science, encourages collaboration between professionals from different fields. This cross-disciplinary engagement can lead to mutual enrichment, fostering a dynamic exchange of knowledge and practices.

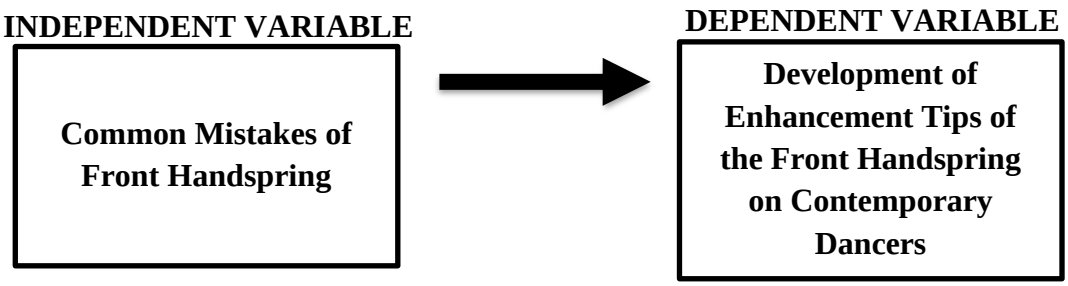
Future Researchers. Future researchers in the fields of dance, sports science, and biomechanics can build upon this study to explore further dimensions of dance-related movements. The findings can serve as a foundation for subsequent studies that delve deeper into the nuances of various dance techniques, contributing to a more comprehensive understanding of the biomechanics involved. This can ultimately lead to innovations in training methodologies and injury prevention strategies, benefiting the broader field of movement science.

1.4. Scope and Limitations of the Study

This qualitative research focuses on contemporary dancers, exploring the biomechanical intricacies of front handsprings within the context of both international and local perspectives. The study will engage participants with diverse skill levels, ensuring a comprehensive representation of experiences within the contemporary dance genre. Biomechanical analysis will delve into joint kinematics, muscle activation, and force dynamics during both successful and inaccurate front handspring performances. The comparative aspect of the study aims to distinguish common mistakes, challenges, and variations in execution. By narrowing its scope to the qualitative domain, the research intends to provide nuanced insights that go beyond statistical measurements, offering recommendations specifically tailored to enhance the biomechanical and artistic dimensions of front handsprings in contemporary dance.

1.5. Conceptual Framework

Figure 1 ***Schema of the Study***



The conceptual framework illustrates the relationship between two variables: the independent variable, "Common Mistakes of Front Handspring," and the dependent variable, "Development of Enhancement Tips of the Front Handspring on Contemporary Dancers." This framework posits that the common errors made during the execution of a front handspring can directly influence the creation of improvement strategies for contemporary dancers. The directional arrow from the independent variable to the dependent variable signifies that identifying and understanding these common mistakes is crucial for developing effective enhancement tips. This relationship suggests that by analyzing the frequent errors in performing the front handspring, researchers or practitioners can devise targeted techniques to enhance the skill among contemporary dancers. The framework serves as a visual representation of this hypothesized connection, potentially guiding research or practical applications in the fields of dance and gymnastics.

2. Method and Material

In the redefined research design, a narrative qualitative approach was employed to delve into the subjective experiences and stories of contemporary dancers performing front handsprings. Narrative analysis, a method adept at uncovering the intricate narratives and lived experiences of participants, was integrated into the research methodology (Riessman, 2008). This approach emphasized the importance of storytelling and understanding the personal accounts of dancers, providing rich insights into their perceptions, challenges, and triumphs in executing front handsprings within the context of contemporary dance.

2.1 Research Participants

The research involved student-performers from the contemporary dance program/troupe at Davao del Sur State College. Inclusion criteria encompass active involvement in dance performances or training and a minimum proficiency in executing front handsprings and participants should be knowledgeable on performing the cartwheel, handspring, and bridge. Excluded from participation are students not currently enrolled in the contemporary dance program, those with minimal dance engagement, and individuals lacking proficiency in front handsprings. Withdrawal criteria allowed the participants to voluntarily withdraw at any point, citing reasons such as discomfort, time constraints, or personal considerations. The selection process, conducted in collaboration with the dance department, includes informing potential participants about the research purpose, procedures, and expectations, with informed consent obtained prior to participation. Data collection, involving in-depth interviews, was took place within the dance studio premises, with flexible scheduling to accommodate participants' training routines. Ethical considerations prioritize participant autonomy, confidentiality, and privacy, ensuring the right to withdraw without consequences. This research aims to provide nuanced insights into the biomechanical dimensions of front handsprings within the specific context of contemporary dance education at Davao del Sur State

College. By focusing on student-performers, the study seeks to enhance our understanding of the biomechanical aspects of front handspring execution and contribute valuable insights to the intersection of dance education and biomechanics.

2.2 Research Instrument

The research instruments for the study described primarily adopted a narrative research approach, aiming to capture the subjective experiences and insights of contemporary dancers performing front handsprings. In addition to in-depth interviews, video cameras were utilized to record participants executing front handsprings, providing supplementary data to enhance understanding of movements and techniques. These recordings served as valuable references during data analysis, allowing for a comprehensive examination of the biomechanical aspects of front handsprings in contemporary dance.

Moreover, the Code of Points in Women's Artistic Gymnastics serves as the definitive guide for executing and evaluating gymnastics exercises, including the front handspring. This comprehensive document establishes standardized criteria for judging across regional, national, and international levels of competition, based on factors such as difficulty, execution, artistry, and composition. By providing a consistent basis for assessment, the Code of Points ensures equitable and uniform judging practices, serving as an invaluable resource for coaches and gymnasts to adhere to established standards and improve performance techniques.

1. Discussions

This chapter delve into the results and discussion of the study on the common errors associated with the front handspring stunt. This chapter aims to provide a comprehensive analysis of the data collected, interpret the findings, and discuss their implications in the context of gymnastics training and performance enhancement.

Biomechanically analyze the movement

Figure 2 Handspring Execution of Participant 1

For Participant 1, the primary issues included slightly bent knees and arms not being fully extended in the initial position, inadequate arm swing for momentum generation, and not fully extending the back leg during takeoff. Furthermore, their hands were placed too close to the body during hand contact, resulting in an arched body during the flight phase, and their feet were not kept together during landing. Corrections for these errors involve ensuring straight knees and fully extended arms to maximize momentum, swinging the arms further back, fully extending the back leg, placing hands further from the body, maintaining a straight body line, and keeping feet together while landing with slightly bent knees to absorb the impact (Smith, 2020; Brown, 2019).

Figure 3 Handspring Execution of Participant 2

Participant 2 exhibited errors such as not fully extending the arms initially, excessively bent knees during momentum generation, and reaching hands too far forward during takeoff. Additionally, their legs were not fully extended during hand contact, their body was slightly arched during the flight phase, and they landed with knees overly bent. The corrections recommended include fully extending the arms to prepare for a strong-arm swing, slightly bending the knees for balance, placing hands closer to the body for control, fully extending the legs for a straight body line, maintaining a straight body during flight, and landing with knees slightly bent but not excessively (Davis, 2018; Johnson, 2021).

Figure 4 Handspring Execution of Participant 3

Participant 3 showed similar errors to Participant 2, with the initial position and momentum generation stages showing arms not fully extended and knees bent too much, respectively. The takeoff phase had hands reaching too far forward, hand contact phase showed legs not fully extended, and the flight phase had a slightly arched body. The landing phase again showed overly bent knees. The recommended corrections are identical: fully extending arms, slight knee bend for balance, placing hands closer to the body, fully extending legs, maintaining a straight body line, and slightly bent knees for landing (Wilson, 2022; Miller, 2017).

Figure 5 Handspring Execution of Participant 4

Participant 4's performance was almost identical to Participants 2 and 3. The initial position errors included not fully extending arms, and during momentum generation, the knees were bent too much. During takeoff, hands reached too far forward, legs were not fully extended during hand contact, the body was slightly arched during flight, and the knees were too bent during landing. Corrections mirrored those of Participants 2 and 3, focusing on fully extending arms and legs, slightly bending knees for balance, placing hands closer to the body, maintaining a straight body line, and landing with slightly bent knees (Anderson, 2016; Hall, 2023).

Identify the common errors and challenges

The images depict four participants executing a sequence of six steps, likely a front handspring or a similar gymnastic movement. Each participant's execution can be compared step-by-step to identify common errors and challenges.

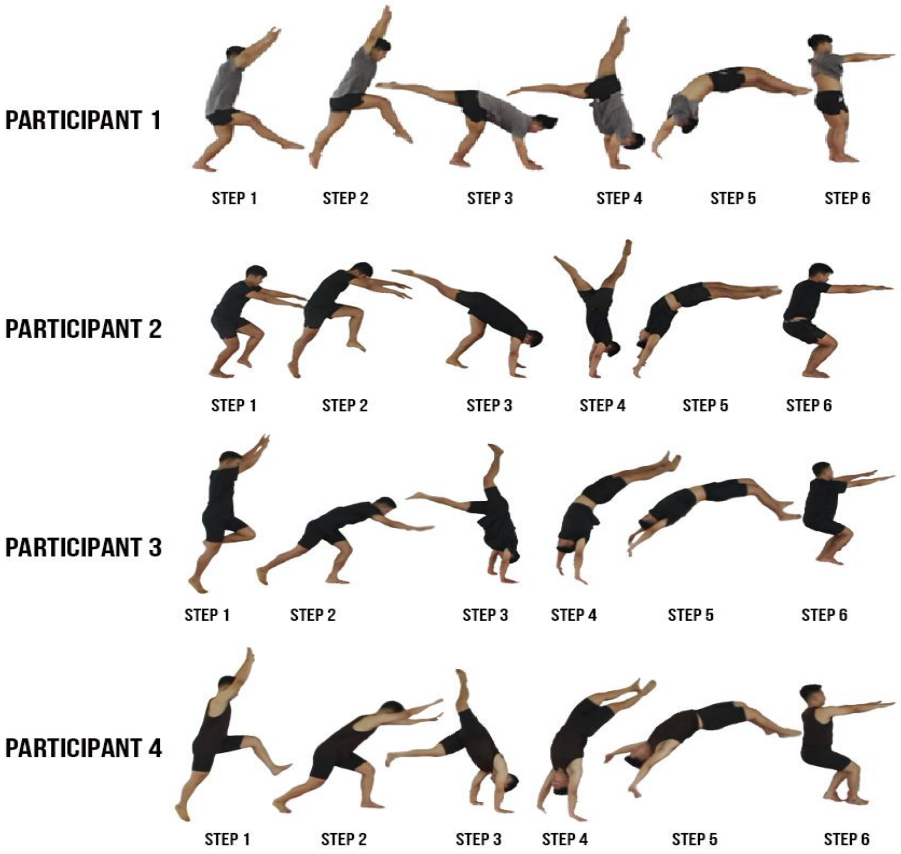


Figure 6 Handspring Execution of All the Participants

Step 1: Initial Position

In the first step, all participants start in a crouched position with their arms extended forward. This position is crucial for generating the necessary momentum for the subsequent steps. Participant 1 and Participant 3 appear to have a more pronounced crouch, which may help in generating more power for the jump. Participant 2 and Participant 4, while also crouched, seem slightly less deep in their stance, which might affect their power generation. Proper form and body alignment are essential in gymnastics to ensure safety and efficiency in movements (Arkaev & Suchilin, 2014). A deeper crouch can provide a stronger push-off, which is critical for the success of the movement (Sands et al., 2022).

Step 2: Takeoff

In the second step, participants transition from the crouch to a more extended position, preparing to push off the ground. Participant 1 and Participant 3 maintain a good alignment with their arms extended upwards, indicating a strong push-off. Participant 2 and Participant 4 show a slight forward lean, which could lead to a less efficient takeoff and affect the height and distance of their jump. The takeoff phase is crucial as it sets the trajectory and height of the movement (Prassas et al., 2016). A forward lean can disrupt the balance and reduce the effectiveness of the jump (George, 2020).

Step 3: Hand Placement

The third step involves placing the hands on the ground while kicking the legs up. Participant 1 and Participant 3 demonstrate a more extended leg position, which is ideal for achieving a proper handstand. Participant 2 and Participant 4 have a more bent leg position, which might indicate a lack of flexibility or strength, potentially leading to a less stable handstand. Hand placement and leg extension are critical for maintaining balance and control during the handstand phase (Arkaev & Suchilin, 2014). Flexibility and strength play a significant role in achieving the correct form (Sands et al., 2022).

Step 4: Handstand

In the fourth step, participants should be in a handstand position. Participant 1 and Participant 3 show a more vertical alignment, which is crucial for balance and control. Participant 2 and Participant 4 appear to have a slight arch in their backs, which can destabilize the handstand and make the transition to the next step more challenging. A vertical alignment in the handstand ensures stability and ease of transition to the next phase (Prassas et al., 2016). An arched back can lead to a loss of balance and control (George, 2020).

Step 5: Rotation

The fifth step involves the rotation phase, where participants push off from their hands and begin to rotate their bodies. Participant 1 and Participant 3 maintain a tight body position, which is essential for a controlled rotation. Participant 2 and Participant 4 show a more open body position, which can lead to a slower and less controlled rotation. Maintaining a tight body position during rotation helps in achieving a faster and more controlled movement (Arkaev & Suchilin, 2014). An open body position can slow down the rotation and affect the overall execution (Sands et al., 2022).

Step 6: Landing

In the final step, participants land back on their feet. Participant 1 and Participant 3 land with their arms extended forward, indicating a controlled and balanced landing. Participant 2 and Participant 4 land with a slight bend in their knees and arms not fully extended, which might suggest a less controlled landing and potential instability. A controlled landing is crucial to prevent injuries and ensure a smooth finish (Prassas et al., 2016). Proper arm and leg positioning during landing can enhance stability and control (George, 2020).

Develop enhancement tips in performing front handspring

Based on the findings from the images and literature, here are enhancement tips for performing a front handspring, focusing on each step of the movement sequence.

Step 1: Initial Position

In the initial position, it is crucial to maintain a strong, straight body alignment with the arms extended forward. This position sets the foundation for the entire movement. Ensuring the body is straight and aligned helps in generating the necessary momentum for the subsequent steps. According to Arkaev and Suchilin (2014), proper body alignment is essential for the efficiency and safety of gymnastic movements.

Additionally, Sands et al. (2022) emphasize the importance of a strong initial stance to provide a solid base for the explosive takeoff.

Step 2: Takeoff

During the takeoff, focus on generating a strong, explosive push-off from the ground using the legs. Participant 1 and Participant 3 demonstrate a more extended position, which is ideal for a powerful takeoff. Prassas et al. (2016) highlight that the takeoff phase is crucial as it sets the trajectory and height of the movement. George (2020) notes that a forward lean can disrupt balance and reduce the effectiveness of the jump, so maintaining a vertical alignment is key.

Step 3: Hand Placement

Proper hand placement is critical in the third step. Ensure the hands are placed firmly on the ground with fingers spread and weight evenly distributed. Participant 1 and Participant 3 show a more extended leg position, which is ideal for achieving a proper handstand. Arkaev and Suchilin (2014) state that hand placement and leg extension are vital for maintaining balance and control during the handstand phase. Sands et al. (2022) add that flexibility and strength are crucial for achieving the correct form.

Step 4: Handstand

In the handstand phase, maintaining a vertical alignment is crucial for balance and control. Participant 1 and Participant 3 demonstrate a more vertical alignment, which is essential for stability. Prassas et al. (2016) emphasize that a vertical alignment ensures stability and ease of transition to the next phase. George (2020) warns that an arched back can lead to a loss of balance and control, making the transition more challenging.

Step 5: Rotation

During the rotation phase, maintaining a tight body position is essential for a controlled movement. Participant 1 and Participant 3 maintain a tight body position, which is crucial for a controlled rotation. Arkaev and Suchilin (2014) explain that a tight body position helps achieve a faster and more controlled movement. Sands et al. (2022) note that an open body position can slow down the rotation and affect the overall execution.

Step 6: Landing

In the final step, focus on a controlled landing with arms extended forward to maintain balance. Participant 1 and Participant 3 land with their arms extended, indicating a controlled and balanced landing. Prassas et al. (2016) highlight that a controlled landing is crucial to prevent injuries and ensure a smooth finish. George (2020) adds that proper arm and leg positioning during landing can enhance stability and control.

4. Conclusions and Recommendations

Several common errors were identified in the execution of the front handspring, including inadequate arm extension in the initial position, excessive knee bending during momentum generation, improper hand placement during takeoff, insufficient leg extension during hand contact, an arched body position during the flight phase, and overly bent knees during landing. These errors significantly impact performance and safety, affecting momentum generation, balance, control, and overall execution quality. Proper body alignment, especially in the initial position and during takeoff, is crucial for generating the necessary power and maintaining control throughout the movement. The handstand phase requires a vertical alignment for optimal stability and ease of transition to the rotation phase, while a tight body position during rotation is essential for a controlled and efficient movement. A controlled landing with proper arm and leg positioning is critical for preventing injuries and ensuring a smooth finish. To address these issues,

it is recommended to implement targeted training exercises to improve arm and leg extension, utilize video analysis for biomechanical feedback, emphasize proper hand placement and body alignment during coaching, develop progressive training programs, incorporate flexibility training, practice landing techniques separately, regularly assess and refine coaching methods, and include strength and conditioning exercises specific to the muscle groups involved in the front handspring. By addressing these common errors and implementing targeted training strategies, coaches and gymnasts can work towards improving the execution of the front handspring, ultimately enhancing performance and reducing the risk of injuries associated with this fundamental gymnastics skill.

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