

## Risk Factors of Roundhouse Kick Wushu Injury: Systematic Review and Meta-Analysis



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**ABSTRACT:** The roundhouse kick is a basic kicking technique in martial arts which is very important in achieving victory. The roundhouse kick is a simple move, easier, faster and more powerful than any other foot action that is also easy to use for attack and for defence, therefore it is the move most used. The aim of this study was to identify and critically assess the evidence relating to risk factors for roundhouse kick injuries. A systematic review was conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) framework. Articles were searched using Scopus, Google Scholar and PubMed. The results of the selected articles revealed that risk factors for injury in roundhouse kick wushu, namely competition experience, technique, history of previous injuries, age, overuse, physical fitness, warm-up and stretching. All risk factors for injury due to competition experience, technique, previous injury history, age, overuse, physical fitness, warm-up and stretching are things to consider. History of previous injuries is the most important factor that can cause injury. Handling and care need to be done optimally to minimize the occurrence of injuries or recurrence of old injuries. In addition, physical fitness, warming up and stretching also really need to be considered before doing sports activities, especially doing roundhouse kick wushu movements to reduce the risk of injury. All risk factors for injury due to competition experience, technique, previous injury history, age, overuse, physical fitness, warm-up and stretching are things to consider. History of previous injuries is the most important factor that can cause injury. Handling and care need to be done optimally to minimize the occurrence of injuries or recurrence of old injuries. In addition, physical fitness, warming up and stretching also really need to be considered before doing sports activities, especially doing roundhouse kick wushu movements to reduce the risk of injury. All risk factors for injury due to competition experience, technique, previous injury history, age, overuse, physical fitness, warm-up and stretching are things to consider. History of previous injuries is the most important factor that can cause injury. Handling and care need to be done optimally to minimize the occurrence of injuries or recurrence of old injuries. In addition, physical fitness, warming up and stretching also really need to be considered before doing sports activities, especially doing roundhouse kick wushu movements to reduce the risk of injury. History of previous injuries is the most important factor that can cause injury. Handling and care need to be done optimally to minimize the occurrence of injuries or recurrence of old injuries. In addition, physical fitness, warming up and stretching also really need to be considered before doing sports activities, especially doing roundhouse kick wushu movements to reduce the risk of injury. History of previous injuries is the most important factor that can cause injury. Handling and care need to be done optimally to minimize the occurrence of injuries or recurrence of old injuries. In addition, physical fitness, warming up and stretching also really need to be considered before doing sports activities, especially doing roundhouse kick wushu movements to reduce the risk of injury.

**KEYWORDS:** Factors, Risk, Roundhouse kick, Wushu, Injury

### I. INTRODUCTION

Wushu can also be interpreted as the art of war or martial arts(El et al., 2022)which includes studying arts, sports, health, martial arts and mental(H. Sun et al., 2022;N. Zhang et al., 2022). Wushu or often also called Kungfu is a martial art that originated in ancient China(Mehrsafar et al., 2019)and spread to all corners of the world through a Chinese named Hua Ren who went abroad and the history of Wushu itself cannot be traced anymore, because it is thousands of years old.(H. Liu & Qu, 2023)and maybe as old as Chinese history where there were many wars(J. Zhang et al., 2022). Wushu can basically be classified into two: the formal/art which is called taolu and the fighting which is often called sanda(Lu, 2008), formal/art wushu is usually a

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set of choreographed moves (Y. Liu et al., 2023), while wushu fights are characterized by one-on-one fights which are regulated in a regulation (Yi & Yu, 2022). Some of the opinions above can be interpreted that wushu is a martial art that originates from China and has been and continues to be developed through existing regulations. Statistical data, sanda has the highest usage rate and score during the competition (Lei & Lv, 2022), which is the essence of the whole sanda technique (Ren, 2022; Wehner et al., 2022).

Comparisons have been made regarding the technical use of Chinese and foreign Sanda athletes and carried out statistical data (Songs, 2022), the conclusion of the main research is that in punching techniques, intermediate level athletes mainly use straight punches and swing punches, but high scores are often used in leg techniques (Vasconcelos et al., 2020). The studied characteristics related to the technicality of male lightweight athletes and showed that the best lightweight athletes were clearly inferior to the heavyweights in terms of strength (CJ & MGL, 2017) and the use of fists rarely scores points, fists are more often used as fake wobbles (G. Sun & Bin, 2018) mainly relying on leg kicks to score points (Wasik et al., 2022). The roundhouse kick is a simple move (Jung & Park, 2022), easier (Moreira et al., 2021), faster and stronger than any other foot action (Wąsik, Mosler, Ortenburger, Góra, et al., 2021) and also easy to use to attack and to defend (Yugang Li, Faben Van, Yujiu Zeng, 2008). This shows that this roundhouse kick is a very effective movement (Ha et al., 2022). Therefore, it can be concluded that the roundhouse kick is a very important thing in wushu (Wąsik, Mosler, Ortenburger, & Góra, 2021).

Wushu in Indonesia has a significant development. The Indonesian government itself includes wushu in the National Sports Grand Design (DBON) program. In different combat sports, risk factors for injury have been studied, including internal and external factors (Kim et al., 2022).

Injuries that occur in roundhouse kicks are higher compared to other attack techniques, knowledge of the risk factors that cause injuries to roundhouse kicks is still needed. Several studies on roundhouse kick injuries are already underway (Pieter, 2005). Identifying and explaining the risk factors that lead to injuries in roundhouse kicks will certainly go a long way in preventing these injuries. To date, and to the best of the author's knowledge the literature review conducted by Kim et al., the author has not specifically explained the risk factors for injury in the roundhouse kick movement. Therefore, the purpose of this study was to conduct a systematic review to identify and explain risk factors for injury in wushu athletes who frequently perform roundhouse kicks.

## II. MATERIALS AND METHODS

The research design in this study used the literature review method. A literature review study is a research design using secondary data related to a particular topic. This literature review study aims to conclude the theory based on several previous research results. The data collection method for this article review uses access to Scopus, Google Scholar and PubMed. The literature review data collection stage uses the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) flow method. The search for research articles is determined by the existing criteria. (1) variables according to written requirements; (2) consistent data collection methods; (3) valid research results; and (4) data analysis is defined precisely and clearly.

Researchers looking for articles related to the topic of risk factors for roundhouse kick injuries using the Scopus, Google Scholar, and PubMed databases were selected because of their ease of access and feasibility to get complete, clear and in-depth articles. In addition, researchers are also looking for open access articles so they can access them free of charge. The keywords used in the search are roundhouse kick, wushu, injury, risk, and factors.

Selection of the type of study was carried out through a screening process and determinations of eligibility were made in the meta-analysis. The selection of studies in this study used several criteria, namely: 1) articles related to roundhouse kick, wushu, injuries, risks, and factors; 2) published within the last 8 years. Next, the researcher selects all titles along with abstracts to check for duplication using the Mendeley application. Search results and the process of selecting articles will be described using a flowchart. The 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow chart is used to summarize the study selection process.

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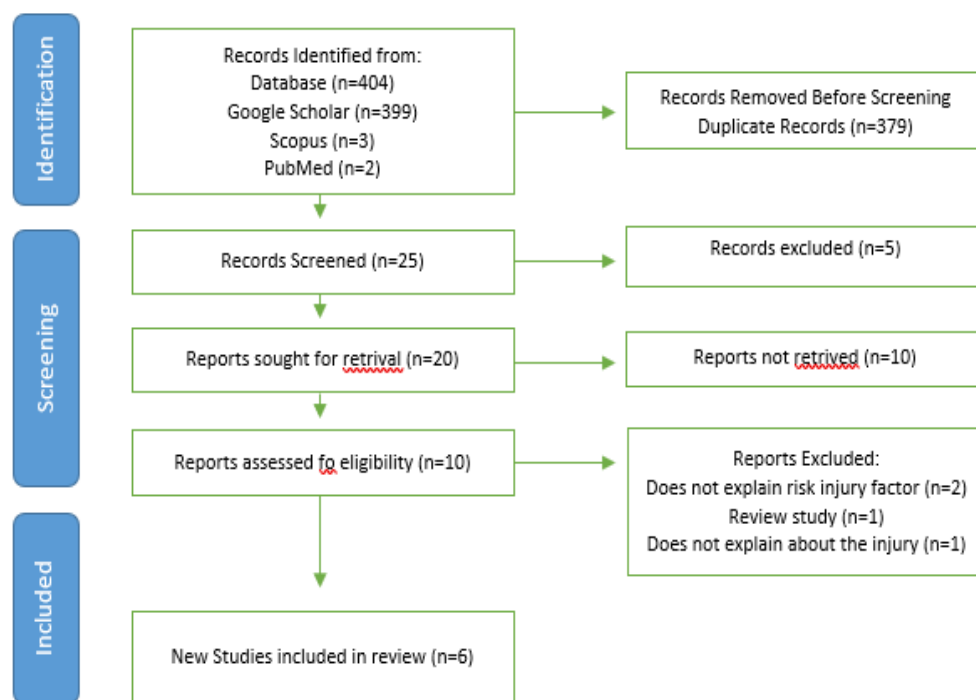


Figure 1. Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) Flowchart

### III. RESULT

From the search results that have been carried out by researchers, six articles related to risk factors for roundhouse kick injuries in the last 8 years have been reviewed and obtained with various research methods and different results. The following is the name of the author (year), study design, sample, number of samples, and risk factors for injury.

Author (year)	Research design	Sample	Number of Samples	Injury Risk Factors
(Su et al., 2023)	Case Report	-	-	Matching experience, History of previous injuries
(Demorest et al., 2016)	Case report	Using data from US Emergency departments for martial arts-related injuries from 1990 to 2003	-	Technique, Warm Up or Stretching, overuse
(Vitale et al., 2018)	Case Report	-	130 Athletes	Age, Experience competing
(Koutures & Demorest, 2018)	Case Report	-	-	Physical Fitness, Past injury history
(Bhatia et al., 2015)	Cross-Sectional	Using data with the University of California, Los Angeles	72 Athletes	Age, Experience, Physical Fitness
(Janzen et al., n.d. 2020)	Case Report	-	-	Stretching or Warming Up

An overview of the study selection process is described in Figure 1. The initial search found 404 articles, consisting of 399 articles from Google Scholar, 3 articles from Scopus, and 2 articles from PubMed. After going through the selection process, 379 articles were automatically deleted, and 25 articles were obtained that were potentially relevant to go through the next selection process. Of the 25 articles, 5 that did not meet the inclusion criteria were deleted, and 20 articles were found. Of the 20 articles reviewed through research titles and abstracts, 10 were deleted, and the remaining 10 deserved analysis. Of the 10

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articles analyzed by the researchers, six were found for review. Deletion of 4 articles was due to 2 articles not being able to explain the risk factors for roundhouse kick injury, 1 article being a systematic literature review.

### **IV. DISCUSSION**

This study is a systematic review that evaluates the risk factors for roundhouse kick injuries. A total of seven injury risk factors have been reviewed and analyzed, namely competition experience, technique, previous injury history, age, overuse, physical fitness, warm-up and stretching.

#### **A. Competing Experience**

Experience is a risk factor for injury in sports because the higher understanding and skills possessed by athletes can influence how they respond to situations and challenges that arise during movement.(Malone et al., 2017)in this case it's a roundhouse kick. In line with researchBell et al.,which states that experience can reduce the level of risk of injury. Another study revealed that inexperienced athletes were more likely to be injured than experienced athletes(Malone et al., 2017).

#### **B. Technique**

Improper or poor technique in sports or physical activity can be a risk factor for injury. Poor technique can cause increased stress on the body, damage physical structure, and affect balance and coordination. Techniques that are poorly understood can increase the risk of injury(Thacker et al., 2004). In addition to reducing the risk of injury, good technique can also optimize movement(Benjaminse et al., 2015)which in this case is a roundhouse kick. In line with researchGabbett & Ryan,which revealed that good technique contributed to the degree of injury sustained.

#### **C. Previous Injury History**

A history of previous injury is a risk factor for injury because previous injury experience can affect a person's physical, psychological, and behavior, which in turn can increase the likelihood of future injury.(Hägglund et al., 2006)revealed that a history of injuries that have been experienced will be more susceptible to injury again. Another study explains that previous injuries create susceptibility to subsequent injuries(Toohey et al., 2017). In line with researchResnick et al.,which reveals that there is a significant relationship between prior injury and trauma which in this case will stimulate the risk of subsequent injury.

#### **D. Age**

Age is a risk factor for injury in physical activity and sports due to physical changes, development and decreased body ability. Age can affect how a person responds to certain exercises or physical activities(Khamalia et al., 2006). Another study revealed that older people experience more injuries(McGuine, 2006). In line with researchGrams et al.,which revealed that old age is closely related to a higher risk of injury. Old age in this case is the age of 50 years and over(Changstrom et al., 2022).

#### **E. Overuse**

Overuse or overuse in physical activity or sports can be a risk factor for injury from too often or too hard doing the roundhouse kick. Roundhouse kicks can cause excessive stress on the body, damage tissue, and increase the risk of injury if done excessively(Divine & Kohl III, 1998). Injuries resulting from overuse can affect athletes(Mahieu et al., 2006). In line with researchKauther et al.,which revealed that overuse increases the risk of injury.

#### **F. Physical Fitness**

Physical fitness involves strength, endurance, balance, flexibility and other components that contribute to the body's ability to perform properly and safely during exercise or physical activity. Poor or poor physical fitness can be a risk factor for injury in physical activity and sports(Carter & Micheli, 2011). In line with researchJones et al.,which explains that the components of physical fitness with the risk of injury have a close relationship. Keeping in shape can reduce the risk of injury(Grant et al., 2015).

#### **G. Warm Up and Stretching**

Incorrect or neglected warm-up and stretching can be a risk factor for injury. Proper warm-up and stretching help prepare the body by increasing blood circulation, improving flexibility and effectively reducing muscle tension(Smith, 1994). In another study, it was explained that athletes who did not warm up and stretch were more prone to injury compared to athletes who did warm up and stretch(Small et al., 2008). In line with researchO'Sullivan et al.,which revealed that warming up and stretching reduced the risk of injury and increased flexibility of the body.

### **V. CONCLUSIONS**

From all the discussion above, it can be concluded that the risk factors for roundhouse kick wushu injuries are competition experience, technique, previous injury history, age, overuse, physical fitness, warm-up and stretching. All risk factors for past

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injuries, past injury history, physical fitness, warm-up and stretching are things that really need attention. History of previous injuries is the most important factor that can cause injury. Handling and care need to be done optimally to minimize the occurrence of injuries or recurrence of old injuries. Apart from that, physical fitness, warming up and stretching also really need to be considered before doing sports activities, especially doing roundhouse kick wushu movements to reduce the risk of injury.

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