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LETTER TO THE EDITOR

Reasons for Absolute Strength Injury and Preventive Measures in Skiing from the Ecological Perspective

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In skiing sports, absolute strength training is very necessary, an increased strength plays a vital role in improving skiing results. Under long term of high intensity training, the change of centre-of-gravity position may lead to deformed movement. The unbalanced movement and exerting excessive strength will further lead to injures of waist, knee, should joint, etc, and thus severely impact careers of skiers. This paper conducted retrospective analysis of occurrence situations of absolute strength injures after skiers applied with comprehensive prevention measures and excellent effect was obtained. Now we conclude the causes for sport injures and related prevention measures as below, in the hope of providing reference and guidance for skiers and skiing trainers.

I Introduction

Peng-Tao Ma. Publish "The Way and Environment of Physical Training of Canadian Athletes and Inspiration" on Issue 107, Pages: 4249-4256, Article No: e107474, Year: 2019. We are often and times met with the popular ideas on the education and development of good athletes which have concluded that athletic excellence as primarily the result of innate abilities or extensive practice and experience.

Absolute strength is created by muscle contraction, skier with larger weight normal can create larger absolute strength, and there is a significant positive relation between weight and absolute strength. In skiing sports, absolute strength training is very necessary, an increased strength plays a vital role in improving skiing results. To increase absolute strength, skiers need to train with quick and repeated lifting movement, squats and straightening up, so as to exert max strength in shortest period. For skiers, absolute strength training can quick increase the strengths of leg, shoulder, waist and back, so as to take more advantages during competition. However, under long term of high intensity training, the change of centre-of-gravity position may lead to deformed movement. The unbalanced movement and exerting excessive strength will further lead to injures of waist, knee, should joint, etc, and thus severely impact careers of skiers (Cantarella 2015).

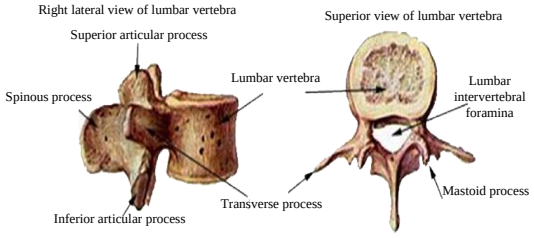

Figure 1a. The Sketch Map of waist injury

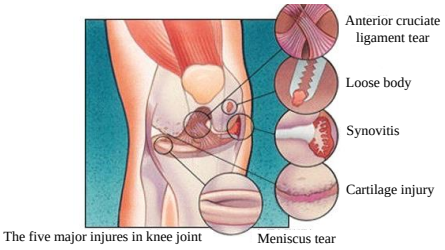

Figure 1b. The Sketch Map of knee joint injury

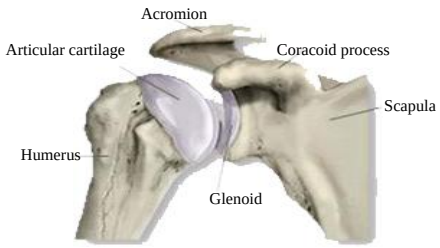

Figure 1c. The Sketch Map of Shoulder joint injury

Figure 1. Example of a figure caption. ***(figure caption)***

To prevent related problems, it is needed to take effective prevention against absolute strength injures, so as to reduce the risk of gating absolute strength injures from the source. To realize such purpose, this paper conducted retrospective analysis of occurrence situations of absolute strength injures after skiers applied with comprehensive prevention measures and excellent effect was obtained. Now we conclude the causes for sport injures and related prevention measures as below, in the hope of providing reference and guidance for skiers and skiing trainers (Wang et al. 2015).

II Data and Method

General data. The research objects and data were all collected from May 2014 to Oct 2015. Research objects were 1200 professional skiers including 745 male ones and 455 female one; The youngest age was 13, while the oldest was 27, with average age reaching at 23.4±2.84; The skiers were divided into two groups using random number table, with 600 in each group. The observation group was applied with comprehensive sports injury prevention measure, while the control group was applied with conventional prevention measure. Through comparison of basic data of both groups, it can observe no statistical difference, $P>0.05$, as shown in Table 1.

Prevention method. Control group was applied with conventional sports injury prevention measure regarding causes and symptoms of absolute strength injury as well as emergency treatment after injury; the observation group was applied with comprehensive injury prevention measure, the specific contents are shown as below (Chen et al. 2015).

First, to improve daily training skill of skiing and scientificity and reasonability of training method. Skiing trainers should targeted research according to current training plan of skiers, realizing specific analysis upon specific problem. For patients who have once suffered absolute strength injures, it is needed to increase or reduce

training intensity of particular training sector according to specific injury condition, and reformulate training plan if necessary, so as to guarantee training reasonability. In addition, skiing trainers should continuous improve skiing skill movements. In particular, for young skiers, skill training is of key importance. Skill training and physical quality training should be conducted both, skill movements should be standard and reasonable, so as to form a correct dynamic stereotype (Gao et al. 2017).

Second, in daily training of skiing sports, the training intensity must be monitored and controlled in a scientific and reasonable. There is a significant relation between absolute strength injury and skiing sports feature. Therefore, to realize an effective prevention of skiing injury, it must fully know and understand the features of skiing sports, taking scientific and reasonable training intensity and avoiding sports injuries. In addition, it is needed to focus on detection and test of conventional physiological indexes such as hemoglobin, blood urea, creatine kinase and urine. Nutrients should be immediately supplemented upon the detection of unqualified physiological indexes (Chen et al. 2015).

Third, take proper amount of skiing exercise and avoid sports fatigue. After each training, skier should be suggested to pay attention to physical capacity recovery, and try to avoid injuries caused by accumulation of fatigue. Large amounts of researches have showed that excessive skill and semi-skill practice may lead to mental fatigue, excessive strength training may lead to muscle fatigue, and repeated stimulation on particular body part may also cause fatigue of such part. Corresponding countermeasures should be applied immediately according to different types of fatigues. For example, if skiers suffer metal fatigue, it is needed to switch training item to adjust their initiatives; if muscle fatigues occur, it can change training load and training item (Zhao et al. 2018). Currently, there are 4 common approaches for fatigue recovery including: physical therapy like sauna and massage; drug therapy, for instance taking some TCM tonic for fatigue recovery; Food therapy, like providing food with rich nutrients; Mental therapy, i.e. letting them do what they like to do, so as to realize mood relax. In addition, skiing trainers should help skier with adjustment of psychology, arrange proper training amount according to psychological and physiological response, so as to make them fully prepared in psychology and further improve skiing results and skill level (Zargar et al. 2016).

Fourth, before each training, it is needed to take warm-up exercises to protect easily injured positions and consolidate strength training of muscle group around forcing parts. During training, it is needed to take protective devices or equipment with and prepare nutrients. Consciously adding practice of self-protective movements that meet strength training features can enhance the formation of conditioned reflex of boy protection in cerebral cortex, and thus reduce the occurrence of sports injuries.

Fifth, emphasizing recovery exercise after training. A proper recovery after training is an important sector of scientific training system, which should be embodied in formulating training plan. First, skiers should be requested to carefully make relaxing exercise, and make certain period of time for body relaxation exercises such as jogging, stretching, and pulling actions. Secondly, warm water bath can effectively help skiers to eliminate fatigue. The water temperature should controlled around 45℃ and bathing duration should be maintained between 30-40 min. In addition, massage is an effective recovery method, which can improve adjusting function of nervous system and thus enhance other organs and the whole body, leading to an improved metabolism process and respiration and blood circulation functions. Finally, it is needed to properly increase supply to muscular tissues to enhance metabolism, and thus realizing purpose of relaxing the muscles and stimulating the blood circulation. Keeping a good living habit and guarantee enough sleep and nutrients are the basis for all kinds of recovery methods. Moreover, it is suggested to supplement sugar, water, proteins, minerals, and vitamins

immediately.

Sixth, further improving scientific training level of skiing trainers. It should guarantee qualified cultural quality and rich skiing experience of skiing trainers, so as to help skiers to make reasonable training plan, which can reduce the injury risks of skiers to the minimum degree while improving skiers' skill level.

Clinical observation indexes. Observation of injury conditions of both groups and the intervention effect after treatment.

Statistical method. Regarding the research on specific causes for absolute strength injures of skiers and injury prevention measures, SPSS21.0 statistical software was used to analyze and process related data. Enumeration data was expressed in form of （n, %） and inspected by chi-square test. Only the condition of $P < 0.05$ is satisfied, can the difference be regarded of statistical significance.

III Results

Table 1. Comparison of general data between two groups（n=600）

Group	Gender	Age
Observation group	Male 372/ Female 228	23.2±3.2
Control group	Male 373/ Female 227	23.7±2.6
X2/t	0.003	2.970
P	0.952	0.003

Of all 600 skiers in observation group, there were 213 showing absolute strength injuries, reaching injured rate of 35.5%. After treatment and intervention, there are 208 injured skiers getting recovered from injuries without recurrence.

However in 600 skiers of control group, there were 434 skiers showing absolute strength injuries, reaching injured rate of 72.33%. In comparison with observation group, there existed no significant statistical difference ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of injury and rehabilitation conditions between two groups（n=600）

Group	Injured rate	Rehabilitation rate
Observation group	35.5%（213/600）	97.65%（208/213）
Control group	72.33%（434/600）	93.17%（405/434）
X2	163.808	5.391
P	0.000	0.020

IV Discussions

Through this research, it can be known that absolute strength injuries of skiers are mainly caused due to following reasons: The first reason, fatigue may lead to reduced muscle contractility and slower contraction speed, so that it will take longer time for muscle to get recovered, and muscle will get stiff and sore. For especially some young skiers, sports injuries caused by fatigue are even common;

The second reason: psychological factor. Some athletes are over confident during skiing and lack of reasonable judgment of athletic ability, so that the sport injuries are resulted; However some athletes are over stressed by mental pressured with unstable moods and cannot concentrate mind during training process, so that the sports injuries are resulted;

The third reason: excessive training load. Trainers do not make proper adjustment according to actual

physical condition of athletes, but still arrange high intensity training or large amount of training for athlete under non-ideal body function, and thus increase the risk of getting sports injuries.

In addition, factors such as unqualified technical skills, age (too young or too old), and training with injuries are also main causes for absolute strength injuries.

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