Introduction

International Olympic Committee since 1996 as the Summer Olympic Games women’s weightlifting competition will be included in the 2000 Sydney Olympics, the women’s weightlifting has been the rapid development of the project. Technical action weightlifting snatch and clean and jerk at two athletes to snatch fast, continuous action will be referred to bar Taiwan from weightlifting straight arm movements in the head and legs straight, feet standing on a horizontal position, maintaining that state of complete stability. It is the first weightlifting moves, but it is also a very strong technical action, action snatch a direct impact on the final results to weightlifting. Into the past several decades, experts and scholars at home and abroad to adopt more advanced technology research method of weight lifting, weight training methods research. However, most of the clean technology research, to snatch a relatively small technology only for technical tests of statistical indicators. Lack of technique and movement to reveal the theoretical analysis of biomechanics. Therefore, we will snatch technology players throughout the process of technical indicators and analysis of statistics.

Research purposes

In this study, in reference to research results and experience of our predecessors on the basis of the method of using video analysis of China’s best athletes in women’s weightlifting competition in the technical analysis of movement in order to reveal the Chinese women’s weightlifter snatch excellent technical features, at the same time strive to IT services means there is a new breakthrough for the coaches and athletes training for the provision of simple and practical, effective means of testing scientific training. Weightlifting snatch of biomechanical characteristics of movement to explore and study the level of play for them to provide research and technology protection.

Research results

To participate in the National Championship in 2007, the women’s snatch at all levels to carry out performance analysis of the first athletes, the basic conditions in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Name</th>
<th>snatch-level</th>
<th>results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yang Lian</td>
<td>48kg</td>
<td>96kg</td>
</tr>
<tr>
<td>Xiong Li</td>
<td>53kg</td>
<td>98kg</td>
</tr>
<tr>
<td>Jiang Jingjing</td>
<td>58kg</td>
<td>98kg</td>
</tr>
<tr>
<td>ShuJian</td>
<td>63kg</td>
<td>110kg</td>
</tr>
<tr>
<td>LuLisha</td>
<td>69kg</td>
<td>118kg</td>
</tr>
<tr>
<td>SunRuiping</td>
<td>75kg</td>
<td>75kg</td>
</tr>
<tr>
<td>Zhang Zheng</td>
<td>75+kg</td>
<td>131kg</td>
</tr>
</tbody>
</table>

Stages of Action

In order to facilitate the scientific, technical and detailed analysis of the snatch action, this action also in this study is divided into five stages. (1) preparatory stages: from the athletes to grasp barbell chest natural legs open ready to bell. (2) to bell stages: from the
barbell from the start to the largest extensor moment (the maximum angle of knee joint) end of the extension to the so-called bell action. The largest angle from the knee extensor moment to moment cited the largest knee (knee angle minimum) concluded that the cited reference bell knee action. (3) force phase: the knee joint angle of knee cited the greatest moments from the beginning to the barbell at all times to maximize the speed of the end of that phase of the largest force. (4) Squat support phase: the maximum speed from the barbell to the barbell at all times the highest point of the end. (5) rose stages: from the squat to stand up to all the body.

Barbell snatch the process of vertical velocity and physical focal point for the study on the relationship between joint angle

Projects in the weightlifting snatch technique, the athletes body hip angle, knee angle change on the success or failure of actions and the vertical bar has a direct impact speed.

Knee angle curve over time

Analysis of samples found in the snatch technique, off from the barbell to the barbell until then athletes, athletes knee angle curve over time showed two peaks plus one valley (see Figure 1-7), two peaks corresponding to force the two athletes, a trough primers corresponding knee action athletes.

Knee technology primers snatch technique is very important, citing knee action is in place to affect a large extent after the completion of action. The first of two peaks with the athletes and the speed of force to accelerate the increase in the slope of the corresponding, when the knee angle of the first two peaks in maximum speed reached the maximum value. From the test data can be seen from the perspective of six athletes were extensor 168.5 degrees, 175 degrees, 163.6 degrees, 161 degrees, 158.7 degrees, 157.9 degrees, 160.6 degrees, extension in place, and action to complete than good leg strength brought into full play, directly for the second time a force fully prepared to do.

Fig. 1. Yang Lian knee angle in time of curve

Fig. 2. Xiong Li knee angle in time of curve

Fig. 3. Jiang Jingjing knee angle in time of curve

Fig. 4. Shu Jiean knee angle in time of curve

Fig. 5. Lu Lisha knee angle in time of curve

Fig. 6. Sun Ruiping knee angle in time of curve

Fig. 7. Zhang Zheng knee angle in time of curve

Hip angle curve over time

Can be found from Figure 8-14, in the snatch move the completion of the technical process, the athlete’s hip joint angle changes with the passage of time is always increasing, only a peak, that is, the second force in the Department. In the entire hip joint angle changes in snatch action is very large, reaching about
150 degrees. The adequacy of the hip extension has become the second force to measure the effectiveness of a standard. Through the study found that the time to open the hip joint will affect the completion of the entire movement. Snatch of elite athletes for the technical performance of the first stage of the main force to complete action on extensor, trunk changed little action until the beginning of primers knee and hip was quickly opened.

From Figure 6 in the hip joint angle curve over time can be seen, from off the bar to force the first stage, the rate of change of hip joint angle smaller than curve More gentle. The force from the first force to the second end of the beginning of this stage, the rate of change of hip joint angle larger on the hip movement in the snatch force the second phase play a major role. We can see that the center vertical barbell velocity knee in place from the beginning of primer to the second force the pace of the end of this stage the rate of change of the largest centers barbell vertical velocity, knee angle and the angle between the hip at the same time, made in the second power stage of the athletes knee and hip joints fully extended is the greatest weight to enhance the speed of the main factors.

Trunk angle curve over time
Trunk angle is the hip joint with the shoulder of the two-point connection with the horizontal angle. The point of view may reveal the athletes in the trunk during the snatch technique of pitching situation. From the trunk angle curve over time can be seen(see Figure 15-21), the trunk angle first and then gradually increased to reduce.

Mainly due to the weight force of the first phase to be completed by the extensor movements, the trunk cannot be stressed too early, so the leg strength in order to give full play to the very beginning, however, reduced the trunk angle. Citation knee action from the beginning to the end of the second force this stage, the trunk angle increase is due to the development of hip joint force to fight the reasons. This is hip once again the second time in the weight lifting force plays an important role.
Conclusion
By studying the body posture angle and the relationship between technology found in the snatch, snatch technique in the process, the knee angle changes over time double peaks: the hip joint angle changes with time curve for the increasing trend, showing a single peak; trunk angle changes over time laughing stock of the performance for the first increase in a single peak curve. Bell to the main course of action to be completed by the extensor, trunk changed little action until the beginning of primers knee and hip was quickly opened.

Prospects for further research
Athletes in the snatch, the focus of the movement of the body, physical characteristics of the various sectors of the movement, muscle strength characteristics of barbell trajectory of the movement have a certain impact on technology. This will be the focus of future research. In addition, further study of elite athletes from different countries the technical architecture of the characteristics of action between the same points with different point.

Literature
9. Liu Xuezhen Wang Xiangdong. the biomechanical diagnosis of knee op for the snatch and the bell to force the action. [J]. Beijing Institute of Physical Education Transaction, 1999, (3).50—52

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