

LETTER TO THE EDITOR

The Therapeutic Efficacy of Isokinetic Training in The Walking Function of Basketball Players Who Had Thoracolumbar Spinal Cord Injury From The Perspective of Ecological Environment

Fengbin Wu*

Department of Physical Education, Changzhou College of Information Technology, Changzhou 213164, China

*Email: changzhouwfb@126.com

To evaluate the improvement of the walking function in basketball players who had thoracolumbar spinal cord injury after isokinetic training. A total of 160 basketball players suffered from thoracolumbar spinal cord injury and treated at our hospital were enrolled. All patients were randomized into research group and control group, with 80 cases in each group. Of those, the patients in the control group was subjected to normal rehabilitation training while isokinetic training was applied on the patients in the research group on that basis. The therapeutic efficacy of both groups was observed and compared. Compared with the control group, the Asia motor score (ASIA), functional comprehensive assessment (FCA), walking ability and activities of daily living (MBI) were significantly better in the research group ($P < 0.05$). The six-minute walking distance and ten-meter walking time were obviously better in the research group ($P < 0.05$). Application of the isokinetic training in the walking function of basketball players who had thoracolumbar spinal cord injury could significantly improve the therapeutic efficacy, actively improve the patient's walking function and promote recovery.

I Introduction

Kaijun Yu, Ruiyi Gong, Longjie Sun, Xiaotao Wang, published articles "Effects of Health Literacy on Health Promotion Behavior and Medical Ecology Resource Utilization" published in Issue: 107, Pages: 989-994, Article No: e107116, Year: 2019, the main content is WHO referred to the issue of supporting lifestyles through health promotion from an ecological perspective. This article is about to evaluate the improvement of the walking function in basketball players who had thoracolumbar spinal cord injury after isokinetic training from the Perspective of Ecological Environment.

Thoracic or lumbar spinal cord injury is a clinical manifestation of spinal cord injury, of which the incidence is on the rise. There are various types of spinal cord injury based on different mechanisms (Zhang et al. 2016). Therefore, there is rather difficult in the clinical diagnosis of spinal cord injury. However, with full understanding of the local pathological anatomical features, overall information of the traumatic history, symptoms and signs, as well as comprehensive analysis, it is not difficult to obtain a correct diagnosis for most cases (Shao et al. 2016).

Rehabilitation treatment plans are needed for patients with thoracolumbar spinal cord injury, which could actively improve the patient's motor function (Ye et al. 2018). This study investigated and analyzed the effects of isokinetic training on the walking function of basketball players with thoracolumbar spinal cord injury, aiming to provide a valuable reference for clinical practice (Lei and Wu 2018). The report is shown below.



Figure 1. The image of thoracolumbar spinal cord injury.

II Perspective

The patients of the control group were subjected to routine rehabilitation training, including strength training, balance training, namely the standing balance training and sitting balance training, as well as gait training and sitting-standing switching training (Cantey et al. 2016). Also, medium-frequency pulse, neuromuscular stimulation therapy, functional electrical stimulation, as well as traditional Chinese rehabilitation training, acupuncture and moxibustion, weight-supported treadmill ambulation training and the like were applied on patients in the control group. The therapy was conducted once a day, 40 minutes each time.

On the basis of routine rehabilitation training, isokinetic training was applied on the patients of the research group. That is, with the use of isokinetic training mimicking rehabilitation training and evaluation system, the patient's isokinetic strength training was guided by experienced rehabilitation doctors (Badal et al. 2017). First, a full warm-up is necessary. Targeted training mode was selected according to the actual functional state of the lower limbs, including assist training mode and active training mode. Meanwhile, based on the active range of the shoulder joint motion measured by the Primus RS system, the setting values were changed scientifically (Li et al. 2018). The treatment was performed once a day, about half an hour each time. There were 6 times of treatment per week. Throughout the treatment course, the amount of training should be strictly selected in accordance with the patient's tolerance, in order to achieve best therapeutic results.

The clinical effects and the recovery of walking ability were compared between both groups. The ASIA scale was adopted to evaluate the motor function of lower extremities. The maximum score of both sides was 50 points. The FCA scale was used to evaluate the patient's comprehensive function, with 18 items listed and the maximum score being 108 points. Moreover, the patient's walking ability was evaluated with FCA scale, including walking on flat ground and walking up and down the stairs, which has a total score of 12 points. The ADL scale was used to evaluate the patient's activities of daily living (MBI), with a total score of 100 points. In addition, after eight weeks of treatment, the gait function was evaluated with a 6-min walking distance and a 10-m walking time.

Statistical analysis was performed using SPSS21.0. All quantitative data were expressed in the form of mean \pm standard variance ($\pm s$), and comparisons were made with t-test. Enumeration data were expressed in the form of natural number (n)+ percentage (%), and comparisons were made with chi-square test. $P < 0.05$ represents the intergroup difference was of statistically significance.

III Personal View

Comparison of the functional comprehensive assessment (FCA) and MBI scores between both groups

As shown in Table 1, the functional comprehensive assessment (FCA) and MBI scores of the research group were significantly better than that of the control group ($P < 0.05$).

Table 1. Comparison of the functional comprehensive assessment (FCA) and MBI scores between both groups ($\bar{x} \pm s$)

Group	Functional comprehensive assessment FCA scores		MBI scores	
	Before treatment	After treatment	Before treatment	After treatment
Research group (n=80)	42.30 \pm 10.19	82.10 \pm 8.93	26.79 \pm 11.03	73.28 \pm 9.03
Control group (n=80)	42.58 \pm 9.68	72.94 \pm 9.02	26.88 \pm 10.26	62.16 \pm 8.42
t	0.29	11.83	0.31	15.60
p	> 0.05	< 0.05	> 0.05	< 0.05

Comparison of the ASLA and FCA scores between both groups.

As shown in Table 2, the ASLA and FCA scores of the research group were significantly better than that of the control group ($P < 0.05$), indicating that the patients of research group had better recovery in walking abilities.

Table 2. Comparison of the ASLA and FCA scores between both groups ($\bar{x} \pm s$)

Group	ASLA score		FCA score	
	Before treatment	After treatment	Before treatment	After treatment
Research group (n=80)	9.32 \pm 1.26	17.13 \pm 3.90	2.02 \pm 0.06	7.29 \pm 2.09
Control group (n=80)	9.87 \pm 1.29	13.90 \pm 3.16	2.09 \pm 0.30	4.20 \pm 2.82
t	0.17	10.88	0.56	12.30
p	> 0.05	< 0.05	> 0.05	< 0.05

Comparison of the six-minute walking distance and ten-meter walking time after treatment between both groups.

As shown in Table 3, compared with the control group, the six-minute walking distance and ten-meter walking time were obviously better in the research group ($P < 0.05$). An image of a patient after treatment was shown in Figure 4.

Table 3. Comparison of the six-minute walking distance and ten-meter walking time after treatment

between both groups ($\bar{x} \pm s$)

Group	Cases	6min walking distance (m)	10m walking time (s)
Research group	80	72.80±6.33	50.83±5.22
Control group	80	60.35±7.06	61.79±7.26
t		8.39	10.25
p		< 0.05	< 0.05

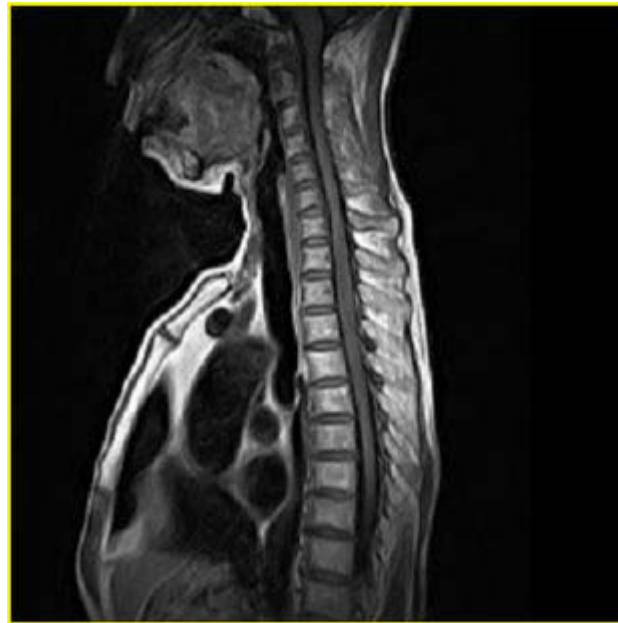


Figure 2. An image of a patient after treatment.

IV Conclusion

In summary, applying isokinetic training on basketball players who had thoracolumbar spinal cord injury can significantly improve the treatment efficacy, actively improve the patient’s walking function, and promote physical recovery. As a new type of training technology, isokinetic training has a wide range of applications in sports training, sports research and rehabilitation medicine. At the same time, it has advantages like objectivity, safety and reproducibility in muscle strength testing and training, which could perform good assessment and develop an optimal muscle function rehabilitation program. In addition, the stress stimulation provided by isokinetic training could simultaneously exercise both agonistic and antagonistic muscles, which can improve the strength and coordination ability of the shoulder muscles, while providing feedback information and compliance resistance and deploying multi-angle training methods only to promote the recovery of motion of the limbs. Therefore, the application of the isokinetic training during the treatment of patients with thoracolumbar spinal cord injury can produce a coordinated effect, significantly reduce joint pain, and actively improve and enhance the patient’s motor function, which has good clinical application value.

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