

## Progress in Modern Rehabilitation of Spinal Cord Injury

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**Keywords:** Spinal Cord Injury, Exercise Therapy, Taijiquan Therapy.

**Abstract:** This paper analyzes the rehabilitation research of spinal cord injury with the method of literature, and draws the conclusions. Physical therapy and psychotherapy are the main means at present, and physical therapy is composed of two parts: exercise therapy and physical factor therapy. As a traditional Taijiquan therapy, it can include sports therapy and psychotherapy, and has achieved remarkable results. Modern rehabilitation combined with traditional practice has achieved good results in functional rehabilitation of patients with spinal cord injury, can improve the functional disorders of patients to varying degrees, and plays a positive role in their return to family and society. At the same time, there are also some problems, such as there is no deep integration of the two, how to integrate the advantages of traditional Chinese and Western medicine, joint application to patients with spinal cord injury, maximize the rehabilitation effect, and reduce the burden for patients and families, which should be one of the topics of modern rehabilitation research.

### 1. The Concept Of Modern Medicine For Spinal Cord Injury

Spinal injury refers to the damage or destruction of the integrity of the spinal structure, including the vertebrae, intervertebral discs, ligaments that stabilize the spine and paravertebral muscles.

Spinal cord injury refers to the impairment of spinal canal nerve structure (including spinal cord and nerve root) and its function caused by various causes (including spinal cord trauma, spinal inflammation, spinal cord (spinal cord) tumor compression, surgical paralysis accident, intervertebral disc prolapse, etc.), resulting in impairment of spinal cord function (motor, sensory, reflex, etc.) below the level of injury. Hindering. It is one of the difficult problems that the medical profession should overcome.

### 2. Classification Of Spinal Cord Injury

Complete spinal cord injury and incomplete spinal cord injury

Incomplete spinal cord injury: below the level of nerve injury, including the lowest sacral segment (S4-5) retains any sensory and/or motor function (i.e., the presence of sacral residue);

Complete spinal cord injury: the lowest sacral segment (S4-5) loss of sensory and motor function (i.e. no residual sacrum). Complete spinal cord injury should be determined after the end of spinal cord shock, 48 hours after spinal cord injury is still manifested as spinal cord shock, examination confirmed that there is no sensory and motor function in the sellar region, according to the diagnosis of complete spinal cord injury.

### 3. The Pathogenic Factors Of Spinal Cord Injury

Traumatic spinal cord injury

Traumatic spinal cord injury (SCI) is a kind of damage to the structure and function of the spinal cord caused by external mechanical forces, including direct or indirect effects.

Direct external force: stabbing the spinal cord with a knife blade or directly penetrating the spinal cord with bullets or shrapnel can cause open spinal cord injury. Stones or heavy objects strike directly on the back of the waist, causing spinal fractures and injuring the spinal cord.

Indirect external forces: In traffic accidents, high fall and diving accidents, external forces do not directly affect the spine and spinal cord, but indirect external forces can cause various types of vertebral fractures, dislocations, and spinal cord injury.

#### Non traumatic spinal cord injury

Developmental causes include scoliosis, spondylolisthesis, spondylolysis, etc. In scoliosis, congenital scoliosis is the main cause of spinal cord injury, while spina bifida is the main cause of tethered cord syndrome.

Acquired causes include degenerative diseases of the spine, such as cervical disc herniation, ossification of the posterior longitudinal ligament, calcification of the ligamentum flavum, and spinal stenosis. The spinal cord will be directly compressed and progressive spinal cord injury will occur. Other diseases, including spinal or spinal tumors, spinal tuberculosis, spinal pyogenic infections, can directly or indirectly cause spinal cord compression and injury.

### **4. Dysfunction Of Spinal Cord Injury**

Due to the different location of the injury, the resulting dysfunction is different, mainly including the following two parts:

Quadriplegia: Neurological dysfunction caused by cervical spinal cord injury, resulting in partial or complete motor and sensory dysfunction of both upper limbs, lower limbs and trunk.

Paraplegia: refers to the thoracic, lumbar or sacral spinal cord injury caused by nerve dysfunction, resulting in trunk and lower limb partial or complete movement, sensory dysfunction.

### **5. Mechanism Of Recovery After Spinal Cord Injury**

After spinal cord injury, the ability of residual neurons to regenerate and replace neural connections is very limited. Therefore, important compensatory mechanisms, including maximizing the function of undamaged structures and pathways to compensate for lost tissues, are called neural remodeling, and are also the main recovery mechanisms after spinal cord injury. Neural remodeling is defined as "an adaptive reorganization of neural pathways that occurs after injury to partially restore lost function". This "recombination" has gradually been recognized as a major recovery mechanism after central nervous system injury (including spinal cord injury). Specific mechanisms that mediate neural remodeling include changes in neuronal excitability, axonal extension, new connections between neurons, and regulation of synaptic transmission efficiency between neurons.

The spinal cord is a low-grade part of the central nervous system, which is as plastic as the brain. Studies have shown that the plasticity changes after spinal cord injury have the same developmental and regional characteristics as the brain. If most of the dorsal roots of the cat's hind limbs were removed, the projection density of the well-preserved dorsal root nerve fibers in the spinal cord was increased, indicating a plasticity change between the reserved dorsal root and the adjacent resected dorsal root. Exercise is the most effective form of stimulation of the central nervous system. All movements provide sensory, motor and reflex inputs to the central nervous system. The spinal cord is an important pathway for the transmission of motor sensation between the brain and the body. Therefore, conditioned stimulation formed by repeated training is conducive to the occurrence of spinal plasticity, promote the regeneration of axonal protrusion buds, and thus improve the function of the spinal cord.

### **6. Rehabilitation Treatment Of Spinal Cord Injury**

Physical therapy consists of two parts: exercise therapy and physical factor therapy. It means to help the patients maintain, recover or develop their motor function and activity ability to the maximum extent, prevent or reduce the occurrence of disability, comprehensively improve the various functions of the patients' body and improve their self-care ability. Improve the quality of life and return to family and society at an early date. Sports therapy is an important part of physical

therapy. It refers to the use of sports anatomy, sports biomechanics, sports physiology, behavioral science, neuroscience and other related professional disciplines by physiotherapists, mainly with the active participation of patients, through speech induction, limb demonstration, unarmed operation and utilization of professional. Rehabilitation training equipment or equipment, such as patients with motor dysfunction, low mobility to prevent, improve, restore and improve a special treatment, which has a lot of traditional Wushu can move. Occupational therapy is a process of evaluation, treatment and training for patients with physical, mental, developmental disabilities or disabilities who have lost their self-care and ability to work to varying degrees through purposeful and selective occupational activities.

Taijiquan therapy, the progress in the rehabilitation of spinal cord injury, Taijiquan training to improve the motor function, sensory function and mental health of patients with spinal cord injury. Improving motor function and reducing the muscle strength of the elderly affect daily life. Taijiquan exercise can effectively improve the static balance of the elderly, reduce the number of falls in the elderly, reduce the risk of falls. Taijiquan exercise can improve ankle and knee muscle strength, limb muscle strength increased significantly after Taijiquan exercise; improve sensory function and health status, Liu Jing and other research shows that compared with walking, Taijiquan in improving proprioceptive ability of the elderly significantly. The elderly who regularly practiced Taijiquan had better proprioception of knee joint and ankle joint than the control group, and had better motion sensation of ankle joint than the swimming and running group. A self-rating depression scale was used to investigate patients with spinal cord injury. The incidence of depression was 94.9%. Taijiquan stresses the philosophy of Yin and Yang, which can well regulate the psychological situation of patients. The application of Taijiquan, softball and other sports in psychological treatment has been accepted by many patients with spinal cord injury.

Psychotherapy, supportive psychotherapy, biofeedback, relaxation and hypnosis, psychoanalysis, marriage and family therapy, cognitive behavioral therapy, expressive art therapy. Psychological rehabilitation can be initiated at an early stage after spinal cord injury. Psychological professionals participate in the formulation of a comprehensive rehabilitation program, and select appropriate psychological rehabilitation measures according to the patient's condition. Occupational rehabilitation is the process of helping disabled people (mainly those with spinal cord injury) to acquire and maintain appropriate occupations and to involve them in or re-participate in social life. Social rehabilitation is a social worker from the perspective of society, using social work methods to help the disabled (hereinafter referred to as spinal cord injury) compensate for their own shortcomings, overcome environmental barriers, take various effective measures to create an environment suitable for their survival, development and Realization of their own values, so that they can participate in social life on an equal footing. Professional activities that live and share the fruits of social development.

## **7. Summary**

To sum up, modern rehabilitation combined with traditional exercise has obvious effect on functional rehabilitation of patients with spinal cord injury, can improve the functional disorders of patients to varying degrees, and play a positive role in their return to family and society. At the same time, there are also some problems, such as there is no deep integration of the two, therefore, how to integrate the advantages of traditional Chinese and Western medicine in the formulation of rehabilitation programs for spinal cord injury patients, so as to maximize the rehabilitation effect and reduce the burden for patients and families, should be one of the topics of modern rehabilitation research.

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