CLINICAL NOTE

Tai Chi Chuan Practice as a Tool for Rehabilitation of Severe Head Trauma: 3 Case Reports

Michael Y. Shapira, MD, Meir Chelouche, MA, Rami Yanai, Chava Kaner, DMT, Amir Szold, MD

ABSTRACT. Shapira MY, Chelouche M, Yanai R, Kaner C, Szold A. Tai Chi Chuan practice as a tool for rehabilitation of severe head trauma: 3 case reports. Arch Phys Med Rehabil 2001;82:1283-5.

Rehabilitation after severe head trauma is a complex process that can be long and frustrating. New, more holistic methods for rehabilitation are constantly sought. We present the cases of 3 patients who had severe head injury and whose rehabilitation was facilitated by Tai Chi Chuan (TCC) therapy. TCC therapy should be taught only by a qualified TCC therapist and under close medical supervision.

Key Words: Art therapy; Brain injuries; Case report Martial arts; Physical therapy; Rehabilitation; Tai chi; Therapy.

physical, and mental being. TCC's complexity increases interest and motivation in rehabilitation programs, as reported by Ch3nner et a1.[2] Fourth, TCC therapy is performed in a relaxed, quiet, and concentrated atmosphere with an emphasis on awareness of the inside and outside worlds. This setting has a mood stabilizing effect and reduces mental stress and frustration, which commonly accompany the rehabilitation process, as was shown by Brown et a1[3] and Jin.' Fifth, TCC complex movements can accelerate neural reorganization, thus promoting recovery.

The following description of 3 patients (table 1) outlines our 4 years of experience using TCC therapy in patients who have had a severe head trauma.

CASE DESCRIPTIONS

TRADITIONAL CHINESE MEDICINE is based on an assumption that a balance between 2 forces (yin and yang) is the key for health. An imbalance toward either force might cause a state of disease. Balance can be restored by various methods including exercise, massage, acupuncture, and herbs. Belief and centuries of personal experience support this theory. Tai Chi Chuan (TCC) is an ancient Chinese martial art integrated in traditional Chinese medicine. It is characterized by soft, slow, and gentle movements leading to complex postures. The practitioner develops balance, coordination, and muscle tone control. TCC was shown to improve balance, kinesthetic sense, and muscular strength. Closely related to Chi Kung, TCC is more complex, demands wider range of motion, and has more applications in martial art and therapy.'

Our knowledge and experience in TCC training led us to the hypothesis that TCC can be used in rehabilitation of brain injury because of its pertinent characteristics. First, its slow and gradual practice promotes the development of muscle tone, control, and muscular strength, thus reducing abnormal hypertonicity and improving muscle weakness. The slowness of practice prevents damage because the patient and trainer can foresee a wrong posture and correct it. Second, falls may be prevented by TCC's promotion of kinesthetic sense, balance, and coordination. These attributes also improve performance of daily tasks, and expand the patient's abilities. Third, the patient takes an active part in the rehabilitation process within a holistic framework that approaches the patient as a whole, physical, and mental being; TCC’s complexity increases interest and motivation in rehabilitation programs. TCC therapy is performed in a relaxed, quiet, and concentrated atmosphere with an emphasis on awareness of the inside and outside worlds. This setting has a mood stabilization effect and reduces mental stress and frustration, which commonly accompany the rehabilitation process, as was shown.

From the Department of Bone Marrow Transplantation, Hadassah University Hospital, Hebrew University Hadassah Medical School, Jerusalem (Shapira); Shalvata Psychiatric Hospital, Tel Aviv (Chelouche, Kaner); Department of Surgery, Tel Aviv Sourasky Medical Center, Tel Aviv (Szold); and Israeli Tai Chi Center (Shapira, Chelouche, Yanai, Kaner, Szold), Tel Aviv, Israel.

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Reprint requests to Michael Y. Shapira, MD, Dept of Bone Marrow Transplantation, Hadassah University Hospital, PO Box 12000, Jerusalem 91120 Israel, e-mail: shapiram@hada.ssah. org. il.

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Case 1

A 24-year-old man received a severe tangential head injury from shrapnel at the age of 19. The injury included open left parietal fracture, intracranial hematoma with severe brain edema, severe diffuse axonal injury, increased intracranial pressure (ICP), and brainstem herniation. The patient was trez'ed with bleeding control and wound debridement. Eventually, because of continuously increased ICP, a lumboperitoneal shunt was inserted. The patient was in a coma for 3.5 months and then slowly regained consciousness. He was discharged form the neurosurgical unit and transferred to a rehabilitation unit with bilateral paraparesis, more significant on the right, and inability to walk. Balance, tested while the patient was in a sitting position, was regarded as normal. He was conscious and aware, speaking spontaneous short sentences and with cognitive disability including organizing disability, and impulsive-passive behavior. At this stage treatment included physiotherapy, occupational therapy, and communication therapy. On discharge from the rehabilitation unit, the man had impaired walking due to recurrent falls that caused severe insecurity. He required constant support. At that time he was referred for a trial in TCC training as therapy.

Case 2

A 54-year-old man had a brainstem injury at the age of 17 during a motor vehicle crash (MVC). Internal cranial bleeding was controlled surgically. He was unconscious for 6 months and then gradually regained consciousness and motor ability. He vas hospitalized for a year in a rehabilitation unit and discharged for home care. During the following years the patient suffered from lack of balance and recurrent falls that forced him to use a wheelchair when he needed to go a long distance. He also suffered from general passiveness and lack of socialization. However, intellectual activity was regained and the patient was able to regain his chess playing activity. His treatment included physiotherapy and occupational therapy. Thirty-five years after injury, the patient was referred for TCC therapy.

Table 1: Patients' Characteristics

Patient	Age/Gender	Age at Injury (yr)	Mechanism of Injury	Duration of Coma (mo)	Time from Injury to Therapy (yr)	Time of TCC Therapy (Yr)	Main Symptoms	General Improvement
1	24/M	19	Shrapnel tangential	3.5	1	4	Organizing disability, impulsive passive behavior, imbalance, recurrent falls	Excellent
2	54/M	17	MVC	6	35	2	Imbalance, recurrent falls, passiveness, lack of socialization	Moderate
3	25/M	20	MVC	4	2	3	Hypertonicity, imbalance, memory loss	Excellent

Abbreviation: M, male; MVC, motor vehicle crash.

Case 3

A 25-year-old man had a severe left hemispheric brain injury from a MVC at the age of 20. Internal cranial bleeding was controlled surgically. He was unconscious for 4 months and then regained consciousness; his motor ability was gradually regained. He was hospitalized for a year in a rehabilitation unit, followed by home care. His main symptoms were imbalance that was mainly attributed to hypertonicity**,** and speech, concentration and memory problems. He was treated with occupational therapy, speech therapy, and physiotherapy. Intellectual ability was not affected. The patient was referred for TCC therapy 2 years postinjury.

METHODS

Because most persons with severe head trauma find it difficult to train while standing without assistance, the training program consisted of gradual steps: sitting, standing, and movement.

Sitting

In the first several weeks training was performed only in the sitting position. The patients were trained to perform partial postures from the TCC form while sitting. Emphasis was placed on the combination of movement and breathing. The patients were asked to imagine that the movement originated from the lower abdomen and that breathing calmly in rhythm with the movement made the postures more efficient and "round." The quality of the movement turned slowly from strenuous and "jerky" to a more controlled, flowing quality.

Standing

The next step was to convince the patients to stand. The most difficult problem to overcome was that the patients did not trust their ability to balance themselves, and the stress that originated from this fear added to the stiffness of the posture and decreased the ability to balance. To address this fear, each patient was taught to stand. The standing position taught was the position at the beginning of the TCC form, which follows certain rules-the feet are placed at shoulder breadth, parallel to each other. The knees are slightly bent and the pelvis is turned, so that the hollow of the lower back is straightened. The abdomen, chest, and shoulders are completely relaxed. The

hands are placed next to the thighs, palms open, relaxed, slightly turned down. The chin is drawn back, the neck is slightly straightened and the mouth is closed (the teeth touch and the tongue touches the front palate) while breathing is through the nose. The eyes are open. We found that a very important point is to teach the patients to look forward and not to the ground. This simple change increased balance tremendously. The training in standing was primarily conducted in a doorway. The presence of a close, solid support on both sides increased confidence, but still placed the responsibility on the patient, as opposed to the support given by an instructor. Special emphasis was made on an effortless posture. After several weeks, the patients were able to stand and keep their balance for prolonged periods. The training then continued in the center of a room, away from any support.

Movement

At that point the basic movements of the TCC form were slowly taught. The first movement was simply to relax the arms an(: swing the body from side to side. This enabled the patient to train balance while shifting his weight slightly from side to side. The different movements of the Tai Chi form were then gradually taught. In many parts of the Tai Chi form, one is required to stand on 1 leg, or make long and sophisticated steps. In these cases the original steps were divided into many small steps that were gradually enlarged until the formal movement was achieved. The most important aim and the point most referred to was

not being afraid of failure. In TCC, while working with a partner, one tries to overcome the partner within a very rigid rule, which is not to use counterforce. When not succeeding, the trainee is taught to give up and to learn the most from the small defeat. The patients were encouraged to refer to all their training in the same way-do your best, follow the rules (relaxation, breathing), and learn from your mistakes.

Training began with a weekly session and then the number of sessions was increased to twice a week. The patients were encouraged to train at home, practicing an hour a day.

RESULTS

After 2 to 4 years of TCC therapy, all 3 patients walk without assistance, rarely fall, and feel more secure while walking. They feel that they have greatly improved control of themselves and their surroundings, that their memory and concentration are better, and they have a decrease in hypertonicity. One patient said that TCC "gave him tools to deal with his injury and a path for improvement." Patient 1's improvement enabled him to regain freedom in daily activities and return to driving his own car.

DISCUSSION

TCC is an ancient Chinese martial art, inseparable from traditional Chinese medicine. Improvement of balance by TCC practice was shown in normal elderly subjects,[5,6] and controlled studies have also shown that it improves kinesthetic sense and muscular strength in normal volunteers.' TCC intervention is also beneficial and safe in the prevention of falls in the geriatric population. These studies relate to healthy subjects, but no studies have been done on TCC as a tool for rehabilitation. Only 1 case report concerning TCC as a rehabilitating tool was found in the English literature,[9] in which TCC was used for the treatment of ankylosing spondilitis. To our knowledge, the present report is the first to describe TCC use for the rehabilitation of brain injury.

The present case series showed the value of TCC as a method of rehabilitation applicable in the postacute phase of brain injury. The patients can safely begin TCC therapy even while in bed, gradually incorporating TCC movements into sitting and standing positions, and then while walking. Although done in different positions, practice and learning are continuous, with the same postures being used in the different positions. In the healthy population, TCC is taught as a form. However, when applied as a therapeutic tool, adjustments of the TCC form toward the patients' needs are frequently necessary. Only an experienced TCC therapist can make these adjustments, because changes of the forms, movements, or sequence can greatly change its effects.

Because TCC practice is gentle and slow, ICP is not expected to rise, and the practice can safely be initiated soon after the traumatic event.

As seen in our patients, the success of this mode of rehabilitation was not affected by the time span between the injury and the intervention. It seems that because this method is completely different from any intervention program our patients undertook previously, it was effective even in a patient enrolled decades after injury.

Because recovering from a head trauma is a long and complex process, developing such capabilities as muscle tone control, kinesthetic sense, balance and coordination, along with reducing mental stress, can be important while returning to optimal level of function. Learning abilities are essential tools for patients who have brain injury, if they are to return to normal daily function. TCC provides the patient with new learning tools and abilities. The patient might be frustrated from the relearning of basic movements such as eating or dressing. New, holistic and complex activities, such as TCC, can prevent such frustration when they are integrated into rehabilitation programs.

Our patients' advances in balance and muscle tone control accelerated greatly after they started TCC therapy, leading to increased physical (and mental) freedom and ability to perform daily activities. Our experience shows that TCC therapy in combination with conventional physical therapy can augment either benefit. Furthermore, because rehabilitation from extensive head trauma can be frustrating to the medical team, TCC practice by the treating staff will also reduce stress and promote healing. We see TCC as a body and mind exercise, and believe that it can be used as a physical and cognitive rehabilitative tool.

CONCLUSION

Because this report is not a controlled study, it is impossible to demonstrate scientifically the isolated role of TCC in our patients' rehabilitation. We suggest that TCC therapy can be beneficial in any form of rehabilitation, especially in head trauma, and this form of therapy certainly warrants further studies. It is mandatory that TCC therapy be taught only by a qualified TCC therapist, and under close medical supervision, to prevent physical and mental damage.

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