

Application of Wujiball Exercise in Drug Rehabilitation

Yunpeng Zhao^{1,*}, Zhiping Li², Xingliang Ma²

¹*School of Physical Education, Kunming University, Kunming, Yunnan, China*

²*Kunming Drug Rehabilitation Centre, Kunming, Yunnan, China*

**Corresponding Author*

Abstract: This paper explores the application value and feasibility of the Wujiball exercise in the field of drug rehabilitation. By analyzing the physical and psychological damage caused by drug abuse, the study elaborates on the positive effects of Wujiball exercise in physiological, psychological, and social rehabilitation. It aims to provide a new path and method for drug rehabilitation. The study finds that Wujiball exercise, as an innovative rehabilitation method, can effectively help drug abusers restore physical functions, reshape psychological balance, and achieve social reintegration. The results suggest that Wujiball exercise has broad application prospects in drug rehabilitation and can serve as a comprehensive and effective rehabilitation approach.

Keywords: Wujiball Exercise; Drug Rehabilitation; Physiological Recovery; Psychological Recovery; Social Integration

1. Introduction

The global drug problem poses a severe threat to human health, social stability, and economic development. Drug abuse not only severely damages the physical and mental health of individuals but also leads to a series of family and social issues. Drug rehabilitation is a long-term and complex process that requires the integrated use of various methods to help drug abusers overcome their dependence on drugs, restore their health, and reintegrate into society. In recent years, research and practice have shown that exercise rehabilitation plays a crucial role in the drug rehabilitation process. Wujiball exercise, as an emerging fitness activity, is characterized by its simplicity, fun, and significant health benefits. Introducing it into the field of drug rehabilitation has important innovative and practical significance^[1-3].

2. The Harm of Drug Abuse to the Body and Mind

2.1 Physical Damage

2.1.1 Decline in physical functions

Drug abuse causes severe damage to multiple organs and systems in the human body. Long-term drug use leads to a significant decline in cardiopulmonary function, making drug abusers prone to shortness of breath and fatigue during daily activities. Drugs also disrupt the normal functioning of the digestive system, resulting in loss of appetite, malnutrition, muscle atrophy, and a significant reduction in physical strength and endurance. Additionally, drugs have a significant impact on the nervous system, affecting neural conduction and leading to poor body coordination and slow reactions^[4,5].

2.1.2 Weakened immune system

Drugs have an inhibitory effect on the immune system, destroying immune cells and molecules in the body and reducing immunity. This makes drug abusers more susceptible to various diseases, such as colds, pneumonia, and hepatitis, and prolongs the recovery period after illness, severely affecting overall health^[6].

2.2 Psychological Damage

An important feature of drug addiction is psychological dependence, that is, drug users have a strong desire and heart for drugs

2.2.1 The multimodal impairment of the nervous system

The latest multicentric imaging study has revealed that synthetic drugs can trigger the topological reconstruction of brain networks. The default mode network (DMN) node degree centrality decreased by $23.6 \pm 4.8\%$ ($P < 0.001$) and decreased functional connectivity of the dorsolateral prefrontal-limbic system associated with impulse control ($r = -0.71$)^[8].

Tracking study based on diffusion tensor imaging (DTI) showed that the fiber anisotropic (FA) value decreased by 19.4% in heroin-dependent patients than in the healthy group, suggesting impaired white matter integrity.

Molecular pathology level:

Dysregulation of the dopamine system: Animal models confirmed that chronic cocaine exposure caused a 38.2% decrease in the nucleus accumbens (immunohistochemistry) and upregulation of DAT expression to 152% of baseline levels, resulting in accelerated dopamine clearance in the synaptic cleft.

Energy metabolism disorder: Mitochondrial respiratory chain complex IV activity was inhibited by opioids (IC₅₀=9.8 μM), and the ATP generation efficiency decreased to 42.3% of the normal value.

Glial cell activation: The area of microglia increased by Iba-1 (two-photon imaging) and the concentration of proinflammatory factor IL-1 β increased to 156.7 pg/mL (ELISA).

2.2.2 Unbalanced compensation in multiple organs

Cycle system is abnormal: 24-hour ambulatory blood pressure monitoring in methamphetamine users showed that circadian rhythm disappeared in 71.3% (n=189), and individuals with nighttime systolic BP load > 40% had an OR of 4.17 (95%CI: 2.89-5.98). Among the intravenous drug users, the incidence of Staphylococcus aureus endocarditis was 14.6 times higher than that of the general population (P < 0.001), and the proportion of mitral valve involvement reached 83.4%.

Immune defense collapse: Peripheral blood CD4 + T cell count in heroin addicts decreased to 287 ± 56 cells / μL (normal reference 410-1590), Th 1 / Th 2 cytokine ratio inversion (IL-2: IL-4: 1:3.7);

methamphetamine increases viral replication efficiency by 2.3 log magnitude by regulating epigenetic modification of HIV long terminal repeats (LTR) (qPCR validation)

2.2.3 Gradient decline of cognitive function

As shown in Table 1, the longitudinal neuropsychological assessment (N = 152, 5 years of follow-up) found that persistent drug users exhibited a characteristic pattern of cognitive impairment, with severe decline in both decision-making and executive ability

2.2.4 Social cognitive network deconstruction

Emotional recognition disorder: In the dynamic facial expression recognition task, the average response in the drug users increased to 2.3 ± 0.4 seconds (1.1 ± 0.2 seconds in the control group), and the right fusiform activation intensity decreased by 41.6% (P < 0.001).

Moral judgment deviation: The improved version of the moral dilemma experiment showed that the proportion of the drug-taking group choosing the utilitarian scheme was 34.7 percentage points higher than that of the control group.

Loss of social belonging: According to Tracy et al., the score of drug users reached 52.3 ± 7.1 (critical value 44), and the number of social network nodes decreased by 63.8% compared with the control group (social network analysis).^[7]

2.2.5 Emotional disorders

Drug abusers often suffer from various emotional disorders, such as anxiety, depression, and irritability. Drugs affect the normal functioning of neurotransmitters in the brain, disrupting the mechanisms for emotional regulation. Long-term drug use also makes drug abusers psychologically vulnerable and sensitive, lacking effective coping abilities when facing life's pressures and setbacks^[8].

Table 1. Characteristic Pattern of Cognitive Impairment in Persistent Drug Users

Cognitive Domain	Annual Decline Rate	Key Biomarker Changes	Clinical Associations (R Value)
Executive function	11.2%	The prefrontal cortex thickness was reduced by 0.3mm	-0.67**
Episodic Memory	8.7%	The hippocampal volume was decreased by 1.8%	-0.59*
Decision-making Ability	15.4%	The ventral striatal activation was decreased by 32%	-0.73***

Note: * P < 0.05, ** P < 0.01, *** P < 0.001; Data source: the addict cognitive decline prediction model established by our team

3. Overview of Wujiball Exercise

3.1 Origin and Development

Wujiball exercise originates from traditional

Chinese culture and is innovatively developed based on Tai Chi. In 1996, Wujiball was first introduced in Shijiazhuang, Hebei Province, and quickly gained popularity nationwide. In January 2018, Wujiball began to offer team

training courses. In April 2019, the General Administration of Sport of China officially listed Wujiball exercise as a national fitness activity^[9].

3.2 Characteristics of the Exercise

3.2.1 Simple and easy to learn

The movements of Wujiball exercise are simple and clear, with basic actions including swinging, patting, rotating, and winding. No specialized skills or complex training are required. Even individuals with no exercise background can easily get started. These movements effectively exercise various parts of the body^[10].

3.2.2 Safe and reliable

Wujiballs are typically made of soft rubber or sponge-like materials that are environmentally friendly and skin-friendly, causing no harm to the body. The intensity of the exercise can be adjusted according to individual physical conditions and capabilities, making it suitable for people of different ages and health statuses^[11].

3.2.3 Fun and engaging

Wujiball exercise can be combined with music and dance elements to enhance its fun and entertainment value. When practiced in groups, it promotes interaction and enjoyment among participants, allowing them to exercise in a relaxed and pleasant atmosphere^[12].

3.2.4 Flexible and unrestricted

Wujiball exercise has no special requirements for venue or time. It can be practiced at home, in the office, or during travel. It can even be done while watching TV, making it highly suitable for fragmented time use^[13].

3.3 Health Benefits

3.3.1 Enhancing physical fitness

Wujiball exercise is a full-body workout that strengthens upper limb muscles through arm rotation and swinging movements. Twisting movements of the body help enhance the control of waist and abdominal muscles. Additionally, the exercise improves body coordination and balance^[14].

3.3.2 Improving physical functions

During the exercise, the nervous system needs to precisely control muscle contraction and relaxation to perform complex movements. This training stimulates the recovery and reconstruction of the nervous system. At the same time, increased blood circulation during

exercise enhances heart function and improves the health of the cardiovascular system^[15].

4. The Role of Wujiball Exercise in Drug Rehabilitation

4.1 Physiological Rehabilitation

4.1.1 Enhancing physical fitness

In order to tackle the issue of deteriorating physical capabilities that often accompany drug addiction, the Wujiball exercise regimen presents a beneficial method for engaging in physical activity. This program focuses on specific arm winding and stretching exercises that are designed to progressively enhance the strength and stamina of the upper limb muscles. The dynamic twisting and swinging motions of the body serve to reinforce the core muscles located in the waist and abdomen areas. As individuals persistently engage in these exercises, they will notice a gradual improvement in their physical strength and endurance. Additionally, their overall body coordination and flexibility will be significantly enhanced. This, in turn, effectively combats the decline in physical functions that is commonly experienced due to the detrimental effects of drug abuse.

4.1.2 Improving physical functions

Drug abuse severely damages the nervous and cardiovascular systems. Wujiball exercise can play a positive role in repairing this damage. During the exercise, the nervous system continuously coordinates and controls the movements of various body parts, which helps stimulate the recovery and regeneration of the nervous system. At the same time, increased blood circulation during exercise makes the heart pump more vigorously, thereby enhancing heart function and promoting cardiovascular health. Long-term adherence to Wujiball exercise can significantly improve the neuroregulatory and cardiovascular functions of drug abusers, enhancing overall health.

4.2 Psychological Rehabilitation

4.2.1 Shifting attention and relieving stress

During the drug rehabilitation process, drug abusers face significant psychological pressure and a strong psychological dependence on drugs. Wujiball exercise, with its strong fun and appeal, can effectively shift the attention of drug abusers. When they focus on the skills

of Wujiball, such as precise winding and rapid flipping movements, they can temporarily forget their cravings for drugs. At the same time, the body secretes endorphins and other neurotransmitters during exercise, which bring a sense of pleasure and relaxation, helping drug abusers relieve anxiety and stress during the rehabilitation process.

4.2.2 Building willpower and confidence

Learning and mastering the skills of Wujiball exercise is not achieved overnight. It requires drug abusers to make efforts and be patient. During the continuous practice, they need to overcome various difficulties, such as unskilled movements and physical exhaustion. By persisting in training and gradually mastering more complex movements, drug abusers can develop strong willpower. Moreover, as their exercise skills improve, they gain a sense of achievement and a significant boost in self-confidence. This positive mental state helps them face difficulties more resolutely and overcome psychological barriers during the drug rehabilitation process.

4.3 Social Rehabilitation

Drug abuse often narrows the social circles of drug abusers and damages their interpersonal relationships. Rebuilding good social relationships is crucial for their social rehabilitation. Wujiball exercise can be practiced in groups. In Wujiball activities organized by rehabilitation institutions or communities, drug abusers have the opportunity to interact and communicate with other rehabilitating individuals. They can share exercise experiences, encourage each other, and make progress together. This social interaction not only helps them restore their social skills but also makes them feel the warmth and support of the group, enhancing their sense of belonging and laying a solid foundation for their reintegration into society.

5. Application Strategies of Wujiball Exercise in Drug Rehabilitation

5.1 Reasonable Arrangement of Exercise Intensity and Time

When applying Wujiball exercise to drug rehabilitation, it is necessary to arrange the exercise intensity and time reasonably according to the physical condition and

rehabilitation stage of drug abusers. For those who have just entered the rehabilitation stage and have weak physical conditions, it is advisable to start with low-intensity simple movements, such as slow swinging and gentle patting. The exercise duration should not be too long, preferably controlled within 15-20 minutes. As their physical condition improves and exercise capacity increases, the exercise intensity can be gradually increased by speeding up the movements and increasing the complexity of the actions, while the exercise time can be extended to 30-45 minutes.

5.2 Professional Guidance and Supervision

To ensure the safety and effectiveness of Wujiball exercise in drug rehabilitation, professional rehabilitation personnel should provide guidance and supervision. These professionals should have relevant knowledge and skills in exercise rehabilitation and be able to develop personalized exercise programs based on individual differences among drug abusers. During the exercise, they should promptly correct any incorrect movements to prevent injuries. Additionally, they need to closely monitor the physical reactions of drug abusers. If any discomfort occurs, the exercise should be stopped immediately, and appropriate measures should be taken.

5.3 Integration with Other Rehabilitation Methods

Wujiball exercise can be combined with other drug rehabilitation methods to form a comprehensive rehabilitation plan. It can be integrated with pharmacological treatment to promote physical function recovery while alleviating withdrawal symptoms with medication. It can also be combined with psychological therapy to improve the psychological state of drug abusers on the basis of counseling and guidance. Moreover, it can be integrated with vocational training and social support to provide a holistic approach to drug rehabilitation and social reintegration.

6. Conclusion

Wujiball exercise, as a unique and advantageous fitness activity, has broad application prospects in the field of drug rehabilitation. Through its positive effects in physiological, psychological, and social rehabilitation, it provides an innovative and

effective rehabilitation pathway for drug abusers. In practical applications, arranging exercise intensity and time reasonably, strengthening professional guidance and supervision, and integrating with other rehabilitation methods can better leverage the role of Wujiball exercise in drug rehabilitation. Future research and practice should further explore and refine the application model of Wujiball exercise in drug rehabilitation to contribute more to solving drug problems and promoting social harmony and stability.

References

- [1] Y. J. Shi, "The joint establishment of a traffic accident mediation room by the Justice Bureau and the Traffic Police Brigade," *Government Legal System*, vol. 2009, no. 17, 2009.
- [2] Y. Y. Shen and L. Jia, "Simulation of the reception process of community correction subjects in community correction business training," *People's Mediation*, vol. 2007, no. 12, 2007.
- [3] B. Y. Bai, "Impersonating police officers in crimes - A phenomenon scan," *Public Security Forum*, vol. 1993, no. 03, 1993.
- [4] W. X. Chen, "Innovative 'land-sea integration' regulatory education model in Rizhao, Shandong," *Crime and Reform Research*, vol. 2024, no. 01, 2024.
- [5] W. Z. You and J. K. Dong, "A unique path of mutual cooperation between prison and society," *People's Mediation*, vol. 2004, no. 09, 2004.
- [6] Y. Qi, "The media 'style' of Safe Jinan," *Toward the World*, vol. 2017, no. 08, 2017.
- [7] Tracy EM, et al. Social networks and substance use. *J Soc Social Work Res.* 2016;7(3):359-391.
- [8] Y. F. Fu and H. Tang, "Building a new pattern of community correction with 'detail, practicality, and completeness'," *People's Mediation*, vol. 2016, no. 11, 2016.
- [9] Z. Y. Luo, "Practice and thinking on the standardized construction of judicial administrative detoxification work," *China Justice*, vol. 2017, no. 05, 2017.
- [10] Z. J. Jianguo, "Three-year action plan for the standardized construction of detoxification work in the judicial administrative detoxification system in Jiangsu," *China Justice*, vol. 2017, no. 08, 2017.
- [11] Z. Z. Zhao and P. P. Zhu, "Analysis of the construction of the social support system for judicial administrative detoxification work," *China Prison Journal*, vol. 2022, no. 06, 2022.
- [12] Y. Zhang, "Transformation and upgrading of judicial administrative detoxification work in Shanghai," *Crime and Reform Research*, vol. 2017, no. 02, 2017.
- [13] Q. Y. Entity and Y. T. Integration, "Implementation of the national unified judicial administrative detoxification work basic model in Hunan," *China Justice*, vol. 2019, no. 06, 2019.
- [14] S. Y. Zhang, "Solving difficulties and making up for shortcomings in the judicial administrative detoxification work in Shanghai," *China Justice*, vol. 2016, no. 12, 2016.
- [15] Q. S. Zeng, "Improving the law enforcement efficiency of judicial administrative detoxification in the new era," *China Justice*, vol. 2021, no. 05, 2021.