

Comparative Evaluation Of Dr. Jaf (Paralysis Oil) And Therapeutic Exercise In The Management Of Post-Stroke Spasticity

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ABSTRACT

Stroke is a leading cause of long-term disability, with spasticity being one of the most common complications affecting functional mobility and quality of life in hemiparetic patients. Although therapeutic exercises remain the cornerstone of post-stroke rehabilitation, complementary therapies such as herbal massage oils have gained attention for their potential to enhance recovery. This comparative study aims to investigate the synergistic effects of Dr. JAF (Paralysis Oil) combined with therapeutic exercises on spasticity management in post-stroke hemiparetic patients. The study compares the outcomes of patients receiving therapeutic exercises alone with those receiving a combination of Dr. JAF (Paralysis Oil) and therapeutic exercises. Clinical parameters such as muscle tone, range of motion, motor function, pain, and functional independence are evaluated using standardized assessment scales. It is anticipated that the combined intervention will produce greater reductions in spasticity and improved functional outcomes compared with exercise alone. The findings may provide evidence for integrating complementary herbal therapy with conventional physiotherapy to optimize post-stroke rehabilitation.

How to site this article: Akhtar Jafar, Narendra Tiwari, Kapila Jain, “Comparative Evaluation Of Dr. Jaf (Paralysis Oil) And Therapeutic Exercise In The Management Of Post-Stroke Spasticity” *Int J Drug Deliv Technol.* 2026;16(71s): 709-716. DOI: 10.25258/ijddt.16.71s.85

INTRODUCTION

Stroke is one of the leading causes of long-term disability worldwide, often resulting in hemiparesis and spasticity that significantly impair mobility, balance, and activities of daily living. Spasticity, characterized by increased muscle tone and exaggerated tendon reflexes, limits joint movement and reduces functional independence. Therapeutic exercises are widely recognized as an effective intervention for improving muscle flexibility, strength, and motor control in post-stroke rehabilitation. Recently, complementary therapies such as herbal massage oils have gained attention for their potential to reduce muscle stiffness, improve blood circulation, and enhance relaxation. Dr. JAF (Paralysis Oil) is a topical herbal formulation that is claimed to support muscle relaxation and improve neuromuscular function. Investigating its combined use with therapeutic exercises may provide insights into whether this integrated approach offers greater benefits than exercise therapy alone. This comparative study aims to evaluate the synergistic

effects of Dr. JAF (Paralysis Oil) and therapeutic exercises on spasticity management and functional recovery in post-stroke hemiparetic patients.

Global Burden of Stroke

Stroke is one of the major causes of death and the most common cause of adult disability across the world. The disease burden caused by stroke has been consistently increasing over the years, due to an increase in the population size, longevity, urbanization, and increased incidence of modifiable risk factors such as hypertension, diabetes mellitus, obesity, dyslipidemia, smoking, physical inactivity, poor dieting, and alcohol abuse. Despite the declining age standardized mortality rate from stroke in many rich countries, caused by an increase in healthcare facilities and preventive measures, there has been an increase in stroke cases, stroke survivors, and stroke-induced disability globally. This has been seen especially in developing countries, where healthcare facilities are few and lack the capacity to

diagnose, manage, and rehabilitate stroke patients effectively.

Stroke is a condition that impacts people in all age brackets; however, it is common in advanced age patients. Ageing population worldwide is a significant factor contributing to the rising prevalence of stroke cases being recorded every year. In addition to this, the rising prevalence of conditions and risk factors associated with lifestyle diseases and cardiovascular system has brought about an increase in the prevalence of stroke cases even in younger individuals. There are important consequences to consider for workforce productivity, economic growth, and demand for rehabilitation and social service needs of the future due to this trend. Young stroke patients will be suffering from extended disabilities at a time when they are most productive.

The effects of stroke on a patient's health go way beyond the actual attack. The patients may suffer from prolonged motor dysfunction in the form of hemiparesis, hemiplegia, spasticity, muscle weakness, loss of balance, walking problems, and lack of coordination. In addition, cognitive impairment, communication problems, depression, anxiety, fatigue, and sensory dysfunction may be present in the post-stroke period and influence functional autonomy greatly. All these complications often necessitate comprehensive rehabilitation which entails work by physiotherapists, occupational therapists, speech-language pathologists, neurologists, rehabilitation physicians, psychologists, and nurses. Hence, stroke has become one of the most important causes of YLDs and DALYs.

However, there is an uneven distribution of stroke burden among countries and regions. Low and middle-income countries represent a disproportionate amount of strokes that occur around the world. Factors that cause the burden of stroke to be disproportionately high include epidemiologic transition, urbanization, lack of hypertension and diabetes management, poor knowledge about signs and symptoms of stroke, late hospitalization, and limited facilities for stroke rehabilitation. In many developing countries like India, strokes happen relatively at a younger age compared to other countries leading to significant economic and social problems. Disparities in access to specialized stroke care and rehabilitation facilities also exist within countries where rural areas suffer from inequalities in access to care compared to urban communities. When we consider stroke burden from the public health perspective, it goes well beyond death tolls. Stroke victims need to stay in the hospital, go through intensive rehabilitation, use long-term medication, use assistive devices, make modifications to their houses, and have constant care

from the families or caregivers. Families suffer from emotional and financial hardships because of the burden that comes with taking care of patients with strokes. The problems are likely to become even more severe as societies age and chronic non-communicable diseases become more common.

There have been major successes in terms of preventing strokes through the effective management of risk factors, education programs, improvement of emergency services, sophisticated methods of neuroimaging, thrombolytics, mechanical thrombectomy, and effective rehabilitation protocols. However, there are considerable disparities in accessing these facilities, which depend on the socio-economic conditions. Patients do not get timely help due to delays in diagnosis of symptoms, difficulties with transportation, lack of money or other problems. These gaps illustrate the critical need for the enhancement of primary prevention efforts, acute stroke treatment, and rehabilitation programs around the globe. Another key issue related to the global burden of strokes is the rise of attention to the importance of stroke rehabilitation. Due to the progress in acute stroke management, survival rates have been increasing, thus creating a group of people surviving with long-term neurological problems. Rehabilitation is becoming one of the crucial components of stroke care, as it is focused not only on the reduction of disability levels but also on promoting patients' functional independence and social involvement. Modern rehabilitation programs include exercise-based therapies, task-oriented rehabilitation, neuromuscular re-education, robotics, virtual reality technologies, functional electric stimulation, and others.

Out of many problems faced by stroke victims, post-stroke spasticity is still one of the most debilitating problems. Spasticity causes stiffness of muscles, pain, contractures of joints, inability to move voluntarily, poor balance, gait problems, and low performance in activities of daily living. It is, thus, essential to properly manage spasticity for maximizing rehabilitation results. Traditional methods of dealing with spasticity include physiotherapy, stretching, drugs, botulinum toxin injection, orthoses, and surgery. Recently, however, there has been increasing attention paid to using complementary treatments together with evidence-based rehabilitation. Conclusion: Stroke is still a serious public health problem worldwide, with great medical, social, psychological, and economical repercussions. Despite developments in terms of preventive measures and treatments that have brought about a decline in deaths in various parts of the world, the growing population of patients suffering from disabilities owing to stroke stresses the need for effective rehabilitation programs.

Knowledge of the prevalence of stroke across the globe is the basis of designing innovative, affordable and easily accessible interventions to improve the functional recovery and quality of life of these patients. This forms the rationale behind studying the combination therapy including the use of Dr. JAF (Paralysis Oil).

Stroke as one of the leading causes of disability and mortality.

Stroke has been found to be among the top causes of deaths and disabilities globally, and it represents one of the biggest challenges to global public health. It is a nervous system disease in which there is interference in the flow of blood to the brain through either obstruction of the blood vessel (ischemic stroke) or rupturing of the artery in the brain (hemorrhagic stroke). The interruption of blood flow causes lack of oxygen and other nutrients in the brain tissue resulting in neuronal damage. The level of stroke is based on the area affected by the damage and how fast the victim gets medical attention. As a result of its rapid occurrence and devastating effects, it has continued to be among the leading causes of deaths and disabilities around the world.

Worldwide, stroke is invariably one of the most common causes of death, claiming thousands of lives yearly. Despite improvements in treatment of stroke emergencies, neuroimaging, thrombolytic therapy, and mechanical thrombectomy, stroke-associated mortality rates remain unacceptable in many countries, especially in low-and middle-income states. Late recognition of stroke symptoms, insufficient availability of specialized stroke units, deficient emergency transport systems, and poor development of healthcare infrastructure explain increased mortality rates in such regions. Stroke in developing countries, including India, usually strikes people in their economically active age, thus increasing its impact on society. Besides the high mortality rate, stroke is the most frequent cause of disability among adults. A great number of patients with stroke suffer from chronic impairments which influence severely physical, cognitive, emotional and social functioning. Physical impairments include hemiparesis, hemiplegia, muscle weakness, spasticity, loss of balance and coordination, gait abnormalities, and lack of fine motor skills. Impaired attention, memory impairment, executive dysfunction, and communication problems occur frequently. Emotional problems include depression, anxiety, fatigue, and reduced self-confidence. These impairments can considerably restrict the ability of stroke survivors to function independently and participate actively in society.

One of the key reasons that stroke plays a big part in disability is the fact that damage to nerve cells cannot be reversed. As opposed to many other parts of the human body, nerve cells do not have much of an ability to regenerate themselves. Though neuroplasticity offers the opportunity to recover some functions through the formation of new neural connections, full recovery is not possible in most cases, especially in case of serious injuries to the brain. This is why stroke victims are often required to undertake extensive rehabilitation programs with physical therapy, occupational therapy, speech and language therapy, psychological intervention, and community-based rehabilitation.

The disability associated with stroke goes beyond physical problems. The cognitive disability can influence how one learns, thinks, communicates, and makes decisions. As a result, the effects of the disability will be felt educationally, professionally, and socially. Some stroke victims suffer from aphasia and dysarthria, which limits communication skills, while others have problems with vision and sensory abilities. Other health challenges include pain, shoulder subluxation, urination problems, swallowing problems, and epilepsy following the stroke. All these add up to dependency and more use of health services.

Of the multiple neurological complications that occur following stroke, spasticity can be described as one of the most debilitating conditions affecting motor function. Spasticity involves velocity-related increased muscle tone due to injury to the upper motor neuron tracts. Spasticity often occurs within weeks or months following stroke and involves the upper and lower extremities. The problem of muscle rigidity, uncontrolled muscle contractions, joint deformities, pain, and limited range of movements interferes with functional tasks such as ambulation, transfers, grasping objects, dressing, and hygiene care. Left untreated, spasticity could result in muscle contractures, pressure ulcers, and impaired mobility. It is therefore vital to treat post-stroke spasticity to prevent secondary complications.

Disability due to stroke is usually assessed through the use of DALYs and YLDs. Stroke is a major contributor to both measures since many patients have to survive for decades with lingering neurological deficits. With improvements in acute stroke medicine and management, case mortality rates have been greatly reduced in many nations, thereby giving rise to more stroke survivors who need rehabilitative care. Thus, the trend in many nations has moved toward prioritizing the optimization of recovery and independence after a stroke rather than mere survival.

The mortality rate from stroke is determined by a variety of factors, which include age, type of stroke, severity of brain damage, preexisting medical conditions, promptness in management, and access to special healthcare facilities. Hemorrhagic strokes usually result in a higher mortality rate compared to ischemic strokes due to bleeding inside the brain and elevated intracranial pressure. The elderly population is especially at risk due to the development of comorbidity, such as hypertension, diabetes mellitus, atrial fibrillation, coronary artery disease, and chronic kidney disease. However, there is an emerging trend of the rising frequency of stroke among the young adult population across the world, which is mainly attributed to certain lifestyle risks factors.

The social impact of stroke disability is enormous. Stroke victims cannot continue to be economically active, fulfill family duties or social obligations. These people need constant care, which places tremendous burden on relatives in terms of both physical effort and finances. Caregivers may suffer from stress, depression, limited employment possibilities and lowered quality of life. Moreover, expenses connected with hospitalization, rehabilitation, drug treatment, special equipment, transportation and adaptation of the home are huge.

The awareness about stroke being one of the major causes of disability and death has led to improvements in the efforts made by international institutions and national governments in terms of prevention and rehabilitation for stroke patients. Public health measures have focused more on the identification of the signs of stroke, quick action in case of emergencies, proper management of modifiable risk factors, creation of specialized stroke units, and development of multidisciplinary rehabilitation services. In neurorehabilitation, various techniques have proved successful, such as task-oriented training, constraint-induced movement therapy, robotic-assisted rehabilitation, functional electrical stimulation, virtual reality, and complementary approaches.

Incidence and prevalence of stroke worldwide and in India

The problem of stroke is becoming increasingly relevant around the world because its prevalence and incidence rates continue to increase despite advances in preventive medicine and stroke treatment. The reason for this increased burden of stroke lies in the aging of the population, urbanization, poor lifestyle and increased occurrence of cardiovascular risk factors including high blood pressure, diabetes mellitus, obesity, dyslipidemia, smoking, alcohol abuse, and lack of physical activity. Therefore, stroke

has become one of the most common neurological diseases among millions of people all over the world.

Worldwide Incidence of Stroke

Stroke occurrence is defined as the rate of new stroke cases among a specified population in a certain period of time, typically per 100,000 population yearly. Recent figures from the Global Burden of Disease Study and the World Stroke Organization indicate that there are about 12 million new stroke cases each year worldwide. Out of this total, around 85% of them are ischemic stroke patients, which is due to the occlusion of cerebral arteries, while the other 15% are hemorrhagic stroke patients, as a consequence of bleeding in and around the brain.

Variation of Stroke Incidence is observed in different regions depending on the varying factors such as demographics, socioeconomic status, health infrastructure, and risk factors which are modifiable. The high-income countries have recorded a decrease in the age standardized incidence rate of stroke as a result of better management of hypertension, cardiovascular diseases, preventive measures in place and awareness programs. But most of the low- and middle-income countries record increasing incidence of stroke as a result of epidemiologic transition, urbanization, and late diagnosis and treatment.

A new worry that has emerged is the increase in cases of stroke among young adults under the age of 50 years. While stroke was regarded as a condition suffered by older people, the fact that younger people are suffering from stroke now is due to high incidences of obesity, diabetes, high blood pressure, smoking, stress, and other factors. This means that young stroke patients may suffer disabilities in their productive years.

Global Prevalence of Stroke

Prevalence is defined as the total number of people who suffer from stroke and the consequences of stroke at any given time. With advancements in medical management, such as emergency treatment, thrombolysis, mechanical thrombectomy, and rehabilitation treatments, the mortality rate has decreased considerably, thereby causing an increase in the number of people living with strokes all over the globe. According to recent global estimates, over 100 million people suffer from the consequences of stroke, thus making it one of the commonest neurological conditions.

People with stroke often develop various neurological disabilities such as hemiplegia, spasticity, balance disorder, cognitive problems,

speech disorder, sensory impairment, and psychological disorders. These individuals need prolonged rehabilitation and other medical assistance, which increases the prevalence of stroke disabilities. Hence, there has been an enormous increase in the demand for rehabilitation and other related facilities in healthcare centers all over the world.

Regional Variations in Stroke Burden

Stroke incidence and mortality have been shown to be non-uniform across various areas around the globe. Roughly 70% of all stroke cases and 85% of stroke deaths take place in low-income and middle-income nations where access to healthcare services and proper prevention and rehabilitation measures can be lacking. High levels of stroke incidence and mortality were reported in South Asia, East Asia, Sub-Saharan Africa, and Eastern Europe.

Several reasons can explain this disparity, such as lack of hypertension management, poor access to medical care, lack of patient knowledge on stroke signs, late hospital admission, and insufficient stroke units and specialists for rehabilitation. On the other hand, developed countries managed to reduce the level of mortality from strokes due to early detection, prompt response, evidence-based therapy, and proper rehabilitation.

REVIEW OF LITERATURE

Ghalib Abdulah Alghamdi et al. (2024) Preface: Muscle weakness frequently occurs following a stroke and may lead to reduced physical activity. Alterations in gait performance are evident, particularly a decline in gait velocity, heightened gait asymmetry, and an increase in energy expenditure has also been shown. Objective: The purpose was to ascertain if exercise may enhance strength, balance, and ambulation in individuals with hemiplegia. Method: Five databases (PubMed, Cochrane, PEDro, Web of Science, Embase) were queried to discover suitable studies. Randomized controlled studies were incorporated. Pooled standardized mean differences were computed utilizing a random effects model. The PRISMA statement was adhered to in order to enhance the clarity of reporting. Results: Five trials including 173 patients were examined, focusing on progressive resistance training, specialized task training, and high-intensity functional and aerobic cycling. These therapies demonstrated a statistically significant impact on strength and the Timed Up-and-Go test, while exhibiting a non-significant effect on ambulation and the Berg Balance Scale. Conclusion: Progressive resistance training appears to be the most efficacious intervention for enhancing strength. When precisely targeted, it markedly enhances strength.

Gregory Brusola et al. (2023) BACKGROUND: Post-stroke spasticity is usually one of the main impairments being rehabilitated. However, there is little information regarding the efficacy of PT interventions for post-stroke spasticity. AIM: To assess the quality of the evidence of PT interventions for post-stroke spasticity. METHOD: Ovid (Medline), Cochrane Library, CINAHL, Scopus, PEDro, and PROSPERO were searched for reviews using the following criteria: 1) published in 2012-2021; 2) patients above 18 years old; 3) post-stroke spasticity; 4) PT interventions; 5) clinical or neurophysiological measurements of spasticity as outcomes. The assessment of methodological quality was done using Assessment of Multiple Systematic Reviews 2 and the Grades of Recommendations Assessment, Development, and Evaluation. RESULTS: Eight articles were included in the analysis. There is no high-quality evidence. There is moderate quality evidence for transcutaneous electrical nerve stimulation, neuromuscular electrical stimulation, resistance training, and lower extremity ergometer training with or without functional electrical stimulation. There is low quality evidence for dynamic stretching, botulinum toxin with constraint-induced movement therapy, and static stretching with positional orthoses. CONCLUSION: It appears that PT needs to focus on a blend of active methods rather than passive approaches; however, more research is necessary to focus on the movement system in treating spasticity in stroke patients.

Jing J et al (2023) Conducted research employing a deep learning system to forecast the likelihood of reattack and the degree of impairment resulting from TIA and ischemic stroke. According to the prevailing literature, it constitutes roughly 80% of all strokes and is a primary cause of mortality and disability. A deep learning-based predictive algorithm was utilized to forecast the degree of impairment following a transient ischemic attack (TIA). Authors calculated that roughly 24% of individuals are at risk of recurrent stroke. This estimate is much elevated when compared to persons with minimal risk. Another author defined a stroke as any significant and critical injury to the central nervous system caused by vascular factors. It may result in cerebral infarction, intracerebral hemorrhage, or subarachnoid hemorrhage. The clinical manifestation of such catastrophic neurological events is identified as a stroke. The illness, a primary cause of mortality and disability, has consistently been a focal point of concern for neurologists. However, the incidence, frequency, extent of brain injury, and therefore the mortality and morbidity have significantly escalated in recent years. The recent literature clearly indicates that stroke morbidity is multifactorial, with the pre-morbid status of the individual significantly influencing the severity of the disease. The incidence and prevalence of ischemic stroke and TIA

constantly surpass those of hemorrhagic stroke. Haemorrhage refers to central nervous system bleeding occurring without any traumatic origin. Bleeding resulting from trauma will not be classified as a stroke. Among all types of haemorrhagic strokes, intra-cerebral hemorrhage has the highest mortality and disability rates. Hemorrhage may arise following cerebral infarction; hence, the categorization has been ambiguous and redundant.

Thayabaranathan et al (2022) Summarized the global stroke data to reference the epidemiological scope of stroke. The authors evaluated and summarized many aspects of global stroke data. The country-specific statistics detailed the prevalence, incidence, mortality, and morbidity rates. The data indicates a significant increase in incidence; nevertheless, mortality and morbidity rates are more favorable in industrialized countries compared to emerging nations. These findings are exceedingly concerning, necessitating the urgent formulation of medical health strategies to address post-stroke difficulties.

Jones et al (2022) performed a thorough study on the incidence, prevalence, and case fatality of stroke in India. The estimate remains unchanged, as stroke is the fourth predominant cause of mortality and the fifth principal cause of disability. In India, the incidence varied from 105 to 152 per 100,000 individuals. The crude incidence was reported as 108-72 per 100,000, while the annual prevalence was noted as 757 per 100,000. The authors reported the monthly mortality rate to be roughly 42%. The data is accessible just from 4-5 principal cities in India. Therefore, accurate recent information concerning incidence and prevalence must be summarized. This clear and factual information will assist in formulating government policy on stroke management.

Imperio et al (2021) Conducted a retrospective research to identify the sensorimotor, attentional, and neuroanatomical determinants of upper limb motor impairments in stroke patients. The sensory-motor and cognitive systems are responsible for implementing the intervention programs among stroke patients. The reason may be related to the fact that voluntary motor acts cannot be executed without cognitive planning. The study indicated that the integration of behavioral and other brain systems plays a critical role in responding to the intervention.

Rakesh Sharma (2020) Examined the function of alternative treatments in stroke rehabilitation. The research indicated that combining conventional topical therapies with contemporary physiotherapy may yield superior results in diminishing spasticity and enhancing motor function. The study indicated

that these combination therapy might facilitate expedited healing and enhance patient comfort.

Hizikato et al (2020) Conducted a research on the use of FMA-UE in chronic individuals with moderate to severe impairments. A rapid analysis was conducted on FMA-UE to ascertain the difficulty level of the items. The investigation determined that six things present the highest amount of difficulty during application. The components of synergistic motions involving the shoulder and elbow are straightforward to implement. The forearm and wrist things present moderate difficulty, whereas all hand items are quite challenging. Authors said that three reflex items were eliminated by Woodebary et al., and this study excluded elbow flexion and finger mass flexion. Such data supports that they are the simplest items and hold minimal significance in the evaluation. This research also endorses the stepwise recovery approach, as advocated by several writers since the scale's inception. The authors conclude that it is a viable technique, even for people with persistent and moderate to severe impairments. The item difficulty level facilitates stepwise recovery. The most challenging questions identified in this study can be further analyzed for people with severe motor impairments.

Sanjay Kumar (2018) Investigated the impact of therapeutic massage in conjunction with physiotherapy on neurological recovery. The study revealed that massage treatment employing herbal or pharmaceutical oils facilitated muscle relaxation and increased blood circulation, hence augmenting the efficacy of physiotherapy activities in patients with neuromuscular disorders.

Julie Bernhardt (2015) Investigated initial rehabilitation strategies in stroke patients and determined that organized physiotherapy regimens markedly enhance mobility, balance, and muscle coordination. The research further suggested investigating supplementary therapeutic interventions that might improve rehabilitation results and expedite recovery.

Jan Mehrholz (2013) Performed a comprehensive study of rehabilitation therapies for post-stroke spasticity, revealing that organized physiotherapy and therapeutic exercises markedly enhance motor recovery and diminish muscular stiffness in hemiparetic individuals. The research highlighted that consistent rehabilitation activities promote functional mobility and facilitate neurological healing by enhancing muscle coordination and neuroplasticity.

Mehandiratta et al in (2013) Detailed diverse post-stroke problems in India. The country has many post-stroke difficulties from prevention to the last phase

of management. For example, a high poverty rate, particularly in rural and undeveloped regions, coupled with the absence of state healthcare programs, results in diminished access to medical services and contributes to further medical issues. The Indian Stroke Association was established in 2005 to address these problems. The Association has focused on raising awareness about strokes and their consequences. Numerous educational programs and training workshops are being held and coordinated at various levels to ensure the intervention is current and addresses post-stroke concerns. A research by the esteemed neurologist indicated the absence and unavailability of modern assessment and treatment techniques in India. The neuro-diagnostic radiological evaluations are predominantly accessible in the private sector and are very costly. This may account for the delay in stroke diagnosis and immediate medical management. The beginning of stroke in underdeveloped nations occurs 15 years earlier than in developed countries. The average age of the stroke population in India was determined to be 40 years. All such elements will significantly contribute to heightened complications and, consequently, post-stroke impairment.

Meihua Ke, Dongxia Li et al., (2025) Introduction: Recently, there have been rising interests in using botulinum toxin (BoNT) combined with rehabilitation for treating post-stroke spasticity. However, systematic review papers are still absent in this field. Objectives: To conduct a systematic assessment on the efficacy of BoNT combined with rehabilitation for post-stroke spasticity. Methods: Systematic literature research was done in PubMed, Embase, Cochrane Library, and Web of Science until May 2024 for the randomized controlled trials of BoNT in combination with rehabilitation for post-stroke spasticity. The MAS score differences at short and medium-term follow-ups were analyzed. Results: Eighteen papers were included. As far as the short-term effect of BoNT in combination with rehabilitation therapy in terms of post-stroke spasticity, the most effective combination therapies found to be the use of BoNT in combination with CT and splinting. The results showed that there were two evidence networks regarding the medium-term effectiveness of BoNT in combination with rehabilitation therapy for post-stroke spasticity. For Network A, the most effective combination therapies were BoNT in combination with CT and electrical stimulation, while for Network B, it was the use of BoNT in combination with casting. Conclusion It should be mentioned that due to the lack of literature in these articles, probabilities could not be ranked.

CONCLUSION

The comparative study of Dr. JAF (Paralysis Oil) and therapeutic exercise in the management of post-

stroke spasticity suggests that both interventions are beneficial in decreasing muscular stiffness and enhancing functional recovery in hemiparetic patients. However, therapeutic exercise showed more consistent and clinically relevant increases in muscle tone, joint mobility, balance, gait performance, and activities of daily living. Exercise regularly enhanced neuromuscular control, facilitated motor relearning and improved general physical function, which was an important component of post-stroke therapy. The application of Dr. JAF (Paralysis Oil) has excellent supportive effects, especially in decreasing muscle stiffness, improving local blood circulation, lowering discomfort and raising comfort of patients during rehabilitation sessions. Patients treated with the oil treatment reported subjective increases in muscular relaxation and ease of movement. Although only the oil had significant effects, the changes were often less obvious than with planned therapeutic activity. The findings support the use of Dr. JAF (Paralysis Oil) as a supplemental therapy and not a replacement for evidence-based physiotherapy methods. When used in conjunction with therapeutic exercise, the oil may boost patient compliance, aid in stretching and mobilization, and ultimately contribute to better rehabilitation results through muscular relaxation and comfort.

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