



GUIDE TO STROKE REHABILITATION

FOR HEALTH CARE PROFESSIONALS



Expert Committee on Medical Rehabilitation
Sri Lanka Medical Association

Guide to Stroke Rehabilitation for Healthcare Professionals

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Sri Lanka Medical Association**

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Foreword

Stroke is a clinical entity that medical professionals encounter quite often in their day-to-day clinical practice. Over the last several decades, there has been many scientific advancements in relation to the management of stroke, out of which the most beneficial for better outcome being Stroke Unit care, where post stroke patients receive coordinated rehabilitation by a multidisciplinary group of caring professionals. The goals of rehabilitation are to optimize how the person functions after a stroke and the level of independence, and thereby to achieve the best possible quality of life. Rehabilitation can substantially help a stroke survivor achieve the best long-term outcomes.

There are many disabilities that may follow stroke. In addition to physical disability, there could be impairment of cognitive functions, speech, swallowing, sphincter functions, depression, and restricted participation in social activities, all of which require the services of multidisciplinary professionals for training and educating on coping strategies. Severity of the brain injury, age, level of alertness, associated medical problems together with the intensity of the rehabilitation programme, work environment, and timing of the commencement of rehabilitation endeavour determine the outcome following a stroke. Although the role played by every member of the multidisciplinary team is relevant in rehabilitation, they may not be available at each and every setting where patients are managed. Sharing of roles become pertinent in that sort of resource limited settings.

As with many countries in the region, being a country with resource constraints, Stroke Unit care is sparse for majority of the stroke patients in Sri Lanka. It has been a challenge to establish coordinated multidisciplinary team care even in locations where the members of the allied health professions and nurses are available. Motivation of medical professionals, particularly the Internal Medicine Physicians and Neurologists, would be essential to improve hospital-based Stroke Unit care.

The “Guide on Rehabilitation of Stroke for Healthcare Professionals” is a book, published under the patronage of the Sri Lanka Medical Association (2021) and the World Health Organization, to guide clinicians providing rehabilitation for stroke patients. The book consists of chapters contributed to by all members of the multidisciplinary team, with diagrammatic elaborations for the convenience of the readers from any of the categories of professionals who would be called upon to deal with stroke patients.

I wish to communicate my sincere gratitude to the World Health Organization Country office for the technical and financial support for conducting the project and publishing the book, “Guide on Rehabilitation of Stroke for Healthcare Professionals”. I wish all success to the training programme that would lay the foundation to establish Stroke Units, providing beds for care for every needy stroke patient in Sri Lanka.

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Editor's Preface

Dr Ajini Arasalingam

“It doesn't matter how slowly you go as long as you do not stop.”

Neurology per se has a major difference compared to many other fields of medicine. Plagued by many progressive illnesses which benefit mostly from rehabilitation, neurorehabilitation is a field of study which has to be taken up as a specialty by itself. Amongst all the neurological conditions stroke is the commonest with one among every five being affected. Stroke can affect anyone irrespective of age and Asians have a higher risk of stroke, with females having a higher propensity to have a stroke and die from it. It is preventable; however, we need to think in terms of the next line of being able to assist the stroke survivor to achieve the best level of social integration. In addition to the physical disability, the psychological and emotional effect on the patient and their carers cannot be overemphasized. Within neurology the field of neurorehabilitation has evolved, and the paradigm shifted significantly in Sri Lanka during the last two decades. The aim would be to provide equality and equity in the provision of stroke rehabilitation services to every province in this country, the pearl of the Indian Ocean. This book is devoted to neurorehabilitation services that can be offered to stroke survivors in Sri Lanka. The 12 chapters will address the role of each member of the multidisciplinary team in achieving our goals in rehabilitating a stroke survivor and the general principles required in the development of stroke rehabilitation units.

This book begins with an up-to-date account on the burden of stroke and essentials of settings for stroke care in Sri Lanka by Dr Senaka Bandusena. The present status of stroke care, stroke rehabilitation including macrolevel and microlevel strategies, community support services and new developments have been addressed. In the next chapter, Dr Gamini Pathirana provides an insight on the principles in stroke recovery and rehabilitation and has gone on to explain the differences between recovery and rehabilitation, phases of rehabilitation, predicting stroke recovery,

timing, intensity, and different options of stroke rehabilitation. He has emphasized on the stroke rehabilitation team and also introduced some newer concepts such as constraint induced therapy, melodic intonation therapy, and electrostimulation in stroke rehabilitation.

Dr Gunendrika Kasthuriratne's chapter on disabilities in stroke and rehabilitation assessment gives us a clear picture on the disabilities and impairments faced by a stroke survivor and outlines the different scales that can be used to assess the impairments and disabilities which are of immense use in the practice of rehabilitation. Post-stroke complications and prognostication by Dr Champika Gunawardhana ensures that the readers are kept abreast of the early identification of neurological deterioration and complications such as venous thromboembolism, infections, post stroke epilepsy, post stroke spasticity, pressure sores after stroke, post stroke psychological disorders, and post stroke pain. He also briefly describes the prognosis after stroke. Dr Harsha Gunasekara provides a review on aspects of a practical approach in stroke rehabilitation where he emphasizes on the organization of post stroke rehabilitation services (inpatient rehabilitation facility, skilled nursing facility, outpatient rehabilitation, long-term care, and early discharge settings). He has explicitly explained how to rehabilitate a stroke patient in a five-step plan.

In the next article Dr Champika Gunawardhana introduces multidisciplinary stroke care as an outset for the remaining chapters on the current and evolving evidence for cutting edge restorative modalities that will improve post stroke recovery. Dr Sujatha Seneviratne addresses the aspects of nursing care for stroke in which she lays out the responsibilities of a nurse in stroke care which includes monitoring of vital parameters, provision of physical care, prevention of specific complications, psychological support, and educating the family and caregivers, and helping to cope. Dr Nadeesha Kalyani, in her chapter on physiotherapy in stroke rehabilitation describes the neurophysiological techniques used in acute and rehabilitation care. Some of the techniques include proprioceptive neuromuscular facilitation, Bobath technique, and motor relearning techniques to mention a few. She has also

described gait training, repetitive task training, and constraint induced movement therapy.

In the next chapter, Mr Nandana Welage has given us great insight in occupational therapy assessments to improve visual perception, memory and cognition, sensory, motor, and upper limb functions. He has reinforced the need of home assessment. Considering the therapeutic interventions, he has focused on the neurodevelopment technique, proprioceptive neuromuscular facilitation technique, motor relearning technique, constraint induced movement therapy, mirror therapy, and motor imagery. He has emphasized on workplace and community reintegration. The chapter on person centered dysphagia and communication support at the stroke unit by Dr Shyamani Hettiarachchi describes the scope of practice establishing swallow safety, screening, and diagnostic assessments for dysphagia. She has focused on objective and instrumental assessments and intervention and management. Her comprehensive article also includes communication assessments and intervention and management. Further, she has touched on the topic of management in the context of COVID-19 including tele-practice services.

Dr Renuka Jayatissa in her chapter on nutritional management in stroke emphasizes on the detrimental value of suboptimal nutritional intake, nutrition screening and assessment, and medical nutrition therapy. Mr Chandana Ranaweera Arachchi in his chapter on intervention of the Department of Social Services for patients' welfare has highlighted the social services support that can be given to stroke survivors.

I would like to express my sincere thanks to all the expert authors contributing to this book and sharing their invaluable experience which will help us provide the highest level of stroke rehabilitation care for post stroke survivors beginning in the acute phase and continuing until they can attain the best functional outcome. My sincere appreciation to Dr M Ladsiyana (pre-intern demonstrator, University of Jaffna) for his expertise in the graphic designing of this book, designing the cover page, typesetting and producing

the final compilation of the book. A special word of thanks to Ms Gopikha Sivakumar (medical student, University of Jaffna) for proof reading and assisting in the final compilation of the book. I also express my gratitude to the World Health Organization Country office for the technical and financial support for conducting the project and publishing the book, which is of great value to advocate and improve rehabilitation of post stroke survivors.

Dr Ajini Arasalingam
Editor

Chapter 1: Burden of Stroke and Essentials of Settings for Stroke Care in Sri Lanka

Dr Senaka Bandusena

Sri Lanka's Stroke Burden

Sri Lanka is an island nation in the Indian ocean with a land area of 65,610 km and a population of 21.8 million. For administrative purposes it is divided into 9 provinces and 25 districts. It is a middle-income country with an estimated per capita income of 3682 USD. Sri Lanka spent 3.9% of its GDP for healthcare in 2019. Due to an admirable public health system, it is considered a country with exemplary selected health parameters with an average life expectancy of 78 years for females and 72 years for males and low infant and maternal mortality rates.

In Sri Lanka, stroke is the leading cause of adult disability and the seventh leading cause of hospital deaths. Two population-based prevalence studies conducted in the Western province and published in 2007 and 2015 have shown a stroke prevalence of approximately 10/1,000 population. However, at present there are no population-based studies to provide incidence or prevalence data outside the Western province.

Sri Lanka's evolving population demography shows that over the last few decades the percentage of elderly have increased and almost doubled from 1981 to 2019. This is due to improved life expectancy and reduced birth rates. It is estimated that 16.4% of the population is over 60 years of age. Going by the trends the percentage of the elderly is predicted to grow even further in the coming years. As stroke is a disease with a higher incidence in older people the number of stroke patients are also likewise expected to increase in future, which in turn will lead to a greater demand for stroke services.

Present Status of Stroke Care in Sri Lanka

Sri Lanka has a state funded, free, and universal health care system which consists of western and indigenous medical systems. In addition to the free health services provided by the state-sector hospitals, there is also a private health care system. While most stroke patients initially get admitted to a government hospital for care, the follow-up care could take place either in the state or private sector.

In 2019, Sri Lankan health institutes providing western medicine in the state sector had a total of 86,589 hospital beds in 643 hospitals, while there were 4,686 beds in the private sector and 4,009 beds in the state indigenous medicine sector. An audit conducted by the Association of Sri Lankan Neurologists (ASN) in 2020 revealed that there were 36 neurology units in the country with a total of 382 general neurology and 74 stroke beds. The 74 stroke beds were distributed in 9 hospitals (National Hospital Sri Lanka-10, North Colombo Teaching Hospital-6, Sri Jayawardenepura General Hospital-10, General Hospital Kalutara-6, National Hospital Kandy-4, Provincial General Hospital Ratnapura-10, District General Hospital Matara-6, Provincial General Hospital Kurunegala-16, and Provincial General Hospital Badulla-6). There were 16 neurology units that did not have a single bed. In addition, there were seven rehabilitation hospitals under the rheumatologists which provided rehabilitation facilities for stable patients, especially those requiring long-term rehabilitation (Ragama, Digana, Jayanthipura in Polonnaruwa, Kandagolla in Badulla, Maliban Rehabilitation Centre in Galle, Ampara, and Jaffna). In 2020, 45 neurologists were in active service, which could be approximated to 1 neurologist per 480,000 population.

When we consider stroke care over the years Sri Lanka has made major strides and improved in many spheres. The first step in organized stroke care took place in 1998 with the establishment of the first stroke unit at the Institute of Neurology, National Hospital of Sri Lanka (NHSL), Colombo. This unit has grown in stature over the years and still functions as the role model for training in stroke rehabilitation and Multi-Disciplinary Team (MDT) care

in stroke for the rest of the country. Another major landmark was the establishment of the National Stroke Association of Sri Lanka in 2001, which has contributed in a major way to improve public awareness on stroke risk factors and care through advocacy and conduct of numerous programs. Formation of the Association of Sri Lankan Neurologists (ASN) in 2007 was another key driving force for coordinated improvement of neurology services in the country which helped expansion of stroke services throughout the country.

When considering acute care, the first stroke thrombolysis was performed in Sri Lanka at the NHSL in 2008, while the first thrombectomy was performed at the Central Hospital, Colombo, a private hospital, in 2013, and in the state sector at NHSL in 2018.

The Government of Sri Lanka has shown great commitment to improve stroke services and related activities. Sri Lanka is one of the few countries in the region where rtPA is offered free of charge in the state sector to patients requiring thrombolysis. As of now there are 22 state sector hospitals offering thrombolysis with at least one hospital in each of the 9 provinces. In addition, the diagnostic services have also improved tremendously with more widespread availability of CT scanning facilities and other services required for cardiac and vascular studies. CT scanning facilities are now available in the state sector in all 9 provinces. In addition, for primary and secondary prevention of stroke, risk factor monitoring and medication to treat hypertension, dyslipidaemia, and diabetes are available free of charge in the state sector.

Another major development that especially contributed to the acute stroke care in the country was the establishment of a rapid-response, free ambulance transport system – the Suwasariya 1990 ambulance service which commenced in 2016 in the Western and Southern provinces. The Suwasariya network now has 297 ambulances and has expanded to cover the entire country. Initiation of this service was a generous gift from the Government

of India which provided the funding and technical assistance necessary for its commencement.

While many advances have taken place in acute stroke care and prevention, there are three areas which are still lagging - stroke rehabilitation, community support services for patients and carers, and thrombectomy.

Stroke Rehabilitation

Following a stroke, a significant proportion of patients are left with a disability requiring rehabilitation. Ideally it should be provided in a well-equipped stroke unit with a multidisciplinary team led by a specialist trained in stroke rehabilitation. However, there are only a few such stroke units in Sri Lanka, and those too have limited bed capacity.

While neurologists lead stroke care throughout the country, most stroke patients are still admitted to general medical units and would thus be attended to by the general physicians. This is mainly due to lack of adequate neurology/stroke beds. Patients are often prematurely discharged due to heavy demand for beds. While some of these patients seek treatment at centres providing indigenous medical therapies, others end up at home not getting the required rehabilitation.

Sri Lanka Stroke Clinical Registry (SLSCR) data analysis for a period of 6 months from November 2016 from five major hospitals in Sri Lanka (NHSL excluding the stroke unit, Teaching Hospital Kandy, Colombo South Teaching Hospital, Teaching Hospital Jaffna, and Teaching Hospital Karapitiya) revealed that the average hospital stays for a stroke patient even in major teaching hospitals was 5 days. However, at the NHSL stroke unit, which is a specialized one, the average stay for such patients was 21 days. While case mix may partly account for the difference it is most likely due to the availability of beds for rehabilitation and the commitment to rehabilitation in the stroke unit. Therefore, to improve stroke rehabilitation services one could think of *macro and micro level strategies*.

Macrolevel strategies involve prioritizing rehabilitation as an important health care goal, developing infrastructure, setting up new units to improve rehabilitation bed capacity, providing adequate facilities including equipment and trained therapists and developing effective stroke care pathways. These measures will require much funding and input from health administrators and policy makers and often take time for implementation.

Microlevel strategies would involve reorganizing existing facilities to achieve rehabilitation goals, starting an MDT meeting, introducing functional scales like Barthel's Index for assessment and monitoring, and allocating a few beds in a demarcated area within the neurology or general medical ward with help from medical colleagues. These measures would not require much funding and can be done by any neurologist/physician who has the commitment to improve rehabilitation.

Patient and doctor perception regarding rehabilitation is another aspect that needs attention. It is important to educate medical personnel, especially those in primary care such as family physicians and general practitioners who would be the first contacts in most instances regarding the importance and local availability of rehabilitation facilities. Additionally, it is important to have a streamlined referral and transfer system from units which lack necessary facilities.

Emphasis on high quality services at rehabilitation units is needed. Merely allocating a bed and keeping a patient without proper input would not help the stroke survivor. Therefore, it is important to have a coordinated approach with proper assessments and goals with regular review to evaluate recovery with treatment.

Both macro and micro level strategies should ideally be data driven and cost effective. The cost of services would involve initial capital expenditure and recurrent costs. Whether a patient would benefit from inward, or outpatient therapy is determined by the patient's clinical status, availability of in and

outpatient rehabilitation resources at the hospital, and transport and social support available to the patient.

Discharge planning is also a crucial aspect that ensures a smooth transition from hospital to home. This would involve carer education and engaging carers early in patient care while the patient is receiving inpatient therapy. This would boost the confidence of both patient and carer to manage domiciliary care following discharge. Pre-discharge home assessments to ensure safety are yet not regularly done in Sri Lanka.

Ideally *clinical audits* (structural/ process/ outcome) should be performed at pre-determined regular intervals to ensure maintenance of standards and optimal use of facilities. It is also important to keep patients and the stroke team well motivated and focused on tasks at hand. This can be achieved by conducting regular meetings with feedback and encouragement given to the staff.

Community Support Services

Despite the best efforts in rehabilitation there are patients who are left with significant disability and dependence. In such situations the burden often falls on the extended family. However, there are many who do not have family members or social support once they get home.

In situations where the family is not in a position to bear the burden of care there are only very few institutions such as hostels, nursing homes, and palliative care centres in Sri Lanka, available for service provision. Lack of these facilities leads to delays in discharge of patients from hospitals. Also, there is a need for centres which provide respite care to temporarily relieve the burden of the carer.

The Department of Social Services, through the Divisional Secretaries does provide social support for disabled stroke patients in the form of housing grants, financial assistance for home modifications such as disability access, construction of toilets with commodes, and obtaining electricity or pipe borne water if not available already. In addition, they could also receive grants for obtaining medicine unavailable in the state sector or assistive

devices such as wheelchairs, crutches etc. There is also provision for vocational training and self-employment.

Thrombectomy Facilities

At present, endovascular thrombectomy for acute stroke patients is limited to Colombo and is available in only two hospitals, the National Hospital of Sri Lanka and the Central Hospital, a private hospital.

New Developments

Several new developments are expected to change the landscape of stroke rehabilitation in the country in future. The first is the entry of Specialists in Rehabilitation Medicine who are expected to play a dynamic role and guide stroke rehabilitation along with the Neurologists. In 2017 the Post-Graduate Institute of Medicine offered rehabilitation medicine as a post MD subspecialty for the first time, to address a long felt need in the country. At present there are 7 postgraduates in training and the first batch is expected to commence work in 2023. The presence of rehabilitation specialists would have a huge positive impact on rehabilitation services in the country.

The second is the establishment of the National Stroke Center, presently being constructed at the Colombo East Hospital in Mulleriyawa which will help bridge the treatment gap to a great extent in the Western province by providing a comprehensive, multidisciplinary care centre with adequate number of beds for stroke patients. This is expected to be commissioned in a few years. The Ministry of Health in Sri Lanka in 2011 made a policy decision to establish a stroke unit in each province. It is anticipated that this would become a reality in the near future to streamline stroke rehabilitation and provide essential, equitable services in this field to the periphery.

Stroke rehabilitation is an area with much scope for further improvement. Improving capacity, better coordination within and between sectors, and commitment are key aspects required to achieve the final objective, which is to offer an optimal, comfortable setting for stroke patients to facilitate the best possible recovery with dignity.

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Chapter 2: Principles in Stroke Recovery and Rehabilitation

Dr Gamini Pathirana

Stroke recovery is best defined as spontaneous improvement across a variety of outcomes including biological and neurologic changes that manifest as improvement in performance and activity based behavioral measures. It does not need a rehabilitation team.

Alternatively, **stroke rehabilitation** is stroke care that aims to reduce disability and improve function with the goal of achieving the highest possible level of independence (physically, psychologically, socially, emotionally, and financially) within the limits of the persistent stroke impairments. Stroke rehabilitation needs a team.

The three ways a human brain recovers from stroke are adaptation, regeneration, and neuroplasticity. **Adaptation** is using alternative physical movements e.g., using the non-dominant hand for feeding after dominant hand function is lost following a motor stroke. **Regeneration** is the growth of neurons to replace those damaged from stroke. This historically is the least useful in stroke rehabilitation since it is believed that central nervous system tissue does not regrow after injury. (Advances in stem cell treatment and tissue growth factor treatments may make it a viable option in future). **Neuroplasticity**, which is the rewiring of the neural network, is considered to be the main process of stroke recovery.

There are three approaches to rehabilitation, namely restoration, compensation and modification. **Restoration** includes an exercise programme with the aim of retraining lost function. **Compensation** includes various adaptations e.g., prisms to correct diplopia. **Modification** includes changing the environment to promote function e.g., installing rails on walkways.

Phases of Stroke Rehabilitation

Four phases are recognized in stroke patients. They are the hyperacute, acute, subacute, and community reintegration phases. Onset and offset of these phases are not strictly demarcated. **Hyperacute phase** is the first 24 hours from stroke onset. This is the phase in which reperfusion therapies and others are targeted towards salvaging penumbra. **Acute phase** begins about 24 hours from onset of stroke and lasts five to seven days. During this phase, the interdisciplinary team ensures that the patient is medically stable and initiates acute rehabilitation. Initiating rehabilitation within 48 hours from stroke onset has beneficial effects on overall functional recovery. **Subacute phase** begins when the patient is transferred to a full rehabilitation facility usually about a week after stroke onset when the patient is medically stable. **Community reintegration phase** begins once the person is discharged home. During this phase patients are directed for home care services, outpatient rehabilitation facilities, community organizations, and stroke associations.

From a pathophysiological point, initial improvement occurs from resolution of edema and restoration of circulation to 'ischaemic penumbra'. Subsequent restoration of functions usually is attributed to many factors inclusive of dendritic sprouting, synaptogenesis, restoration of axonal transport, remyelination, unmasking of alternate pathways, redevelopment of cortical inhibition, resolution of diaschisis, alteration in neurotransmitters, and bilaterality of brain functions. Shift of functions to neighboring areas which has been shown in animals seems to occur in humans as well. However, this neuronal reorganization can be maladaptive and give rise to spasticity and seizures.

The degree and rapidity of stroke recovery depends on many factors. They include severity and degree of damage to the brain; optimum acute management including salvaging the penumbra tissue as much as possible, early antiplatelet therapy, stroke unit care, age (degree of recovery is greater in children and young individuals compared to the elderly) and Intensity of rehabilitation programme, severity of concurrent medical problems,

supportive home, work and social environments; and finally, timing of rehabilitation (sooner it begins the better).

Pathophysiological processes that underlie stroke recovery involves unmasking of latent network representations, excitatory metabolic stress, an imbalance in activating and inhibiting transmission leading to salient hyperexcitability, or mechanisms that consolidate novel connections which together may prime the plastic capabilities of the brain. These pathophysiological processes are potentially influenced by rehabilitative interventions.

The recovery process continues from plasticity into the 'period of consolidation' which begins after the subacute phase and continues up to several months following onset and then followed by the chronic phase where recovery slows dramatically with time.

Among some of the principles of motor learning based on existing literature are massed practice, spaced practice, dosage, task-specific practice, goal-oriented practice, variable practice, increasing difficulty, multisensory stimulation, rhythmic cueing, explicit feedback/knowledge of results, implicit feedback/knowledge of performance, modulate effector selection, action observation/embodied practice, motor imagery, and social interaction. These principles are being used in scientific rehabilitation.

Swallowing, facial movement, and gait tend to demonstrate better recovery than other deficits. One hypothesis to explain this observation is that these deficits have bi hemispheric representation. On the other hand, cortical functions, such as language and spatial attention as well as dominant hand movement which are lateralized consequently recover more slowly.

Predicting Stroke Recovery

Motor recovery tends to begin in the proximal upper and lower extremities and then progresses to other parts. Upper extremity recovery at 6 months can be predicted with 98% accuracy by two simple bedside tests, the first

being voluntary finger extension and the second being shoulder abduction present 48 hours after stroke. If these movements do not present by day 9 post stroke, likelihood of complete recovery drops to 14% (EPOS study: Early Prediction of Functional Outcome after Stroke Study). Similar models are available to predict lower extremity function recovery too.

Timing and Intensity of Rehabilitation

There is still uncertainty about the exact time to start rehabilitation. But most stroke rehabilitation experts agree that shorter and more frequent early mobilization is better (AVERT trial: A Very Early Rehabilitation Trial).

Different Options for Rehabilitation

Initial 'in hospital' rehabilitation is followed by any of the following - in home rehabilitation (therapist comes home), in- independent rehabilitation facility (IRF) rehabilitation, 'outpatient' rehabilitation (patient visits outpatient rehabilitation clinic) or 'skilled nursing home (SNF) facility' rehabilitation based on the stroke survivors' requirements. Placement of rehabilitation patients to these units is based on the nature and severity of stroke, comorbidities, and level of social support. Admission into these facilities is based on entry criteria e.g., independent rehabilitation facility (IRF) needs: (1) ability for patient to participate in at least two disciplines of therapy from physiotherapy, occupational therapy or speech and language therapy, (2) ability to engage at least 3 hours per day and (3) reasonable expectation of patient returning home following rehabilitation.

Rehabilitation Team

Interdisciplinary team is responsible for the rehabilitation of the stroke survivor. Physiotherapist is responsible for ambulatory recovery (transfer in and out of the chair or bed). The occupational therapist concentrates on the upper extremity with activities of daily living. The speech and language therapist (SALT) is responsible for language deficit or swallowing issues. The neurologist, rehabilitation specialist, and psychiatrist too will be there in the team. Others include social worker, vocational therapist, and neurophysiologist. Patient and family too are included as they could help in decision making and setting realistic goals.

Constraint Induced Therapy.

Once a stroke occurs, patients develop a phenomenon called 'learned disuse' where they underuse the affected side, being compensated by using the intact side. Because of this phenomenon, the affected side does not recover or recovers at a slower pace. In constraint induced therapy the unaffected extremity is constrained with a restraining device which forces the patient to use the affected side. Therefore, the patient is compelled to use the affected side for activities. This has been shown to make improvement in the deficit.

Melodic Intonation Therapy

This means using musical elements of melody, rhythm, and emphasis to improve language production. We are aware that language localizes to the dominant hemisphere in the majority of human beings. If the dominant hemisphere is affected, they may not be able to produce language. However, singing and melody localize to the non-dominant hemisphere. So, a patient who cannot talk with aphasia due to a stroke of the dominant hemisphere, may be able to retain the ability to sing and carry out a melody. Speech therapists use this technique to help the recovery of the damaged side and to improve vocalization, tone, and verbal output.

Electrostimulation in Stroke Rehabilitation

This technique is primarily used with motor deficits. It involves applying electrical stimulation to muscles of interest to produce a desired movement. This can be used for both upper and lower extremity muscles. This is an evidence-based therapy. Amount of stimulation can be adjusted depending on the level of function and improvement.

Pharmacotherapy and Stroke Rehabilitation

Use of fluoxetine (antidepressant) 20 mg /day compared to placebo beginning 5-10 days post stroke proved to improve recovery of upper extremity motor deficit (FLAME trial: Fluoxetine for Motor Recovery after Acute Ischemic Stroke trial). Use of cholinesterase inhibitors and glutaminergic agents help improve post stroke aphasia. Dopaminergic medications too have been used.

Certain antiepileptics e.g., phenobarbitone, diazepam, and phenytoin seem to impede synaptic formation and hinder neuroplasticity in animal models, so they tend to be avoided in stroke rehabilitation subjects. Furthermore, antihistamines too may retard the neuroplasticity and excessive pain medications should also be avoided. Dopamine blockers (typical antipsychotics) too may hinder stroke recovery.

Spasticity and Stroke

Spasticity means velocity dependent resistance to movement resulting from hyper excitability of stretch reflex. The underlying mechanism of the hyperexcitable stretch reflex, however, remains poorly understood. Experimental evidence has supported supraspinal origins of spasticity, likely from an imbalance between descending inhibitory and facilitatory regulation of spinal stretch reflexes secondary to cortical disinhibition after stroke. For a long time, it was controversial whether spasticity is beneficial or harmful in stroke recovery. Latest studies indicate that spasticity adversely affects stroke recovery. Spasticity can limit motor function and lead to pain, reduction in quality of life, deformities causing social isolation, and even depression.

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Chapter 3: Disabilities in Stroke and Rehabilitation

Assessment

Dr Gunendrika Kasthuriratne

Rehabilitation remains the mainstay of treatment for most of the stroke victims in spite of all the advances in acute stroke care. Thrombolytic therapy is best received within the first 3 hours although the therapeutic window has been extended up to 6 hours. Only a minority will be qualified for a successful thrombolytic therapy and about one third of the survivors will have residual disability. Severe strokes can place a great burden on the coping mechanisms of caregivers and family as well as patients.

Stroke related disability almost always impairs mobility and independence in the activities of daily living (ADL). Majority of the patients will have spastic hemiplegia, while cerebellar ataxia may affect mobility in some. Persistence of motor synergies and contractures and / or spasticity may affect mobility in the long term. Those who recover with motor functions early can commence learning ADL. Apraxia, hemianopia, hemineglect, and cognitive defects or depressive mood will add to the severity of functional impairment and thus prevent the functional recovery in a patient whose recovery of mobility is satisfactory.

There are disabling pain syndromes characteristic to stroke patients. They are caused by poor motor control and improper limb and gait biomechanics. The pain can affect the shoulders, hips, muscles, and other parts of the body. Hemiparetic shoulder pain (HSP) is a severe and disabling pain often occurring on the affected side. HSP is frequently accompanied by limitation in the range of motion at the shoulder. Central poststroke pain (CPSP) is a condition where they feel an exaggerated distress in response to unpleasant stimuli such as a pinprick and is difficult to treat. Some strokes may affect the continence of bladder and/or bowel. Factors that contribute to post stroke bladder incontinence include direct damage of the micturition centers in the brain, which result in bladder hyperreflexia and urgency. Normal bladder

function may be intact post stroke, but impaired mobility and cognition may be represented as incontinence.

Stroke may impair the cognitive abilities such as memory, reasoning, speech, and problem-solving skills. Impaired cognition has a significant negative impact on functional recovery. Aphasia is found in about one-third of patients with acute stroke. Aphasia will affect stroke victims in different ways. Speaking (expressive aphasia), understanding (receptive aphasia), reading, writing, using numbers, handling money, and even telling the time can be affected in an aphasic. It may resolve spontaneously but around half of the affected may experience long-term problems. Dysphagia is very common after a stroke. A bedside swallowing assessment is a must in the initial evaluation of a stroke victim. Many undergo rapid recovery, but the rest will continue to have high risk of aspiration and chest infections, and long-term nutritional and hydration issues.

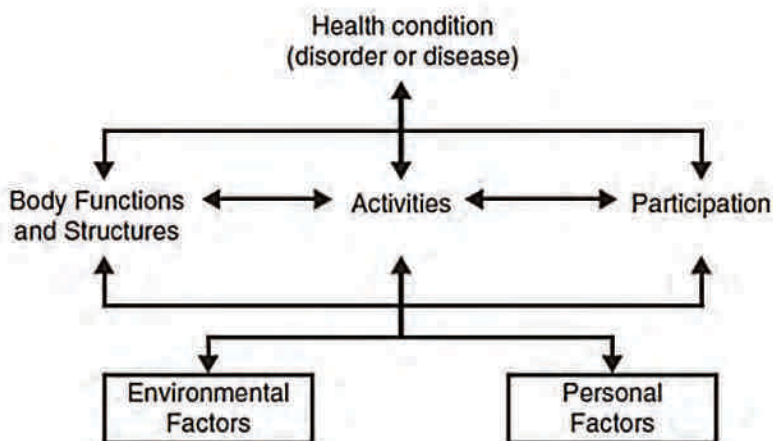
All currently available guidelines recommend all stroke survivors to be assessed for rehabilitation during the stay in the acute stroke care unit, unless they reach the pre-morbid level of function, or they are not fulfilling the criteria to be enrolled into a rehabilitation programme. They may be rehabilitated as inpatients, outpatients or at home. Generally, the criteria used to select a candidate for inpatient rehabilitation are significant persisting neurological deficit, stable neurological status, sufficient cognitive function to learn, communication ability to engage with therapist, physical ability to tolerate the active programme, achievable therapeutic goals, and a proper discharge plan. The decision is taken after assessment by an inter-disciplinary team.

A large number of stroke-assessment scales have been described in literature aiming to quantify stroke related disability and to predict the functional outcome. Different measures of functional outcome are used in the acute clinical setting in view of thrombolytic therapy and in planning and monitoring of a rehabilitation program. The World Health Organization's International Classification of Functioning, Disability and Health (WHO-ICF) is



a framework that aids classification of such scales. ICF helps decide on the appropriate measure/scale for a particular purpose.

The WHO-ICF is a global instrument that provides a unified and standard language and framework for the description of “functionality”. The ICF model is based on the biopsychosocial approach that integrates the biological, individual, and social dimensions of health. This model describes the interaction of positive aspects among three main components: 1) body functions and structures; 2) activity and participation; and 3) environmental and personal factors. The environment is considered as either a facilitator or a barrier to functional recovery. The components interact with each other and there are feedback loops.



World Health Organization's International Classification of Functioning, Disability and Health

Tools that assess stroke at all these levels are available. Only few studies have explored post stroke functionality based on the ICF conceptual model. All available outcome measures do not always fit neatly into a single category and often, they assess elements belonging to more than one domain. Some of the scales are general and are used to assess any disabling condition other than stroke. Some are specific to stroke. The most commonly used, clinically approved classic clinical scales for stroke patients are Mini-Mental State Examination (MMSE), Fugl-Meyer Assessment of Motor function (FMA-M)

and Balance function (FMA-B), National Institute of Health Stroke Scale (NIHSS), modified Rankin Scale (mRS), Functional Independence Measure (FIM), and modified Barthel Index (mBI).

MMSE is specific to assess the cognition impairment. For activity limitation or ADL assessment, the commonly used scales in the rehabilitation setting are the mBI and the FIM. FIM contains a section on cognition as well. Studies involving the comparison of the physical subtotal of the FIM and mBI scores have shown that neither is superior to the other. In both scales higher scores indicate higher independence in function.

Bodystructure (<i>impairments</i>)	Activities (<i>limitations to activity–disability</i>)	Participation (<i>barriers to participation–handicap</i>)
Beck Depression Inventory Behavioral Inattention Test Canadian Neurological Scale Clock Drawing Test Frenchay Aphasia Screening Test Fugl-Meyer Assessment General Health Questionnaire -28 Geriatric Depression Scale Hospital Anxiety and Depression Scale Line Bisection Test Mini Mental State Examination Modified Ashworth Scale Montreal Cognitive Assessment Motor-free Visual Perception Test National Institutes of Health Stroke Scale	Action Research Arm Test Barthel Index Berg Balance Scale Box and Block Test Chedoke McMaster Stroke Assessment Scale Chedoke Arm and Hand Activity Inventory Clinical Outcome Variables Scale Functional Ambulation Categories Functional Independence Measure Frenchay Activities Index Motor Assessment Scale Nine-hole Peg Test Rankin Handicap Scale Rivermead Mobility Scale Rivermead Motor Assessment	Canadian Occupational Performance Measure EuroQol Quality of Life Scale LIFE-H London Handicap Scale Medical Outcomes Study Short- Form 36 Nottingham Health Profile Reintegration to Normal Living Index Stroke Adapted Sickness Impact Profile Stroke Impact Scale Stroke Specific Quality of Life
Orpington Prognostic Scale Stroke Rehabilitation Assessment of Movement	Six Minute Walk Test Timed Up and Go Wolf Motor Function Test	

**Based on tables presented in Roberts & Counsell (1998) and Duncan et al. (2000).*

Classification of stroke related outcome measures according to the WHO-ICF <http://www.ebsr.com/>

Assessment by mBI or FIM can be done by anyone who knows the patient well. Usually, the mBI or FIM scores are documented in the inter-disciplinary team meeting. The scores are documented at the commencement of the programme and are compared at each regular team meeting. The discharge score is a must at the time of discharge from rehabilitation.

The participation restriction or handicap section of the WHO-ICF is assessed by scales which concentrate more on health-related quality of life. This section includes outcome measures that reflect an individual's involvement in life events such as social functioning. Those tools are mostly interviewer administered questionnaires and they are used more in the research setting than in a clinical one.

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Chapter 4: Post-Stroke Complications and Prognostication

Dr Champika Gunawardhana

Introduction

Post stroke complications are common after acute stroke and they contribute to poor clinical outcomes, delayed functional recovery and increased morbidity and mortality. Post stroke complications are defined as medical or neurological conditions that necessitate a physician's involvement and require monitoring by the medical staff. Prevalence of patients experiencing one or more medical complications after acute stroke varies widely, from 44 to 95%. The most predominant independent risk factors for adverse post stroke complications are older age and stroke severity.

Post stroke complications are both dynamic and transitional in their onset and are heterogeneous in nature. In general, complications which develop after stroke vary according to the chronicity of the illness and initial neurological deficits. Acute complications are mainly neurological conditions which occur as a direct consequence of the brain infarction. The infarction related acute events include cerebral oedema, haemorrhagic transformation of infarction, seizure activity, and death subsequent to brain herniation. The common complications which develop as a consequence of impairments related to stroke include venous thromboembolism, urinary tract infections, aspiration pneumonia, pressure sores, spasticity and falls. Post stroke depression, delirium, cognitive impairment, and anxiety are the prominent neuropsychiatric complications associated with stroke. Hence, it is important to continue close monitoring and vigilant observations of patients with stroke, for early detection and timely intervention of these complications.

Preventative strategies and treatments are available and should be used when appropriate. Prevention and specialist management of complications that arise following stroke may improve both short-term and long-term outcome of stroke survivors. Anticipating potential post-stroke complications may also expedite initiation of preventative and therapeutic measures in

high-risk patients. Multidisciplinary stroke unit care provides the best environment to prevent and manage these complications effectively.

Early Neurological Deterioration

Early neurological deterioration is generally seen in the very early stage of the post stroke period and is relatively common after acute strokes. These complications are associated with increased disability and mortality. There are a number of mechanisms involved with neurological deterioration including, neurological causes as a direct consequence of the neurological insult to the brain, and non-neurological causes such as abnormal physiological parameters. Both of these mechanisms can lead to secondary neuronal damage within the ischaemic penumbra. Acute neurological deterioration is predominantly due to brain parenchymal involvement and common complications include haemorrhagic transformation of infarction, seizure activity, cerebral oedema and death subsequent to brain herniation.

Many of these factors are potentially reversible, and therefore it is crucial that appropriate monitoring is undertaken to identify high risk patients. There is substantial evidence that offering high dependency unit care for patients with higher potential risk of developing early neurological complications after acute stroke, will dramatically improve the mobility and mortality.

Venous Thromboembolism in Stroke

Venous thromboembolism (VTE) is a common and potentially life-threatening condition seen after stroke and there are a number of different mechanisms described for heightened risk of venous thrombosis after stroke which include loss of muscle pump, blood stasis in paralytic limb and underlying prothrombotic conditions. The risk of VTE is common in first month to three months following the initial event of stroke predominantly due to immobility. Deep vein thrombosis (DVT) is a serious complication in patients with stroke in which blood clots form in deep veins of paralytic lower limbs and may lead to the devastating consequences of a pulmonary embolism (PE) if these clots embolize to lungs. The common risk factors for DVT after stroke include older age, high National Institute of Health Stroke

Scale (NIHSS) score, hemiparesis, immobility, female gender and atrial fibrillation.

The signs and symptoms of PE are usually nonspecific and can include sudden onset pleuritic chest pain, shortness of breath, tachycardia, tachypnea, hypoxia and hemoptysis. This is even more applicable in stroke patients as they often find it difficult to communicate their symptoms accurately. As a result of these diagnostic challenges, PE may be mistaken for pneumonia, which is relatively common after stroke. The gravity of PE after stroke is even greater as there are subclinical and silent events which are often clinically unrecognized and cause sudden death. Hence, a high degree of clinical suspicion is of paramount importance in early diagnosis and appropriate management of PE.

Prophylactic anticoagulant therapy for preventing DVT and PE is widely used in many patients hospitalized with different medical conditions including stroke. Usage of prophylactic anticoagulation, even at lower doses, can result in significant complications due to increased risk of bleeding especially in post stroke patients. The recommendations on usage of prophylactic anticoagulation in post stroke patients remain controversial in different guidelines and majority of them do not recommend it for universal use. The clinical decision should be made considering the benefits of anticoagulation and the risk of bleeding. Meanwhile, the usage of mechanical DVT prophylaxis is more popular among clinicians even though the evidence is scant. According to the available evidence, the graduated compression stockings are not very beneficial, but intermittent pneumatic compression showed more robust evidence in preventing deep-vein thrombosis and reducing mortality. The events of venous thromboembolism should be managed as a matter of urgency with anticoagulation or an inferior vena cava filter if the risk of bleeding is high.

Infections after Stroke

Even with the recent advancement of stroke care and sophisticated facilities, infection remains the most common and clinically important medical complication during the post stroke period. Pneumonia and urinary tract infections are the most frequent post-stroke infections and are often attributed to post stroke neurological impairments such as motor paralysis, immobilization, incontinence and dysphagia. Stroke-induced impairment of immunological competence has also been described as a cause for increased risk of infections among stroke survivors, further, older age and associated co-morbidities also play a vital role in post stroke infections. These complications are commonly associated with poor outcomes including deterioration of disability, prolongation of hospital stay and eventually death in complicated patients.

The commonest infection after stroke is pneumonia and the incidence ranges between 3% to 12 % in stroke units. Post-stroke pneumonia is usually caused by aspiration due to neurological deficits, such as impaired level of consciousness, disturbed protective reflexes or dysphagia. In addition, aspiration, stroke severity, age, medical comorbidities, and stroke induced immune depression also contribute to a larger extent in post stroke pneumonia. Conventionally, the diagnosis of pneumonia is based on clinical assessment, radiological imaging and relevant microbiological analysis; however, in the practical setting the diagnosis is mostly based on clinical evaluation. In complicated cases and in clinical doubts it is always recommended to obtain specialist opinion and request for advanced investigations. Commencement of empirical antimicrobial therapy based on local microbiological recommendations, in the earliest stage of presentation is of evident importance in minimizing life-threatening complications.

Urinary tract infections (UTI) are one of the commonest infections often seen in stroke survivors and the incidence is usually around 3 to 9%. Bladder dysfunction is a frequently seen complication among stroke patients and out of them, urine-storage disorder due to bladder hyper-reflexia seems to be more common. As a result of bladder dysfunction, most post stroke patients

develop urinary incontinence which is one of the most important risk factors for UTI. There are a number of other risk factors for UTI after stroke such as female sex, age, stroke severity, poor cognitive function, and catheterization. Clinical suspicion is essential in timely diagnosis and prompt treatment as subtle, nonspecific presentations are frequently seen in UTIs of post stroke patients. Appropriate antimicrobials should be commenced based on local guidelines.

Even in dedicated stroke units with standard management protocols, post-stroke infections remain the most responsible factor for poor outcome.

Post Stroke Epilepsy

Even though the incidence and prevalence rates are highly variable in different studies, it is well understood that epilepsy after stroke is a relatively common phenomenon. According to most of the prevalence studies, the incidence rates of post stroke epilepsy are between 2.5 and 6.5 %. Since, the brain parenchyma gets damaged and scarred as a result of cerebral infarction, there will be a permanent structural abnormality in the brain following any type of stroke and these structural abnormalities may create a seizure activity at any time after a stroke. Higher incidence of post stroke seizures occurs in subarachnoid haemorrhage (SAH), intracerebral haemorrhage (ICH), and large-volume cortical infarct.

Investigations should be undertaken to rule out alternative diagnoses such as cardiac disease-causing syncope and non-stroke causes of seizures including electrolyte and metabolic abnormalities, malignancy, and drug or alcohol withdrawal. Due to the large number of possible causes for seizure-like activity, magnetic resonance imaging, electroencephalogram (EEG) and video telemetry may be considered to support the probable diagnosis of post-stroke epilepsy when the clinical scenario is complex.

Once the diagnosis of epilepsy is confirmed after a detailed clinical assessment, appropriate antiepileptic medications should be started considering relevant patient factors. Even though epilepsy has been

considered as an independent risk factor for greater mortality following stroke, majority of patients achieve successful seizure remission with treatment.

Post Stroke Spasticity

Spasticity is a clinical phenomenon of upper motor neurone pathology and is commonly associated with pain, stiffness, and spasm which results in a massive impact on physical, functional, and emotional lifestyle of affected patients. According to prevalence studies spasticity occurs in 17 to 38% of patients following stroke and it can develop within the first few weeks to months after stroke. The onset of the spasticity is mostly variable, and it can develop in the early, late, or very late stages of the post stroke period. A number of neurological factors affect the onset and severity of spasticity in stroke which include size and location of the infarction and age of the lesion. The common pattern of spasticity in upper limb is adduction and internal rotation of shoulder together with flexion at elbow, wrist, and fingers. In lower limbs, the most frequently seen pattern is adduction and extension of knees together with inversion of foot.

In the context of any motor weakness, spasticity can be either be beneficial or detriment depending on the degree of involvement. Spasticity sometimes positively contributes to maintenance of mobility and posture, preservation of muscle mass and bone health, and prevention of venous thrombosis. However, when spasticity is extreme, it can interfere negatively with positioning, mobility, functional movements, and hygiene. Therefore, clinicians managing patients with spasticity must consider components of the functional disability and effects of spasticity before introducing the management plan. The reduction of beneficial effect of spasticity would be counterproductive. Hence, the appearance of spasticity following stroke does not always warrant treatment.

Reduction of negative functional complications, minimizing caregiver burden, improvement of posture, and achieving early independence in Activities in Daily Living (ADL) are the key treatment goals for disabling post-

stroke spasticity. A multidisciplinary approach is absolutely important in the process of management of spasticity arising after stroke. Especially a cooperative team approach with involvement of physicians, nurses, physiotherapists, occupational therapists, and orthotists would be essentially important for a successful outcome. Conventionally, spasticity is managed in a sequential manner with step wise approach and treatment must be tailored according to the functional impairments of individual patients.

Usually, the management of spasticity is combined with both physical therapy and pharmacological treatments. The commonly used pharmacological treatments include systemic anti spastic medications and locally acting agents. There is substantial evidence to support the use of botulinum neurotoxins for focal spasticity and it has proven efficacy in reducing muscle tone in administered groups. There is emerging evidence of effectiveness of physical therapy including electric stimulation delivered to muscles after botulinum toxin injections, serial casting of ankle and elbow joints, partial body weight support gait training, and limb neuroprosthesis.

Timely detection and appropriate management of post-stroke spasticity will improve functional capacity, independence, and quality of life in patients with spasticity while minimizing care burden.

Pressure Sores after Stroke

Stroke patients are a group at high risk for pressure sores due to many different disease and patient related factors. It is important to identify risk factors for pressure sores in post stroke patients in order to facilitate early adoption of appropriate preventive and treatment measures. Severity of neurological disability, older age, history of diabetes mellitus, and peripheral vascular disease are the predominant predisposing conditions for pressure sores in patients after stroke. Additionally, immobility, reduced attention, sensory loss, and tonal changes will make it further complicated. Positioning and pressure care are important components of post stroke management and has significant impact on minimizing the development of pressure sores.

There are a number of recommended strategies for effective positioning of post stroke patients that will remarkably prevent the complications related to pressure sores and eventually improve the rehabilitation process. Every patient after stroke should be considered as potentially high risk for developing pressure sores and positioning and pressure care plan should be designed based on the patient's individual risk factors.

Post Stroke Psychological Disorders

Stroke related neurological and functional disability directly affect the individual's psychology after an acute stroke. The commonest psychological disturbances include depression, anxiety, emotionalism, and cognitive impairment. Post stroke psychological disorders affect over half of the stroke patients at some point after their stroke. These psychological issues are associated with higher mortality and disability rates, poor quality of life and impaired personal relationships. The independent predictors of depression after stroke include severity of stroke, functional disability, and past history of depression. Apparently, depression itself is the main risk factor for anxiety after stroke. Cognitive impairment is common after stroke and deficits may affect specific cognitive domains such as language or may be more global. Each of these psychological impairments has a huge impact on the rehabilitation process and is directly associated with poor functional outcome and impaired quality of life.

Clinicians involved in the care of stroke patients should be able to diagnose depression, anxiety, and cognitive impairments accurately in early stages. Every standard stroke care team should have a dedicated psychologist who will play a vital role in recognition and delivering non-pharmacological interventions for post stroke psychological disorders. Liberal use of antidepressants should be considered for the management of depression, anxiety, and emotionalism after stroke which has shown clear benefits in rehabilitation outcomes.

Post Stroke Pain

Pain is a common and often distressing complication of stroke, which can have a negative impact on rehabilitation and recovery. Post stroke pain frequently affects the shoulder and upper limb and is usually classified as either central post-stroke pain or post-stroke shoulder pain. Other common types of pain experienced by post stroke patients include spasticity-related pain, tension-type headaches, limb pain exacerbated by immobility, and widespread pain syndromes. Previous painful disorders and post stroke depression are well recognized risk factors that will contribute to post stroke pain.

Careful clinical assessment is needed to ascertain the underlying causes and commence appropriate treatment and monitoring. All members of the multidisciplinary team, both in hospital and after discharge, need to be aware of the problems associated with post-stroke pain and the need for specialist referral where necessary.

There are several other minor medical complications frequently seen during post stroke period such as post stroke fatigue, post stroke insomnia, and falls after stroke. All these complications directly affect the rehabilitation process, morbidity, mortality, quality of life, and caregiver burden. Hence, it is evident that treating clinicians and members of multidisciplinary team should pay adequate attention and make observations for early recognition and implementation of appropriate treatment of post stroke complications.

Prognosis after Stroke

Stroke is the second leading cause of death across the globe, although the mortality rate is slowly declining. More than 75% of patients with acute stroke will survive for one year and five-year survival rate is over 50%. The majority of patients who survive a stroke recover their independence, although around 25% are left living with minor disabilities and around 40% have more severe disabilities.

The patient prognosis after an ischemic stroke is much more positive than after a haemorrhagic stroke during acute presentation. In addition to brain

parenchymal damage, haemorrhagic stroke increases the risk of critical complications such as cerebral oedema, increased intracranial pressure, or spasms in the brain vasculature which led to relatively higher mortality in haemorrhagic stroke during the initial 30 days after stroke. Hence, the mortality after acute stroke is commoner in haemorrhagic than ischaemic stroke. The predictive factors for poor prognosis and delayed rehabilitation outcome include, severity of neurological damage, initial functional impairment, presence of post stroke depressive disorder, and urinary incontinence. In addition, there are several non-neurological factors such as age, socioeconomic background, family support, and previous personality type which affect the prognosis both positively and negatively.

There have been major advances in acute stroke management, critical care and stroke rehabilitation over the last couple of decades and that has made a remarkable positive impact on mobility and mortality. In addition, more importantly it has created a huge attitude shift towards positive directions in stroke as a disease.

Accurate and elaborative data on post stroke complications and prognosis after stroke is of vital importance in planning acute stroke management, rehabilitation process, and long-term care.

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Chapter 5: Stroke Rehabilitation: A Practical Approach

Dr Harsha Gunasekara

Introduction

Stroke is infamous in its notoriety for dealing a critical blow to an individual's ability to perform the crudest and simplest of bodily movements and has claimed a name of its own in being one of the most common causes of adult-onset disability. Statistics reveal that 70-85% of first strokes are accompanied by hemiplegia and only 60% of people with hemiparesis who need inpatient rehabilitation achieve functional independence in simple activities of daily living (ADL) 6 months post-stroke. Patients with sensorimotor and visual-field losses tend to be dependent on caregivers on a much higher degree in comparison to those with pure motor impairments.

Stroke rehabilitation can be defined as the process of post-stroke care that aims to reduce disability and improve patient participation in activities of daily living (ADL), and it incorporates organized, multidisciplinary, and supportive services that commence within 24 hours after onset, in patients who have reached stability. Functional recovery and achievement of independence are promoted in patients with acute stroke utilizing rehabilitation as the primary mechanism.

Organization of Post-Stroke Rehabilitation Services- Levels of Care

It is implied by firm evidence that an organized multidisciplinary stroke care regimen tends to succeed not only in reducing mortality rates, likelihood of institutional care, and long-term disability, but also enhances recovery, while promoting ADL independence. A majority of the research works conducted on stroke, however, have had their focus on acute and post-acute care, with a lesser degree of attention towards the more chronic recovery phase. The ensuing discussion attempts to describe the different levels of care available for stroke rehabilitation.

Inpatient Rehabilitation Facility (IRF)

IRF offers care at the level of the hospital to those patients who are in need of intensive, multidisciplinary rehabilitation programs to improve their ability to function, and all stroke units and neurology units with dedicated stroke beds are ideally expected to offer IRF level care. Listed out below is a standard set of recommendations for IRF level care.

Admissions to an IRF are justified only when the rehabilitation team deems significant functional improvement possible within a reasonable time period.

Standard set of recommendations for IRF level care

Ideally suited for acute stroke patients with medical comorbidities.

24-hour availability of Neurologist/Physician/Medical Officer

Close supervision by nursing officers specially trained and/or experienced in rehabilitation.

Availability and provision of physical therapy (PT) and occupational therapy (OT). Intensity and duration of therapy varies according to patient needs but standard recommendations specify a minimum of 45 minutes to 3 hours for at least 5 days a week.

Availability of other skilled rehabilitation modalities – speech and language pathology (SLP), prosthetic and orthotic services, psychological services, and social services.

Documentation of medical interventions, patient progress, review of initial rehabilitation goals, and discharge planning every 2-3 days and through weekly multidisciplinary team (MDT) conferences.

Skilled Nursing Facility (SNF)

Another inpatient rehabilitation setting is the skilled nursing facility, an institution or a distinct part of an institution in which the primary focus is the provision of skilled nursing care and rehabilitation services to residents requiring medical or nursing care. Even in the absence of expectations that the stroke survivor would reach full or partial recovery, skilled services within a skilled nursing facility can be requested to maintain or prevent further deterioration of the patient's current medical status.

Examples for situations in which there is a need for skilled nursing services include bowel and bladder impairment, skin breakdown or high risk for skin breakdown, impaired bed mobility, dependence for activities of daily living (ADLs), and high risk for nutritional deficits. It should be kept in mind that nursing services are not limited to the above-mentioned circumstances.

Outpatient Rehabilitation

In the Sri Lankan context, the available outpatient rehabilitation services are usually based on hospitals whereas there seems to be a lack of those that are home-based. In an ideal situation, a periodically reviewed plan for therapy services, with the input of therapists with a minimum frequency of every 30 days should exist, along with a physician referral specifying the therapies needed.

Services are required to possess the features of being reasonable, necessary, restorative, complex, and sophisticated enough to necessitate the supervision of a qualified healthcare professional (HCP), only by or under whom it can be performed in a safe and effective manner.

Long Term (chronic) Care Settings

The successful management of the stroke survivor's level of health may require the provision of support and external resources, which becomes the main focus of care in the long-term setting. These services may be preventive, diagnostic, and/or therapeutic, and may include counseling and educational services. It is of utmost importance that these services be prescribed by a physician or other qualified HCP.

Early Supported Discharge (ESD) Rehabilitation Services

It is wise to consider ESD for patients with mild to moderate stroke, in the presence of adequate community services for both rehabilitation and caregiver support, with the possibility of providing the desired level of intensity of rehabilitation.

Stroke Rehabilitation- How to do it?

Three different approaches are adapted in the process of stroke rehabilitation, the primary goal being the improvement of functional recovery. The first of these is restoration, which involves re-training of the central nervous system (CNS) to engage in the impaired function in order to restore the function subserved by the injured brain tissue. Compensation is considered next, and it involves adaptation through the use of devices or specific behaviors to perform the lost/impaired function. Finally, modification attempts to alter the patient's environment to promote function and ADL.

The rehabilitation process can be broken into five essential steps which are discussed in the subsequent sections.

Step One- Organized Care Setting and Multidisciplinary Team Based on Standard Recommendations

Securing a defined geographical area for the purpose of establishing a stroke unit has proven to be quite challenging in Sri Lanka, as factors such as limited space availability in hospitals belonging to the state sector and other procedural issues cause significant impedance. In such a framework, it becomes more practical to allocate a few beds from a unit or ward to serve the purpose. The latest recommendations on Stroke Systems of Care can be found in *Stroke*. 2019;50: e187-e210. Staffing requirements for stroke units can be found in British Association of Stroke Physicians (BASP) Stroke Services Standards- June 2014.

Composition, functions and service requirements of the MDT in stroke rehabilitation.

Discipline	Description of Duties
Neurologist/Physician/Medical Officer	Usually coordinate the rehabilitation team and manage medical conditions pertaining to stroke and comorbidities.
Nursing Officer	Manage medical issues, continence, skin, nutrition, hydration, provide ongoing patient and caregiver education, and establish care plans to maintain optimal wellness.
Physiotherapist	Experts in examining and treating neuromuscular problems that affect the abilities of individuals to move.
Occupational Therapist	Focus on improving the skills of ADL
Speech & Language Pathologist	Assess speech, language, and other cognitive functions, as well as swallowing, and provide interventions and counseling/education to address language and speech disorders
Social Worker	Assist individuals, groups, or communities to restore or enhance their capacity for social and economic functioning, while creating social conditions favorable to their goals. Also assist in vocational barriers.
Psychologist	Improves patient participation in the rehabilitation process through motivation and also address the psychiatric comorbidities

It is recommended that all stroke rehabilitation services incorporate organized training for all categories of staff and caregivers involved.

Step Two- The Rehabilitation Assessment

A comprehensive assessment of the patients' needs within 24 hours of admission should be carried out concurrently with other diagnostic tests, depending on the patient's medical stability, to all admissions received at the stroke unit. The rehabilitation assessment should direct its attention towards three essential requirements. They include identification of extent and severity of disability and assessment and documentation of functional capacity using the Barthel Score, screening for post-stroke complications, and referral to appropriate therapy services.

The medical officers are duty bound to ensure that all admissions to the stroke unit are referred to the appropriate therapy services within 24 hours, using referrals whose reception by the MDT members and initiation of therapy is seen to by the nursing officers. On admission to the stroke unit, patients should be assessed for post-stroke complications with the assessments described below, using screening tools whenever appropriate.

Dysphagia Assessment

On suspicion of dysphagia or risk of aspiration, a bedside water swallowing screen should be performed by the speech and language pathologist (SLP) or nursing officer and appropriate feeding adjustments should be made in accordance with the advice provided by the SLP.

Assessment for Skin Breakdown

This involves identification of at-risk patients via application of screening tools (Barden or Waterlow scale), following which regular assessments and suitable interventions which include turning every 2 hours, using support surfaces, avoiding excessive moisture, and maintaining hygiene, should be carried out.

Assessment of Risk of Deep Vein Thrombosis (DVT)

Aided once again by appropriate scales for risk assessment, patients who are at high risk for DVT should be identified and recommended preventive measures such as the use of low molecular weight heparin (LMWH) and pneumatic compression should be undertaken.

Assessment of Bladder and Bowel Functions

The risk of skin breakdown is elevated in the case of urinary and faecal incontinence, and it is well advised to avoid the use of urinary catheters for a prolonged period of time.

Assessment of Nutrition and Hydration

Nutritional supplementation becomes a requisite, only in the presence of malnutrition. The correction of dehydration and the prevention of over hydration, especially avoidance of 5% dextrose, is essential in all stroke patients.

Assessment of Depression and Emotional and Behavioural Disturbances

It is of the highest importance that diagnosed patients should undergo pharmacological treatment and psychological counseling, as patient motivation, and the outcome of the rehabilitation itself could be subject to adverse effects by depression, emotional lability, and behavioural issues.

Step Three- Rehabilitation Goal Setting

Goal setting, or goal planning in other words, is the corner stone of effective stroke rehabilitation and a prerequisite for multidisciplinary teamwork. Goal setting should have the patient as its center of focus and should be done through discussion in concert with the MDT at the initial case conference. Goal planning in stroke rehabilitation is vital as it has the capacity to improve patient outcome and to enhance patient autonomy, in addition to which it also helps in the evaluation of outcomes.

The principle of being “SMART” applies to rehabilitation goals, as they too are required to possess the characteristics of being Specific, Measurable, Achievable (rather than challenging), Realistic (rather than hopeful), and Timebound. It is to be expected of the patient to direct his focus at tasks which matter the most, and the therapist should be able to select goals that are manageable or tasks that are of a lower order and then initiate therapy plans to achieve them. The stroke MDT members should encourage the active involvement of the family/caregivers in day-to-day care and rehabilitation.

Examples of rehabilitation goals

Goal Theme	Specific Goal	Responsible MDT
Improve mobility	Walk without support	PT
Improve Hand Function	Increase use of left hand Improve skill in using right hand	OT
Improve speech	Improve functional communication Learn strategies to assist with word finding	SLP

Step Four- Implementation of Interventions, Overcoming Barriers, and Evaluation of Progress.

It is recommended that stroke survivors receive rehabilitation at an intensity commensurate with anticipated benefit and tolerance. Intensive and very early mobilization within 24 hours of stroke onset can reduce the odds of a favourable outcome at 3 months and is not recommended.

Barriers to patient compliance to rehabilitation should be recognized and corrected. Common problems that arise include pain which may be post-stroke shoulder pain or pain due to spasticity or osteoarthritis, depression, and socio-economic factors.

The multidisciplinary team collectively plays a pivotal role in enhancing the ability of stroke patients to progress in the rehabilitation process via implementing the therapies needed to achieve the short- and long-term goals. Although each discipline has its own unique contribution, weekly conferences facilitate individualization of care approach and evaluation of care plan and outcome parameters.

Traditionally, it is the duty of the nurses to ensure consistent and timely implementation and evaluation of the recommendations presented and whilst members of each discipline treat particular body structures and functions, the nurse tends to the patient as a whole, thus providing continuity and integrity to both the patients' and their families' rehabilitation experience. As the nurses are the ones caring for patients 24 hours a day, 7 days a week, they naturally become the primary professionals who are expected to communicate and collaborate effectively with all parties involved, to achieve the patients' individualized care needs.

Step Five- Discharge Planning and Continuum of Care

The inpatient care to home transition after a stroke event can indeed be quite challenging to both the patient and the caregiver. Those patients who require ongoing rehabilitation after discharge should continue to be followed up by a care team with expertise in stroke rehabilitation, whenever possible. Patients who do not require additional rehabilitation services are discharged to their homes, and early supported discharge (ESD) should be offered as an option to all eligible stroke patients. Those who are profoundly and permanently disabled and are discharged to long-term care settings, can be managed by a primary care provider.

In accordance with statistics which reveal that one in four stroke patients experience recurrence, it is essential that all patients receive health education and medications for secondary prophylaxis. Family and caregivers should be provided with information on outpatient and community rehabilitation and follow ups should be arranged to ensure continuity of care.

Conclusion

Stroke rehabilitation is in essence, a massive process which requires a sustained and coordinated effort from a large team including the patient, family, or other caregivers such as personal care attendants, physicians, nurses, physical and occupational therapists, speech and language pathologists, psychologists, social workers, and others. Communication and coordination among these team members are paramount in maximizing the effectiveness and efficiency of rehabilitation, without which the isolated efforts to rehabilitate the stroke survivor are unlikely to achieve their full potential.

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Chapter 6: Multidisciplinary Stroke Care

Dr Champika Gunawardhana

Introduction

The neurological impairment, functional disability and psychological distress of stroke can have a profound effect on recovery process, quality of life, overall patient outcome, and caregiver burden. Despite the recent advancements in the field of hyper-acute and acute stroke management, the vast majority of stroke survivors remain functionally disabled. Therefore, rehabilitation represents a key part of stroke care for the majority of post stroke patients and can create a significant contribution for improving their quality of life.

Stroke rehabilitation should begin with the patient's hospital admission. Obviously, the degree of recovery is impacted by many factors including the quality of stroke rehabilitation process.

Coordinated Stroke Rehabilitation

Rehabilitation is a scientific, structural, and dynamic goal-oriented approach to provide optimal functional recovery and independence in patients. Since it is a complex process, it is impossible to manage with the involvement of an individual professional and essentially requires the development of a professional rehabilitation team. Teamwork is the key factor in rehabilitation process to achieve holistic goals in complicated, disabled post stroke patients and this approach facilitates the achievement of the best possible and desirable outcome in rehabilitation.

It is a well-recognized concept that collaboration and coordination are the most successful mechanisms to achieve challenging rehabilitation objectives in the real world. Communication and collaboration among multidisciplinary team members is one of the key elements which develop the habit of constant discussions about patients and continuous information exchange during the management process. Coordination is the other element which

facilitates efficient group work based on structured plans and systematic, target oriented interventions.

Professionals in different fields in rehabilitation should function together to provide the best expertise to the process and enhance the quality of life in disabled patients. The definition of Multi-Disciplinary Team (MDT) refers to activities that involve the efforts of individuals from a number of disciplines. These efforts are discipline-orientated and, although they may impinge upon clients or activities dealt with by other disciplines; they approach them primarily through each discipline relating to its own activities.

The MDT in stroke include the neurologist/stroke physician, physiatrists, stroke nurse, physical therapist, speech and language pathologist, occupational therapist, clinical psychologist, orthotist, and social worker. This group of professionals assess and analyses the disabilities of patients and set specific, achievable goals to provide the best possible care. The common platform designed for the professionals to develop a patient centered and goal-oriented rehabilitation process based on detailed discussions is the MDT. Every professional involved in the MDT process has a shared responsibility and equal opportunity to provide the best and evidence based therapeutic options to achieve holistic patient care. This will only be reachable with commitment, cooperation, and appropriate communication with each member of the MDT team for the betterment of patient care.

Effectiveness of Multidisciplinary Stroke Care

There is unequivocal evidence of improved outcomes when patients are treated in stroke units by multidisciplinary teams. In comparison to conventional stroke care, structured inpatient stroke management has clearly shown reduction in long-term dependency, improved quality of life, and mortality. There is also substantial evidence that involvement of MDTs in post stroke rehabilitation facilitate early discharge and increase regaining independence.

There is a dire need to improve stroke rehabilitation care and MDT approach in Sri Lanka. An acceptable, feasible, and economical multidisciplinary stroke care model should be introduced to the local health system as early as possible. Implementation of a multidisciplinary stroke care model will definitely enhance the patient outcomes after stroke.

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Chapter 7: Nursing Care for Stroke

Dr Sujatha Seneviratne & Ms G Thushari Anuruddhika

Nurses render health services to the individual, the family, and the community and coordinate their services with those of related groups [International Council of Nurses (ICN), 2012]. The four fundamental responsibilities of nurses include promotion of health, prevention of illness, restoration of health, and alleviation of suffering which exemplifies the delivery of safe, competent, and ethical nursing care for stroke within the multidisciplinary team. Nurses who work in stroke units have a wide range of functions and responsibilities including assessment, identification of life-limiting and life-threatening problems, monitoring, rehabilitation, and providing psychological support to enhance recovery. The wide range of responsibilities and functions a nurse would perform incorporates the fourteen Basic Human Needs of a patient described by Henderson and the International Council of Nurses (1998). Accordingly, nursing care must be tailored for individual needs of a patient based on *cognitive and physical functional* level of each individual from the onset of stroke. This article provides an overview of the functions and responsibilities of nurses in the care for stroke to assist the affected persons in fulfilling their needs and to achieve optimum health within their scope of practice.

Nurses' Responsibilities in Stroke Care

Nurses are responsible to provide comprehensive care round the clock focusing on nursing assessment and recording of vital signs and level of consciousness from admission onwards and making on-going observations as required and throughout their stay in hospital, taking care of the patients' general health including physical care, the provision of a favourable environment (both physical and psychological), administration of medications as prescribed, assisting in optimal positioning, maintaining nutrition, bladder and bowel functions, rehabilitation and preventing complications. It is essential for nurses to anticipate, prevent, and recognize as early as possible, the risks for complications in stroke patients at the acute phase because complications may affect the patient outcomes. In such

instances, timely interventions and care will be delivered by the nursing staff coordinated with the members of the multidisciplinary team. Further, nurses are in constant contact with the patient and family members to provide necessary information and support. Nurses have to be mindful about problems in vision that can occur in patients who have weakness on the right side. Nurses have to approach such patients from his/her left side in providing care, because the patient will not notice the nurse approaching from his/her right.

Monitoring and Recording of Vital Signs and Level of Consciousness

Assessment is performed initially on admission, immediately following the treatment modalities, and throughout the hospital stay to identify the risks and priority needs in providing nursing care. Nurses play a vital role in observation of the patient in order to detect and inform the medical officers of any deterioration of health status for timely action. The main vital signs monitored and recorded by the nurses are body temperature, blood pressure, respiration rate and pattern, oxygen saturation, pupils, capillary blood sugar, and level of consciousness using the Glasgow Coma Scale (GCS). The regularity of observation of GCS will depend on the severity of the patient's condition and according to the guidelines provided. Nurses implement the prescribed treatment and nursing care soon after the initial assessment. For example, Oxygen will be administered immediately through a face mask if a patient is having difficulty in breathing.

Provision of Physical Care

Nurses are responsible for preparation of the patients' environment and maintaining personal hygiene including mouth care, selecting suitable clothes, grooming, assisting in maintaining body posture, and mobilization.

Preparation of the environment of patient

Preparing an environment which promotes recovery of a patient is a prime responsibility of nurses. On receiving a patient to a stroke unit/ward nurses prepare the patients' physical environment considering the needs identified during their initial brief assessment. In many wards the beds are arranged in

an open area, around a central station for staff. A patient's unit consisting of a bed with railings and facilities to elevate at least the head end, a locker or a bedside cupboard, a bed-side table, and an armchair are arranged. The distance between two beds in a ward should be at least one metre for easy access and for the movement of equipment such as x-ray machines. Easy access to the bathrooms is considered in relation to the activity level of each individual patient. Nurses take measures to minimize environmental hazards considering the potential visual and physical impairments. In addition to the provision of clean bed linen and supplies, nurses maintain the patient care environment with minimal noise levels, making sure not to talk aloud, having a clear structure of the day, and ensuring undisturbed sleep to support the healing process. A clear wall clock and a day calendar large enough to be read at a distance would be essential in the recovery process of those who are having cognitive impairments. The photographs or drawings/paintings on the walls (if available) should be large with pleasant light colours and clear enough for them to understand.

Maintaining personal hygiene

The level of nursing care in maintaining personal hygiene is decided on the patient's ability for self-care. The Barthel index is used to assess the activities of daily living. Nurses will provide the necessities to the bedside and assist the patient to perform the tasks such as brushing teeth. If the patient does not have energy, physical ability, or if the patient is unconscious, nurses will perform hygienic care including oral care, bed bath, maintaining skin integrity, perineal care, hair care, and nail care. Additional precautions such as goggles, mask, disposable apron, and gloves should be worn when the patient is immunosuppressed or for safety of both the patient and staff.

Maintaining oral hygiene / mouth care

Providing oral care is aimed at promoting patients' wellbeing and comfort by removing offensive odours, food debris and plaques, preserving cleanliness of teeth, gums, and mouth, and preventing infections. Oral care stimulates circulation to the gums and helps to preserve their integrity. It also prevents dryness of the oral mucosa and lips, freshens breath, and improves appetite.

Thus, oral care contributes to improve the quality of life of a stroke patient and maintain self-esteem while enabling them to communicate better.

Nurses are aware of the risks associated with poor oral hygiene and are well trained to assess and help patients to maintain or provide oral health. The nurse has to choose the appropriate devices and cleaning products. A conscious patient is made to sit in the Fowler's (upright) position to prevent aspiration during mouth cleaning and to inspect the oral cavity for any sign of dryness, oedema, redness, bleeding, or debris. An oral airway can be used to keep the mouth open for the procedure if the patient is unconscious. An unconscious patient may need oral care four times a day. A Yankauer suction can help in removing any excessive secretions in the mouth. Unconscious patients mostly breathe through their mouths and because of that the secretions get dry and stick on the surfaces of the mouth. If persistent mucous is present or if the mouth is crusted, it is recommended to use Sodium bicarbonate solution (prepared using one teaspoon of Sodium bicarbonate dissolved in 500 ml of warm water). The solution should be discarded once used. A lip moisturizer or glycerine can be applied to prevent lips cracking.



Yankauer suction

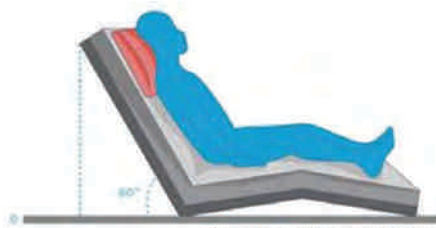
Maintaining nutrition

The blood investigations at the initial screening including haemoglobin levels, serum proteins, and electrolytes are helpful to make decisions by the multidisciplinary team regarding the nutritional level and the dietary requirements that need to be fulfilled. Risk of dysphagia should be screened for within four hours of admission before administering any food, drink, or

oral medication. A water swallow test will be done to assess the patient's pharyngeal reflexes. Paroxysmal coughing, food dribbling out or pooling in one side of the mouth, food retained for long periods in the mouth, or nasal regurgitation when swallowing liquids must be observed.

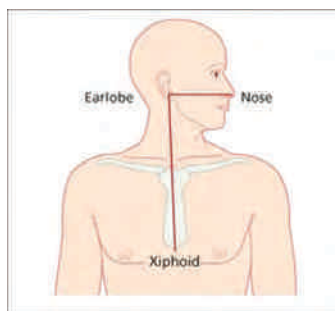
If the patient is allowed to take food, nurses assist the patient with meals. When feeding the patient, the food should be placed on the unaffected side of the mouth and ample time should be allowed for eating. When there is a difficulty in swallowing, nasogastric (NG) feeding should be continued until the patient is able to swallow fluids.

Placing a NG tube has to be done by a skillful nurse. Explaining the procedure to the patient is helpful in gaining his/her cooperation. Fowler's position is recommended for this procedure. Giving a sip of water to swallow the tube when it reaches the pharynx is not encouraged in stroke patients. Only three attempts should be made in inserting the NG tube at a time to prevent trauma to nasal and oesophageal mucosa (University of Glasgow, n.d). Checking of the placement of NG tube is traditionally done by auscultation of the upper abdomen while pushing air through the tube with a syringe to detect the "whoosh" sound, checking whether there is bubbling when the distal end of the tube is put into a cup of water, or by checking the acidity of aspirated gastric contents with pH paper. The aspirated contents from the tube should be acidic with a pH less than 5.



It is important to take extra care in confirming the placement because the above tests could be misinterpreted on the basis that stomach and lungs are

both resonant organs that can transmit sounds, and it can be difficult to detect the difference, which could be misleading. However, evidence-based practices to verify NG tube placement recommend aspiration and pH testing (and x-ray if necessary) to be carried out to confirm the NG tube placement before giving any fluids (National Institute for Health and Care Excellence, 2021). The precautions proposed include measuring of the NG tube by placing the exit port at the tip of the nose, extending the tube to the ear lobe, and then to the xiphisternum. Before giving each feed nurses need to check the placement of the NG tube and the amount of gastric aspiration. Retained feeds increase the risk for aspiration. The head of the bed should be kept raised at 30 degrees or higher to prevent risk of aspiration.



Measurements for NG tube insertion

Bladder and bowel care

Urinary continence may be affected due to altered psychological status, inability to communicate the need to urinate, or inability to use a bedpan or urinal due to impaired motor control. Similarly, bowel control is a problem in stroke with the most common problem being constipation. Management of bladder and bowel functions is an essential part of rehabilitation. A high fibre diet should be provided with adequate fluid intake (2-3 litres per day) for those who have constipation, unless it is contraindicated. It is helpful for the patient if a regular time is established for toileting.

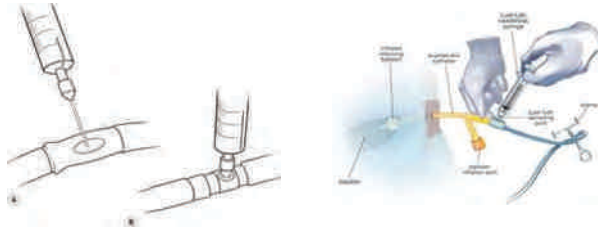
Care of the urinary catheter

Urinary catheterization is done only when it is essential, and the catheter should be removed as soon as possible. Nurses' responsibilities include making the autoclaved catheterization sets and other necessary supplies readily available, selecting and providing the appropriate size (usually the narrowest gauge) of catheter, maintaining the sterile technique during insertion, adhering to infection control guidelines (College of Microbiologists Sri Lanka, 2005) in care after insertion, and educating the caregivers on catheter care if the patient has to be discharged with the catheter.



Closed drainage system

After insertion, the catheter tube is secured to the patient's leg to prevent catheter movement and urethral damage. The catheter tube and the urine collection bag are kept from kinking to prevent obstruction. The drainage bag should be placed below the level of the patient's bladder at all times. The tip of the drainage bag or tubing should not touch the floor or other surfaces. A closed system is maintained by not disconnecting the catheter from the bag other than the routine bag changes to prevent Catheter-Associated Urinary Tract Infections (CAUTI). The sampling port should be used to take urine samples from a catheterized patient, and it must be disinfected prior to drawing the sample using a sterile syringe.



Sampling port

Nurses ensure that the urethral meatus and the catheter tube are cleaned daily with soap and water. Antiseptic solutions should be avoided. In females, the labia should be separated, and the perineal area should be cleaned downwards to prevent infection. In males cleaning should be done under the foreskin. The urinary catheter is cleaned from the tip where it enters the urethra, and then downwards away from the meatus. It is important to maintain a record of intake and output to ensure adequate hydration in a patient with an indwelling catheter.

If a urinary catheter is kept in-situ for more than two weeks, the catheter should be clamped intermittently for 03 days prior to catheter removal to improve bladder tone and bladder capacity. The patient should be informed about the process of removal of the catheter and the expected problems such as burning sensation when urinating. The catheter must be removed slowly after deflating the balloon to minimize trauma. After removal, nurses should assess and report inability or difficulty to pass urine, haematuria, or any new incontinence or bladder distension.

Prevention of Specific Complications

Preventing aspiration

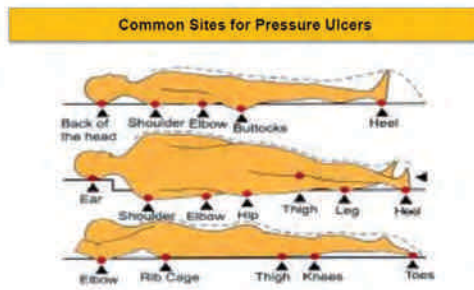
Maintaining airway and promoting adequate ventilation are first priorities when caring for an unconscious stroke patient. Nurses look for any snoring or harsh breathing sounds that may be a sign of the airway being compromised. Appropriate positioning of the patients by the nurse i.e., turning them onto their sides, will facilitate drainage of secretions or vomitus

that may obstruct the airway and cause aspiration. The risk of aspiration is assessed by a nurse initially through water swallowing test and also with the Language and Speech Therapist. Further, nurses should remove secretions collected in the mouth through suction, ensuring that the air way is maintained patent; inspect the mouth and teeth and remove dentures if present; and make a note on loose teeth that can be potentially dislodged, obstructing the airway. When a patient is being fed through a NG tube checking for the placement of the tube before each and every feed is a major responsibility of the nurse.

Prevention of pressure sores

Nurses are responsible for prevention of pressure ulcers, and presence or absence of pressure ulcers has been generally considered a performance indicator for measuring the quality of nursing care. Assessment of risk of pressure ulcers must be carried out using a standard procedure, for example the Waterlow Pressure Ulcer Risk Assessment Chart as recommended by the guideline for stroke care for Sri Lanka by Gunaratne et al. (2017).

Nurses' routine care focuses on maintaining cleanliness of the patient including assisting bathing or performing a bed bath for patients according to their activity level. Maintaining skin integrity is a major concern and nurses should provide skincare by cleansing and drying the skin followed by massaging common pressure points using a lubricant cream. Pressure relieving devices such as water/air mattresses can be used.



Common sites of pressure ulcers

If a patient is unable to turn or reposition him/herself in bed, nurses will change the position every two hours to reduce the mechanical load of the patient. Care must be taken to minimize shear and friction forces which cause damage to skin when a patient is turned or positioned in bed. The skin areas especially over bony prominences have to be observed regularly while changing the position and urgent measures have to be taken if signs of developing a pressure ulcer are evident. A standard turning chart/positional change chart could be maintained with a column to record any risk of developing a pressure ulcer and the observations could also be recorded in the nurses' notes.

Optimal positioning and prevention of shoulder pain

Nurses should change the patients' position every two hours. When placing a patient in the side-lying position, a pillow should be kept between the legs before the patient is turned. The upper thigh should not be flexed completely to prevent oedema and to promote venous return. If sensation is impaired the amount of time spent on the affected side should be limited. Further, nurses should encourage and remind the patients to engage in short periods of exercise frequently and regularly to improve muscle strength and maintain the range of motion. A written schedule for exercise would be helpful.

Proper positioning of the paralyzed arm or leg is essential to prevent pain and further damage. The main goal of arm care after a stroke is to prevent partial separation or subluxation of the shoulder joint. Nurses should take correct measures when moving the patient in bed by supporting the affected arm and asking the patient to support the affected arm with the unaffected arm to prevent muscles, tendons, or ligaments from overstretching. In order to prevent dislocation, the affected extremities should never be pulled. The team should be made aware of any pain in the joints of the affected extremities.

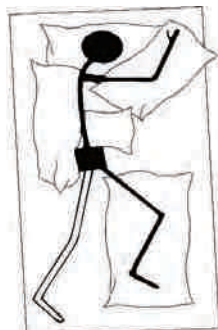
A patient who is paralysed can be positioned on the unaffected side as well as the affected side. The side-lying position is most comfortable for a patient when attention is given to appropriate body alignment. Nurses need to place

the arm in the correct position when the patient is lying in bed on the affected or unaffected side and when sitting on a chair.

When lying on the unaffected side, the patient's head should be supported with a pillow and the affected shoulder should be forward and the arm should be supported on one or two pillows. The affected leg should be well supported using pillows, with the hip and knee bent and another pillow may be used behind to prevent the patient from rolling backward.



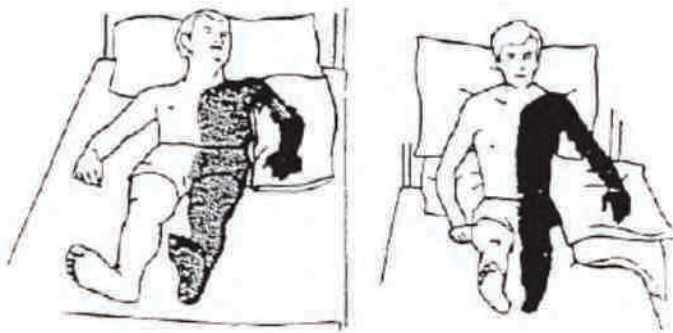
Lying on the affected side



Lying on the unaffected side

When lying on the affected side, the patient's affected shoulder should be positioned comfortably, supporting the entire arm on the bed and the affected leg should be straight with knee slightly bent while the unaffected leg is supported on a pillow.

When lying on the back or sitting up, pillows should be placed under the head and under the affected shoulder, elbow, forearm, wrist, and hand.



Lying on patient's back or sitting up

Elevation of the arm and hand is also important in preventing dependent oedema of the hand. Further, Pressure stockings are applied to paralyzed legs to prevent thromboembolism as prescribed, and nurses need to observe the status of the skin before its application.

Psychological Support and Care

Stroke is a life-changing event and the patients experience restricted physical abilities as well as emotional problems. As a result, they experience low moods, anxiety, and depression. Nurses caring for stroke patients are well positioned to provide psychological support. The technological procedures, medical equipment, investigations, and interventions intimidate the patients and their families. The lack of knowledge on the disease and recovery process which takes longer than they expect, misconceptions among people regarding stroke as 'the end of their lives', and the limitations of time for staff members to talk with the patients and their families may contribute to elevated stress levels. Therefore, a supportive culture should be fostered by nurses for the physical, intellectual, social, and spiritual well-being of patients, family members, and staff in order to cope with the stress created due to the sudden illness and hospitalization.

Nurses should discuss patients' concerns, while giving adequate time to express their emotions, needs, fears or opinions. They should be able to identify the patients who need further psychological support by the

specialized team members during their encounters with patients while providing physical care. Further, patients' family members may need psychological support especially when they have not been informed adequately about the changes that have occurred in the patient. The family members may have concerns regarding the treatment and care provided as they may anticipate a speedy recovery. They need to be provided with information on the nature of the existing problems as well as the rehabilitation process.

Nurses may identify sources of support or connect them with family and friends they wish to talk to, especially if a patient is not visited by his/her relatives. They may encourage the family members to visit the patient, taking turns, so that the patient has opportunities to make constant social contact. Nurses are in a position to find out the persons preferred by the patient and those who have the ability to support the patient and ask them to visit the patient frequently. It will be helpful if the nurses could provide explanations to the visitors regarding refraining from expressing sympathizing remarks and discussing any negative aspects of recovery at the patients' bedside as such actions may affect their moods.

Patients may have problems related to cognitive, behavioural, and emotional deficits following a stroke. Nurses play a supportive role in improving the patients' thought process, by reviewing the results of neuropsychological assessments, observing the patients' progress of performance, providing positive feedback, building confidence in their strengths, and giving hope.

Helping to express/communicate

Patients with aphasia can be depressed due to inability to speak and express themselves, and this inability to ask or answer a question, may result in anger, frustration, fear of the future, and hopelessness. The speech and language therapist will assess the patient and plan rehabilitation and the nurses too, need to learn how to help the patients as a key role player in the team. Nurses need to provide moral support and create a conducive atmosphere to enable patients to communicate by being sensitive to their

needs and should try to respond appropriately. Nurses must talk to patients with aphasia while rendering care to the patient, to provide social contact. Maintaining the dignity of the patient and treating them as an adult at all times is most important. Trying to complete the sentences spoken by the patient is a common problem and should be avoided because it can cause more frustration to the patient.

Nurses need to gain the patient's attention when talking to them, and should speak slowly, giving one instruction at a time. Time should be allowed for the patient to process what was told, as it takes time to understand and formulate an answer. Therefore, patience is an essential quality to develop when communicating with such patients.

Enhancing self-care

Enhancing self-care is an essential component in the rehabilitation process. Activities related to personal hygiene are encouraged by nurses as soon as the patient has the strength to sit up. First the self-care activities such as brushing teeth, shaving, eating, and combing hair are encouraged with the unaffected hand. At the same time the patient is encouraged to perform the exercises on the affected side as well. The need to repeat motor skills in order to gain them has to be explained to the patient and family.

Educating the Family/Caregivers and Helping to Cope

Persons who take care of the patient after discharge, family members or caregivers play an important role in the recovery of the patient. Post stroke care and rehabilitation can be considered as the most significant stage of stroke rehabilitation because this is the phase that decides the improvement of the quality of life of the stroke survivors. It needs to be explained to the family that rehabilitation may take months and the progress can be slow. The family should be taught regarding the signs and symptoms of a stroke, risk factors, and prevention of stroke, so that they will be able to identify its early signs. Further, the family should be made aware of the emotional problems such as laughing or crying, being easily irritable, or being confused. Family and caregivers experience challenges such as increased workload, restricted social life, physical problems, and knowledge and financial deficits. Nurses

need to understand the burden of family/care givers and the necessity to provide knowledge and skills to maintain patients' personal hygiene, manage stress, look after their own health, and facilitate family coping. In educating the family, nurses have to specifically consider the disabilities of the patient and the knowledge of the person taking over care at home. Nurses are expected to provide training on maintaining personal hygiene, mobilization, and nutritional needs of the patient, as well as care for NG tubes, NG feeding, and providing proper hydration. Further, nurses should guide them on bowel care and on care related to urinary catheters, emptying drainage bags, identifying catheter related complications, and when to seek professional advice.

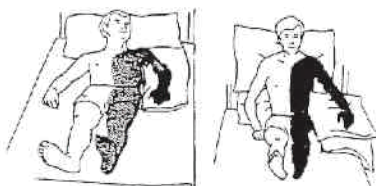
The Way Forward

Nurses are uniquely positioned to deliver care for early rehabilitation of stroke survivors, but insufficient knowledge and skills in carrying out the specific functions was identified as the major barrier. Further, demand for more nurses and most importantly the 'misdistribution of nurses' has been identified as a major challenge globally to address staff shortages and their competencies. It is emphasized that nurses in stroke services should complete stroke-specific training in order to deliver competent care for better health outcomes. Provision of specific training at national level for Sri Lankan nurses on stroke care to further nurses' competence would maximize the quality of care and patient satisfaction. The newly established Public Health Nursing services in Sri Lanka (ICN, 2020), could be effectively utilised to identify the unmet care needs of the stroke patients and their caregivers for continuity of care in the community.

Bed Positioning for Stroke Patients

A. Lying on your back or sitting

- Place a pillow under your head.
- Place a pillow under affected shoulder, elbow, forearm, wrist and hand.
- Use foot splint to prevent heel cord tightening and skin breakdown.



B. Lying on unaffected side

- Place a pillow under your head.
- Ask someone to help you position yourself and the pillows.
- Stack one or two pillows under affected arm so that the shoulder is slightly forward and hand is supported.
- The affected leg is entirely supported by pillow(s), hip and knee are bent.
- A pillow behind back can prevent rolling backward.



C. Lying on affected side

- Place a pillow under your head.
- Lie on affected side, then position affected shoulder forward, supporting entire arm on bed.
- Affected leg should be straight, with knee slightly bent.
- Place unaffected leg on a pillow for support.



- D. Positions should be changed every 2 to 4 hours to prevent skin breakdown and improve comfort.

WATERLOW CONTINUOUS ASSESSMENT CHART									
SEVERAL SCORES PER CATEGORY CAN BE CALCULATED			ID LABEL						
Categories:			Date	Date	Date	Date	Date	Date	Date
Body Mass Index (kg/m²)	Scores		Score	Score	Score	Score	Score	Score	Score
Average:	20-24.9	0							
Above Average:	25-29.9	1							
Obese:	>30	2							
Below Average:	<20	3							
Continence	Scores		Score	Score	Score	Score	Score	Score	Score
Complete/Catheterised:		0							
Incontinence of urine:		1							
Incontinent of faeces:		2							
Doubly incontinent:		3							
Mobility	Scores		Score	Score	Score	Score	Score	Score	Score
Fully mobile:		0							
Restless/Fidgety:		1							
Apathetic:		2							
Restricted:		3							
Bed bound:		4							
Chair Bound:		5							
Nutrition									
A – Has patient lost weight recently									
Yes	Go to B								
No	Go to C								
Unsure	Go to C and score 2	2							
B – Weight Loss Score	Scores		Score	Score	Score	Score	Score	Score	Score
	0.5 – 5kg	1							
	5 – 10kg	2							
	10 – 15kg	3							
	>15kg	4							
	Unsure	2							
C – Patient eating poorly or lack of appetite	Scores		Score	Score	Score	Score	Score	Score	Score
	No	0							
	Yes	1							

		Date	Date	Date	Date	Date	Date	Date
Categories								
Skin type visual risk areas	Scores	Score	Score	Score	Score	Score	Score	Score
Healthy	0							
Tissue Paper	1							
Dry	1							
Oedematous	1							
Clammy/pyrexia	1							
Discoloured – stage 1	2							
Pressure Ulcer – stage 2-4	3							
Sex/Age	Scores	Score	Score	Score	Score	Score	Score	Score
Male	1							
Female	2							
14 to 49	1							
50 to 64	2							
65 to 74	3							
75 to 80	4							
81 plus	5							
TissueMalnutrition	Scores	Score	Score	Score	Score	Score	Score	Score
Eg terminal Cachexia	8							
Single Organ failure	5							
Multiple organ failure	8							
Peripheral vascular disease	5							
Anaemia (HB<8)	2							
Smoking	1							
Neurological deficit	Scores	Score	Score	Score	Score	Score	Score	Score
Diabetes	4-6							
Multiple Sclerosis	4-6							
Motor/sensory paraplegia	4-6							
Cerebro vascular accident	4-6							
Major surgery/Trauma	Scores	Score	Score	Score	Score	Score	Score	Score
On table >2 hrs (past 48hrs)	5							
On table >6 hrs (past 48 hrs)	8							
Orthopaedic/spinal	5							
Medication	Scores	Score	Score	Score	Score	Score	Score	Score
Cytotoxics	Max 4							
Steroids (Long term high dose)	Max 4							
Anti-inflammatory	Max 4							
Total								
Risk Category								
10+ At risk								
15+ High Risk								
20+ Very high risk								
Signature								

Positional Change chart

Patient Name			Hospital number	
Ward		Plan- frequency of positional changes as per care plan		
Date and Time	Time position changed	Patient position	Skin condition	Signed

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Chapter 8: Physiotherapy in Stroke Rehabilitation

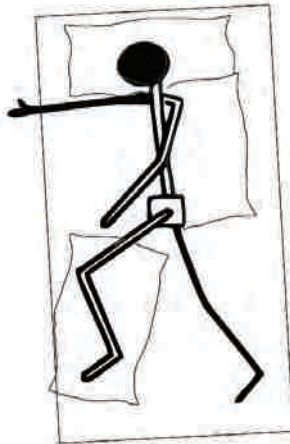
Dr H H N Kalyani & Mr B A P Lakmal

Introduction

The innate human nature never ceases to seek ways in which what is lost can be re-possessed and the aftermath of a stroke is no exception. It falls in the hands of healthcare providers to offer that initial stimulus which can have monumental impacts on the outcome of the entire process of rehabilitation. Stroke is the sixth highest disease burden worldwide in terms of disability-adjusted life years. The South Asian region, which includes Sri Lanka has a high prevalence of stroke, especially in younger individuals, and short-term mortality from stroke is found to be high. Hemiplegia is one of the most common presentations after stroke and contributes significantly to motor impairment. Any rehabilitation intervention which can expedite the recovery and reduce long term disability could have a major impact on both the individual and the social burden of the disease. Physiotherapy is an established component of stroke rehabilitation which aims at promoting the recovery of the affected side by helping patients to regain independence in functional tasks. The underlying principle which forms the groundwork for all physiotherapy approaches is the re-education of normal movement by encouraging recovery of the hemiplegic side.

Acute Care

The aims of physiotherapy during the acute phase are early mobilization, prevention of complications and the encouragement of resumption of self-care activities. Commencing mobilization within hours or days of stroke onset such as sitting out of bed, standing, and walking may help faster recovery. Proper positioning post-stroke is also essential in order to promote optimal recovery by modulating muscle tone, providing appropriate sensory information, increasing spatial awareness, and preventing complications such as pressure sores. It is more beneficial to the patient if his bed in the ward or room makes him look across his affected side. The bed must have a firm mattress, and adequate pillow support should be provided to maintain correct alignment of the patient's head, trunk, and limbs.



Hemiplegic positioning on affected side

Rehabilitation Care

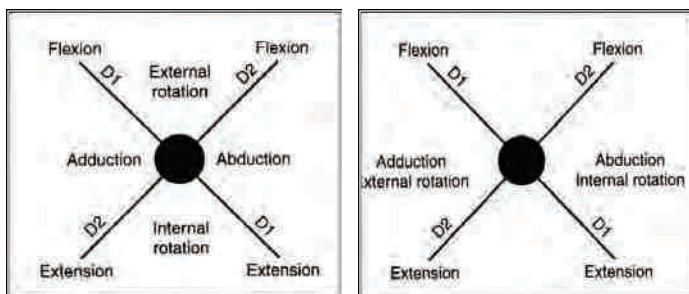
Generally, recovery of function is fastest up to three months following the onset of stroke, with statistically significant recovery occurring up to six months while some patients continue to recover function up to one year. Therefore, physiotherapists treat stroke patients for varying lengths of time. Physiotherapy in the rehabilitation of stroke patients is represented by various approaches that can be broadly divided into techniques based on either neurophysiological or motor learning principles.

Neurophysiological Techniques

During the application of these techniques, the physiotherapist supports correct movement patterns of the patient, acting as the decision maker for those movements so that the patient is a relatively passive recipient.

Proprioceptive Neuromuscular Facilitation (PNF) Technique

The PNF technique is based on diagonal patterns of movements through the application of a variety of stimuli which may be visual, auditory, or proprioceptive to achieve normalized movements. These movements increase the recruitment of additional motor units, maximizing the motor response required. This technique is a very effective therapeutic exercise for the improvement of muscle thickness, dynamic balance, gait, and physical functioning of stroke patients. If the patient is able to follow the commands, PNF should be implemented preferably from the first day after stroke. During these exercises, the upper and lower extremities are allocated two diagonal patterns each, namely D1 and D2, and they involve the movement components of flexion-extension, abduction-adduction, and internal-external rotation. Diagonal patterns produce greater adaptive plasticity as the neural recruitment increases compared to single plane movements.



Proprioceptive Neuromuscular Facilitation (PNF) Technique

Bobath Technique

Bobath is a widely accepted treatment which aims at optimizing the functions of the person after a stroke by facilitating selected movements and orienting these towards activities of daily living. This concept hypothesizes a relationship between spasticity and movement, considering that the muscle weakness is due to the opposition of spastic antagonists. The Bobath Technique attempts at inhibiting spasticity by passive mobilization associated with tactile and proprioceptive stimuli, thereby eliminating abnormal movements, and restoring the normal ones. This approach begins from the

trunk, followed by the scapula and pelvis and then progresses on to more distal segments.

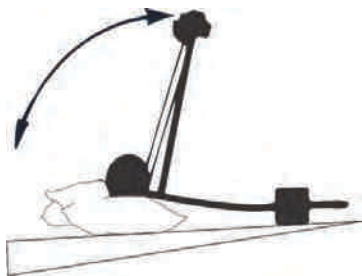
Motor Re-learning Techniques

Evidence indicates that physiotherapy with motor re-learning techniques is preferable to physiotherapy with neurophysiological techniques in the rehabilitation of acute stroke patients. Motor re-learning requires the intention to perform a task, repetition of particular task through practice, and feedback. In contrast to the passive role of patients implied in the neurophysiological techniques, motor re-learning techniques approach stress-active patient involvement.

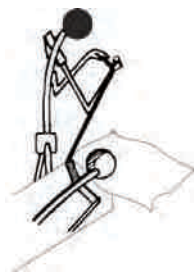
Activities While Lying

Mobilizing The Arm

A stiff painful arm imparts remarkable hindrance as it disturbs the balance and movement of the whole body, limits treatment and interferes with daily living. Passive elevation of the arm is performed every day, while the patient is taught to clasp the hands together, with the fingers interlaced, and to actively lift the arms up to full elevation.



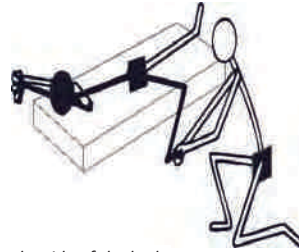
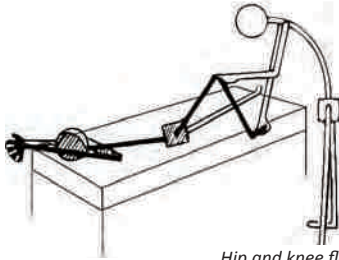
Self-assisted arm movements



Elevation of arm

Moving The Leg

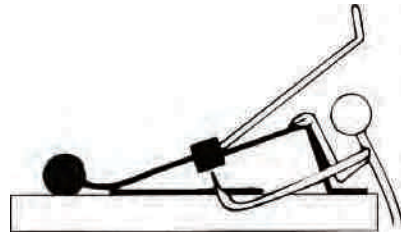
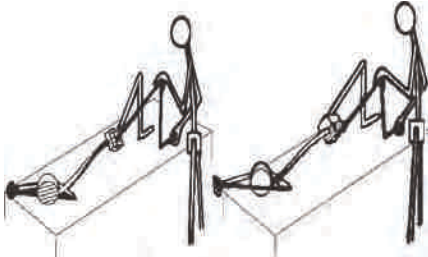
The hemiplegic leg is mobilized using self-assisted movements. To prevent associated movements, the patient's hands can be clasped in elevation and is then placed over the side of the bed by extending the hip. The knee is kept in flexion and the foot in full dorsiflexion.



Hip and knee flexion over the side of the bed

Trunk Stabilization

Stabilization of the trunk is necessary for the stability of the spine and pelvis when they are in a functional position. The principal trunk exercises include pelvic tilt exercises, quadruped exercises, abdominal hollowing exercises, and bridging exercises. These can be used as low intensity weight bearing exercises (9). Bridging exercises are used therapeutically for lumbo-pelvic stabilization as they reduce fear and the instability of weight bearing during gait and allow exercise in a secure posture.

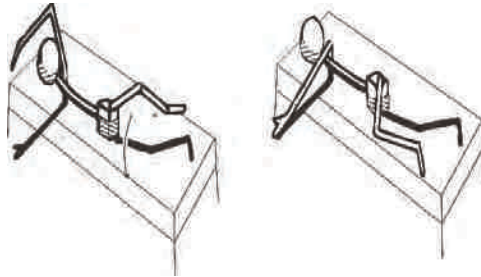


Bridging with rotation of the pelvis

Bridging on the affected leg

Rolling

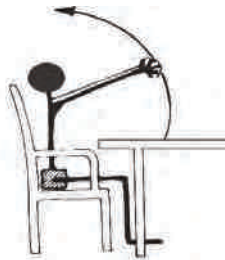
Correct rolling makes the patient aware of the affected side and facilitates the release of spasticity between the shoulder girdle and the pelvis, while aiding the active movements of the trunk and limbs.



Rolling to the affected side

Activities While Sitting

The recovery of sitting balance is commonly assumed to be essential to obtain independence in other vital functions such as reaching, rising to stand, and sitting down. Hence the patient needs to be moved into a sitting position as soon as possible even if he is not fully conscious, to stimulate the balance reactions. While sitting, emphasis is given to obtaining symmetrical weight distribution by transferring weight through the affected upper limb.



Self-assisted arm movement in sitting

Activities While Standing

It is well known that one of the commonest issues when it comes to standing with balance following a stroke, is the inability to transfer body weight onto the affected leg. Since walking essentially requires the bearing of the entire body weight on the affected leg during the single limb support phase, it is encouraged that weight-shifting to the affected leg is practiced during rehabilitation.

Gait Training

The primary goals of people with stroke include being able to walk independently and to manage to perform day-to-day activities. Although the majority of stroke patients achieve an independent gait, many do not reach a level of walking that enables them to perform all their daily activities. Gait re-training through different types of exercise is the most common approach in improving the ability to walk. While performing these exercises, the physiotherapist's observation, and direct manipulation of the positioning of the lower limb during gait over a regular surface, followed by assisted walking practice over ground is essential. These gait training exercises need to be initiated promptly after stroke to promote cortical reorganization and achieve better functional benefits.

Despite the benefits obtained by stroke patients through overground gait training, there are some who fail to achieve the expected outcomes, resulting in the increased acceptance of robotic devices such as electromechanical gait trainers. In the gait trainer, the patient is supported with a harness while the feet are placed on motor-driven footplates and the amount of body-weight support provided by the harness is chosen according to the patient's individual needs. This method has resulted in the successful recovery of walking in patients with stroke.



Patient with acute stroke walking overground with moderate assistance from two physiotherapists, walking belt, knee orthosis, and elastic bandage.



Patient with acute stroke walking on electromechanical Gait Trainer with minimal assistance from physio-therapist.

Repetitive Task Training

Repetitive practice of functional tasks such as walking, reaching for objects, and manipulating them is a major component of rehabilitation after stroke. Some interventions used in the promotion of repetitive practice include treadmill walking with body-weight support and robotic devices. These interventions are typically performed with emphasis on more repetitions and no added resistance to movement.

Constraint-Induced Movement Therapy (CIMT)

The aim of CIMT is to induce the patient to use the more impaired upper extremity for as many hours of the day as possible, and it involves restricting the contralateral arm in a sling and training the affected one. Repetitive training of the more affected arm is prioritized in CIMT, as the brain changes itself when the affected extremity is involved intensively for various activities.

Role of Physiotherapy in Stroke Rehabilitation

As part of a healthcare team, the physiotherapist plays a vital role in the recovery of physical function in stroke survivors, so much so that early mobilization and functional training provided by a physiotherapist is considered the most important aspect of acute treatment in the stroke unit. As recovery may continue for years after stroke, the benefits of continuous long-term care from a physiotherapist should be emphasized. The time of a physiotherapist is not only spent on patient care; a large proportion of it also extends to educating, advising, and training relatives and other caregivers. Hence it can be concluded that the role of a physiotherapist in stroke care and in curing the patient is immeasurable and it encompasses a wide array of responsibilities such as assessing, treating, advising, training, and supporting not just the patient, but also their relatives and other caregivers.

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Chapter 9: Occupational Therapy for Stroke Rehabilitation

Mr Nandana Welage & Mr H G T Dilshan

It is known that stroke in general, can have devastating effects on its victims as it essentially derails their lives by rendering them incapable of performing even the most basic of day-to-day activities, to varying extents. Regaining functional independence, however minute, is of paramount importance and hence occupational therapy is designed in such a way that it focuses on improving motor control of affected areas of the body including the upper extremities and hand function, training strategies to improve sensory, perceptual, and cognitive weaknesses associated with stroke and on maximizing the ability of self-care, along with the preparation of home and work environments to live independently. The aim of occupational therapy is to facilitate the functions of the person with stroke through training activities of daily living, teaching compensatory methods to overcome lost abilities, and improving their performing skills. Therefore, it can be said that in including all the relevant aspects in a cohesive manner, the occupational therapist provides a holistic approach in supporting the person to regain independence of activities of daily living, work, and leisure.

The starting point of the therapy is the identification of the impact of stroke in motor function, sensation, perception, cognition, and executive function that are important in managing activities of daily living, via an appropriate assessment. Identifying the functional level of the person and the environmental barriers in order to plan person-centered goal setting in conjunction with the multidisciplinary team, is made possible through further assessments.

Occupational Therapy Assessments:

A description of core areas of occupational therapy assessments based on the International Classification of Functioning (ICF) terminology (World Health Organization, 2001) is provided in table I. Rehabilitation goals related to activity and participation that are specific, measurable, attainable,

realistic, and timely to the person with stroke are set by the occupational therapist on the basis of the findings yielded through these assessments.

Commonly used memory and cognitive assessments

Occupational Therapy Adult Perceptual Screening Test (OT-APST)(Cooke, 2005)

Rivermead Perceptual Assessment Battery (RPAB)(Jesshope, Clark, & Smith, 1991)

Mini Mental State Examination (MMSE)(Kurlowicz & Wallace, 1999)

Cognitive Assessment of Minnesota (CAM)(Feliciano, Baker, Anderson, LeBlanc, & Orchanian, 2011)

Loewenstein Occupational Therapy Cognitive Assessment (LOTCA)(Katz, Itzkovich, Averbuch, & Elazar, 1989)

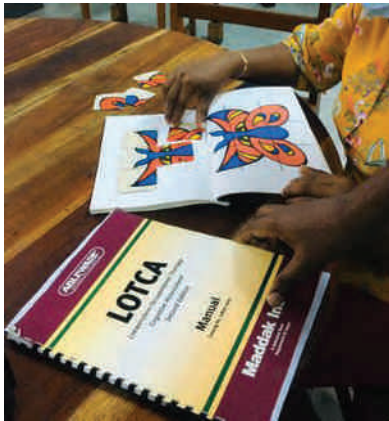
Visual Perception

In adapting to the environment and practicing activities of daily living, the role of vision is substantial, which prompts the assessment to begin with an analysis of basic visual skills such as visual acuity, visual fields, and visual tracking. Assessment of visual perception follows, with the therapist screening for impairments of visual perception such as agnosia (lack of recognition of familiar objects), visuospatial relations problems (organization of the body in relation to objects or spatial awareness), and visual discrimination skills (ability to distinguish different types of forms).

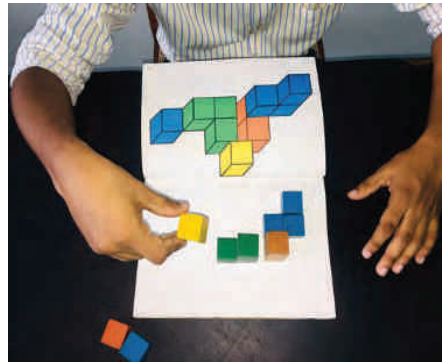
Memory and Cognition

Detailed assessments in the areas of orientation (awareness of time, place, and person), memory (ability to retain and recall previously experienced sensations, impressions, information, and ideas), cognition (process of knowing, perceiving, or remembering), and executive functioning (ability to make plans and carry them out) are conducted to determine the impact of impairment on the ability of the person to resume daily function.

Standardized assessments and systematic observations are employed by the occupational therapist for the identification of impairment and the subsequent devising of a treatment regimen



LOTCA, consisting of subtests to measure orientation, spatial perception, motor praxis, visuomotor organization and thinking operations, is a widely used assessment available in occupational therapy units to assess vision, perception, and cognition.



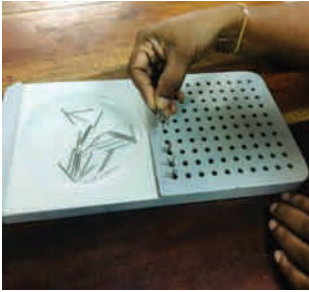
Visuo-motor reorganization (LOTCA) and 3-D construction

Sensory, Motor, and Upper Limb Functions

An in-detail assessment is undertaken by the occupational therapist for the motor and sensory changes in the wake of the stroke event, with particular attention to upper limb and hand functions, after which the therapist proceeds to discover changes in motor power, muscle tone, motor planning, praxis, fine motor coordination, hand function, and sensory loss, with the aim of regaining upper limb control and function.

Assessment tools available in occupational therapy units

Hand dynamometers (Cadenas-Sanchez et al., 2016).
O'Connor finger dexterity test (Corlett, Salvendy, & Seymour, 1971).
Purdue Pegboard (Buddenberg & Davis, 2000).
Nine-hole peg test (Mathiowetz, Weber, Kashman, & Volland, 1985).
Jamar monofilament sensory testing (Anderson & Croft, 1999)



O'Conner finger dexterity test



Monofilament sensory test

In addition, a number of other forms of assessments are utilized to appraise upper extremity and hand functions. These measurements are used to gauge the impairments that affect the functions in the upper extremity.

Measurements used to gauge the impairments that affect the functions in the upper extremity.

Action Research Arm Test (ARAT) (Yozbatiran, Der-Yeghiaian, & Cramer, 2008).

Jebson Taylor Hand Function Test (JTHFT)(Jebson, Taylor, Trieschmann, Trotter, & Howard, 1969)

Motor Activity Log (MAL)(Uswatte, Taub, Morris, Light, & Thompson, 2006)



Jebson Taylor Hand function Test

Home Assessment

In the course of the rehabilitation stage and just prior to discharge, the person's capacity to complete basic activities of day-to-day living, their ability to manage safely in the home setting, and the extent to which secure access to the community can be had, are usually examined by the therapist. The home, including the environmental barriers, risk of falls, and the needs of the patient and family, is evaluated for the purpose of achieving home integration. The home visit provides the opportunity to apply various observational and standard assessments, such as, The Home Falls and Accidents Screening Tool (HOME FAST).

Occupational Therapy Intervention after Stroke

Rehabilitation following stroke should be commenced at the very first opportunity that presents itself immediately after the medical condition stabilizes. The individual's abilities and needs are taken into consideration and a tailor-made occupational therapy treatment plan is contrived. Therapeutic activities which are the main treatment media of occupational therapy, form the foundation for a considerable portion of the treatment. This consists of graded tasks and activities to retrain motor, sensory, visual, perceptual, and cognitive skills, while minimizing secondary complications, and providing education and guidance to the person with stroke and their family or caregivers.

Initially, the therapist strives for restoration, if the affected person displays impairment of perceptual, cognitive, or executive functions, and should this fail, an adaptive approach is opted for as compensation for the loss of abilities. To understand this further, consider the treatment of choice for the following scenario in which a person presents with dressing apraxia, which is the inability to dress due to disorder of body scheme.

Adaptive approach: focuses on compensation of loss of functions

The position of dressing practice is altered, for example the sitting or lying position.

Clothes are arranged and labeled for easy identification by the patient. Buttons are replaced with Velcro fastening.

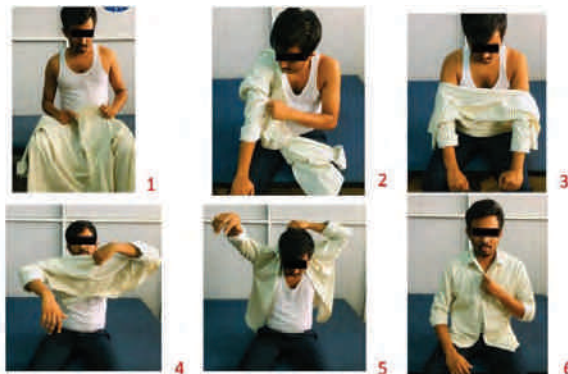
The type of dress is changed, for example a shirt instead of a T-shirt.

Restorative approach: focuses on restoring the impaired function

A variety of two- and three-dimensional tabletop activities are practiced. The therapist places his/her own hand over that of the patient, and guides to practice activities such as buttoning of the shirt.

A neurodevelopmental approach, employing weight bearing, weight shifting, and the use of the affected extremities is applied to enhance movements for independent dressing.

The steps of dressing are aided by visual and verbal cues from the therapist.

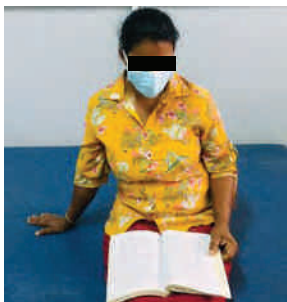


Dressing practice

Intervention through occupational therapy adheres to practice methods backed by evidence with the goal of maintaining or improving the body functions including the upper extremity.

Neurodevelopment Technique (NDT)

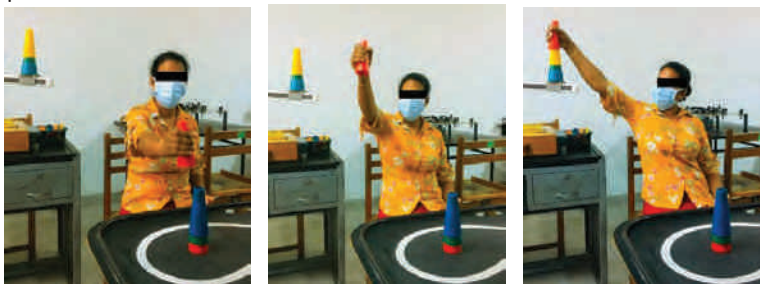
Some of the conventional techniques are based upon basic neurophysiological theories and such techniques are widely practiced in stroke rehabilitation globally. One such technique is the Neurodevelopment Technique (NDT) which is built on a problem-solving approach used in the evaluation and treatment of persons with movement and postural control disturbances. NDT is incorporated into occupational therapy activities.



Weight bearing on affected upper extremity, while engaging in the diversional activity of reading.

Proprioceptive Neuromuscular Facilitation (PNF) technique

Another conventional rehabilitation technique is the Proprioceptive Neuromuscular Facilitation technique, whose principles form the basis of activities designed by occupational therapists to increase the range of motion and performance.



Activity based on PNF technique, placing cones in a diagonal pattern

Motor Relearning Technique

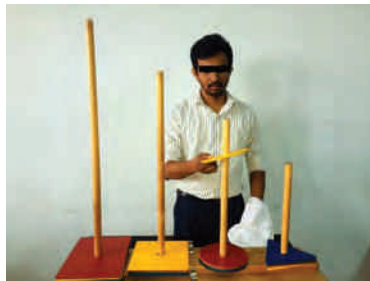
Improving a specific component of movement as a result of repetitive practice of an activity is the core principle of the Motor Relearning Technique. Practice is undertaken with the supervision of the therapist and the re-learned skill is integrated into the routine daily activities of living. The following image depicts a purposeful activity, repeatedly practiced in order to improve mobility of the upper extremity.



Repetitive task practice.

Constraint Induced Movement Therapy (CIMT)

The theory of learned non-use is put into practice in the Constraint Induced Movement Therapy (CIMT), as the occupational therapist attempts to train the stroke patient with basic finger and wrist movements, compelling the use of the affected extremity for activities, while the unaffected hand remains constrained with a mitt.



CIMT

Mirror Therapy

A technique that is more befitting of patients having no or limited movements in the affected hand, is the Mirror Therapy which utilizes the theory of mirror neuron system and involves the practice of simple hand tasks by the patient, while the affected hand is kept hidden behind a mirror box.



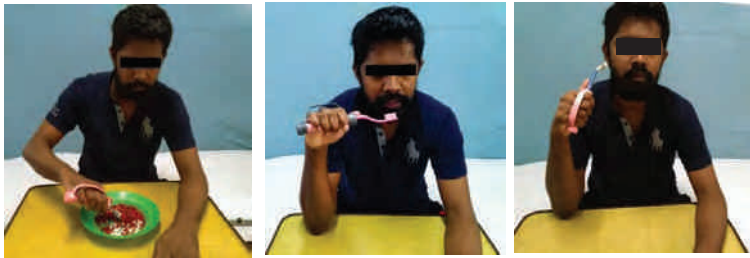
Mirror Therapy

Motor Imagery

Motor Imagery is a method of activating the motor cortex of the brain by attempting to repetitively form a mental image of the task. The person with stroke is asked to form in his mind, an image of a structural hand activity while it is being carried out simultaneously.

The above are a few techniques that are currently in wide use in the occupational therapy units of Sri Lanka. People with stroke are also approached with compensatory techniques on a temporary or permanent basis, depending on the severity of the lesion and regaining of function.

When a stroke patient is rendered incapable of using the affected upper extremity due to impairment, assistive devices designed for a short period of use can be utilized, and the device can be discarded once the extremity regains its function. However, an assistive device will be provided for lifetime if the disability proves to be permanent in nature.



Upper extremity adaptations (feeding, brushing, and shaving)

Current research findings are more supportive of the fact that hand splints are indeed not helpful in improving function and anti-spastic splints are rarely used in the reduction of severe hand spasticity as it may give way to the development of contracture and deformity.

Occupational Therapy: Post-Discharge Intervention

In other parts of the world, occupational therapists often conduct a home visit prior to the discharge of the patient from the hospital, in order to assess the home environment to make necessary modifications to ensure safety, functionality, and independence therein.

Areas in which modifications can be made in the environment

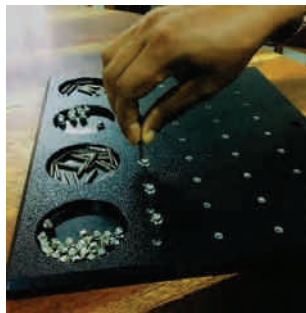
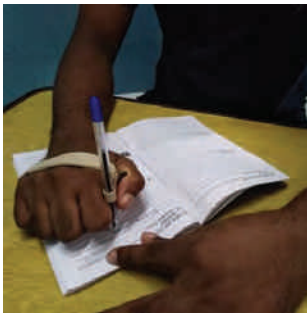
- Ramps and railing at the front entrance.
- Furniture arrangement of the home.
- Remove the clutter and loose rugs.
- Proper illumination of the house
- Bathroom modification
- Toilet modification
- Modification to the utensils at the kitchen including one handed instrument.



Home modifications

Workplace and Community Reintegration

It is the duty of an occupational therapist to survey the workplace of the patient as early as the acute stage if they had been engaged in a permanent employment before the onset of the stroke. Information regarding the nature of the occupation, types of duties to be carried out, work hours, work conditions, and work environment should be gathered through a thorough job analysis. Such measures are taken to aid the therapist in designing training programs at the therapy units which include simulations of the tasks practiced at work. Sometimes the circumstances necessitate the use of adapted pens and writing practice, or computer skills with an adapted keyboard and mouse before the affected individual can return to work.



Writing practice and fine hand skills practice with nuts and bolts

During home transfer and work placements, it is required of the occupational therapist to work in close association with a social service officer to ensure the supply of necessary assistive devices. Assessments are carried out to screen the need for light work or different employment at the same workplace or self-employment for those who are unable to return to their previous jobs. If a situation does arise, where the person with stroke is in requirement of a new employment, they are linked to the social service officer to receive the necessary funds to start a new business. The occupational therapist, in addition to job placement, recommends assistive devices and home modifications such as installing a new commode chair, with financial support from the social service department.

Core areas of occupational therapy assessment				
ICF dimension	Body function and structure	Activity	Participation	Environment
Occupational Therapy terminology assessment areas	Occupational Performance components	Occupational Performance	Occupational Performance and roles	Environments and Contexts
	Vision	Upper limb function	Occupational roles	Physical (home, work)
	Visual perception	Personal self-care tasks	Community integration	Social
	Memory	Domestic or instrumental activities of daily living		Cultural
	Cognition	Leisure activities		
	Executive function	Driving		
	Sensory and motor			
	Psychosocial adjustment			

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Chapter 10: Person-centered Dysphagia and Communication Support at the Stroke Unit

Dr Shyamani Hettiarachchi, Dr S P Rathnayake & Ms K P Dineshika

Introduction

If there is one client group where multi-disciplinary team collaboration is imperative and its importance unmistakable, it would be in stroke care. In our clinical work with stroke survivors, we are confronted by the centrality of eating/drinking and communication to our lives; as it resonates with the very core of our existence of 'what makes us human'. At the heart of our work in swallow therapy and communication therapy is unmistakably the most important necessity of all needs of the stroke-survivor, the need for individualized person-centered holistic care, and maintaining dignity and quality of life. It is only through very close collaboration with all members of the multi-disciplinary team that speech and language therapists are able to offer the most optimal and timely care for the stroke survivor.

This requires, for instance, working directly with physiotherapy colleagues to determine the most suitable postural management for safe swallowing, which may also extend to positioning to enable access to a communication system. With occupational therapy colleagues, a partnership is required to decide on special seating and hand function for self-feeding and access to a communication system, as required. Similarly, with psychologist and counsellors, a close association is essential to enable client motivation and readiness for speech therapy and in managing emotional lability; as well as a working alliance with dietitians to provide adequate nutritional intake and specialist nursing colleagues to establish swallow safety.

Within stroke care, speech and language therapists have a central role in the identification and management of dysphagia and in establishing a communication system for the stroke survivor immediately post-stroke. At present, within the backdrop of Covid-19, speech and language therapists are required to take particular precautions, given the aerosol generating

procedures connected to dysphagia management in particular, as well as to communication therapy in general, due to the proximity of our interactions.

Scope of Practice

The Royal College of Speech & Language Therapists outline the key role and scope of practice of a speech and language therapist within stroke care.

Initial assessment of swallowing and communication difficulties post-stroke

Training of other healthcare professionals to conduct screening assessments.

Long-term intervention with the stroke survivor as a member of the core multidisciplinary stroke rehabilitation team.

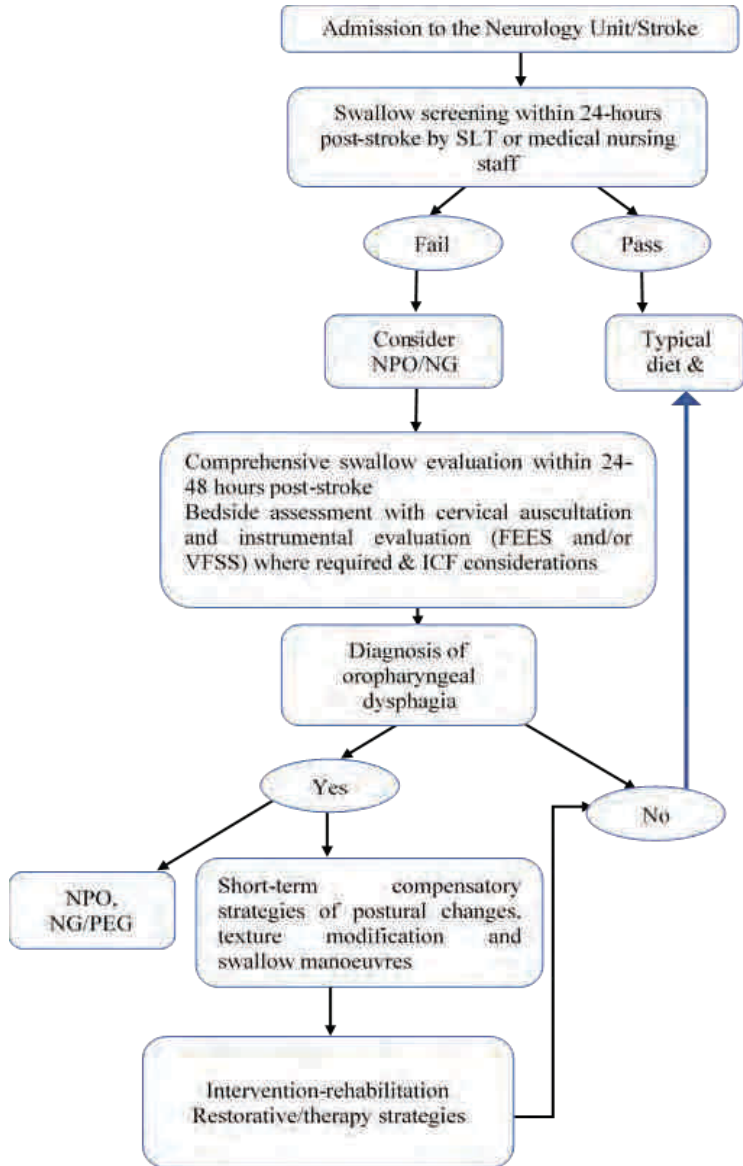
Training of carers and other professionals to aid communication

Supporting the medical team to assess capacity in instances where it is difficult to gain consent from a stroke survivor

Devising a discharge plan for “seamless transition into the community” with support mechanisms in place to enable continuous therapy

Establishing Swallow Safety

The Royal College of Speech & Language Therapists recommends an urgent referral of the stroke survivor to the speech and language therapy service within the first 24 hours following the stroke. A reported 40% – 78% of stroke-survivors are said to present with some level of dysphagia immediately post-stroke, with persistent difficulties seen in 76% who will experience moderate to severe dysphagia, and 15% showing signs of profound dysphagia.



Referral and care pathway

Covid-19 Considerations

The professional guidelines offered to speech and language therapists is to minimise physical contact, limit face-to-face contact, avoid oro-motor assessments including the testing of the reflexive and voluntary cough, and suspend the use of specific instrumental assessments of dysphagia including fibreoptic endoscopic evaluation of swallowing (FEES). As all these aspects of assessment carry a risk of ‘aerosol generating procedures’, speech and language therapists are acknowledged to be at an increased risk of exposure to aerosol droplets. The Government Union of Speech and Language Pathologists/Therapists have collated safety guidelines to be followed that contain considerations of distance, protective PPE gear, hand hygiene, disinfection and sterilisation, and individual care.

Assessment

Screening for dysphagia

As a working definition to our chapter, we will use Logemann’s perspective, as a pioneer within the field of dysphagia. Logemann defines swallowing as “the entire act of deglutition from placement of food in the mouth through to the oral and pharyngeal stages of the swallow until the material enters the oesophagus through the cricopharyngeal juncture”. The American Speech-Language Hearing Association described dysphagia as “a swallowing disorder involving the oral cavity, pharynx, oesophagus, or gastroesophageal junction”.

The aims of a dysphagia service. (Royal College of Speech and Language Therapists’ clinical guidelines by consensus for speech and language therapists)

To provide a comprehensive and responsive service to clients presenting with swallowing disorders within available resources

To facilitate intervention by the multi-disciplinary team and to refer or recommend referral to other agencies where appropriate

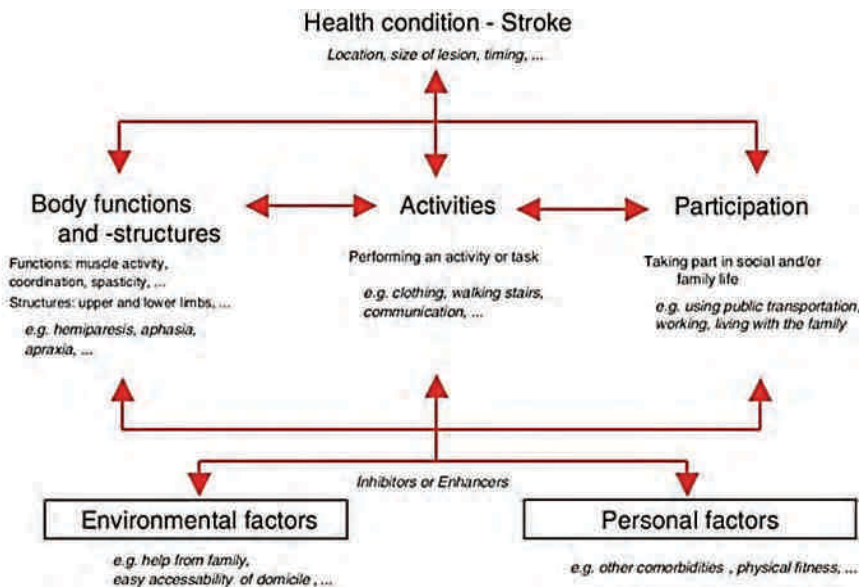
To become engaged in the planning and provision of services to clients presenting with swallowing disorders.

Within the Stroke Unit, the remit of swallow screening, assessment and management lies with a speech and language therapist. In units where a fulltime speech and language therapist is available, the initial screening is undertaken by a speech and language therapist, and where unavailable, by trained specialist medical or nursing staff. The pass/fail process of a swallow screening will help identify the potential presence of dysphagia, strongly suggesting a follow-up clinical swallow evaluation by a speech and language therapist. The 'water swallow test', which is usually part of an initial screening is conducted to determine the presence or absence of dysphagia. Failure to successfully 'pass' the screening may lead the team to decide on the temporary insertion of a naso-gastric tube to maintain nutrition and hydration and for all oral medication. For a post-stroke adult with a tracheostomy, a Modified Evans Blue Dye test to determine the safety of introducing oral intake may be indicated when medically stable coupled with analysing the data of oxygen saturation via pulse oximetry.

If the swallow screening is undertaken by specialist nursing staff, a referral to speech and language therapy should be undertaken as a matter of routine, irrespective of the outcome of the screening, in order to undertake a comprehensive diagnostic assessment. Following the initial screening, a speech and language therapist would undertake a comprehensive assessment to ascertain the type and severity of dysphagia, immediate strategies to be recommended and intervention to minimise the risk of aspiration and support swallow safety, and to determine a suitable individualised rehabilitation programme. Therefore, establishing a clear screening protocol in consultation with the in-house speech and language therapists would be essential.

Diagnostic assessment

In the assessment, intervention, and management of stroke survivors, speech and language therapists use the World Health Organization's ICF framework as a guide.



The ICF framework (Source reference 9)

Assessment and intervention target the impairment level, as well as its impact on functional activities (e.g., eating and drinking skills and saliva management) and on participation (e.g., meals with friends and family, going to a restaurant for meals). The aim of the dysphagia and communication assessment (as all assessments) is to determine the nature, severity and type of disorder. The speech and language therapist’s diagnostic assessment of swallowing would entail a detailed case history with information on the medical history, current medical diagnosis and history of the swallowing disorder, nutritional and respiratory status, together with a comprehensive bedside clinical evaluation. The bedside assessment includes a structural assessment, functional assessment, observation of posture, oral reflexes, observation at rest and assessment of each phase of the swallow (pre-oral, oral, pharyngeal and oesophageal stages) with food/liquid trials, and with the adjunct use of cervical auscultation that relies on the therapist’s trained observation skills and critical decision-making ability. The therapist will also observe the level of alertness and the ability to follow instructions; key factors in determining recommendations. A number of useful, locally applicable assessments adapted from established global protocols have

emerged through mainly undergraduate research projects. This includes a post-stroke dysphagia screening protocol by Eliinangai, the adapted “Nair Hospital Bedside Swallowing Assessment” protocol for post-stroke adults by Wijesekera enabling direct assessment by a speech and language therapist, as well as the adapted and translated client-reported Eating Assessment Screening Tool (EAT- 10) in Sinhala and in an accessible aphasia-friendly format by Piyumali.



Bedside assessment of dysphagia

For the stroke-survivor experiencing difficulties with saliva control, the speech and language therapist works in close partnership with the physiotherapist on postural management to ensure safe drainage of saliva, particularly during the night. Given the high risk of choking and aspiration of secretions, this is a key area of multi-disciplinary collaboration involving speech and language therapists. While the physiotherapist takes the lead in advising on postural management for saliva control as well as on chest physio to reduce build-up of phlegm, the speech and language therapist offers advice on the stroke survivor’s ability to safely swallow their saliva. The speech and language therapist will also seek support from the specialist nursing team to ensure oral hygiene and suctioning of saliva, as required.

Objective/instrumental assessments

Considered the 'gold standard' to determine the nature and extent of an oropharyngeal swallowing dysfunction and the safest texture for the individual, video fluoroscopy (or a Video Fluoroscopic Swallowing Study (VFSS)) has emerged as standard practice in the Global North. To date, it remains the most widely used objective assessment of oropharyngeal swallowing. Globally, speech and language therapists are part of the core team, together with a radiologist and radiology technician undertaking video fluoroscopic swallow studies, which involve assessing a range of food/liquid textures as well as diverse compensatory strategies, to ascertain the safety of oral intake and the effectiveness of strategies. It captures information on bolus transit times, motility issues, and aetiology of aspiration. That said, this instrumental assessment is not currently widely available in local hospitals. Although video fluoroscopy (VFSS), and fiberoptic endoscopic examination of the swallow (FEES) are available in some hospitals in Sri Lanka, they are not routinely used as yet, with arguably wider use of FEES, with the routine use of pulse oximetry alongside FEES or a bedside assessment. Speech and language therapists in Sri Lanka, similar to other therapists in the Global South, are more reliant on the bedside assessment and cervical auscultation, the latter used as an adjunct to direct clinical assessment, with a reliance on extensive clinical experience.



Diagnostic assessment

Intervention & Management

Interdisciplinary and multidisciplinary collaboration is paramount in dysphagia management. The key objective during the acute phase is to minimize the risk of aspiration and penetration of food, liquid and saliva by facilitating swallow safety. To do so, following the bedside clinical assessment, comprehensive diagnostic assessment and instrumental assessments (if available and indicated), the speech and language therapist would proceed to make clear individual recommendations to support swallow safety and to enable maintenance of nutrition and hydration. Consideration would be given to the confluence of general body posture, tone and swallowing, cognitive factors, psycho-social concerns, and emotional state, which all influence swallow therapy, with efficacy and effectiveness of intervention considered. The specific dysphagia management recommendations would be based on the physiology of the dysphagia, the ability of the individual to follow directions, the physical limitations of the stroke-survivor (including posture, hemiplegia, fatigue levels), prognosis, family support, and the aims of the intervention decided on by the speech and language therapist and the stroke survivor. Therapy aims to alter the physiology of the swallow, working at the level of impairment, but with a view to addressing issues of activity limitation and restrictions to participation.

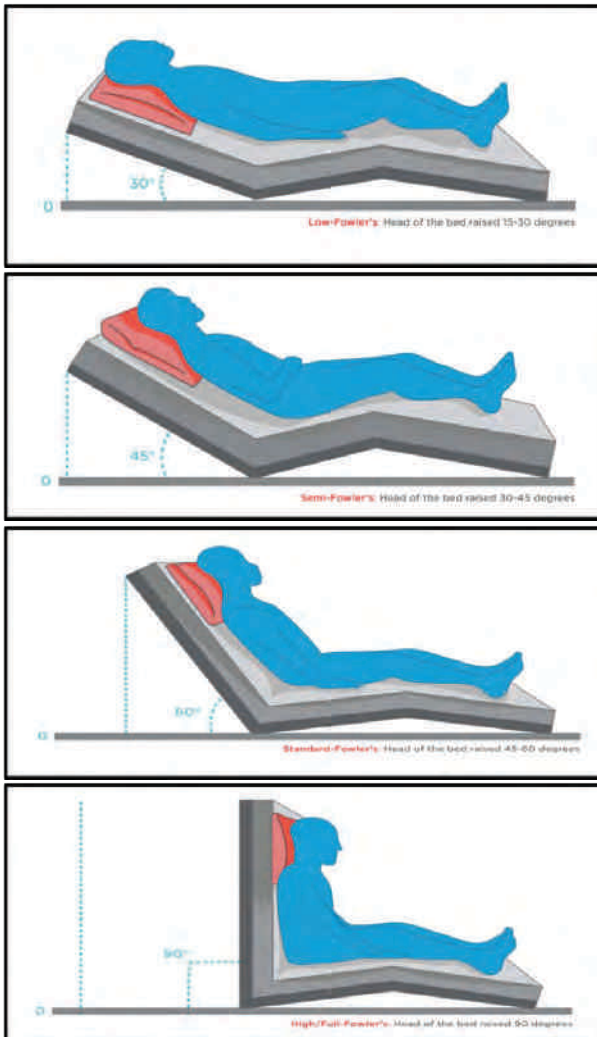
Overall, speech and language therapists situate their practice using the ICF framework, with more emphasis placed in the last 20 years on addressing issues of participation. Given the significance of hospitality and food in our culture, this includes the reintegration of the stroke survivor into shared mealtime experiences with family, friends, and the wider community, be it a cultural-religious celebration of *avurudu*, Christmas, Eid, an almsgiving or *dane*, *dansal* at Wesak, Thai Pongal or family gatherings at birthdays, weddings or at funerals. It includes working directly with the stroke survivor, as well as with members of the family, to implement a therapy programme. This may entail training on the use of compensatory strategies, such as modification of food/drink textures, and creating acceptance of these potential changes, in order to offer a safe and non-judgmental family/community mealtime experience.

Compensatory strategies

Broadly speaking, intervention involves deciding on oral vs enteral feeding methods, and on direct vs indirect therapy of compensatory strategies and therapeutic or rehabilitative techniques. Compensatory management aims to overcome or 'compensate' for the swallowing difficulties, to eliminate the stroke survivor's symptoms. These client-specific strategies are usually short-term and frequently monitored and modified, and involve using swallow manoeuvres, postural changes and texture modification with regard to form, volume, viscosity and temperature, or the use of oral prosthetics.

The aim within speech and language therapy management is to minimise aspiration using a variety of methods such as modification of texture and form of the food bolus, changes to body positions, maintenance of adequate nutrition and hydration, and specific exercises for functional training. The general guideline is to ensure that the stroke survivor is alert and in an upright posture for all meals as well as when offered medication orally. Specific body positions found to minimise aspiration are head rotation, side inclination, chin tuck, reclining position, recumbent position or combining several of these strategies. While the general guideline is of an upright posture at 90°, it is important to note the evidence for using a reclining position with stroke survivors. Whether the reclining position should be at 60°, 45° or 30° will depend on the thorough assessment of cognition, levels of alertness, swallow safety and severity of dysphagia conducted by the speech and language therapist in consultation with the physiotherapist and occupational therapist. The speech and language therapist in conversation with the physiotherapist may decide that a position assisted by the force of gravity or a specific technique to steer food/drink to the non-paralysed side may benefit an individual. Additionally, it is important to consider the seating position of the caregiver, if the stroke survivor requires assistance during meals. It would be supportive to the stroke survivor to maintain his/her head and trunk position if the caregiver adopts a position at the same level or slightly below their eye level. As there is no 'one solution fits all' within dysphagia management whether body position or strategy for functional training, Kagaya and colleagues encourage therapists to assess and confirm

the effectiveness of body positions and strategies prior to use with individual stroke survivors.



Body positions during mealtimes

A stroke survivor who does not pass the swallow screen/water test, may be kept nil-orally (NPO) with a short-term NG-tube inserted. The comprehensive assessment by the speech and language therapist will determine whether the individual is safe for any food/drink orally, and if so, which texture poses the least risk of penetration/aspiration. Also, the comprehensive assessment will offer information to make recommendations on the body posture or postural technique to be used, any changes to the food texture or diet modification, whether the bolus size needs to be decreased or increased, the amount of food/liquid per spoonful, pace of feeding and any specific feeding or cueing strategies to be utilized by the stroke survivor and/or caregiver, if needed. If oral intake for food and liquid (including medication) is contra-indicated and non-oral feeding is to continue, body positioning/postural techniques will still be a consideration to minimize the risk of aspiration and/or reflux.

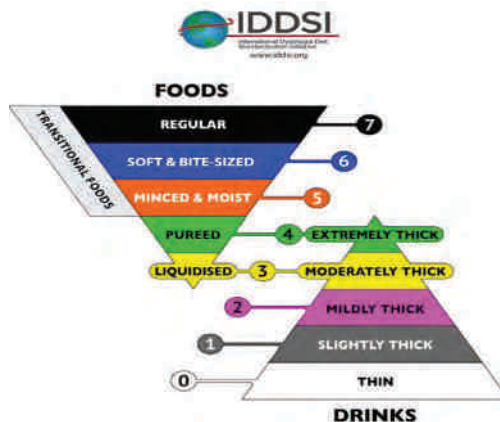
Therapy intervention

The specific dysphagia management recommendations would be based on the physiology of the dysphagia, the ability of the individual to follow directives, the physical limitations of the stroke survivors (including posture, hemiplegia, fatigue levels), prognosis, family support, and the aims of intervention/management decided collaboratively by the speech and language therapist and the stroke survivor. The long-term holistic goals include working closely with other team members to offer therapy intervention to help the stroke survivor to return to (or near to) their pre-onset level of skill. That said, as the American Speech-Language Hearing Association propose, intervention can be “restorative”, aiming to ‘restore’ lost or impaired function, and/or compensatory, where retraining may not be an option, at least, in the present or in the short-term. In the most recent systematic review of swallowing therapy for dysphagia in acute and subacute stroke, Bath and colleagues found a benefit of ‘behavioral interventions’ such as oral motor swallowing exercises, environmental modifications, dietary modification, expiratory muscle strengthening exercises, and counselling/educating. The ‘restorative’ or therapy strategies that are widely used by speech and language therapists depending on their applicability to

the individual stroke survivor include exercises to develop range of motion, safe swallow practice and thermal stimulation.

Standardizing texture descriptors

To ensure better understanding and compliance with texture modification, the stroke unit could adopt the International Dysphagia Diet Standardization Initiative (IDDSI) framework, specifically developed to ensure a global standard. This could minimize potential intra- and inter-professional confusion across speech and language therapists within a team or across hospitals as well as across the multi-disciplinary team. In a local research study, Devagiri formulated a resource tool with an exemplar food list for each IDDSI level in consultation with stroke survivors, speech and language therapists, dietitians, and occupational therapists that may be a useful starting point. Within the global context, there have been policy-level changes in hospitals where the IDDSI framework has been adopted as a basis to label all hospital food using a clear colour-coding system.



International Dysphagia Diet Standardization Initiative (IDDSI) framework (Source 18)

General Recommendations

While the recommendations that would be made to ensure swallow safety would be individual to the stroke survivor, the following general guidelines can be adopted by the members of the stroke unit.

Summary of General Recommendations:

Ensure that all oral feeding is offered when the stroke survivor is awake and alert.

The general postural recommendation is to keep the head and trunk upright. This would entail nursing staff in consultation with physiotherapy colleagues, adjusting the ICU bed to an appropriate angle.

Inform the stroke survivor that it is a mealtime using the communication system introduced by the speech and language therapist.

Take care to offer all food and drink given orally according to the texture or consistency recommended by the speech and language therapist for the individual stroke survivor.

If the speech and language therapist recommend thickening all drinks, the team would need to ensure it is followed at all times to minimize the risk of aspiration, as thin fluids are usually a challenge for many stroke survivors.

Initially, if the stroke survivor has difficulties with chewing their food, softer mashed food or pureed food may be recommended by the speech and language therapist following assessment. It is important for the team to follow texture recommendations during all mealtimes.

For some stroke survivors, eating small amounts at a time throughout the day may be better than having three large meals, particularly if the stroke survivor is experiencing difficulties with alertness, concentration and motivation or gets tired easily.

It is best to offer small amounts per spoonful at a time and make sure the food/drink has been swallowed and cleared prior to offering the next.

Stroke survivors may benefit from reminders to take small bites of food and small sips of water. Taking one sip of water or liquid at a time may help minimize the risk of aspiration.

Not mixing textures, such as food and liquid together (e.g. soup with chunks of vegetables), but offering one texture at a time might help the stroke survivor time their swallow better; again, minimizing the risk of liquid trickling down to the lungs.

Avoid asking questions and engaging in conversation while the stroke survivor is swallowing food/drink to minimize the risk of aspiration. Communication is important but best done at the start of the mealtime and after the stroke survivor has swallowed a spoonful of food/drink.

Offering prompts to swallow or to use specific techniques recommended by the speech and language therapist may be useful.

Aim to make mealtimes as relaxed as possible by reducing distractions. Display the texture and mealtime strategies to be used in a simple clear chart at the bedside, particularly for stroke survivors who are NPO/NBM, as this is a useful MDT strategy within a busy stroke unit.

Document any potential signs of aspiration or difficulty during mealtimes. Implement a consistent daily oral care programme to manage oral hygiene needs in consultation with the nursing staff, including clearance of any food residue after meals.

It is important to keep the stroke survivor's mouth and lips moist. If the stroke survivor is not safe to take fluids orally, a saliva spray or special gel may be recommended. Lip balm could be used to keep the lips from cracking. The nursing staff could incorporate this as part of the oral hygiene programme.

It must be emphasized that the above generic guidelines alone may not suffice. In fact, a note of caution is required as these general guidelines may not be beneficial to all stroke survivors and may even be contra-indicated in many cases.

Enabling Communication

“Only through communication can human life hold meaning.”

Paulo Freire

A prompt referral of the stroke survivor to the speech and language therapy service is recommended to enable access to a suitable individual communication system in the days immediately post-stroke. The right to communicate is a central tenet within speech and language therapy, as enshrined within the United Nations Convention on the Rights of Persons with Disabilities, and to do so using any means available. Up to an estimated third of all stroke survivors are said to experience a communication difficulty, though the nature and severity levels vary.

A stroke resulting in aphasia affecting receptive and expressive spoken language and/or reading and writing skills and dysarthria or dyspraxia affecting clarity of speech is arguably a life-altering experience. As per the ICF framework and its emphasis on participation, from the multitude of ‘roles’ played by the individual as a parent, grandparent, uncle or aunt, brother or sister, friend, neighbour, and co-worker, even heading an organization as the CEO of a company or Head of an organization, the stroke-survivor is suddenly and rudely confronted by the challenge of not being able to recall words or produce speech with clarity, affecting everyday simple communicative exchanges, resulting in a lack of autonomy.

Assessment

During the person’s stay in the stroke unit, the effect of the stroke on communication may be observed in difficulties experienced in understanding the questions or instructions posed (including instructions within any clinical examination), in formulating responses to questions and/or in initiating conversation, including making requests or refusing intervention, as well as in the intelligibility of speech, even to members of the family; all of which challenge autonomy, a sense of self; and could have a psycho-social impact on the individual. A screening tool based on the Sheffield screening

assessment developed by colleagues at the National Hospital of Sri Lanka (NHSL), and a relatively new Tamil Language Screening Test (LAST) validated for use post-stroke by Saleem, Shadden, and Wickramasinghe are used widely by speech and language therapists to aid the assessment process. The screening assessment undertaken would gain information on hearing and vision, and directly assess oro-motor skills, speech production, comprehension and production of spoken language, cognition for communication, and comprehension and use of written language.

Having established whether further assessment is warranted following the screening assessment, a comprehensive assessment mainly targeting speech, language, and cognitive communication are undertaken. The comprehensive diagnostic assessment conducted by the speech and language therapist aims to differentially diagnose between dysarthria and dyspraxia and to determine the type of aphasia (i.e., Broca's aphasia, transcortical aphasia etc.), the level of severity, as well as the responsiveness to diverse cueing systems, alternative and augmentative communication and/or multi-modal communication. In bilingual or multilingual individuals, age of acquisition of each and pre-morbid use and competence of each language should be determined, and all languages assessed to determine the influence of the stroke on everyday communication.

Within the comprehensive assessment, speech and language therapists aim to gather information relevant to each component of the *International Classification of Functioning, Disability and Health* (ICF) framework. This includes gaining information on the impact of the stroke on communication skills and interpersonal interactions that limit activity and participation in performing usual social roles and life participation in the community, as well as on the individual's overall quality of life. Based on the principles of well-established assessments of English such as the Boston Diagnostic Aphasia Examination, Western Aphasia Battery, and Psycholinguistic Assessments of Language Processing in Aphasia, local speech and language therapists and researchers have developed Sinhala-language assessments for aphasia, such

as, Rathnayake’s Sinhala Language Aphasia Assessment (SLAA), with culturally-sensitive and linguistically-applicable test materials.



Comprehensive speech, language, and communication assessments

Within the process of differential diagnosis, with a view to reaching a communication diagnosis, speech and language therapists may employ a classification system to denote the type of aphasia. One such commonly used classification is the categorisation of aphasia as nonfluent or fluent, reflecting features of spoken language expression. The aphasia classification employed may change over time reflecting improvement in communication skills. A stroke survivor may also present with complicated concurrent speech and language difficulties, with aphasia together with dysarthria and/or dyspraxia. Apart from the more commonly identified factors influencing aphasia recovery, such as lesion site and size and immediate aphasia severity post-stroke, social networks and social isolation, and post-stroke depression have been found to deter the recovery process. This reiterates the need for speech and language therapists to work collaboratively with psychiatrists, psychologists, counsellors, and family members, as well as to forge close links with Disabled People's Organisations and social-support networks in the community. This could compliment the adoption of a life participation approach to aphasia.

The impact of communication difficulties on quality of life (QOL) in comparison to the stroke survivor's social roles in the family and the community is a key consideration. Overall, post-stroke QOL is an area within assessment and intervention, measured using specific questionnaires. Karunathilake's translated and adapted stroke and aphasia quality of life scale (SAQOL – 39) in Sinhala could be a very useful tool for the local context.

The assessment may also lead to a diagnosis of a motor speech disorder of dysarthria or apraxia/dyspraxia. Dysarthria is defined by Duffy as a group of neurogenic speech disorders associated with "abnormalities in the strength, speed, range, steadiness, tone, or accuracy of movements required for breathing, phonatory, resonatory, articulatory, or prosodic aspects of speech production". Apraxia of speech (AOS) is defined by Duffy as a "neurologic speech disorder that reflects an impaired capacity to plan or programme sensorimotor commands necessary for directing movements that result in phonetically and prosodically normal speech". AOS, also known as dyspraxia,

acquired apraxia of speech, or verbal apraxia is a motor speech disorder affecting speech sound production. An individual experiencing dyspraxia may have difficulties with imitating and producing speech sounds independently, display inconsistencies in producing words correctly, show groping oro-motor behaviour, and slow speech production. Volitional movements are significantly affected (e.g., coping a movement or speech sounds) compared to automatic movements (e.g., blowing or licking an ice-cream; reciting *bana* or prayers memorised through rote learning as a child) in dyspraxia.

Right Hemisphere Disorder (RHD) or Right Cognitive Communication Disorder (RCCD) is another common communication disorder observed post-stroke due to poor processing of cognitive skills related to communication, which includes symptoms such as semantic processing of words, discourse processing, prosody and pragmatics. The individual may experience difficulties with attention and listening, memory, orientation, social communication or pragmatic difficulties, higher language functions of problem solving, reasoning, and understanding abstract language and emotions. Additionally, mood swings, anosognosia and visual neglect are common comorbid features associated with RCCD that could affect communication and spoken and written language. Prevalence of RCCD has been reported as 42%-49% in several hospital-based studies. It is worth remembering that RCCD is a condition that is often missed due to the varied presentation of symptoms.

Intervention & Management

No speech is not everybody cup of tea!
Old friends came to my home
but could not talk to them,
was horrendous¹, enormous effect.
HARD WORK!
Doesn't see them too much,
they are busy with everything,
That is HARD WORK too!

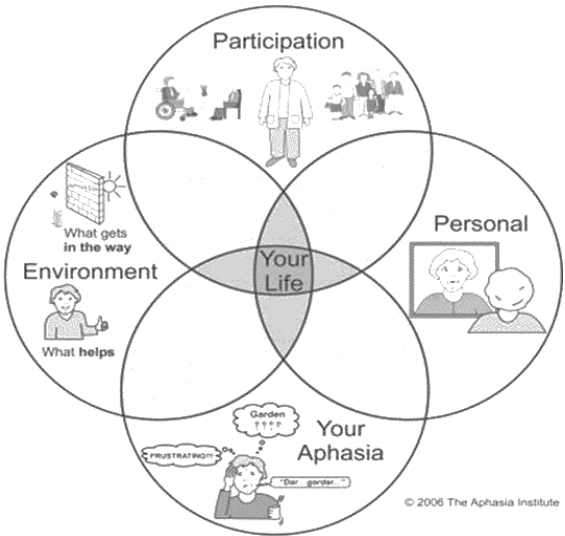
The poem 'HARD WORK' by Chris Ireland

Following a screening assessment, and a comprehensive diagnostic assessment where possible, the speech and language therapist needs to establish an accessible communication system that enables the stroke survivor to engage in communication and be as autonomous as possible. At the stroke unit, the establishment of a communication system for the stroke survivor might be a simple augmentative and alternative communication (AAC) system such as a communication board, alphabet board, use of gestures, drawing or writing (motor skills permitting), or even the use of a communication app on a mobile phone or iPad, where accessible and appropriate.

As communication is a two-way process, the individual stroke survivor's difficulties with receptive and expressive language and/or motor-speech skills could result in communication breakdown, making carer training on facilitating conversation between the stroke survivor and members of the family imperative. Using the ICF framework as a guide, therapy aims to get the stroke survivor back to or as close as possible to their premorbid level of skill; to be as independent as possible in their everyday communicative roles and participation.

¹ The original poem by Chris Ireland, who lives with post-stroke aphasia is given above with no changes made to the grammar or spelling.

The ICF is a guide for assessment, intervention, and management of communication disabilities, given the potential far-reaching sequelae, including addressing challenges faced in returning to the work-place. Therefore, therapy could focus on impairment, activity, and participation levels as per the ICF framework, in consultation with the stroke survivor. Using the stroke survivor’s strengths and their communication needs, the speech and language therapist will aim to work directly on areas of difficulty or train the individual and/or the caregivers/members of family to use specific strategies during conversation. This could also include recommendations on better access to healthcare information through aphasia-friendly written materials and reasonable accommodations at the workplace. Here too, our intervention can be restorative, aiming to repair or improve the ‘impairment’, and/or compensatory, focused on using strategies to mediate any loss in function. The therapy approaches for aphasia could focus on stimulation of language functions, reorganization of language functions and/or substitution of language functions.



Life Participation Approach to Aphasia (source 33)

The intervention could also directly focus on activity and participation, or cueing systems to support word recall. An augmentative and alternative communication device may be introduced to a stroke survivor following robust assessment by the speech and language therapist in collaboration with the physiotherapist and occupational therapist to encourage communicative participation as part of a multimodal approach. Therapists could also train the stroke survivor and partners/family members in using a range of verbal and nonverbal communication strategies to support conversation and social interaction. Facilitating the establishment of stroke groups or community aphasia groups by and for stroke survivors has the potential to address issues of post-stroke isolation and any limitation in social networks. Extending this to caregivers, and facilitating carer support groups may offer a useful safe space for family members to share their lived experiences and to learn from each other.

For a stroke survivor experiencing dysarthria, therapy will address the underlying sub-system or systems affected. Therapy for dysarthria is aimed at achieving better intelligibility, naturalness, and efficiency of speech using restorative approaches to improve the function affected. It can also include compensatory approaches of training the stroke survivor to use specific communication strategies, introducing an AAC device (remember Prof. Steven Hawking's high-tech AAC device), working with communication partners to develop communication-partner strategies and modifying the communication environment.

Similarly, the aim of therapy for an individual experiencing dyspraxia is to enable the stroke survivor to reach the highest level of communicative independence in everyday participation. Person-centered therapy focusing on function includes retraining to produce speech sounds in isolation and in words. It also encourages the speaker to use strategies for repairing breakdowns in communication. When primary speech communication is not an option, the speech and language therapist would consider a relevant and accessible augmentative and alternative communication system including gestures, writing, a communication wallet or a context-specific

communication board, a communication app or a specialist electronic voice-output high-tech communication device. For a stroke survivor with a diagnosis of RCCD, early intervention that includes strategies to reorganize communicative functions into a logical sequence with use of appropriate pragmatic and prosodic skills could increase effective communication, reducing the significant impact of social isolation.

General Recommendations

While we do not wish to assume that the stroke survivor cannot understand our questions or instructions, and while the communication method/system put in place at the Stroke Unit for each stroke survivor is individual, the following strategies may support communication.

- Keep questions and instructions short and simple.
- Initially, a slower pace of speech as well as pausing between sentences might give the stroke survivor extra time to process what is being said.
- Model or offer examples of what you expect, where appropriate.
- Point to relevant objects (e.g., tablets, NG tube) or pictures (e.g., pictures in a communication chart, communication app, or on an iPad) to indicate the topic or key word within a discussion to aid understanding.
- Repeat instructions and simplify instructions or rephrase sentences if not understood, incorporating gestures, facial expression and pointing to target items, where necessary.
- Give extra time to the stroke survivor to understand what is being said and to formulate a response.
- Use the communication method/system set-up by the speech and language therapist when communicating with the stroke survivor enabling a 'voice' in the decision-making process and in their care.
- Write down instructions and recommendations in simple language, highlighting the target words, adding additional picture support, where necessary and appropriate.

- For a stroke survivor experiencing particular difficulties with finding the right words, prompting using the first speech sound of the presumed response may be useful.
- For a stroke survivor experiencing significant difficulties with clarity of speech or in formulating a response, opportunities to answer yes/no questions using the communication method/system set-up by the speech and language therapist (e.g., thumbs up/thumbs down, eye blinking, eye gaze to point at a yes/no chart) may be easier, enabling inclusion into conversations about their care.
- The stroke survivor may get frustrated if repeated attempts at speaking are not understood. They may need encouragement, particularly initially, to use alternative ways of communication such as writing down a message, writing and then reading it aloud, drawing a picture, pointing to an alphabet board, word, letter, photograph, picture on a chart or an object, using gestures or describing the word when unable to recall the exact word.
- Offer a pen and paper to write or draw to enable communication, where appropriate.
- It would be useful to minimise distractions during conversations within the stroke unit, to encourage the stroke-survivor to listen to the communication partner.
- Limiting the number of communication partners at a time initially may be useful, to help the stroke survivor to follow the thread of a conversation.
- If the stroke survivor uses a hearing aid and/or spectacles, ensure that they have access to it and that the hearing aids are working during conversations.



Facilitating communication at the stroke unit

Discharge Plan

The multi-disciplinary team discharge plan for the stroke-survivor necessitates the training of family members/caregivers to maintain the client's NG tube. It also necessitates the stroke survivor and/or caregiver/family member understanding the compensatory strategies and therapy strategies recommended as part of the rehabilitation programme. Additionally, the stroke survivor and/or family member/caregiver would be offered clear communication strategies to use to minimise communication breakdown, as well as recommendations on any specific therapy activities to be conducted at home.

Telepractice Services

Within the backdrop of Covid-19, speech and language therapists have considered innovative service delivery models of telepractice to ensure a continued 'duty of care'. The American Speech-Language-Hearing Association defines telepractice as "the application of telecommunications technology to the delivery of speech language pathology and audiology professional services at a distance by linking clinician to client or clinician to clinician for assessment, intervention, and/or consultation". The main telepractice types of synchronous, asynchronous, and hybrid have been trialed by local speech and language therapists, with a local evidence-base evolving. Given the heavy reliance on technology for the effectiveness of this service delivery model, speech and language therapists continue to critically reflect on possible issues of equality/equity of access in Sri Lanka, while exploring a range of service delivery models in order to reach hard-to-access communities.

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Chapter 11: Nutritional Management in Stroke

Dr Renuka Jayatissa & Dr Wasana Marasinghe

Half to two third of patients were found to have lost weight from week one to six months post-stroke.

Nearly one fifth were undernourished at six months post-stroke.

Weight loss post-stroke is a major risk factor for poor clinical outcomes.

Failing to identify and treat dysphagia, malnutrition, sarcopaenia and pressure injuries hampers recovery and rehabilitation, which adversely affects quality of life.

Nutritional care should be initiated in a timely manner and monitored regularly from the day of acute admission on through rehabilitation and into the community.

Individualist dietary advice, fortified texture modified diets and medical nutrition therapy play a key role across the continuum of post-stroke care.

Multi-disciplinary teamwork is essential throughout the journey of the stroke patient.

The burden of stroke in Sri Lanka is alarming. Studies have revealed that malnutrition is common in stroke patients at the time of admission (8% to 28%) and worsens during their hospital stay. According to the APPLE (Algorithm for Post-stroke Patients to improve oral intake Level) study, 93.2% of convalescent stroke patients above 65 years faced the risk of malnutrition. In Sri Lanka, it was reported in 2011, that 75.9% of neurological patients had inadequate calories in their diet. Global evidence has shown the necessity of multi-disciplinary rehabilitation services including medical nutrition therapy. Although nutrition could affect recovery from acute stroke, it is often overlooked in Sri Lanka may be due to the lack of local evidence which

influence local feeding policies and guidelines. Moreover, the lack of consistent data about the benefits and risks of feeding regimens adds further uncertainty to decision making. This article will focus on evidence-based nutritional optimization strategies in stroke in view of motivating the health care workers who struggle to meet the nutritional needs of their patients in busy health care settings in Sri Lanka.

Risk factors for malnutrition following a stroke

Dysphagia

Consciousness / cognitive function

Visual disturbances

Speech

Facial, arm and hand weakness

Depression

Olfactory changes / loss of appetite

Fatigue

Dehydration

Environment

Impact of Sub-optimal Nutrition Intake.

Stroke related sarcopenia

Sarcopenia, characterized by loss of muscle mass and strength can develop rapidly after a stroke, and has a reported prevalence of around 42%.

Sarcopaenia after stroke is a multifactorial systemic inflammatory response caused by both catabolism and degradation of fat-free body mass. It is further compounded by immobility, bed rest, and insulin resistance associated with diabetes.

Pressure injury

A failure in achieving nutritional goals is independently associated with the development of pressure injuries.

Nutrition Screening and Assessment

All stroke patients should be screened. Screening should be followed by detailed assessment of malnutrition for those “at-risk” within 48 hours of hospital admission.

Patients deemed “at risk” for malnutrition should be referred to the medical nutrition team for nutrition assessment, grading of malnutrition (mild, moderate, severe) and for individualized medical nutrition therapy.

The following screening tools can be used

Nutrition Risk Screening 2002 (NRS 2002) is the most suitable screening tool during the acute stage.

Malnutrition Universal Screening Tool (MUST),

Mini Nutrition Assessment for elderly patients (MNA),

Subjective Global Assessment (SGA).

Medical Nutrition Therapy (MNT)

Points to be considered when implementing nutritional support for stroke patients

Increased energy demand is usual in subarachnoid haemorrhage but is not the same in patients following cerebral infarction.

Concomitant infectious complications may increase resting energy expenditure.

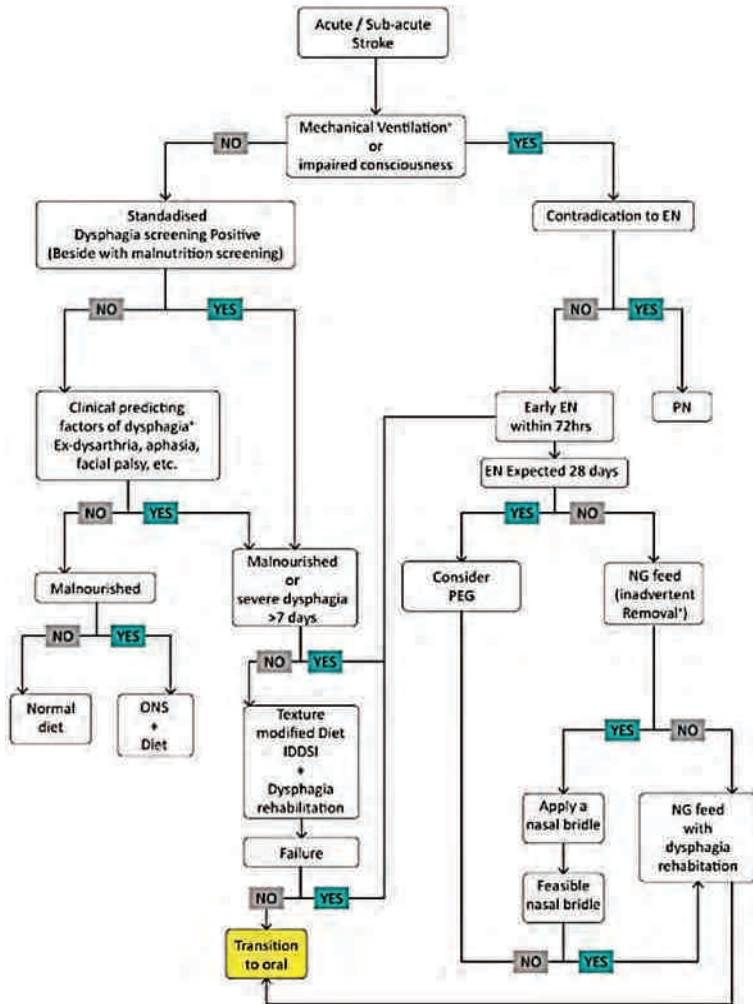
Generally, stroke patients will receive energy and proteins based on their maintenance requirement. (Energy - 20-30 kcal/kg/day and proteins - 1g/kg/day).

An early enteral feeding does have several advantages to improve gut motility, gut immunity, and preventing translocation of gut bacteria into the systemic blood flow.

Evidence has proven that medical nutrition therapy reduces the incidence of infections in stroke.

In essence, adhere to the nutrition algorithm provided with a series of step-by-step instructions, which will help health care workers to overcome nutritional challenges of their patients.

The Nutrition Care Process of Stroke
(Algoythm)



MNT for dysphagia in stroke patients

Due to its prognostic importance, early detection of oropharyngeal dysphagia among post-stroke survivors would be a cornerstone in lessening the occurrence of malnutrition, dehydration, and aspiration pneumonia. Up to 27% to 64% of stroke patients suffer from dysphagia and more than half of them recovered spontaneously from dysphagia after 2 weeks. However, the patients who remained with dysphagia are more prone to malnutrition because of divergent eating speed, anxiety, and other reasons.

Evaluation of dysphagia:

Dysphagia should be screened for in all stroke patients within 2 hours of admission to stroke unit using clinical bedside approach.

Water swallowing test (WST)

It is a non-specific test recommended for use in daily routine where the patient is administered 50 to 90 ml of water and observed for signs of aspiration such as cough and examined for double swallow.

Multi-consistency test/Viscosity swallow test (VST)

In this test, dysphagia is graded into four categories as severe, moderate, mild or no dysphagia, and under each severity code, a detailed dietary recommendation can be implemented.

If dysphagia is identified, tests should be performed by a speech and language therapist or following instrumental testing should be performed.

Instrumental testing methods

Videofluoroscopic swallowing study (VFSS) -

It can reveal the cause for aspiration.

Fiberoptic endoscopic evaluation of swallowing (FEES)

It helps to check the anatomy and physiology of swallowing.

Steps of MNT:

1. Use nutrition assessment tools to determine the level nutritional requirement and method of delivery.
2. If there is a risk of aspiration or severe dysphagia, initiate tube feeding.
3. If oral feeding is possible, consider starting texture-modified diet either visually, textually via customization, through meal fortification or providing oral nutrition supplements (ONS).
4. Monitor the nutrition requirements and intake throughout the recovery

Suitable dietary methods when oral feeding is possible.

Through tube feeding

Using pre-thickening ONS

Using manual thickening powders

Using tailored food and drink preparation guidance

Texture modified diet

The nutritional intake of patients with dysphagia may be achieved by texture modified diet after grading dysphagia. In 2016 International Dysphagia Diet Standardization Initiative (IDDSI) was introduced. Texture modified feeds are recommended in patients with chronic dysphagia to enhance nutritional status.

Methods of texture modified feeding.

If thickened diets cannot optimize fluid intake in these patients, proper monitoring is needed to prevent dehydration in acute or chronic dysphagia.

Texture modified feeds can reduce aspiration pneumonia incidence in patients suffering from acute dysphagia.

For the sake of reducing aspiration pneumonia in patients with chronic dysphagia, the “Chin down” procedure and thin fluids should be the first choice rather than thickened fluids.

MNT for malnutrition in stroke patients

Screen all patients within 48 hours of admission, irrespective of dysphagia status, and weekly during the acute stage.

Rescreen and monitor nutrition intake throughout the recovery and when the patient is shifted from one unit to another (e.g., ICU to ward, ward to home).

Adjust nutrition care plan from one method to another suitable method (e.g. oral to tube, tube to oral)

MNT for sarcopaenia in stroke patients

Evaluate muscle strength, muscle mass, and physical performance using tools appropriate for stroke patients.

Start nutrition intervention with adequate high-quality protein (1-2 g/kg body weight, depending on the individual needs) together with physical rehabilitation programme.

If one sided weakness is present, in addition to general physical exercises, encourage strength training to unaffected side.

MNT for pressure injuries in stroke patients

Screen and assess for risk and presence.

Provide adequate calories, protein, and micronutrients for optimum healing.

Monitor throughout recovery.

General Nutrition Care Plan For Stroke Patients

- Patients with prolonged severe dysphagia anticipated to last for more than 7 days should receive tube feeding within 72 hours.
- Critically ill stroke patients with a diminished conscious level requiring mechanical ventilation should obtain early tube feeding support.
- Theoretically, in dysphagic stroke patients, with a high risk of aspiration, continuous feeding is more recommended, preferably with a feeding pump rather than by a gravity-driven feeding bag. As this may cause gastric overload and regurgitation with subsequent aspiration. Available evidence shows no significant difference in nutritional outcome in intermittent over continuous NG tube feeding in acute stroke patients.
- When deciding the type of tube feeding, during the acute phase of stroke, nasogastric (NG) feeding is preferred. A small gauge NG tube (8 French) is favored to lower the risk of internal pressure sores. Due to the risk of displacement, the correct position should be confirmed before each NG feed and a local standard for the assessment of the correct NG position should be established in every hospice.
- If tube feeding support is anticipated to be more than one month a percutaneous endoscopic gastrostomy (PEG) feeding shall be considered in sub-acute stroke patients. Mechanically ventilated acute or sub-acute stroke patients should receive a PEG at an early stage, usually within 1 week. Evidence has shown that PEG feeding was superior to NG feeding in mechanically ventilated stroke patients in viewpoint of lowering the risk of ventilator-associated pneumonia. In a Cochrane review (1966 to 2011) on “Interventions for dysphagia and MNT in acute and subacute stroke” the expert committee stated that, reduced treatment failures, reduced gastrointestinal bleeding, higher albumin concentrations, and had higher feed delivery were noted in the PEG group compared to the NG fed group.
- FOOD (Feed or Ordinary Diet) trial, which was the study of the biggest sample size (859 acute stroke patients) evaluating the timing of feeding in stroke patients has not shown any superiority between PEG feeding and NG feeding considering the endpoint of “mortality after six months”. The study has revealed an increased prevalence of pressure sores in the

PEG group in contrast to the NG group. Reflecting all, decision of PEG-tube or an NG tube in acute stroke patients, should be decided by the attending physician jointly with multi-disciplinary discussion. If an NG tube is well-tolerated, PEG-insertion should not be a rehabilitation plan in a palliative care patient with an uncertain prognosis. Moreover, there is an assumption that strategies to overcome dysphagia might not be possible with an NG tube in situ. This hypothesis is contradicted by shreds of evidence; NG tube in situ did not trigger any negative impact on swallowing function and was not an obstacle to dysphagia rehabilitation.

- Dysphagia therapy should start in a timely manner, in tube-fed as well as non-tube-fed patients. Conscious stroke patients with tube feeding should be offered additional texture modified oral feeds, assumed by dysphagia grading.
- If an NG tube is repeatedly removed inadvertently by the patient and if tube feeding will be compulsory for more than 14 days, a nasal loop (bridle) may be applied to anchor the NG tube. If it is not feasible or not tolerated early positioning of a PEG should be considered.

Usually, the body produces more than 500ml of saliva daily with or without oral feeds which is contaminated by bacteria and attributed to aspiration pneumonia. Therefore, strict oral hygiene and oral decontamination has been recommended in the prevention of ventilator-associated pneumonia.

It is important to enhance the awareness among non-nutrition experts that nutrition is a modifiable factor in stroke patients, and it will improve the outcome. In order to provide a holistic care, facilitation and integration of nutritional screening and dysphagia assessment should be in cooperated into routine stroke rehabilitation. Nutrition care as an integral component of post-stroke management cannot be further emphasized.

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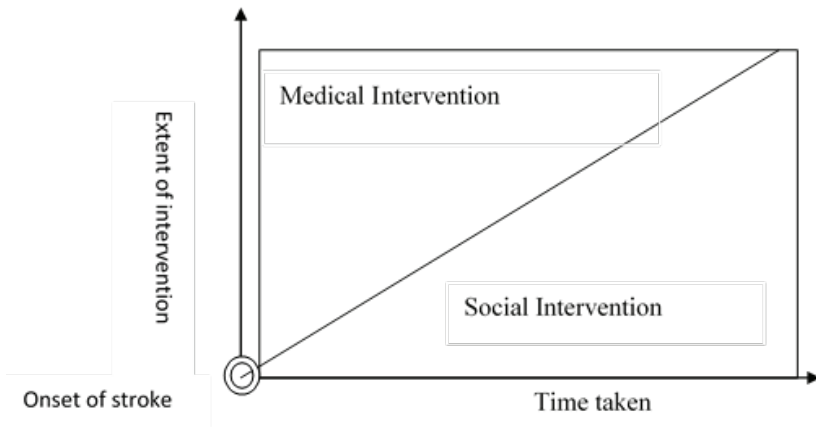
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Chapter 12: Intervention of the Department of Social Services for Patients' Welfare Services.

Mr Chandana Ranaweera Arachchi

The gradual and steady on-going progress of interventions being carried out by the social services department in the health sector in the recent past is leading the way to provide optimal medical support for the patients.



In stroke rehabilitation, social interventions begin in the acute phase and continue throughout the process of rehabilitation. As the medical interventions gradually decrease, the social interventions increase appropriately to offer maximal social support to the family and the stroke survivor. Health care professionals have no reservations in acknowledging the fact that social care services and interventions play a pivotal and vital role in helping stroke survivors to reintegrate into the society and also support the family of the stroke survivor by providing financial aid, vocational training, and job opportunities to enhance their ability to cope and support the patient. This is even so very important in the stroke survivor if he or she is the sole bread winner, or the socio-economic state of the family so deserves additions support and benefits.

With a view of providing the optimal possible social support, an officer from the social services department explores the patient's mental status, medications and therapeutic interventions needed, the family's economic state, and other basic social problems. Currently the social services department provides assistance for renovation of the home to suit the needs of the stroke survivor, basic support equipment, access facilities, and many other services as deemed necessary by the assessing officer. These services are commenced and provided continuously through the duration of in-patient care, out-patient care, and community care. The services of a dedicated social service officer have been available to stroke survivors from 2000 at the stroke unit of the National Hospital of Sri Lanka. Access to social services is available to all stroke survivors in the island via the regional offices.

Social Services Officers provide patients' welfare services in two phases.

Social services for the welfare of in-ward patients.

Providing solutions for the problems and needs of a patient that are brought up during multi-disciplinary meetings or daily ward rounds conducted by the rehabilitation team. For example, if a stroke survivor needs an air mattress, the coordination to provide the equipment to the patient is conducted by the social services officer of the rehabilitation team with the assistance of government agencies or donors.

On discharge from hospital the social services officer coordinates the required assistance to the family such as providing commode toilet facilities, wheelchair, access facilities, as well as assisting in improving the socio-economic status of the family via assisting in educational facilities, vocational training, and securing employment to mention a few examples. The facilities provided are individualized to the requirements of the family of each stroke survivor. The officer may also coordinate other related services.

An information report is prepared for the patient for use in future rehabilitation plans.

Engagement of social services officers in the following matters are also very effective

Providing vocational training facilities for target groups.

Providing career opportunities.

Counseling.

Intervening in issues occurring with employers.

Making contacts with the Department of Labour.

Coordinating on providing compensation.

Making family members and the community aware about disabilities.

Referring for Legal Aid Services.

Maintaining and strengthening organizations for the persons with disabilities.

Providing housing and other facilities for the stroke survivor and family.

Bringing the problems of the persons with disabilities to the national level.

Bringing the sports capabilities of the persons with disabilities to the national level.

Bringing the artistic and cultural abilities of the persons with disabilities to a national level.

Making health staff aware of social service activities.

Supporting the establishment of organizations for patients (e.g The National Stroke Association of Sri Lanka).

Introducing music therapy programmes.

Making public officers aware of social service activities.

Participating in national and international conferences.

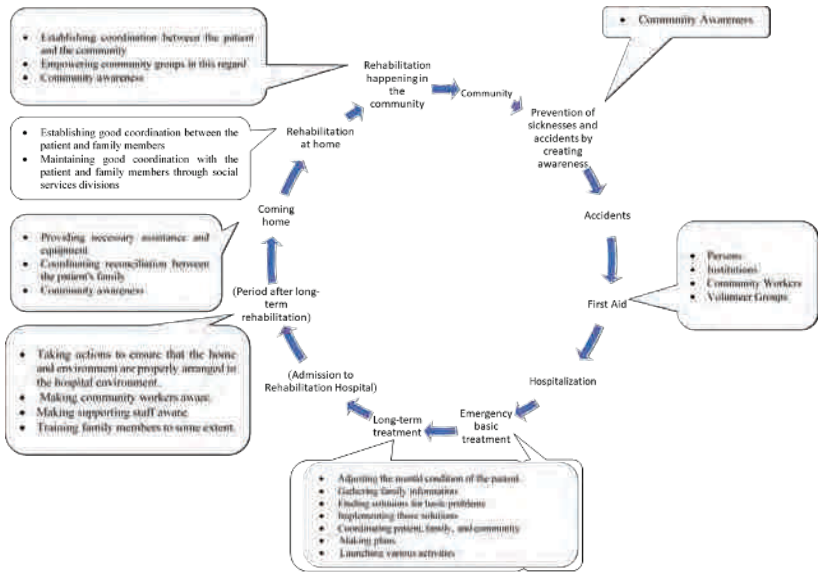
Inter-agency coordination.

Providing knowledge on disability prevention programmes and first aid to target groups.

Coordination of welfare services and social services officers of the relevant Divisional Secretariats on discharge from hospital.

The social services officer of the relevant hospital coordinates with the relevant persons, institutions, and organizations to ensure that the required equipment is delivered to the patient's home and the required social services are arranged on or before the discharge of the patient from the hospital.

They also coordinate to assist the patient to obtain financial assistance for traveling expenses required to attend hospital clinics from remote areas and assist in obtaining the necessary medications and other medical requirements.



The above welfare cycle provides a clear outline of the functioning of services provided by the social services department where persons with disabilities and patients including the stroke survivors are at the forefront. Of special

concern are adults who do not have carers and need significant assistance from social service officers.

The stroke survivor, their carers, and families benefit the most when the social services officer is also a member of the multi-disciplinary team that conducts regular meetings and sets goals and targets in rehabilitation whilst the patient is in the ward or a stroke unit.

The teams with which the social services officers have to coordinate

Stroke survivor.

Hospital staff.

Stroke survivor's family members, caregivers, friends, rural community groups, and organizations.

Field officers of the Divisional Secretariat (e.g. -Technical officers, Samurdhi Development Officers, Agrarian Development Officers, Relevant Officers in the Office of the Director of Health Services (MOH))

Grama Niladhari of the area

Organizations, donors, and societies (rural development societies, sports clubs, children's clubs, "Swashkthi" groups for the persons with disabilities, and senior citizens' organizations to name a few).

Other Government Agencies

- National Secretariat for Persons with Disabilities
- Relevant Pradeshiya Sabha, Provincial Council
- Ministry of Education
- Office of the Director of Regional Health Services
- Department of Labour
- Relevant Provincial Councils

Challenges faced by social services officers.

Lack of financial or other resources required in carrying out emergency patient needs.

Breakdown of inter-agency and inter-personal relationships.

Failure to establish an appropriate centralized system to provide proper services (related to patient wellbeing).

Problems with updating of knowledge.

Lack of proper awareness of some hospital authorities on patient welfare services provided by the social services officers.

Lack of basic facilities for social service officers in certain hospitals.

Methodological development issues.

Strategies used by social services officers to overcome the challenges.

The vast majority of officers are university graduates.

Long-term experience and work experience in the field of social work.

Being creative.

Sympathy for the entire target group, especially the stroke survivor and the family.

Possess communication skills.

The primary duty of the social services officers both in the hospital and the community are directed towards the wellbeing of the stroke survivor. The Social Services Department serves the differently abled, the injured, and the stroke survivors through the "National Programme for the Rehabilitation of Persons with Disabilities" or "CBR Programme" established in the Department of Social Services. Majority of the disability welfare services in the community, especially to those discharged from hospital and for those currently in the society with disabilities are carried out using the annual allocation of LKR 10 million to the Social Services Department. A database on persons with disabilities is being maintained through the CBR programme since 2017.

The Department of Social Services performs a national mission to raise the living standards of the disadvantaged and marginalized communities in the society and provides a great opportunity to make welfare services more effective by adopting modern methodologies to further formalize this duty, as an institution under the Ministry of Health.

