पुनर्स्थापना सेवा (Osteoarthritis of Knee, Non-Specific Back Pain, Stroke, Developmental Delay and Cerebral Palsy) सम्बन्धी चिकित्सकिय प्रोटोकल

Rehabilitation Clinical Protocol on:

Osteoarthritis of Knee, Non-Specific Back Pain, Stroke, Developmental Delay and Cerebral Palsy

नेपाल सरकार
स्वास्थ्य तथा जनसङ्ख्या मन्त्रालय
स्वास्थ्य सेवा विभाग
इपिडिमियोलोजी तथा रोग नियन्त्रण महाशाखा
कुष्ठरोग नियन्त्रण तथा अपाङ्गता व्यवस्थापन शाखा
टेकु, काठमाडौ

USAID अमेरिकी जनताबाट

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स्वास्थ्य सेवा विभाग
महाशाखा

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फ्याक्स-४२६२२३८

पत्र संख्या :-
चलानी नम्बर :-

पचली, टेकू
काठमाडौं, नेपाल ।
मितिः.....

विषयः- प्राक्कथन

पुनर्स्थापना सेवा बिभिन्न स्वास्थ्य समस्या भएका व्यक्तिको कार्यगत क्षमता (Functioning) मा सुधार र अपाङ्गता न्यूनिकरणमा मद्दत गर्ने स्वास्थ्य सेवा हो ।यसले व्यक्तिको कार्यगत सिमितता र सहभागिताका अवरोधहरु हटाई कार्यगत क्षमताको अभिवृद्धि गर्दछ । रोकथाम, स्वास्थ्य प्रवर्द्धन, उपचार र प्रशामकका साथै मानिसको पुर्ण स्वास्थ्य सम्वोधनका लागि आवश्यक छ ।

राष्ट्रिय स्वास्थ्य नीति २०७६, जनस्वास्थ्य ऐन २०७५, अपाङ्गता भएका व्यक्तिहरुको अधिकार समवन्धि ऐन २०७४ ,स्वास्थ्य मन्त्रालयको " अपाङ्गता व्यवस्थापन (रोकथाम, उपचार तथा पुनर्स्थापना) नीति, रणनीति तथा १० वर्षे कार्य योजना २०७४-२०८३" जस्ता विभिन्न राष्ट्रिय दस्तावेजहरुमा स्वास्थ्य सम्वन्धि पुनर्स्थापना सेवालाई पहिचान गरेको छ । त्यसैगरी संघिय, प्रादेशिक तथा स्थानिय सरकारले पनि स्वास्थ्य सम्वन्धि पुनर्स्थापना क्रियाकलापमा बजेट विनियोजन प्राथमिकतामा राखेको छ । यी सबै प्रतिबद्धताहरु र अवस्थाहरुले पुनर्स्थापना सेवाको गुणस्तर एवं एकरुपता आजको आवश्यक्ता रहेको छ ।

यस परिप्रेक्ष्यमा अपाङ्गता निम्त्याउने पाँच प्रकारका स्वास्थ्य समस्याहरु (Non-specific low back pain, Oosteoarthritis of knee, Stroke Cerebral Palsy & Developmental Delay) लाई समावेश गरी पुनर्स्थापना सेवा सम्वन्धि चिकित्सकिय प्रोटोकल निर्माण गरिएको छ । यस्मा सबैको लागि पुनर्स्थापना, सेवाग्राही केन्द्रित अवधारण, पुनर्स्थापनामा बहु-पक्षिय अवधारणा-जसमा "चिकित्सक, नर्स, फिजियोथेरापिष्ट, अकुपेशनल थेरापिष्ट, Speech and Language Therapist, प्रोस्थेटिष्ट एण्ड अर्थोटिष्ट र साइकोलोजिष्ट" सबैको महत्वपुर्ण भुमिका समावेश गरिएको छ । जसबाट नेपालमा बढी समस्याको रुपमा देखिएको माथि उल्लेख भएका अपाङ्गताका कारकका रुपमा रहेको स्वास्थ्य समस्याहरुको गुणस्तरिय चिकित्सकिय पुनर्स्थापना सेवा उपलव्ध गराउन सहजिकरण हुने मैले महशुस गरेको छु ।

अन्त्यमा यस प्रोटोकल निर्माण गर्न सहभागी हुने बिज्ञहरु, सरोकारवाला संस्थाहरु लगायत कुष्ठरोग नियन्त्रण तथा अपाङ्गता व्यवस्थापन शाखा परिवार सबैमा हार्दिक धन्यवाद दिन चाहन्छु ।

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डा. दिपेन्द्र रमण सिंह
महानिर्देशक

डा. दिपेन्द्र रमण सिंह
महानिर्देशक

नेपाल सरकार
स्वास्थ्य तथा जनसंख्या मन्त्रालय
स्वास्थ्य सेवा विभाग
इपिडिमियोलोजी तथा रोग नियन्त्रण महाशाखा

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फ्याक्स-४२६२२३८

पचली, टेकू
काठमाडौं, नेपाल ।

पत्र संख्या :-
चलानी नम्बर :-

मिति: २०७८/०२/२१

प्राक्कथन

विषयः-

स्वास्थ्य पुनर्स्थापना सेवा एक महत्वपूर्ण विषय हो । यो सेवा स्वास्थ्य जीवनको सुनिश्चितताको लागि सबै उमेर समूहहरुका व्यक्तिहरुमा कुनै न कुनै रुपमा आवश्यक्ता पर्दछ । विश्व स्वास्थ्य संगठनको असक्त समायोजित जीवन वर्षहरु (Disability Adjusted Life Years) मा उल्लेख भए अनुसार पुनर्स्थापना सेवा ७० प्रतिशत रोगहरुमा आवश्यकता पर्दछन् भनिएको छ ।

यस परिप्रेक्ष्यमा पुनर्स्थापना सेवा ज्यादै महत्वपूर्ण विषय भएकोले सेवालाई सरलिकृत र एकरुपता वनाउन आजको आवश्यकता रहेको छ । यस सम्वन्धमा चिकित्सकिय सेवाको लागि पाँच अवस्थाका स्वास्थ्य पुनर्स्थापनाहरु (फ्याक्चर, मेरूदण्ड पक्षघात, टाउकोमा चोट, पोलाई र एम्पूटेशन) उपचारका लागि स्वास्थ्य तथा जनसंख्या मन्त्रालय बाट क्लिनिकल प्रोटोकल अन ट्रमा मेनेजमेन्टको निर्माण गरिसकेको छ । यसै गरी अपाङ्गता निम्त्याउने प्रमुख अवस्थाहरु जस्तै: घुँडा खिइने (Osteoarthritis of Knee), कम्मरको दुखाई (Non-specific Back Pain), बालवालिकाको विकासमा ढिलाई तथा बाल मस्तिष्क पक्षघात (Developmental Delay & Cerebral Palsy) र मस्तिष्क पक्षघात (Stoke) को पुनर्स्थापनाका लागि चिकित्सकिय प्रोटोकल (Rehabilitation Clinical Protocol) को आवश्यकता महशुस भइ यो प्रोटोकल तयार गरिएको छ ।

यस चिकित्सकिय पुनर्स्थापना प्रोटोकलमा सेवा शव्दावली, उद्देश्य, विधि, पुनर्स्थापना सेवा, कार्यक्षमता र अपाङ्गतामा आधारित जाँचहरु, बहु –विशिष्टिकृत पुनर्स्थापना सेवाको समन्वय, कार्यक्षमता निर्धारण, पूर्व डिस्चार्ज योजना/ प्रकृया, स्वयं हेरचाह प्रशिक्षण, अनुगमन प्रक्रिया आदि रहेका छन् । जस् बाट चिकित्सकिय पुनर्स्थापना सेवा संचालनमा चिकित्सक, नर्स, फिजियोथेरापिष्ट, पारामेडिकल तथा अन्य पुनर्स्थापनाकर्मीहरू सबैलाई सहजीकरण भई सेवामा गुणस्तर तथा एकरुपता हुने मैले विश्वास लिएको छु ।

अन्तमा यस प्रोटोकल निर्माणमा प्रत्यक्ष्य वा अप्रत्यक्ष सहयोग/ सहभागी हुने परामर्शदाता, विशेषज्ञहरू, सरोकारवालाहरु र कुष्ठरोग नियन्त्रण तथा अपाङ्गता व्यवस्थापन शाखा परिवारलाई स-धन्यवाद दिन चाहन्छु ।

२०७८/२/२१

डा. कृष्ण प्रसाद पौडेल
निर्देशक

सारांश

पुनर्स्थापना सेवा स्वास्थ्य सेवाको एक महत्वपूर्ण हिस्सा हो । दिगो विकासको लक्ष्य ३ प्राप्त गर्नका लागि पनि पुर्नस्थापना सेवा एक प्रमुख रणनिति हो । जसमा सबै उमेर समुहका व्यक्तिहरुका लागि स्वस्थ जीवनको सुनिश्चितता र हितको लागि प्रोत्साहितका लागि जोड गरिएको छ । स्वास्थ्य सम्वन्धित पुनर्स्थापनालाई नेपाल सरकारले राष्ट्रिय स्वास्थ्य नीति, रणनीति, कार्ययोजना तथा निर्देशिकाहरुमा पहिचान गरिसकेको छ । इपिडिमियोलोजी तथा रोग नियन्त्रण महाशाखा, कुष्ठरोग नियन्त्रण तथा अपाङ्गता व्यावस्थापन शाखाद्वारा समन्वय गरिएको अपाङ्गता तथा पुनर्स्थापना साझेदार भर्चुवल बैठकले पनि अपाङ्गता निम्त्याउने प्रमुख अवस्थाहरु जस्तैः घुँडा खिइने रोग (Osteoarthritis of Knee), कम्मरको दुखाई (non-specific back pain) विकासात्मक ढिलाई तथा बाल मष्तिष्क पक्षघात (Developmental Delay and Cerebral Palsy) र मस्तिष्क पक्षघात (Stroke) को लागि पुनर्स्थापना क्लिनिकल प्रोटोकलको आवश्यकता महशुस गरिएको थियो । पुनर्स्थापना सेवाले व्यक्तिको कार्यसिमितता र सहभागिताका अवरोधलाई हटाइ कार्यक्षमताको अविवृद्धि गर्दछ । रोकथाम, स्वास्थ्य प्रवर्द्धन र प्रशामक सेवाका साथै मानिसको पूर्ण स्वास्थ्य आवश्यकता पुरा गर्न पुनर्स्थापना जरुरी छ । नेपाल स्वास्थ्य अनुशन्धान परिषद्ले पनि Osteoarthritis of Knee र non-specific back pain लाई रोगको विश्वव्यापि भार (Global burden of disease) को रुपमा लिएको छ । यस अवस्था भएका व्यक्तिहरुलाई सबैभन्दा धेरै अवधि अपाङ्गता भएर बाच्न पर्ने अवस्थाको सूचिमा राखेको छ । त्यसैगरी Developmental delay and cerebral palsy र Stroke को लागि पुनर्स्थापना सेवा जीवन रक्षक हुने भनिएको छ ।

माथि उल्लेख गरिएका स्वास्थ्य अवस्थाहरुमा आधारित रहेर सेवा ग्राहीलाई केन्द्रविन्दुमा राखि सेवाको एक रुपता हुने गरी सेवाप्रदायकहरुले पुनर्स्थापना केन्द्रमा अथवा अस्पतालमा दिइने बहु बिशिष्टीकृत पुनर्स्थापना सेवाको लागि यो चिकित्सकिय अभ्यास सम्वन्धि प्रोटोकोल तयार गरिएको छ । यस प्रोटोकल तयार गर्नुको लागि विश्वभरी भएका राम्रा अभ्यासहरु र तथ्यको समिक्षा गरियो, सरकारी र गैह्वसरकारी स्वास्थ्य पुनर्स्थापना क्षेत्रमा कार्यरत सम्वन्धित विज्ञहरुसँग परामर्श र श्रृङ्खलाबद्ध बैठकहरु गरिएको थियो ।

यस पुनर्स्थापना क्लिनिकल प्रोटोकल विकासका प्रकृयाहरु, पुनर्स्थापना सेवाका शब्दावालीहरु, उदेश्यहरु विभिन्न विधीहरु, पुनर्स्थापना सेवाहरु तथा कार्य क्षमता मुल्याङ्कन, कार्य क्षमता र अपाङ्गतामा आधारित जाँचहरु, बहु बिशिष्टीकृत पुनर्स्थापना सेवाको समन्वय, कार्यक्षमता निर्धारण, पूर्व डिस्चार्ज योजना, डिस्चार्ज प्रकृया, स्वमद्धत र हेरचाह गर्नेको प्रशिक्षण र फलोअफ प्रकृया समेटिएको छ । यो पुनर्स्थापना क्लिनिकल प्रोटोकल प्रमाणमा आधारित छ । जुन पुनर्स्थापना स्वास्थ्य सेवाहरु प्रवाह गर्नमा र पुनर्स्थापना अस्पताल, केन्द्र तथा इकाईहरुको लागि उपयोगी हुनेछ ।

Abbreviations:

ACR - American College of Rheumatology

ADL`s – Activities of Daily Livings

AFO – Ankle Foot Orthosis

CFCS - Communication Function Classification System

CIMT – Constraint Induced Movement Therapy

CLBP – Chronic Low Back Pain

CP – Cerebral Palsy

DD&CP – Developmental Delay and Cerebral Palsy

DoHS – Department of Health Services

FES- Functional Electrical Stimulation

GMFCS - Gross Motor Function Classification System

IADL`s – Instrumental Activities of Daily Livings

ICF-CY – International Classification of Functioning, Disability and Health – Children and Youth Version

LBP- Low Back Pain

LMWH- Low Molecular Weight Heparin

MACS - Manual Ability Classification System.

MoHP – Ministry of Health and Population

MoSD – Ministry of Social Development

MSK – Musculoskeletal system

NMES – Neuromuscular Electrical Stimulation

NPO- Nil Per Oral

NSAIDS – Non-steroidal Anti-inflammatory Drugs

NSLBP – Non-Specific Low Back Pain

OA – Osteoarthritis

ROM – Range of Motion

SMART –Specific, Measurable, Achievable, Realistic, and Timely

Table of Contents

Chapter 1: Introduction

1.1 Background:

Rehabilitation is "a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions, in interaction with their environment (WHO)". Unmet rehabilitation needs can delay discharge, limit activities, restrict participation, cause deterioration in health, increase dependency on others for assistance and decrease quality of life and these negative outcomes can have broad social and financial implications for individuals, families and communities. Rehabilitation is an important part of universal health coverage and is key strategy for achieving Sustainable Development Goal 3 –"Ensure healthy lives and promote well-being for all at all ages".

The World Health Organization (WHO) estimates that approximately 1 billion people, or 15% of the global population, are living with some form of disability. As the aging population increases globally, the disability trend is also expected to increase. In addition, a recent prolonged political insurgence (1996–2006) and frequent natural disasters, including major earthquake in 2015, have also led to increased impairments and disability in Nepal. During Nepal's 2011 census, 1.96% of the country's population reported some kind of disability, of these, physical disability accounted for one-third of the reported disabilities. Given that more than 90% of the causes of the world's burden of disease may benefit from rehabilitation services, the potential needs are significant.

During second disability and rehabilitation partner virtual coordination meeting organized by LCDMS/EDCD, the partner organization and LCDMS/EDCD highlighted and also decided the need of rehabilitation clinical protocol on very common disabling conditions which need rehabilitation.

Table-1: Lists the impairments/ health conditions selected for the rehabilitation clinical protocol and its rationales.

S.N	Impairments/ health conditions	Rationales
1	Non-specific back pain	Highest contributor of year lived with disability(YLD)-Burden of Diseases Study conducted by Nepal Health Research Council (NHRC)

2	Musculoskeletal conditions: Osteoarthritis of knee	High YLD, Burden of diseases study conducted by NHRC, high number of cases reported in physiotherapy OPDs of hospitals
3	Stroke	Rehabilitation is the lifesaving interventions and need specialized rehabilitation
4	Developmental delay & Cerebral Palsy	Rehabilitation is the lifesaving interventions and need specialized rehabilitation

The importance of and the need for rehabilitation was brought to the forefront of planning and policy making immediately after the 2015 earthquake in Nepal. According to the Nepal Government's new Policy, Strategy, and Ten Years Action Plan on Disability Management - 2016, within 5 years, adequate disability and rehabilitation human resources should be produced and posts created for primary disability identification, management, referral, and counseling. Furthermore, within 10 years every region and state should have at least one fully equipped rehabilitation center and established orthotics/prosthetics workshop. This new policy reflects a commitment from the Nepali government, which ratified the CRPD in 2010, and marks a dramatic improvement in attention and support given to caring for individuals with disabilities and expanding rehabilitation services throughout the country. Other health related rehabilitation has been already identified by key national health documents such as 15th Development Plan, National Health Policy 2019, Public Health Service Act 2018, Disability Right Act 2017 and Nepal Health Sector Strategy 2016-2021. All these commitments and progresses make it a favourable time to strengthen the rehabilitation system and its service quality.

Realizing the fact and there is intense need of standard evidence based rehabilitative care for highly prevalence musculoskeletal conditions with highest contributor of year lived with disability like non-specific back pain, osteoarthritis of knee and complex neurological conditions like stroke, developmental delay and cerebral palsy. Furthermore, federal, provincial and local governments are increasing in investment in health related rehabilitation interventions and also this is right time to strengthen rehabilitation system and its service quality by developing national standard rehabilitation clinical protocol.

1.2 Biomechanics of knee and back:

For osteoarthritis of knee and non-specific back pain, understandings of biomechanics are very important which are as follows.

Osteoarthritis of knee (OA knee) is a chronic disease process affecting synovial joints, particularly large weight-bearing joints and by far the most common form of arthritis strongly associated with ageing and is a major cause of pain and one of the leading cause of disability. It is composed by osseous structures (distal femur, proximal tibia, and patella), cartilage (meniscus and hyaline cartilage), ligaments and a synovial membrane. The latter is in charge of the production of the synovial fluid, which provides lubrication and nutrients to the avascular cartilage. Unfortunately, given the high use and stress of this joint, it is a frequent site for painful conditions including OA. OA of the knee occurs most commonly in the medial tibiofemoral compartment, and increased regional load across this compartment's articular cartilage is believed to be an important factor in the pathogenesis of the disease. The knee adduction moment is generated by the combination of the ground reaction force, which passes medial to the centre of the knee joint, and the perpendicular distance of this force from the centre of the joint. Moderately strong and significant association between both the line of progression and degree of foot rotation during gait and the magnitude of the knee adduction moment, so the dynamic factors associated with the knee adduction moment has to be analyzed in OA knee.

Non-specific back pain (NSBP) generally results from an acute traumatic event, but it may also be caused by cumulative trauma. NSBP due to cumulative trauma tends to occur more commonly in the workplace. Multiple anatomic structures and elements of the spine particularly focus on (e.g. bones, ligaments, tendons, disks, and muscle) are all suspected to have a role. Biomechanically, the movements of the lumbar spine consist of the cumulative motions of the vertebrae, with 80-90% of the lumbar flexion/extension occurring at the L4-L5 and L5-S1 inter vertebral disks. The lumbar spine position most at risk for producing LBP is forward flexion (bent forward), rotation (trunk twisted), and attempting to lift a heavy object with out-stretched hands. Axial loading of short duration is resisted by annular collagen fibers in the disk. Axial loading of a longer duration creates pressure to the annulus fibrosis and increased pressure to the endplates. Compressive muscular forces may combine with the loading forces to increase intradiscal pressure that exceeds the strength of the annular fibers. Repetitive, compressive loading of the disks in flexion (e.g, lifting) puts the disks at risk for an annular tear and internal disk disruption. In lumbar flexion, the highest strains are recorded within the interspinous and supraspinous ligaments, followed by the intracapsular ligaments and the ligamentum flavum. In lumbar extension, the anterior longitudinal ligament experiences the highest strain. Lateral bending produces the highest strains in the ligaments

contralateral to the direction of bending. Rotation generates the highest strains in the capsular ligaments.

1.3 The International Classification of Functioning, Disability and Health (ICF) Model

The ICF is the evidence based and widely recognized framework which conceptualizes a person's level of functioning as a dynamic interaction between health conditions, environmental factors, and personal factors. It is a biopsychosocial model, based on an integration of the social and medical models of disability. As illustrated in figure - 1, disability is multidimensional and all components of disability are important and any one may interact with another. Environmental factors must be taken into consideration as they affect everything and may need to be changed. Any health related interventions to people with disability (short and long term) at the system and service level should be guided by ICF.

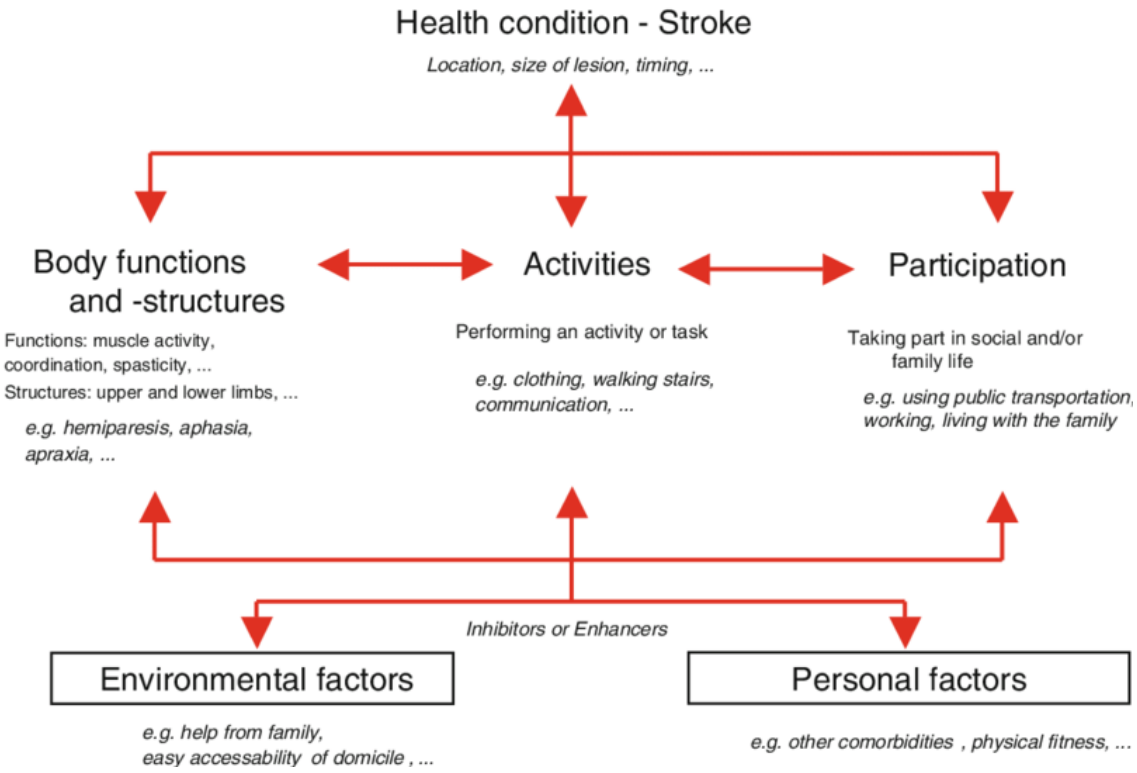


Figure: 1 ICF with example

The ICF-CY - conceptual framework and a common language and terminology for recording problems manifested in infancy, childhood and adolescence involving functions and structures of the body, activity limitations and participation restrictions, and environmental

factors important for children and youth. These differences were taken into account and the ICF-CY was developed in a manner sensitive to changes associated with growth and development.

Definitions:

Body functions: The physiological functions of body systems (including psychological functions).

Body structures: Anatomical parts of the body such as organs, limbs and their components.

Impairments: Problems in body function and structure such as significant deviation or loss.

Activity: The execution of a task or action such as daily living limitations and difficulties faced in executing activities- for example, sitting, walking or eating and self-care like brushing, dressing, undressing, toileting etc.

Participation: Involvement in a life situation such as children going school, individual going to work place etc.

Activity limitations: Difficulties an individual may have in executing activities. For example- not being able to do toileting routines, brushing, eating on own.

Participation restrictions: Problems an individual may experience in involvement in life situations. Example- children got able to play with friends or go school, individual not been able to visit work place etc.

Environmental factors: The physical (include products and technologies), social and attitudinal environment (support and attitude of family, community, services, system and policies) in which people live and conduct their lives. These are either barriers to or facilitators of the person's functioning.

Personal factor: Includes physical fitness, motivation, self-confidence and self-esteem which can influence how much a person participates in society.

Functioning is an umbrella term for body function, body structures, activities and participation. It denotes the positive or neutral aspects of the interaction between a person's health condition(s) and that individual's contextual factors (environmental and personal factors).

Disability is an umbrella term for impairments, activity limitations and participation restrictions. It denotes the negative aspects of the interaction between a person's health condition(s) and that individual's contextual factors (environmental and personal factors).

1.4 Core multidisciplinary rehabilitation clinical team

Ideally, the core rehabilitation team has to do the individual assessments, identify the problems, share with team, set the rehabilitation goals (SMART) and applies the rehabilitation interventions, periodic review of the outcomes, pre-discharge planning and discharge if the team agreed with proper follow-up plan.

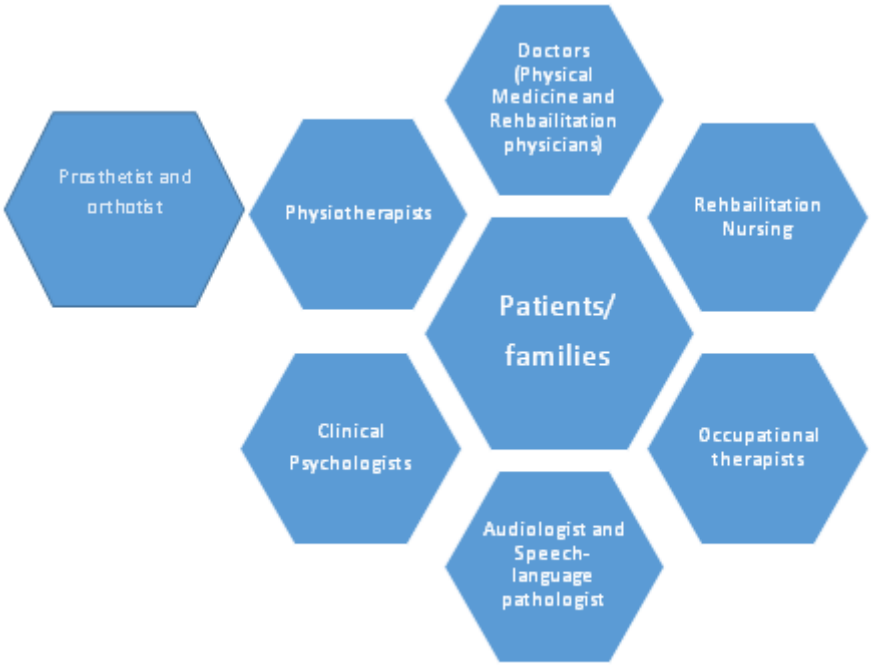


Fig: 2 Core multidisciplinary team

Doctor: Diagnosis and management of medical problems, design client centric comprehensive treatment plans in rehabilitation set up in coordination with multidisciplinary team and co-ordination and supervision of overall rehabilitation program. Physical Medicine and Rehabilitation physician (Physiatrist or Rehabilitation physician) is the most and would be ideal however in shortage of PM&R physicians any clinician who has accredited training in PM&R or Rehabilitation Medicine will be acceptable.

Nurse: Assessment, education, overall nursing care, positioning, skin, bowel and bladder care.

Physiotherapist: Assessment, physiotherapy diagnosis and management - education, application of exercises, manual therapy, transfers, balance, coordination and mobility training, apply physical modalities.

Occupational therapist: Assessment, education, ADL`s and IADL's training, home and environment modifications and occupation assessment.

Audiologist and Speech – Language Pathologist: Assessment, education, optimizing communication and swallowing.

Clinical psychologist/peer counselor: Assessment, psycho-education, psychotherapy, coping strategies, care-giver/parent management skill training and self-help training and self-help group network.

Prosthetist and Orthotist: Assessment and prescription, fitting and user training, follow-up, maintenance and repairs of orthoses**,** splints, assistive devices to prevent deformity, improve function and mobility. Custom made would be ideal however readymade can also be acceptable if non availability of the former one.

Patient/family or care giver: Needs agreed client centered rehabilitation services from the core and non-core team.

Other non-core but important clinical team: Neurologist, neurosurgeon, pediatric neurologist, orthopedic surgeons and other physicians, surgeons or other health professionals, dietitians, medical social workers etc. Assistive technology specialist: Assessment, provide assistance with technology equipment, helping individuals to understand and operate technological devices, such as system applications, computers, cell phones.

1.5 Approach of Rehabilitation Management

Multidisciplinary: People from different disciplines working together, each drawing on their disciplinary knowledge.

Interdisciplinary: Integrating knowledge and methods from different disciplines, using a real synthesis of approaches.

Transdisciplinary: Integrates the natural, social and health sciences in a humanities context and transcends their traditional boundaries.

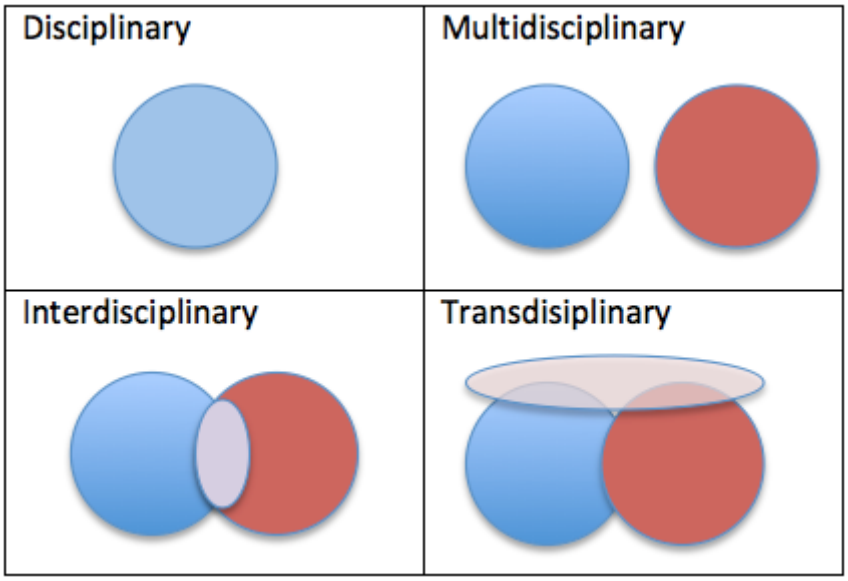


Fig: 3 Illustration of approaches in rehabilitation settings

Multidisciplinary (MDT) grand round: Usually, it is designed for in-patients rehabilitation unit with complex needs and is usually done every week through the interdisciplinary approach.

Goal settings: Multidisciplinary team with patients/families/care givers should make SMART goal which must be specific, measurable, achievable, and realistic and time bound. It should be done at least once a week and usually within 2-4 weeks' time interval individual should get goal settings meeting. However, it should be tailored individually.

1.6 Rehabilitation settings:

Inpatient rehabilitation units: It may be freestanding or part of larger hospital complexes. The stay at the facility for usually 1 to 3 months which depends on the severity of conditions and involves a coordinated, intensive program of rehabilitation that may include at least 3 hours of active therapy a day, 5 or 6 days a week. Inpatient facilities offer a comprehensive range of medical services, including full-time physician supervision and access to the core MDT as in fig: 2, specializing in complex conditions like stroke, developmental delay and cerebral palsy (DD & CP), OA knee, non-specific back pain rehabilitation and more specialized equipment. In Nepalese contexts at least one care giver (the closest family member or someone who stay with him/her most of the time) should be present and would be ideal while in rehabilitation process.

Outpatient units: These are free standing or often part of a larger hospital complex and provide access to the core multidisciplinary team as in fig: 2, specializing in given conditions as per need in stroke, DD & CP, OA knee and non-specific back pain rehabilitation. It involve coordinated therapy sessions and returning home. Comprehensive outpatient facilities frequently offer treatment programs as intense as those of inpatient facilities, but they also can offer less demanding regimens, depending on the person's physical capacity. The clients must be able to visits such units safely and timely otherwise care givers/families should be accompany.

Skilled nursing facilities: Offer variable types of care and usually place a greater emphasis on rehabilitation, whereas traditional nursing homes emphasize residential care. In addition, fewer hours of therapy and fewer doctor visits are offered compared to inpatient rehabilitation units.

Home/community-based rehabilitation programs: Allow for great flexibility to let a stroke, DD & CP, OA knee, non-specific back pain clients and rehabilitation to tailor a program specific to that client's individual needs. Such a program allows the client to practice skills and develop compensatory strategies in the context of her/his own living environment. Home/community- based rehabilitation may involve participating in an intensive level of therapy several hours per week or follow a less demanding regimen. Home/community-based rehabilitation programs are often best suited for people who require treatment by only one type of rehabilitation therapist.

1.7 Referral pathways

An effective referral system ensures a close relationship between all levels of the health system and helps to ensure client receive the best possible. All the rehabilitation service provider facilities should have mapping of different rehabilitation services available in the country, which help for referral pathways and there should be a formal referral pathways between local, provincial and federal hospital or rehabilitation facilities and should work in collaboration. Rehabilitation coordinator or patient referral coordinator should facilitates and coordinate referral from acute hospital/unit to the rehabilitation unit/centre or either and also to the local level after discharge. If the patients have more than two problems, then there must be intervention from multidisciplinary team. Problems in 2 or more of the following area but not limited to - Activities of daily living (ADLS), mobility (walking, wheelchair, stairs),

transfers, sphincter control (bowel & bladder), communication, cognition (memory, social interaction, problem solving), pain, spasticity, contractures.

1.8 Level of care

Primary care: Usually the first point of contact for patients within the health care system, and provides a link to more specialized care. Primary care is usually based at the local level, and provided in a range of settings – typically community based settings. The setting/ condition where single disciplinary rehabilitation provider can manage this setup. E.g. Physiotherapist and/ or Occupational therapist / or Speech therapist or Orthotist.

Secondary care: Rehabilitation services provided by core multidisciplinary rehabilitation team, typically hospital and institutional settings.

Tertiary care: Specialized multidisciplinary rehabilitation team of each condition. It is based at the national level.

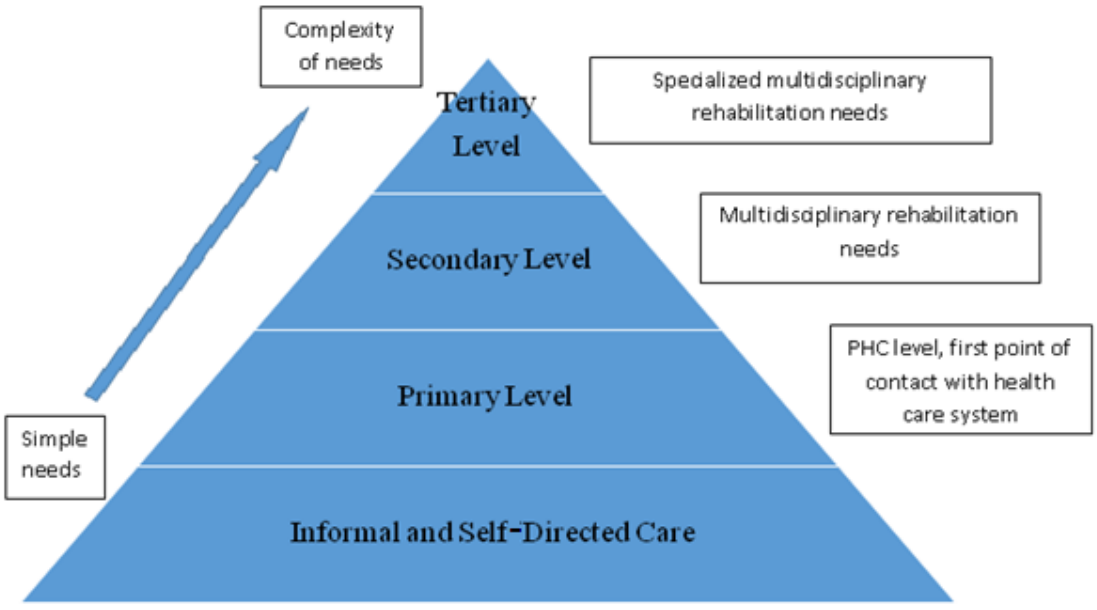


Fig: 4 Rehabilitation in health frame work.

Discharge from rehabilitation set up: With pre-discharge planning, all the multidisciplinary team should agree for the discharge when maximal functional outcome is achieved. The post-discharge planning to be done if necessary this must be linked with home/CBR programs mentioned in 1.5.

Overall Aim of Rehabilitation

The overall aim of rehabilitation is to:

- Education, reassurance and advice on self-management
- Optimize the function
- Prevent secondary complications and modify the disease process where possible
- Identify and treat related co-morbidities
- Community reintegration and participation

These aims are interrelated and success in one often benefits the others. Successful management requires careful assessment of the whole person which are as follows:

- The management plan needs to be individualized and patient-centered, to be agreed and understood by both patient and practitioner and take into account: the person's daily activity requirements, and work and recreational aspirations
- Risk factors and its associations
- The person's perceptions and knowledge of their condition
- Medications and coping strategies already tried by the patient
- Co-morbid disease and its therapy
- The availability, costs and logistics of appropriate evidence-based interventions

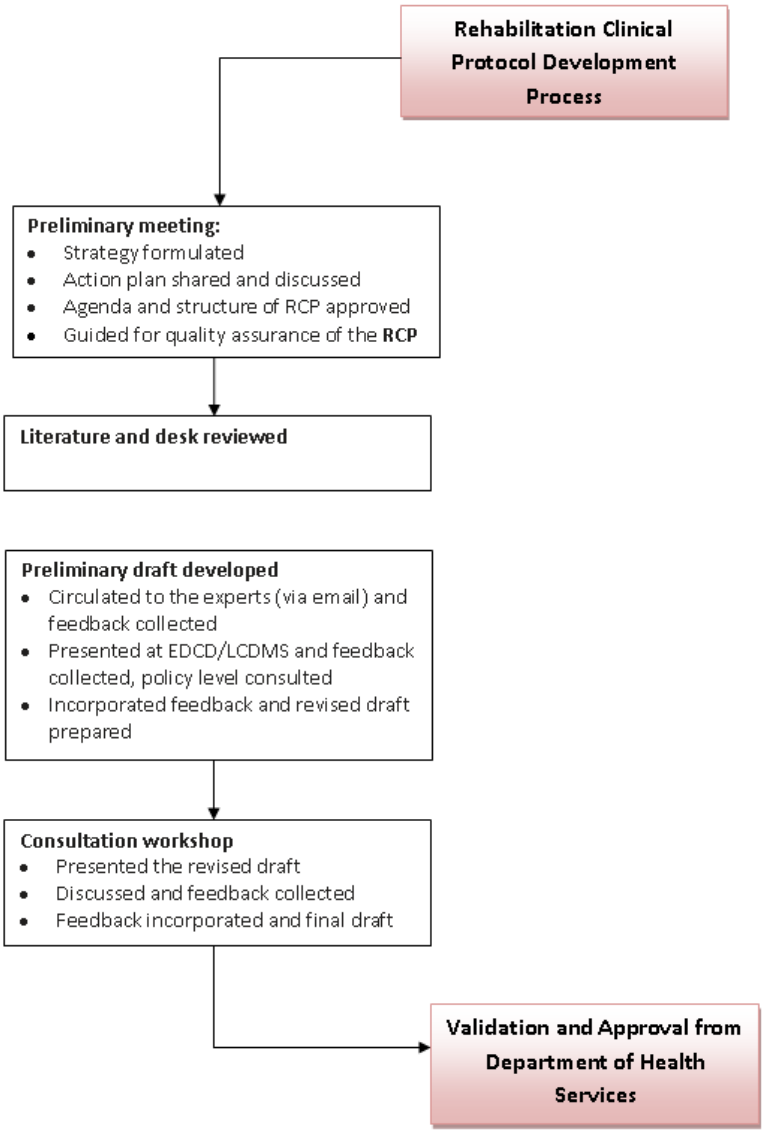
Simple, safe, available and affordable interventions should be tried first. Symptoms and signs will change with time, so the plan requires review and possible readjustment. Effective management may require the expertise of a variety of health professionals, with a coordinated multidisciplinary team approach. The core interventions should be considered for everyone.

1.9 Purpose and rational of the protocol

- To ensure uniform, client centric, evidence based clinical service delivery in rehabilitation set up.
- To promote the quality and holistic rehabilitation service delivery to maximize functions, independence and quality of life of patients and family members.

1.10 Methodology for development of Rehabilitation clinical protocol (RCP)

Epidemiology and Disease Control Division (EDCD), Leprosy Control and Disability Management Section (LCDMS) led the protocol development process. Literature review of good practices, health conditions/impairments were conducted to prepare the draft. Coordination for consultation and focused group discussion with key governmental and non-governmental health related rehabilitation stake holders were conducted to incorporate comments and feedback on the protocol. The final draft of the protocol was validated from EDCD, LCDMS and approved from Department of Health Services, Ministry of Health and Population, Nepal.



1.11 Users of this rehabilitation clinical protocol

- Rehabilitation professionals
- Rehabilitation and health service providers
- Health administrators and policy makers from MoHP, DoHS, MoSD and local municipalities

1.12 Common terminologies/definitions which are applicable in this protocol

1.12.1 Therapeutic exercises: Therapeutic exercises are prescribed to improve flexibility, endurance, aerobic capacity, strength, and among other purposes. While prescribing the exercises and physical modalities, there is no universal consensus to state its type, repetition, sets and duration however, it should always be individualized, clients tolerance and compliance and always start from simple to progressive. Generally, Frequency, Intensity, Time and Type (FITT principle) can be used. So, usually 10 repetitions or 6-12 repetitions, contracts/relax: 3secs/5secs and progress to 6secs/10secs, 2-3 sets per day for about 10-14 days, (5-6 times a week) and then assessment and adjustment of dosimetry.

1.12.2 Flexibility exercise: Defined as the ability to move body joints through their entire range of motion (ROM). Flexibility exercises maintain mobility within the available ROM.

1.12.2a Techniques to improve flexibility: Can be done through anatomic planes of motion, combined planes of motion (similar to peripheral neuro-facilitation patterns), or functional teaching activities.

1.12.2b. Stretching exercises: Increase ROM by lengthening tendon and muscle beyond the available range. Include static stretching, static stretching with contraction of the antagonist muscle (reciprocal inhibition), static stretching with contraction of the agonist muscle, and ballistic stretching.

1.12.2c. Static stretching: The joint is moved to the end of the ROM where the position is slowly held for 5 to 60 seconds. It can be done actively or passively using safe technique.

1.12.2d. Reciprocal inhibition: The joint is also moved to the end of ROM, and this is followed by a symmetric contraction of the antagonist muscle group for 5 to 30 seconds.

1.12.2e. Static stretching with contraction of the agonist: The joint is moved to the end of ROM and followed by an isometric contraction of the agonist muscle for 5 to 30 seconds.

1.12.2f. Ballistic stretching: Utilizes repetitive bouncing movements with a rapid stretch. More tension is developed, and more energy is absorbed into the muscle and tendon, which can lead to bone avulsion or muscle–tendon tears. High risk of injury.

1.12.3 Types of strengthening exercises:

1.12.3a. Isometric exercise: Muscle force generated with no visible joint movement – Internal force does not overcome external force. E.g. Exertion against immovable objects or by holding joint in a static position

1.12.3b. Isotonic exercise: Muscle force generated with visible joint movement, variable speed, constant external resistance (constant weight through ROM). E.g. weight lifting DeLorme's progressive resistive exercises (PREs).

1.12.3c. Isokinetic exercise: Muscle force generated with visible joint movement, constant speed, variable external resistance. E.g. Static cycle with constant speed, etc

1.12.3d. DeLorme's exercises, also known as progressive resistive exercises (PREs): The greatest weight that can be lifted, pulled, or pushed 10 times through full ROM is determined. The patient performs one set of repetitions at 50% of the 10 repetition maximum (RM), a second set at 75% of the 10 RM, and a final set at 100% of the 10 RM. Each session consists of the three sets with breaks between sets. The 10 RM is determined each week with progressive advancement as strength increases. PREs should be done at a moderate to high level intensity in order to be effective. A comprehensive exercise program prescription designed for strength training should include type of activity, frequency, intensity, duration, and precautions.

1.12.4 Balance, proprioception and coordination exercises: General principles of coordination exercises are constant repetition of a few motor activities, use of sensory cues (tactile, visual, proprioceptive) to enhance motor performance,

increase of speed of the activity over time, activities are broken down into components that are simple enough to be performed correctly, assistance is provided whenever necessary, the patient therefore should have a short rest after two or three repetitions, to avoid fatigue, high repetition of precise performance must be performed for the engram to form. Techniques but not limited to - single leg stance, single leg stance on an unsteady surface, single leg stance with eyes closed, standing up and sitting down from a chair without using your hands, Tai Chi, tandem standing and walking, single leg stance on a BOSU or BAPS or oval board.

1.12.5 Aerobic exercises (endurance exercises): Combination of cardiopulmonary endurance exercise with strengthening. It should consist of a warm-up period, a training period, and a cool-down period – Warm up for 5 to 10 minutes, Training period of 20 to 30 minutes at 40% to 60% (low intensity), 60% to 70% (moderate intensity), or 70% to 85% (heavy intensity) of their VO2 max, Cool-down period of 5 to 10 minutes. For example: running, swimming, walking, stair climbing, etc. Frequency: 3 to 5 days per week, duration: 20 to 60 minutes, Intensity: 60% to 90% HRmax – 50% to 85% of VO2 max or 50% to 85% of HR reserve max.

Aerobic walking exercises or can instruct patients in this way at home – Start small, and build up gradually and also brief the intervention on obesity and promotion of physical activity as per instruction on package of essential non-communicable disease (PEN) intervention. EDCD, MoHP. Or cardiovascular training - cycling, walking (as tolerated) or swimming for > 20 min at 60-80% MHR or Warm up period - 5-10 minutes – stretching and strengthening exercises as taught then start training period, week 1: walk for 10 minutes, 3 days, week 2: walk 3 days this week, adding 2 minutes to each, 12 minutes, 14 minutes, and then 16 minutes, week 3: walk 3 days this week, adding 2 minutes each time -18 minutes, 20 minutes, and 22 minutes, week 4: walk 3 days this week, adding 2 minutes each time- 24 minutes, 26 minutes, and 28 minutes, week 5: Add an extra day to your routine. Walk for 30 minutes, 4 days this week, week 6: Add another day to your routine walk for 30 minutes, 5 days this week. Cool down period - 5-10 minutes - After you exercise/or walking, take a rest or can apply ice compression in your joint which relieve swelling.

1.12.6 Anaerobic exercises: High-resistance, short-duration exercises at 80% to 100% of maximum exertion capacity. Utilizes the glycolytic system, which functions during the first 2 minutes of exercise and during high intensity, short-duration exercising.

1.12.7 Aquatic exercises: Pool-based therapy takes advantage of the buoyancy and viscosity of water a patient submerged in chest-deep water has a decreased weight-bearing load of 40% of total body weight. Viscosity of water allows for increased resistance to movement that is equal to the force exerted by the patient—resistance also decreases in proportion to the speed of movement. This will result in improvement in pain, fatigue, physical function, muscle relaxation, balance, coordination and quality of life.

1.12.8 Manual therapy: The International Federation of Orthopedic Manipulative Physical Therapists (IFOMPT) defines manual therapy techniques as "skilled hand movements intended to produce any or all of the following effects: improve tissue extensibility, increase range of motion of the joint complex, mobilize or manipulate soft tissues and joints, induce relaxation; change muscle function; modulate pain; and reduce soft tissue swelling, inflammation or movement restriction." Manual therapy includes such as mobilization, movement with mobilization, soft tissue mobilization, positional release technique, muscle energy technique, myofascial release techniques.

1.12.9 Proprioceptive (Peripheral) neuromuscular facilitation (PNF): Uses spiral and diagonal components of movement rather than the traditional movements in cardinal planes of motion with the goal of facilitating movement patterns that will have more functional relevance than the traditional technique of strengthening individual group muscles.

1.12.10 Bobath approach / neuro-developmental technique (NDT): The goal of NDT is to normalize tone, to inhibit primitive patterns of movement, and to facilitate automatic, voluntary reactions as well as subsequent normal movement patterns. Pathologic movement patterns (limb synergies and primitive reflexes) must not be used for training.

1.12.11 Brunnstrom approach / movement therapy: Uses primitive synergistic patterns in training in an attempt to improve motor control through central facilitation.

1.12.12 Constraint-induced movement therapy (CIMT): CIMT requires that patients be able to extend their wrists and actively move their digits. Participants required to have

at least 10° of active wrist extension, at least 10° of thumb abduction/extension, and at least 10° of extension in at least two additional digits.

1.12.13 Motor imagery: It is a mental process during which an individual rehearses or simulates a given action before it is actually performed.

1.12.14 Mirror therapy: Mirror is placed in the patient's mid sagittal plane, thus reflecting movements of the non-paretic side as if it were the affected side. Mirror therapy is effective for improving upper extremity motor function, activities of daily living (ADL), and pain, at least as an adjunct to normal rehabilitation for patients after stroke.

1.12.15 Virtual reality: Utilizes computer-simulated environment and interactive video gaming to provide patients with engaging activities to improve motor or cognitive function.

1.12.16 Physical modalities: Physical agents to use for their therapeutic effects in the body. E.g. Thermotherapy (heat and cold modalities), hydrotherapy, light therapy (ultraviolet radiation, laser), electrotherapy, manual therapy (traction, therapeutic massage, manipulation, mobilization), acupressure, acupuncture.

1.12.17 Activities of daily livings (ADLS): Basic self-care tasks like grooming, bathing, dressing, feeding, toileting, transferring.

1.12.18 Instrumental activities of daily livings (IADLS): Advance self-care tasks which need complex and organizational skills like managing finances, managing transportation, shopping, house cleaning, meal preparation, home maintenance, manage communication, and manage medication.

1.12.19 Patients/family education: Patient/family education is a critical piece within the client-provider relationship that empowers and enables patients to make well informed, shared decisions related to their care, for patient centered evaluation and management plan to address the patients' need and increased compliance of rehabilitation treatment. It reduces the pain and disability, improve self-efficacy and reduce the health care costs.

1.12.20 Assistive devices and technologies: Those whose primary purpose is to maintain or improve an individual's functioning and independence to facilitate participation and to enhance overall well-being. They can also help prevent impairments and secondary health conditions. E.g. wheelchairs, orthoses, specialized computer software for vision, or communication capacities.

1.13 Self-help and coping strategies:

The aim is to increase self-management through self-assessment and problem-solving so that patients can recognize negative but potentially remediable aspects of their mood (stress, frustration, anger or low self-esteem) and their situation (physical, social, financial). Involvement of the spouse or partner in mutual goal-setting can improve partnership adjustment. When the symptoms are present on most days, along with sleep/ appetite disturbance, any kinds of suicidal/homicidal ideas/thoughts, are severe enough to disrupt daily activities and social occupational functioning, then it should be understood that one needs to seek consultation from formal clinical psychological. Self-help and coping strategies can be addressed by changes in attitude and behavior, as mentioned below.

1.13.1 Coping Skills:

Anything people do to adjust to the challenges and demands of stress. Coping is expanding conscious effort to solve personal and interpersonal problems, and seeking to master, minimize or tolerate stress or conflict. Psychological coping mechanisms are commonly termed coping strategies or coping skills. Different types of coping skills can be applied which are as follows.

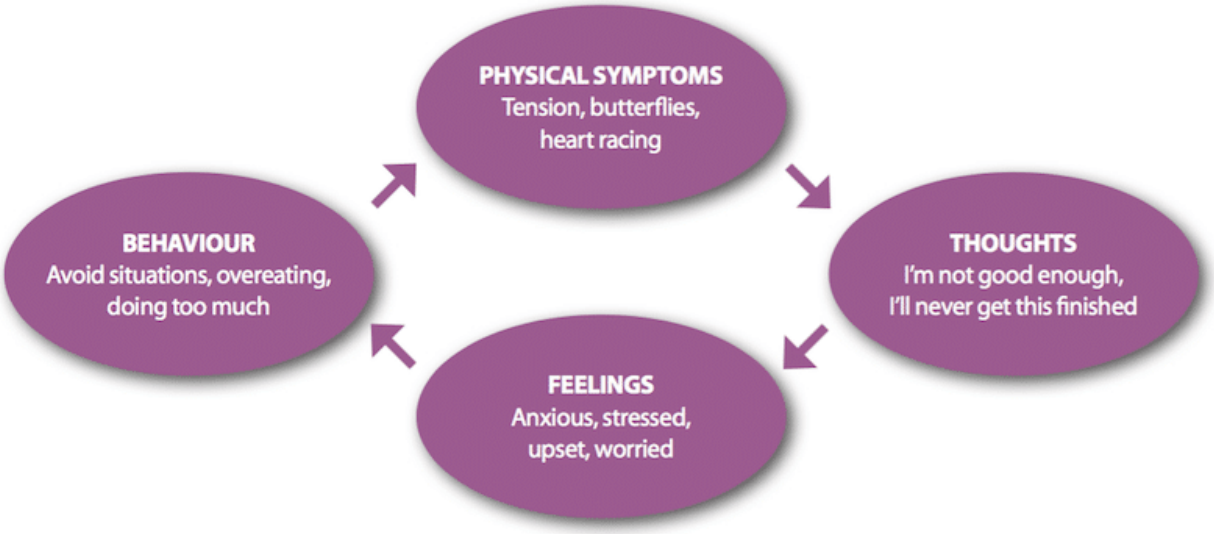
Emotion-focused coping skills

- Rather than taking actions to change the stressor itself, the individual tries to control feelings using a variety of cognitive and behavioural tools, including meditation and other relaxation techniques.
- Listening to music, massage, meditation, relaxations, getting physical exercise, going out with a friend, writing in a journal or diary, taking bath, expressing your emotions creatively (i.e. painting), etc.

- Spending time with friends, hobbies, finding humor, eating healthy, getting good night`s sleep, engaging with spirituality, spending quality time with pets
- Imagery and distracting techniques for pain

1.13.2 Cognitive coping skills

- By identifying and addressing how a person's thoughts and behaviours interact to create problem.
- Understanding the language of stress: Thoughts, Physical Symptoms, Feelings & Behaviours



- Works to recognize how negative thought patterns influence a person's feelings and behaviours.
- Cognitive restructuring, behavioural management techniques

1.13.3 Problem solving coping skills

Targets the causes of stress in practical ways which tackles the problem or stressful situation that aims to remove or reduce the cause of the stressor

Steps of problem solving:

- Problem identification
- Developing and implementing plans to deal with an event
- Information seeking
- Seeking assistance from others

- Logical analysis
- Confrontation and Direct Action: Tackling the problem head on
- Evaluation

1.13.4 Care for care givers

Stress identification, self-care & stress management

- Everybody can have stress in a difficult situations which can present with emotional, physical and behavioural symptoms**:**
    - **Emotional-** feeling sad, anxious, irritable, angry, numb, fearful, etc.
    - **Physical-** headache, backache, neck pain, pain in the limbs, lethargy, loss of libido etc.
    - **Behavioural** –substance use, quarrelling, aggressive behaviors, etc.
- Different methods that have helped them to manage their own stress:

  "Self-care activities are the things for everybody to maintain good health and improve well-being and some self-care activities might already be part of individual's routine". This can be divided into Physical self- care, Psychological or Emotional self-care, Social self- care, Spiritual self- care and Professional self-care.

The following measures and coping strategies (as discussed in above section) can help them to manage their stress:

- Structuring of routine. Gradually build up the schedule. Be flexible.
- Communication with family members and their support
- Healthy lifestyle- diet, exercise, rest, recreation, quality time with family, proper flexible scheduling of work.
- Deep breathing, relaxation techniques

Chapter 2: Osteoarthritis of Knee

Osteoarthritis (OA) knee is a long-term chronic disease characterized by the deterioration of cartilage in knee joints which results in bones rubbing together and creating stiffness, pain, and impaired movement. The knee is the largest synovial joint in humans, which composed of osseous structures (distal femur, proximal tibia, and patella), cartilage (meniscus and hyaline cartilage), ligaments and a synovial membrane. The latter is in charge of the production of the synovial fluid, which provides lubrication and nutrients to the avascular cartilage. Unfortunately, given the high use and stress of this joint, it is a frequent site for painful conditions including OA. Detail assessments including medical history, imaging and laboratory investigation for diagnosis is beyond the scope of this protocol, however detail functional assessments should be made as a principle of ICF.

2.1 Assessments

Brief medical and detail functional assessments as per ICF bio psychosocial approach by multidisciplinary team to identify the problems, to set the goals and apply intervention from each discipline in coordinated way. Red flags has to be always in Rehabilitation needs should be based on assessments of residual functions/structures, activity limitations, cognitive, and psychological status, determination of previous functional ability and medical comorbidities, level of family/caregiver support, capacity of family/ caregiver to meet the care needs, and ability to participate in rehabilitation. Simple and comprehensive which has been translated, validated and trans-cultural adaption was done in Nepali language with Nepali population is West Ontario McMaster University OA Index (WOMAC OA index). It assesses their activities of daily living (ADL), functional mobility, gait, general health and quality of life (QoL). **For WOMAC, please see the appendix. I**

2.2 Core interventions for patients with osteoarthritis of knee:

Simple, safe and affordable core interventions should be consider for everyone with painful OA knee. There should be an individualized evaluation and management plan for patients with knee osteoarthritis. Education and lifestyle interventions are key for success of rehabilitation of OA knee.

2.2.1. Education, reassurance and self-management: This should include family member and care givers that enables client centered management and improves compliance of rehabilitation treatment. Patient/family should be informed about the diagnosis, causes, pathophysiology, investigation, rehabilitative management, and prognosis and follow up plan. Education can be provided through one to one discussion, written literature, patient led group education classes and interactive computer programs. Education about joint protection measures, fitness, exercises goals and its approaches. IEC/BCC materials for pathophysiology and rehabilitative management should be use for better adherence and compliance of treatment.

2.2.2. Exercises – Please see in **1.10** for dosimetry and details.

Local strengthening exercise for muscles that act over compromised knee joints reduces pain and disability, with improvements in the muscle strength, proprioception, coordination and balance that associate with OA. Aerobic fitness training can produce long-term reduction in pain and disability. It improves wellbeing, encourages restorative sleep and benefits common comorbidity such as obesity, diabetes, chronic heart failure and hypertension. Small amounts of strengthening exercise are better than protracted sessions performed infrequently and always start with gentle exercises with gradually progressive individualized way. Acute inflammation, severe pain with joint swelling should be contraindication to initiate vigorous strengthening exercises, however pain free ROM should be started. Cryotherapy following exercise remains an important measure in controlling post-exercise induced inflammation.

2.2.2a Flexibility exercises:

- Initially, ROM and stretching of knee joint.
- Stretching for preservation/restoration of extensibility in posterior capsule/hamstrings (hip flexion and knee extension) and anterior capsule/ quadriceps (knee flexion and hip extension).

2.2.2b. Isometric strengthening of quadriceps/hamstrings:

Provide visual performance feedback and verbal encouragement for maximal effort. Getting started with inner range quads over roll with resistance by sitting or even

supine position, knee bent 30 degree, knee cap and toes pointing towards ceiling. Keeping the knee in contact ground, straighten the affected leg and slowly lift the heel off the surface. If towel not available, just keep knee and toes pointing towards ceiling, then dorsiflex ankle and toes as much as possible with provide downward force by knee and feel or visualize contraction of quadriceps.

2.2.2c. Isotonic strengthening:

Hip flexion, internal and external rotation of hip joints, dynamic quads, SLRs in four plane, squats, lunges, step exercises and progressively increasing repetitions and resistance. Seated knee extension with resistance, slowly progress the resistance and make sure it won`t hurt knee and patients feel comfortable. Hamstrings curls - in standing, seated, prone, with a ball, with a dumb bell or weight. Wall squats (for Quadriceps and gluteal muscles) - Stand with the head, shoulders, back, and hips flat against a wall. Step both feet out about 24 inches away from the wall, while keeping the back and shoulders against it. Keep the feet no more than hip width apart.

2.2.2d. Isokinetic:

Stationary cycling initiated when knee flexion is > 90 degrees flexion. Speed - Gradual increase to 60 RPM as capable Duration: 5-15 min. Increase seat height to accommodate limited knee flexion ROM.

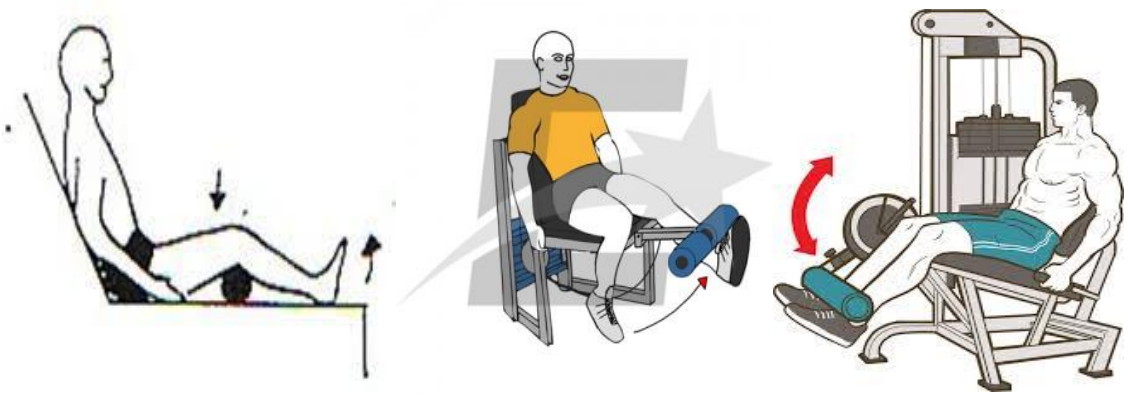


Fig: 5 Quadriceps strengthening exercises

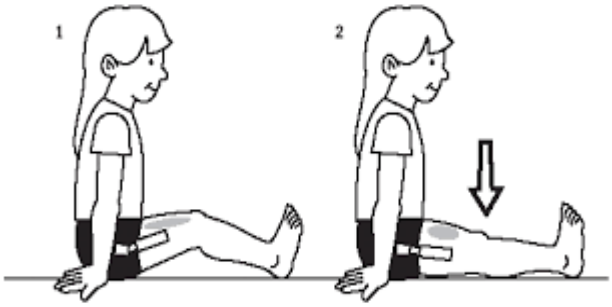


Fig: 6 Quadriceps strengthening exercises

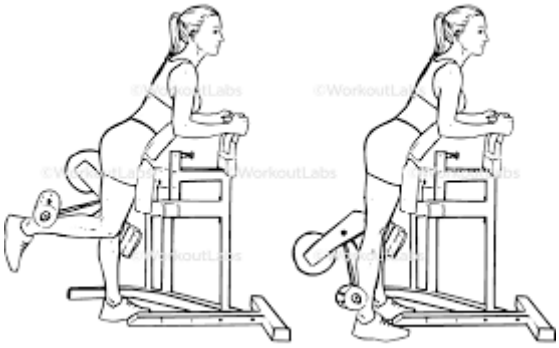


Fig: 7 Hamstring curls in standing

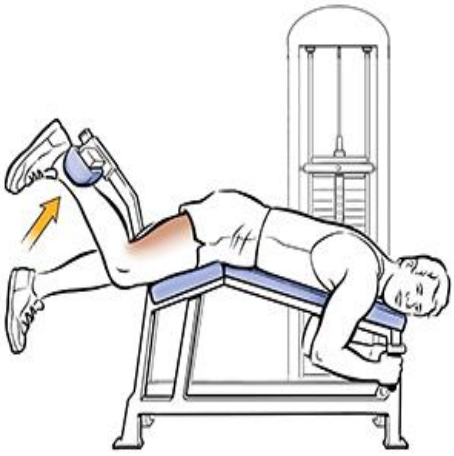


Fig: 8 Hamstring curls in prone lying

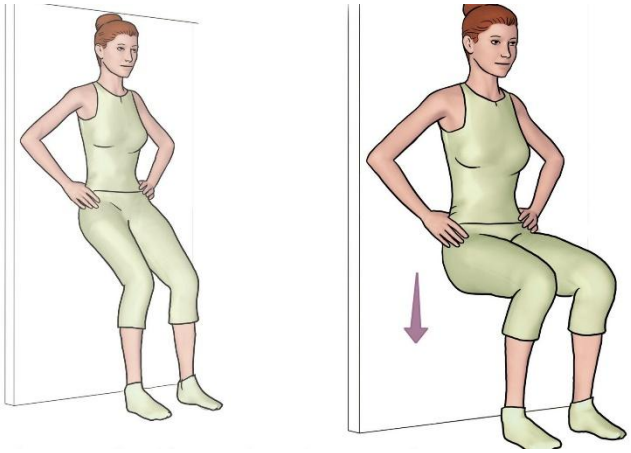


Fig: 9 Wall squats

2.2.2e. Aquatic exercise:

It has to be applied if patients could not tolerate the land based exercise or activities. Please see **1.12.7.**

2.2.2f. Aerobic walking exercises: As describe in **1.12.5.**

2.2.2g. Balance and coordination exercises: As described in **1.12.4.**

2.2.3. Manual Therapy: Addition of manual therapy as an adjunct to supervised exercise can improve pain, function, and walking distance

2.2.4. Cardiovascular training: 60-80% max heart rate sustained for >30 min (stair-stepper, treadmill, stationary cycle, rowing, upper body cycle, etc). Lower extremity exercises as tolerated by patient.

2.2.5. Gait training:

Before starting the gait training, flexibility and strength of knee joint has to be achieved with good postural balance and then start gait training with real time feedback using a mirror and providing verbal cues to retrain and or correct abnormal gait mechanics contributing an injury with or without using assistive devices. Cadence, gait cycle, biomechanics and its determinants should be kept in mind while providing gait training. Different obstacles including even and odd surfaces, ups and down stairs walking, retro walking should be practice. Gait trainer - low-speed treadmill walking with unweighing system gradually increase speed and duration of walking with proper gait: Speed: very slow, comfortable for patient. Progress to 15 min, as tolerated.

2.2.6. Tai Chi:

Tai chi improve physical strength, mobility, promotes a sense of well-being. This technique helps to improve muscle strength, joint stability and mind body aspect. The tai chi could be once or twice a week for an hour and should be slowly and gently.

2.3 Joint protection:

Excessive impact-loading and adverse repetitive use of a compromised knee joint and periarticular tissue should be reduced by:

2.3.1 Avoidance of contact sports, altered use of machinery or tools at the workplace.

2.3.2 Simple ‘pacing’ of activities dividing physically onerous tasks into shorter segments with brief breaks in between is essential.

2.3.3 Use of shock-absorbing footwear with thick soft soles reduces the impact-loading through feet, knees, hips and back and improve symptoms at these sites.

2.3.4 A walking stick held on the contralateral side takes weight off a painful knee. A stable standing posture and who do not spontaneously load more than 40% of their body weight on their affected lower limb, the use of a cane for walking would be ideal. Application of brace and/or foot orthotics (lateral wedge) if medial joint space narrowing and/or varus tibiofemoral malalignment of >5 degrees is evident.

2.3.5 Avoid prolong standing and prolong bending of knee

2.3.6 Knee orthoses – Help to reduce instability and excessive abnormal movement. They include working knee orthoses. Custom made valgus knee unload bracing is a

mechanically valid method of treatment of medial compartment OA knee. Particularly suited to severely disabled patients in whom a surgical option is inappropriate.

2.4 Weight loss is the cornerstone in management of Knee OA:

2.4.1 Obesity is well-recognized risk factor which aggravates pain and rapid progression of joint damage by enhancing mechanical strain.

2.4.2 Obese patients should receive an explanation of this and be offered strategies on how to lose and then maintain an appropriate weight. Clinicians should refer overweight or obese patients (defined by a BMI > 25 kg/m2) with osteoarthritis of the knee to a weight management program to lose a minimum of five percent body weight and maintain this new level of weight benefit. Ideal BMI should be 18.5 – 24.9 kg/m^2.

2.5 Other interventions for patients with OA knee:

2.5.1 Modalities (heat, ice packs):

Local heat, ice packs, wax baths conditionally used which induce muscle relaxation and temporary relief of symptoms. In acute inflammation/swelling ice packs and in chronic and non-swelling condition wax bath and or local heat should be given.

2.5.2 TENS:

TENS particularly strong burst mode of duration of 20-60 minutes/day at least four weeks have shown significant efficacy in pain relief.

2.5.3 Aids and appliances for ADLs and IADLs:

It provides dignity and independence to patients with respect to activities of daily living. E.g. A raised toilet seat, raised chair height, extended handles on taps, a shower instead of a bath, and extended 'hands' to pull on tights and socks. Install handrails in the bathroom to reduce joint loading when getting up from the toilet seat and minimize fall risk. Replace sofa with sturdy wooden chairs with cushion to avoid low sitting, and rearrange items to keep often used items nearby to conserve energy. Raised chair in kitchen so that intermittent sitting/standing can be done while cooking and washing dishes. Staying at ground floor to minimize steps up and down in the stair would be ideal, however, if that is not possible use hand rail and cane while up and down.

2.5.4 Fall prevention:

Fall risks should be assessed. All the core intervention with proprioception and balance exercises mentioned at **1.12.4.** With modification of external factors at home and in community should be obtained. There must be sufficient light at home, avoid slippery floor and steps and keep floor dry.

2.6 Simple analgesia:

Paracetamol or acetaminophen is the core initial and if successful then preferred long term oral analgesics of choice in management of knee OA in most patients; especially those patients with milder disease or symptoms of OA and in those patients with risks associated with taking NSAIDs including presence of renal disease, cardiovascular disease or at risk for cardiovascular disease, history of gastrointestinal ulcers, those receiving oral anticoagulants or corticosteroids, and the elderly (e.g., greater than 65 years). The usual doses (up to a maximum of 4gm daily i.e maximum of 1gm four times daily), the risk for acute liver injury and liver failure is increased in patients taking doses greater than 4,000 mg daily. Use of topical NSAID creams, gels and capsaicin (chili extract; 0.025%) can be used as monotherapy or an adjunct with oral analgesics.

2.7 Other interventions used in rehabilitation set up:

If paracetamol do not work and there are no contraindications, oral non-steroidal anti-inflammatory drugs (NSAIDs) can be used. If persistent, moderate or moderately severe osteoarthritis pain, duloxetine or tramadol as an alternative or adjunct to oral NSAIDs. Duloxetine 60-mg dose. Tramadol is a therapeutic option for patients who have inadequate response to paracetamol, NSAIDs (including COX-2 inhibitors and topical NSAIDs), and duloxetine. Tramadol is preferable to NSAIDs, particularly in elderly patients with OA Knee. Glucosamine and chondroitin sulfate can be used dietary supplements or DMARDS for relief of pain and improved function in OA knee, however this should not be the first choice. 1500 mg once daily or 500 mg three times daily, either alone or together with 400 mg of chondroitin sulfate two or three times daily for one to two months. If a response is obtained, the dose can be reduced to 1,000 mg or glucosamine and 800 mg of chondroitin per day. However, it should be used conditionally and clinicians have to decide when to stop.

2.7.2. Intra-articular injections – Intra-articular steroid injections can be given not more than 3-4 injections per year. E.g. Triamcinolone acetonide 40-80mg with full aseptic precaution followed by core intervention of rehabilitation. **Hyaluronan injections -** Intra-articular injection a course of weekly injections for 3–5 weeks, may give modest pain relief for several months. There is insufficient evidence to recommend routine use of hyaluronan injection. **Platelet-rich plasma (PRP) injections:** PRP may be beneficial however; there is insufficient evidence to recommend routine use of PRP.

2.8 Self-help and coping strategies:

These help patients to cope better with, and to adjust to chronic pain and disability. Do yoga in modified way so that it won't hurt to knee. For details please see at **1.13.**

2.9 Advice for self-care and care giver:

This should be the integral part of rehabilitation clinical protocol and have to ensure that the patients and care givers should be taught and prescribed above mentioned intervention depending upon the patients need. Analysis of critical functional demands of job (work site visit, if possible) and the ergonomics. Review in each follow up whether self-care and care giver has been following as per instruction. Provide information and encourage involving peer support organization or peering support group.

2.10 Surgical referral for OA knee:

Details of surgical management and post arthroplasty rehabilitation of osteoarthritis of knee is beyond the scope of this protocol, however, rehabilitation professionals specially rehabilitation or PM&R physicians should have basic knowledge on how and when to have a surgical consultation and its possible outcomes.

For patients with osteoarthritis of knee, who experience joint symptoms (such as pain, stiffness, and reduced function) with substantial impact on their quality of life (individualized based upon patient assessment), and who have not benefited from the core non-surgical therapies, clinicians may offer referral for joint replacement surgery. Clinicians should obtain weight-bearing plain radiographs within 6 months prior to the referral to surgical consultation. Injections should not be given into the involved joint if joint replacement is anticipated within three months. Total knee arthroplasty (TKA) has been established as a highly successful procedure for treating patients with advanced OA.

Chapter: 3 Non-Specific Back Pain

Non-specific back pain is tension, soreness and/or stiffness in the back region for which it is not possible to identify a specific cause of the pain. Back pain persisting for at least 12 weeks called as chronic back pain. Detail assessments including medical history, imaging and laboratory investigation for diagnosis is beyond the scope of this protocol, however keeping in mind red flags and detail functional assessments should be made as a principle of ICF.

3.1 Assessments:

Brief medical (focus on red flags, **please see in appendix II)** and other functional assessments as per ICF biopsychosocial approach by multi-disciplinary team to identify the problems, to set the goals and apply intervention from each discipline in coordinated way. Rehabilitation needs should be based on assessments of impairments, activity limitations, and psychological status, previous functional ability and medical comorbidities, level of family/caregiver support, capacity of family/ caregiver to meet the care needs and ability to participate in rehabilitation. Outcome measures for back pain such as Oswestry Disability Index (ODI), preferably cross-cultural adapted questionnaire should be used. ODI has been cross-culturally translated and validated into Nepali language with Nepali population. ODI is an extremely important tool that uses to measure a patient's functional disability. The test is considered the 'gold standard' of low back functional outcome tools. **Please see the appendix. III.**

Simple, safe, easily available, cheapest core interventions should be considered for everyone with painful non-specific back pain. There should be an individualized evaluation and management plan for patients with non-specific back pain.

3.2 Patient/family education, reassurance, and self-management:

This should include family member and care givers that enables client centered management and improves compliance of rehabilitation treatment. Patient/family should be informed about the diagnosis, causes, pathophysiology, investigation, rehabilitative management, goals, approaches, prognosis and follow up plan. Education can be provided through one to one discussion, written literature, patient led group education classes and interactive computer programs. IEC/BCC materials should be used for adherence and compliance of treatment.

Educate patient/family on life style interventions, fitness, exercises goals and its approaches. IEC/BCC materials for pathophysiology and rehabilitative management should be used for

better adherence and compliance of treatment. Reassure that there is no serious underlying pathology, prognosis is good, and that the patient can stay active and get on with life despite the pain can help counter negative thoughts and misinformation that the patient might have about back pain. Providing empathy and a strong therapeutic alliance improves adherence to treatment and better outcomes. Advice to continue ordinary activity as normally as possible fosters a quicker recovery and can lead to less disability than the advice to rest and "let pain be your guide". Back schools should be used.

3.3 Type of exercises can be applied for non-specific back pain:

Therapeutic exercises are the common modality of treatment for NSBP. They are different types, like stretching, core stability, and core dynamic strengthening. They can be personalized or administered in small groups as a standard approach, and eventually mixed with other modalities like education and manual therapy. Local strengthening exercise for muscles reduces pain and disability, with improvements in the muscle strength, proprioception and balance that associate with non-specific back pain. Aerobic fitness training can produce long-term reduction in pain and disability. It improves wellbeing, encourages restorative sleep and benefits common comorbidity such as obesity, diabetes, chronic heart failure and hypertension. Small amounts of strengthening exercise are better than protracted sessions performed infrequently. Acute inflammation/ acute severe back pain should be contraindication to initiate such exercise. Cryotherapy following exercise remains and important measure in controlling post-exercise induced inflammation. For **details and dosimetry see 1.12.**

3.3.1. Mobility exercises: e.g cat and camel, trunk rotations, pelvic tilting, knee to chest exercises

3.3.2. Stability exercise: eg. Abdominal in drawing, bridging, four point kneeling

3.3.3. Exercises in erect position

3.3.4. Exercise while sitting in a chair

3.3.5. Extension exercises

3.3.6. Flexion exercises

All the exercises mentioned above has been illustrated in the following pictures.

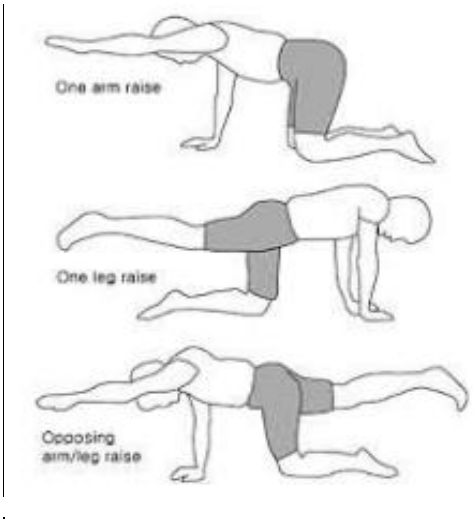


Fig: 10 Four point kneeling with arm and leg raise

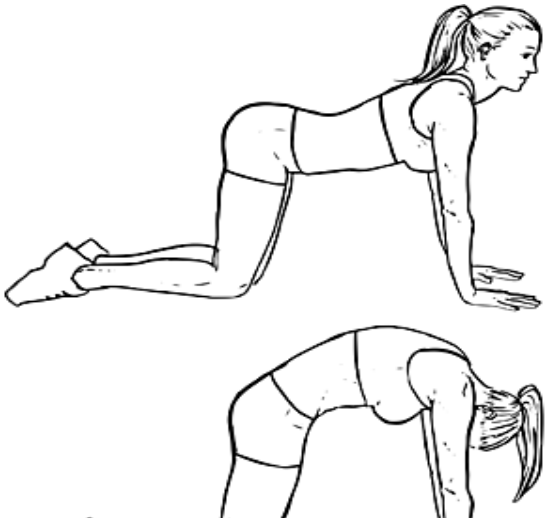


Fig: 11 Cat and Camel exercises

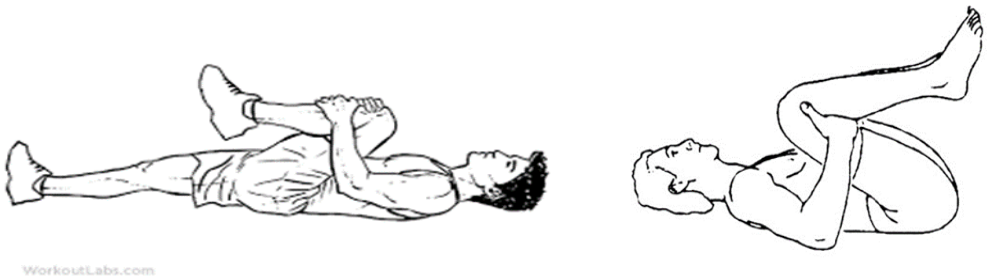


Fig: 12 Single and double knee chest/back flexion exercises

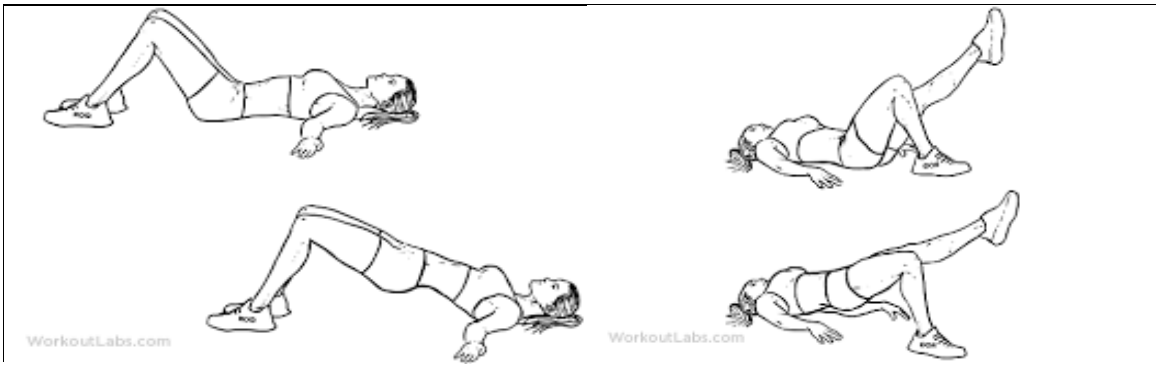


Fig: 13 Pelvic tilt and bridging exercises with single and double leg

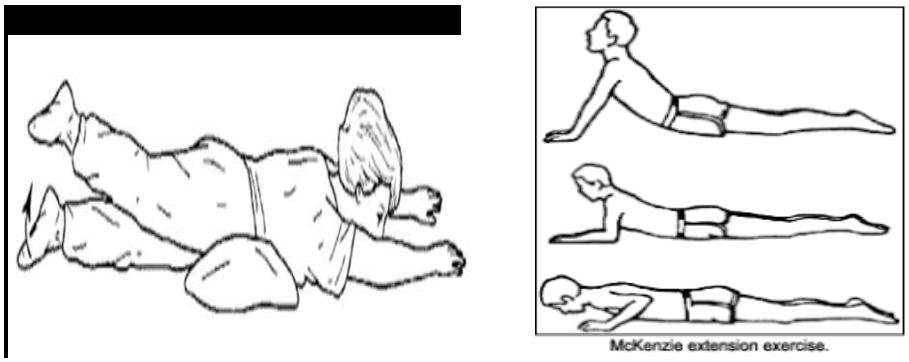


Fig: 14 Back extension exercises

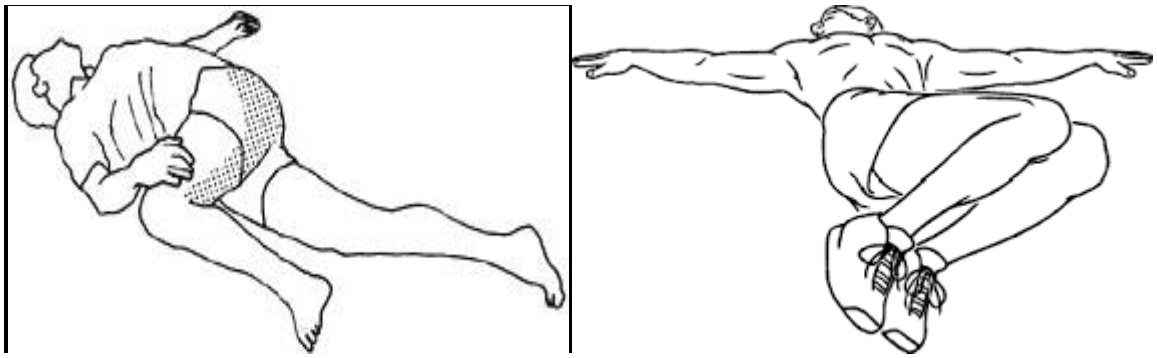


Fig: 15 Pelvic rotation exercises

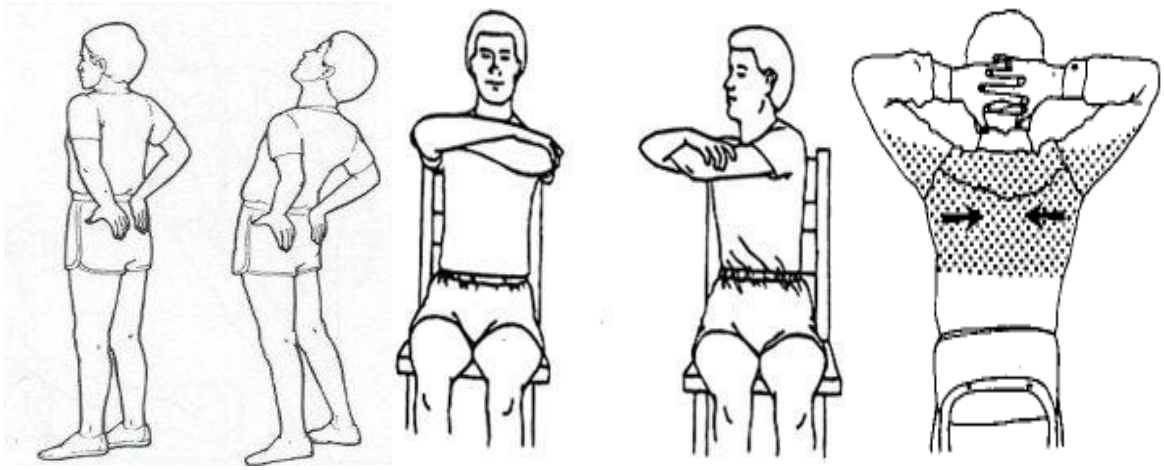


Fig: 16 Standing and sitting back exercises

3.3.7. Pilates: More effective at reducing pain and disability in people with LBP compared to standard care on a short- or medium-term basis. For long-term benefits, Pilates is similar to cycling or McKenzie exercises.

3.3.8. Aerobic exercises: As describe at **1.12.5**.

3.4 Activities of daily living (ADL) instructions:

Activity of daily living instructions on balance and posture during rest and activity, bathing, sleeping posture, clothing, footwear and how to deal with daily back pain are as important as physical therapy and exercise therapy.

3.4.1 Sitting: Prolong sitting without lumbar support should be minimized as much as possible. The height of chair should be that when sitting, the knees should be at the same level or slightly higher than the hips and both feet flat on the ground. Soft cushioned chair should be avoided. A firm, straight back, armed chair is preferable.

3.4.2. Standing: Whenever possible take a rest in 4-8 inches high chair to minimize prolong standing. Leaning back against a support is an alternative measure.

3.4.3. Bending: Bending, lifting and carrying heavy weight, prolong stooping must perform cautiously, so that it won`t hurt back. The patient should be instructed to sit or kneel whenever possible for the task which otherwise require a stooping posture. Do not attempt to lift heavy object in forward flexion and knee straight while standing.

3.4.4. Bed and mattresses: Patient should be instructed to use firm, non-shagging and usually not more than 3 inches height.

3.4.5. Motivational interview for cessation of smoking, try to avoid heavy lifting, or consider your back and make sure that weight lifting won`t hurt your back, walking instead prolong sitting in car helps in reduction of back pain. Better not to use high heel. A brisk walking may be suggested which relieves pain.

3.5 Obesity:

Obese patients should receive an explanation of this and be offered strategies on how to lose and then maintain an appropriate weight. Clinicians should refer overweight or obese patients (defined by a BMI > 25 kg/m2) with non-specific low back pain to a weight management program to lose a minimum of five percent body weight and maintain this new level of weight benefit. Ideal BMI should be 18.5 – 24.9 kg/m2.

Consider a short course of spinal manipulation/ mobilization as a treatment option for CLBP. PENS can be used for symptomatic pain reduction in patients with chronic nonspecific back

pain. There are insufficient evidences to support the use of TENS, IFT, message, acupuncture, lumbar supports in patients with non-specific back pain.

Behavioural treatment should be done which is more effective for pain, functional status and behavioural outcomes and also helpful for returning at work.

3.6 Simple Analgesia (paracetamol):

Paracetamol is the core and oral analgesic of first choice and, if successful, the preferred long-term oral analgesic. Take usual doses of paracetamol 325 to 650 mg every 4 to 6 hours or 1000 mg every 6 to 8 hours. Use regular paracetamol as the first medication option.

When paracetamol alone provides insufficient pain relief, offer non-steroidal anti-inflammatory drugs (NSAIDs) and/or weak opioids. Use of topical NSAID creams, gels and capsaicin (chili extract; 0.025%) can be used as monotherapy or an adjunct with oral analgesics. If paracetamol do not work and there are no contraindications, oral non-steroidal anti-inflammatory drugs (NSAIDs) can be used. Only add short course of muscle relaxant can add its own or with NSAIDs if paracetamol or NSAIDS have failed to reduce the pain.

Consider the use of muscle relaxants for short-term pain relief in chronic low back pain. Use weak opioids (e.g. tramadol) in patients with nonspecific chronic low back pain who do not respond to other treatment modalities.

Consider the use of noradrenergic or noradrenergic-serotonergic antidepressants as co-medication for pain relief in patients with chronic low back pain without renal disease, glaucoma, pregnancy, chronic obstructive pulmonary disease and cardiac failure

3.7 Self-help and coping strategies:

These help patients to cope better with, and to adjust to chronic pain and disability. Please see at **1.13.**

3.8 Acute non-specific back pain:

Patient education and reassurance with ADL`s and ergonomics advice as mentioned above and please **see appendix - VII**. Do not advice for bed rest however, if severe pain is not more than 2 days for bed rest. Advise patients to stay active and continue normal daily activities including work if possible. Do not advise specific exercises (for example strengthening, stretching, flexion, and extension exercises) for acute low back pain. Prescribe medication, if necessary, for pain relief. Preferably should be taken at regular intervals. First choice paracetamol and second choice is NSAIDs. Only consider adding a short course of muscle

relaxants on its own or added to NSAIDs, if paracetamol or NSAIDs have failed to reduce pain. Consider (referral for) spinal manipulation for patients who are failing to return to normal activities.

Consider multidisciplinary treatment programs in occupational settings for workers with sick leave for more than 4 - 8 weeks. TENS, acupuncture, massage do not have robust evidence and should not be used routinely, however it can be used conditionally and when above mentioned measures fail.

3.9 Advice for self-care and care giver:

This should be the integral part of rehabilitation and have to ensure that the patients and care givers should be taught and prescribed above mentioned intervention depending upon the patients need. Analysis of critical functional demands of job (work site visit, if possible) and the ergonomics should be made. Review in each follow up whether self-care and care giver has been following as per instruction and necessary training has to be given during each follow up visits so that it can be done at the home in right way. Provide information and encourage involving with peer support organization or peering support group.

3.10 Surgical referral for non-specific back pain:

Detailed surgical management is beyond the scope of this protocol, however, rehabilitation professionals specially rehabilitation or PM&R physicians should have basic knowledge on how and when to have a surgical consultation and its possible outcomes. However, we do not recommend for surgical options for patients with non-specific back pain.

Chapter 4: Stroke

The World Health Organization (WHO) has defined stroke is: "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin". Broadly, it is classified as Ischemic (thrombotic, embolic and lacunar), the commonest one and Hemorrhagic (intracerebral hemorrhage and sub-arachnoid hemorrhage). Detail assessments including medical history, imaging and laboratory investigation for diagnosis is beyond the scope of this protocol, however detail functional assessments should be made as a principle of ICF.

Stroke rehabilitation requires a sustained and coordinated effort from a large team not limited to the patient, family, friends, other caregivers (eg, personal care attendants), physicians, nurses, physical and occupational therapists, speech-language pathologists, recreation therapists, psychologists, orthotists, nutritionists, social workers, and others. When admission to a stroke unit is not possible, rehabilitation should be provided even in a generic rehabilitation ward on an individual basis. An important principle of rehabilitation is multidisciplinary round in interdisciplinary approach and goal setting/family conference. Rehabilitation should start as soon as possible after stroke within 24-72 hours or even earlier if condition allowed.

Staffing structure is country specific, however internationally within 10 beds stroke rehabilitation unit – Physiatrist/Rehabilitation Physician 1-2 (full time), nursing 10 (per 24 hour shift), physical therapist 1-2 (full time), occupational therapist 1-2 (full time), speech and language therapist 0.5 (part time), social worker 0.5 (part time). In situations where it is not possible to have a multidisciplinary team with all the rehabilitation professionals available, other medical/rehabilitation staff may acquire skills and knowledge in the missing disciplines, in order to ensure the rehabilitation treatment will be as comprehensive as possible. This should be continued until there are qualified staffs in all required disciplines.

4.1 Assessments:

Medical and functional assessments as per ICF bio psychosocial approach by multidisciplinary team should be done within 24 hours of admission, identify the problems, set the goals and apply intervention from each discipline in coordinated way. Post-acute rehabilitation needs should be based on assessments of residual neurological deficits, bowel, bladder, activity limitations, cognitive, communicative, and psychological status, swallowing

ability, previous functional ability and medical comorbidities, level of family/caregiver support, capacity of family/ caregiver to meet the care needs of the stroke survivor, likelihood of returning to community living, and ability to participate in rehabilitation. E.g. Western Aphasia Battery Test and Language Profile Test for aphasia, for overall functional outcome tools, Functional Independent Measures **(FIM)** is ideal and widely accepted measures during inpatient rehabilitation, however it needs certification and license. If certification is an issue, then the Modified Barthel Index **(MBI)** and for cognition Rowland Universal Dementia Assessment Scale **(RUDAS)** can be recommended as its Nepali version is available. The assessment should be done at least during admission and discharge; however it can be measured multiple times during rehabilitation stay as per need. **Please see the appendix IV.**

4.2 Patients/family education, reassurance and self-management:

With empathy and dignified way, patient/family should be informed about the diagnosis, causes, pathophysiology, investigation, management, and prognosis and follow up plan Education can be provided through one to one discussion, written literature, patient led group education classes and interactive computer programs. Inclusion of patient`s partner or care giver is appropriate. Educate about the intervention in stroke rehabilitation, goals and its approaches. IEC/BCC materials for pathophysiology and rehabilitative management should be used for better adherence and compliance of treatment.

4.3 Prevention and management of comorbidities:

4.3.1. Prevention of skin breakdown: During hospitalization and inpatient rehabilitation, regular skin assessments with objective scales of risk such as the Braden scale. Patients, staff, and caregivers should be educated about the prevention of skin breakdown. Minimize or eliminate skin friction, to minimize skin pressure, to provide appropriate support surfaces, to avoid excessive moisture, and to maintain adequate nutrition and hydration to prevent skin breakdown. Regular turning (at least every 2 hours) good skin hygiene, and use of specialized mattresses, wheelchair cushions, and seating are recommended until mobility returns.

4.3.2. Contractures: Early after stroke, positioning of the hemiplegic shoulder in maximum external rotation for 30 minutes each day either in bed or in a chair for preventing shoulder contracture. Daily stretching of the hemiplegic limbs to avoid contractures, and patients and families should be taught proper stretching techniques to avoid injury and to maximize effectiveness. Resting hand/wrist splints, along with regular stretching and spasticity management in patients lacking active hand movement is essential. Use of serial casting or

static adjustable splints has to be considered to reduce mild to moderate elbow and wrist contractures. Resting ankle splints used at night (set in the plantigrade position (ankle at 90° and subtalar neutral), or standing on a tilt table for 30 min/day should do in preventing contracture or flexibility exercises as mentioned **1.12** sufficient to prevent contracture.

Fig: 17 proper positioning while lying in bed

Note: If there is substantial elbow contractures and associated pain, then surgical opinion for release of brachialis, brachioradialis, and biceps muscles has to be considered.

4.4 Post- stroke shoulder pain:

Intervention to prevent and treat shoulder pain includes proper positioning, maintenance of shoulder range of motion, and motor retraining. For people in wheelchairs, lap trays and arm troughs are useful positioning devices to reduce shoulder pain and subluxation. The use of slings, especially during ambulation training to protect the shoulder from traction injury, has to be considered, and the use of overhead pulley exercises should be avoided. Different strapping (or taping) techniques can be followed. Acupuncture in combination with standard therapeutic exercise may be a safe and effective adjuvant for the treatment of hemiplegic shoulder pain.

4.4.1 Complex regional pain syndrome: Education and reassurance for patients and families, Exercises - ROM exercises of the involved joint, Pain free within 3 weeks, passive stretching of involved joints. Modalities like contrast baths or paraffin baths, edema control measures, TENS or Phonophoresis. Graded motor imagery which includes right-left discrimination, explicit motor imagery and mirror therapy. Medications – Corticosteroids, usually prednisone in doses of 1 mg/ kg, and tapered over 2 weeks. Topical or Oral -

Analgesics/NSAIDS. For neuropathic pain, pregabalin or gabapentin. intra-articular steroid injection can be used if conservative measures failed.

4.4.2. Shoulder subluxation: Subluxation can be prevented by combining the early reactivation of shoulder musculature (specifically supraspinatus and post- and mid-deltoid) with the provision of FES or a passive support of the soft-tissue structures of the glenohumeral joint (e.g. arm trough). Shoulder sling when patients ambulate to support upper extremity but do not use continuously as it does more harm than benefit. Arm board, arm trough, lapboard can be used in poor upper extremity recovery, primary wheelchair users. Arm board may overcorrect subluxation. Overhead slings prevent hand edema (may use foam wedge on arm board).

4.4.3. Adhesive capsulitis (Frozen shoulder): Intervention to prevent and treat shoulder pain includes proper positioning, maintenance of shoulder range of motion, and motor retraining. Flexibility exercise – ROM and stretching, Sustained stretch of 15-30 seconds should end every ROM routine, Anterior and posterior capsular stretches, painful stretching should be avoided in acute phase. Gentle strengthening of rotator cuff and scapular stabilizers should be done. Moist heat prior to therapy should be applied. Phonophoresis can be used as per need which usually is 1MHZ, 1watt/cm^2 10 min/day for 10-14 days. Medications – analgesics/NSAIDS and or corticosteroid injection: subacromial and glenohumeral will decrease pain to maximize therapy. Home program: stretches in all ranges of motion.

Note - Surgical – Manipulation under anesthesia may be indicated if there is no substantial progress after 12 weeks of conservative treatment. Arthroscopic lysis of adhesions usually reserved for patients with IDDM who do not respond to manipulation.

4.4.4. Impingement syndrome and rotator cuffs tear: Acute phase (up to 4 weeks) - Relative rest: Avoid any activity that aggravates the symptoms. Reduce pain and inflammation. Modalities: ultrasound, iontophoresis. Reestablish non painful and scapulohumeral ROM. Retard muscle atrophy of the entire upper extremity.

Recovery phase (months): Improve upper extremity ROM and proprioception. Full pain-free ROM. Improve rotator cuff (supraspinatus) and scapular stabilizers (rhomboids, levator scapulae, trapezius, serratus anterior). Assess single planes of motion in activity-related exercises.

Functional phase: Continue strengthening, increasing power and endurance (plyometrics). Perform activity-specific training. Rehabilitation in swimmers focuses on strengthening the rotator cuff muscles and scapular stabilizers, including serratus anterior and lower trapezius. Corticosteroid injection: Only up to three yearly. (May weaken the collagen tissue, leading to more microtrauma.)

4.5 Central pain after stroke:

Pharmacotherapy combined with therapeutic exercise and psychosocial support is a reasonable approach. Lamotrigine and amitriptyline is first line of treatment. Amitriptyline 75 mg at bedtime has been shown to lower daily pain ratings and to improve global functioning. Pregabalin improves pain, sleep and anxiety.

4.6 Spasticity:

The expectations of all involved (patient, family, therapists, and physician) must be taken into account prior to efforts to treat the patient's spasticity. Treatment options represent a continuum of care, or stepladder approach (conservative → surgical). Modified Ashworth Scale tool can be used for measurement of spasticity.

Prevention and treatment - Maintain daily stretching/ROM program. Avoid noxious stimuli such as infection, pain, DVT, HO, pressure ulcers, urinary retention or stones, ingrown toenails. Education of all involved is essential. It is important to involve the patient, his or her family, and any other caregivers in the management process. Emphasize proper positioning; daily skin inspection, adequate bladder/bowel programs, NMES or vibration applied to spastic muscles may be reasonable. Pharmacotherapy – baclofen, tizanidine, dantrolene and diazepam. Chemoneurolysis – Phenol or ethyl alcohol. Chemo denervation with botulinum toxin. Neurosurgical procedures like dorsal rhizotomy.

4.7 Deep vein thrombosis (DVT):

For prevention or prophylaxis hydration should be maintained, early mobilization – ROM, gradient compression stockings in combination with LMWH or intermittent pneumatic compression (IPC). IPC if contraindicated anticoagulant. Elastic stockings are not useful to prevent DVT.

4.8 Bladder dysfunction:

Assessment of bladder function, urinary retention through bladder scanning or intermittent catheterization after voiding, cognitive awareness should be obtained. Foley catheter (if any)

should be removed within 24 hours after admission for acute stroke and as early as possible in rehabilitation set up. Before removal of catheter, patients/care givers should be educated and trained in following way.

Education– Group sessions, one to one sessions, videos and book.
Practical demonstrations and hands on training of intermittent catheterization with aseptic precautions. Hands on practice in dummy and followed by in person. Hand washing and clean silicon catheter 10-14G size in running water or soap water, clean tip penile or vaginal urethral part or perineal area and insert gently by applying lignocaine gel till the urine come out. Once all urine taken out the again clean with running or soap water, air or sun dry it and keep in cotton bag.

If patient is able to spontaneously void, ensure that patient is not relying on abdominal pressure (increased by using abdominal muscles or hands) to void. Immediately check RUV by ultrasound. CIC would be painful and discomfort for some patients, in that case, condom catheter would be ideal, however we have to measure RUV after each void. Behavior modification and sometimes diaper would be ideal.

- If RUV > 100mL, perform S/CIC after each void.
- If RUV 50 ≤ 100mL, perform S/CIC once daily.
- If RUV <50 mL four days in a row (checking once daily), discontinue S/CIC.

Bladder diary (everyday) - Intake – 2L of water, Output – 4-6 times/day, 450-500ml per void is ideal, PVRUV – USG method or by plain catheter of no pain, Leakage volume/frequency of CIC or leakage/ urine color/odors and if any associated discomfort or symptoms.

Urodynamic study-To know the functional status of storage and voiding phase of bladder. If uninhibited spastic bladder then oxybutynin 2.5mg three times daily or tolterodine 2mg twice daily.
Proper positioning, sitting balance, transfer, dressing/undressing training, Kegel's exercise with biofeedback and mobility training should be as a part of standard care which is as adjunct to bladder care. Prompted voiding and pelvic floor muscle strengthening (Kegel's exercise) with biofeedback technique should be continued. If urinary tract infections then treat the underlying causes.

4.9 Bowel dysfunctions:

Ultimate goal is consistent and complete evacuation of the bowel at a specified time, in a relatively short time period, without incontinence between programs. Patient and family education, if flaccid anal sphincter then scooping method and if spastic anal tone digital rectal emptying however if this method causes pain and discomfort then behavior modification like timed-toileting schedule, abdominal massage in clock wise position after a glass of warm water or after 20-30 minutes of meals, training in toilet transfer or sometimes diaper can be used and communication skills training should be continued. Stool should be soft to firm in consistency and adequate fluid intake/hydration, diet modification (e.g., increase dietary fiber), bowel management (stool softeners, stool stimulants, suppositories), commode would be ideal.

Reflexes can be used for bowel training - instruct to perform their bowel programs 20 to 30 minutes after a meal. Increased colonic activity occurs in the first 30 to 60 minutes after a meal (usually within 15 minutes)

4.10 Dysphagia:

Dysphagia screening is essential. Fiber-optic Endoscopic Evaluation of Swallowing (FEES) has to be performed in collaboration with Head and Neck surgeon whereas Modified Barium Swallow (MBS) with Radiologist.

Oral feeding: Modifications of diet consistency (thickened fluids, pureed or soft foods in smaller boluses) if the patient is able to tolerate oral without evidence of aspiration. Non-oral feeding (NPO) - NPO indicated in patients at high risk of aspiration because of reduced alertness, reduced responsiveness to stimulation, absent swallow, absent protective cough, and difficulty handling secretions, or when there is significant reduction of oral pharyngeal and laryngeal movements.

Changes in posture and head position, elevation of the head of the bed, feeding in the upright position. Compensatory strategies: Chin tuck, head rotation, head tilt, supraglottic swallow. Oral/motor exercises (to improve tongue and lip strength, ROM, velocity, and precision, and vocal fold adduction)

4.11 Aphasia:

Intensive treatment is indicated, but there is no definitive agreement on the optimum amount, timing, intensity, distribution, or duration of treatment. Interventions duration: Session

length, frequency per week for total number of weeks, usually 30 - 45mins/day and 3 - 5 days /week for 3-4 weeks, if needed longer duration can be given as per the condition. Speech and language pathologist should include communication partner/family training, so that they understand knowledge and attitudes of stroke with aphasia.

Assessment - Auditory comprehension, verbal expression, naming, repetition, reading and writing. Other various formal screening test like bedside evaluation test (BEST) is carried out. Rule out aphasic component, dysphagia/aspiration, dysarthria, apraxia, cognitive status and mood of the patients and also do needful referral. Formal test materials which are adopted in Nepal are Western Aphasia Battery Test (Nepali version) and Language Profile Test (Nepali version).

4.11.1. Approaches to improve the communicative skills of aphasic patients. These are as follows:

- Stimulation-Facilitation Approach
- Cueing (Semantic and Phonetic)
- Thematic Language Stimulation
- Melodic Intonation Therapy (MIT)
- De-Blocking
- Promoting Aphasic's Communicative Effectiveness (PACE)
- Visual Action Therapy (VAT)
- Voluntary Control of Involuntary Utterances (VCIU)
- Helm Elicited Program for Syntax Stimulation (HELPSS)
- Augmentative and Alternative Communication

Training should be provided to the care taker or family member. All the techniques might not be applicable for all the patients so the prior choice is to be made by the Speech-Language Pathologist.

4.11.2. Behavioural interventions: Behavioural treatments focus on improving the physiological support for speech and target impairments in respiration, phonation, articulation, and resonance. It also includes strategies to increase the precision of articulation,

to modify the rate and loudness of speech, and to improve prosody. Augmentative and alternative communication devices range from simple picture boards or spelling boards to portable amplification systems and high tech electronic devices with eye-tracking capability. Supplemental strategies such as gesture or writing can be used to enhance communication attempts.

4.11.3. Constrained induced aphasia therapy: This is based on three principles. 1. Use of intensive practice for short time interval is preferred over long-term, less-frequent training (Intensive practice). 2. Constraints are used that force the patient to perform communication only in the way that patients normally avoid (constraint induction). 3. The therapy focuses on actions relevant in everyday life (Behavioral relevance). Partners should be trained; conversational partner is beneficial for improving social communication.

4.11.4. Musical based therapy: Music-based speech-language therapies may be beneficial for improving verbal fluency, but not social communication, discourse, or global speech and language

4.11.4. Tele-rehabilitation: It is useful when face to face treatment is impossible or impractical. Environmental modifications, including listener education, may be considered to improve communication effectiveness. Activities to facilitate social participation and promote psychosocial well-being should be considered.

4.11.5. Technological interventions: Computer based therapy: Computerized treatment must be considered to supplement treatment provided by a speech and language therapist. Computer-based therapy is beneficial for repetition and ability for naming. Filmed based therapy is more cost-effective and accessible alternatives.

4.11.6. Pharmacological interventions: Acetylcholinesterase inhibitors - Acetylcholinesterase inhibitors are beneficial for improving naming. Amphetamines are beneficial for improving global speech and language. Dopaminergic medication has shown beneficial for improving aphasia. Scalp acupuncture may be beneficial for improving verbal fluency, writing, reading and global speech and language

4.12 Dysarthria:

Some of the test which are used for the evaluation of articulatory errors are Deep Test of Articulation (Nepali version) and Picture Articulation Test in Nepali Language. Formal test for the assessment is Frenchay Dysarthria Assessment (FDA). Assessment and treatment of

the speech subsystem we also need to focus on volitional articulatory proficiency, fluency, prosody, reading and writing component.

Treatment - Beneficial for improving activities of daily living. Gesture training for apraxia is beneficial for improving general comprehension, apraxia and activities of daily living. Interventions for motor speech disorders should be individually tailored and can include behavioural techniques and strategies that target- physiological support for speech, including respiration, phonation, articulation, and resonance with the global aspects of speech production such as loudness, rate, and prosody.

Augmentative and alternative communication devices and modalities should be used to supplement speech. Tele-rehabilitation should use when face to face treatment is impossible or impractical. Environmental modifications, including listener education, have to be considered to improve communication effectiveness. Activities to facilitate social participation promote the psychosocial wellbeing.

Some of the techniques to improve speech in dysarthria are - Oro-motor exercises, respiratory exercises, voice therapy, articulation therapy, resonance therapy, and stress and intonation therapy

4.13 Apraxia:

Treatment - Techniques that can be used to improve apraxia are key word technique, self-control (self-monitoring), phonetic placement, contrastive stress drill, total communication for severe apraxia, phonetic derivation (shaping or progressive approximation), and cueing and feedback techniques

4.14 Cognition and memory:

Screening for cognitive deficits should perform for all stroke patients before discharge home. When screening reveals cognitive deficits, a more detailed neuropsychological evaluation to identify areas of cognitive strength and weakness will be beneficial. The neurobehavioral cognitive status examination is a brief screening tool that assesses cognition in the ability areas of language, constructions, memory, calculation, and reasoning. A formal neuropsychological examination (including assessment of language, neglect, praxis, memory, emotional responses, and specific cognitive syndromes) is helpful after the detection of cognitive impairment with a screening instrument.

4.14.1. Enriched environments: Increase engagement with cognitive activities should be provided. Stroke rehabilitation environment with the provision of a computer with internet, books, games, virtual reality gaming technology, and encouragement from staff to use the activities increased the engagement of patients with cognitive activities and reduced time spent inactive and alone e.g, four weeks of playing virtual reality games for 30-minute sessions 3 times weekly improved visual attention and short term visuospatial memory. Compensatory strategies may be considered to improve memory functions, including the use of internalized strategies (e.g, visual imagery, semantic organization, and spaced practice) and external memory assistive technology (e.g, notebooks, paging systems, computers, and other prompting devices). Some type of specific memory training is reasonable such as promoting global processing in visual-spatial memory and constructing a semantic framework for language-based memory. Errorless learning techniques may be effective for individuals with severe memory impairments for learning specific skills or knowledge, although there is limited transfer to novel tasks or reduction in overall functional memory problems. Music therapy is helpful for improving verbal memory.

4.14.2. Use of drugs to improve cognitive impairments, including attention: Modafinil has some effects for the treatment of post-stroke depression and fatigue but not cognitive recovery. Donepezil 5 mg improved in mini mental status examination. Fluoxetine, nortriptyline has no robust evidence to improve cognitive function.

4.15 Hemi-spatial neglect or hemi-inattention:

Right visual field testing is important. Provide repeated top-down and bottom-up interventions such as prism adaptation, visual scanning training, optokinetic stimulation, virtual reality, limb activation, mental imagery, and neck vibration combined with prism adaptation to improve neglect symptoms.

4.16 Balance and ataxia:

Balance training has to be implemented as group and one to one sessions, circuit training, and hospital versus home - versus community-based programs. Content of the training typically includes balance-specific activities, (e.g, practice responding to challenges in standing) and more general activities (e.g, strengthening exercises, gait activities). Progression to more challenging training activities over the course of training is important. Appropriate assistive devices may need to improve balance. Types of balance training devices (sliding board, trunk exercises on a physio ball, shoe wedge) or programs (yoga, Tai Chi, gait training, motor

imagery. task-oriented training program. Postural training and task-oriented therapy has to implicate for rehabilitation of ataxia. Frankel's exercise needs to be applied to improve ataxia.

4.17 Mobility:

Gait-related activities include such tasks as mobility during rising to stand, sitting down, stair climbing, turning, transferring (e.g, wheelchair to bed or bed to chair), using a wheelchair after stroke, walking quickly, and walking for specified distances. Intensive, repetitive, mobility task training is recommended for all individuals with gait limitations after stroke. An AFO after stroke is needed in individuals with remediable gait impairments (e.g., foot drop) to compensate for foot drop and to improve mobility and paretic ankle and knee kinematics, kinetics, and energy cost of walking. Group therapy with circuit training is a reasonable approach to improve walking. NMES is reasonable to consider as an alternative to an AFO for foot drop.

Incorporating cardiovascular exercises and strengthening interventions have to consider for recovery of gait capacity and gait related mobility tasks. Practice walking with either a treadmill (with or without body-weight support) or over ground walking exercise training combined with conventional rehabilitation for recovery of walking function. Resistance training produces increased strength, gait speed, and functional outcomes, as well as improved quality of life. The effectiveness of neurophysiological approaches (i.e, neurodevelopmental therapy, proprioceptive neuromuscular facilitation) compared with other treatment approaches for motor retraining after an acute stroke has not been established.

4.18 Prevention of fall:

The berg balance scale **(see Appendix-V)** would be an ideal for the details assessment however in outpatient and bedside settings simple one "timed up and go" test, can also predict the risk of falls in individuals with stroke. Individuals with stroke be provided a formal fall prevention program during hospitalization and their caregivers receive information targeted to home and environmental modifications designed to reduce falls. A stable standing posture and who do not spontaneously load more than 40% of their body weight on their paretic lower limb, the use of a cane for walking would be ideal. Annual evaluation of falls risk should be established. A community-based progressive group exercise program that included walking, strength and balance training for 1 hour 3 times a week for participants with mild to moderate hemiparesis to be safe, feasible, and efficacious in a

community setting. Tai Chi has been more effective than strength and range of movement exercises.

4.19 Post-stroke depression, including emotional and behavioural state:

Address the symptoms early in the rehabilitation process, especially given the recent trend for less time in rehabilitation. Patient education, counseling, and social support may be considered as components of treatment for post-stroke depression. Early effective treatment of depression may have a positive effect on the rehabilitation outcome. Combining pharmacological and nonpharmacological treatments e.g. Cognitive Behavioural Therapy (CBT) Approach of post-stroke depression has to be considered. Physical exercise provide a complementary treatment for depression .An exercise program of at least 4 weeks duration to be considered as a complementary treatment for post-stroke depression.

4.20 Post-stroke osteoporosis:

Individuals with stroke residing in long-term care facilities be evaluated for calcium and vitamin D supplementation. Increased levels of physical activity indicated to reduce the risk and severity of post-stroke osteoporosis. Sunlight exposure up to 15 min/day can improve plasmatic vitamin D levels and reduce the hip fracture risk in elderly community-living stroke survivors**.**

4.21 ADLs, IADLs, and disability measurement:

A formal assessment of their ADLs and IADLs, communication abilities, and functional mobility should be directly related to their discharge living setting. The routine administration of standardized measures can be useful to document the severity of stroke and resulting disability, starting in the acute phase and progressing over the course of recovery and rehabilitation. The individuals with stroke discharged from acute and post-acute hospitals/ centers receive formal follow-up on their ADL and IADL status, communication abilities, and functional mobility within 30 days of discharge. A standardized measure of balance and gait speed (for those who can walk) may be considered for planning post-acute rehabilitation care and for safety counseling with the patient and family.

4.22 Upper extremity activity (Includes ADLs, IADLs, touch, proprioception):

Functional tasks should be practiced that is task-specific training, in which the tasks are graded to challenge individual capabilities, practiced repeatedly, and progressed in difficulty on a frequent basis. All individuals with stroke should receive ADL training tailored to individual needs and eventual discharge setting. All individuals with stroke should receive IADL training tailored to

individual needs and eventual discharge setting. CIMT or its modified version has to consider for eligible stroke survivors. NMES has to consider for individuals with minimal volitional movement within the first few months after stroke or for individuals with shoulder subluxation. Mental practice has to consider as an adjunct to upper extremity rehabilitation services. Strengthening exercises are reasonable to consider as an adjunct to functional task practice. Virtual reality is reasonable to consider as a method for delivering upper extremity movement practice Somatosensory retraining to improve sensory discrimination may be considered for stroke survivors with somatosensory loss.

4.23 Adaptive equipment, durable medical devices, orthoses, and wheelchairs:

Ambulatory assistive devices (e.g. cane and walker) should be used to help with gait and balance impairments, as well as mobility efficiency and safety, when needed. A stable standing posture and who do not spontaneously load more than 40% of their body weight on their paretic lower limb, the use of a cane for walking would be ideal. Single point cane, tripod, quad cane, two wheeled walker, four wheeled walker or rollator has to be individualized. AFOs should be used for ankle instability or dorsiflexor weakness. Wheelchairs should be used for non-ambulatory individuals or those with limited walking ability. Adaptive and assistive devices should be used for safety and function if other methods of performing the task/activity are not available or cannot be learned or if the patient's safety is a concern.

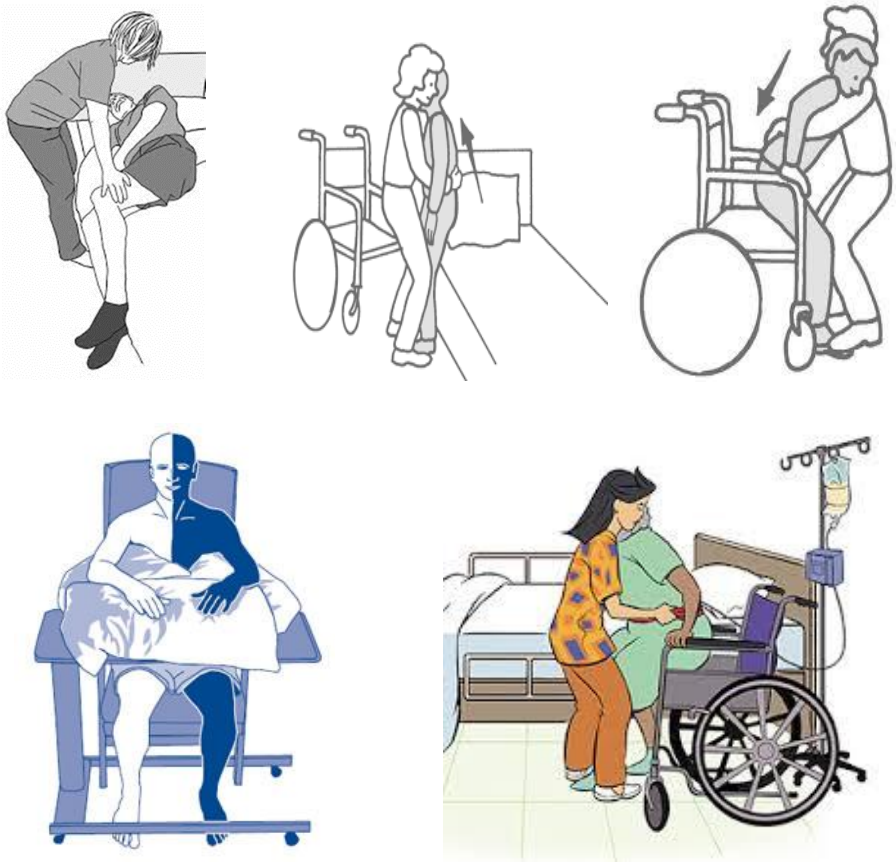


Fig: 18 Transfer from bed to wheelchair, positioning in wheelchair and transfer to bed from wheelchair.

4.24 Treatments/interventions for visual impairments:

4.24.1. For deficits in eye movements: Eye exercises for treatment of convergence insufficiency are recommended. Compensatory scanning training has to be considered for improving functional ADLs, improving scanning and reading outcomes.

4.24.2. For deficits in visual fields: Yoked prisms may be useful to help patients compensate for visual field cuts. Compensatory scanning training has to be considered for improving functional deficits after visual field loss but is not effective at reducing visual field deficits. Computerized vision restoration training has to be considered to expand visual fields.

4.24.3. For visual-spatial/perceptual deficits: The use of virtual reality environments to improve visual-spatial/perceptual functioning may be considered. Multimodal audiovisual spatial exploration training appears to be more effective than visual spatial exploration training alone and is recommended to improve visual scanning.

4.25 Hearing loss:

If suspected hearing impairment, refer to an audiologist for audiometric testing. It is reasonable to use some form of amplification (e.g, hearing aids). It is reasonable to use communication strategies such as looking at the patient when speaking. It is reasonable to minimize the level of background noise in the patient's environment.

4.26 Transitions in care and community rehabilitation ensuring medical and rehabilitation continuity through the rehabilitation process and into the community:

Consider individualized discharge planning in the transition from hospital to home. Alternative method of communications and supports (e.g, telephone visits, tele-health or Web-based support) should be used particularly for patients in the rural settings. Exercises and the physical activity designed to promote cardiovascular fitness should be an important aspect of community reintegration after stroke. Develop partnerships between healthcare professionals and fitness centers or community exercise programs. Integrated care models that include periodic liaison between care providers and patients after stroke via telephone or electronic follow-up is the solution to provide ongoing support for physical activity. After completion of formal stroke rehabilitation, participation in a program of exercise or physical activity at home or in the community is essential.

4.27 Social and family caregiver support:

The family/caregiver has to be an integral component of rehabilitation. Family/caregiver support include some or all of the following on a regular basis- education, training, counseling, development of a support structure, financial assistance. Family member/caregiver should involve in decision making and treatment planning as early as possible and throughout the duration of the rehabilitation process.

4.28 Referral to community resources:

Successful transition to the community requires careful assessment of the match between patient needs and the availability of formal and informal resources. The acute care hospitals and rehabilitation facilities should maintain up to date inventories of community resources. Patient and family/caregiver preferences for resources should be considered. The information about local resources should be provided to the patient and family. The contact with community resources be offered through formal or informal referral. Follow-up should be ensured that the patient and family receive the necessary services.

4.29 Rehabilitation in the community:

Patients with stroke receiving comprehensive ADL, IADL, and mobility assessments including evaluation of the discharge living setting should be considered candidates for community or home-based rehabilitation when feasible. Exclusions include individuals with stroke who require daily nursing services, regular medical interventions, specialized equipment, or inter-professional expertise. The caregivers, including family members, should be involved in training and education related directly to home-based rehabilitation programs and be included as active partners in the planning and implementation or treatment activities under the supervision of professionals. There should be formal plan for monitoring compliance and participation in treatment activities for individuals with stroke referred for home or community-based rehabilitation services. A case manager/patient referral coordinator or professional staff person should be assigned to oversee implementation of the plan.

4.30 Sexual function:

An offer should be made to patients and their partners to discuss sexual issues before discharge home and again after transition to the community. Discussion topics include safety concerns, changes in libido, physical limitations resulting from stroke, and emotional consequences of stroke.

4.31 Recreational and leisure activity:

Promote engagement in leisure and recreational pursuits, particularly through the provision of information on the importance of maintaining an active and healthy lifestyle. Foster the development of self-management skills for problem solving for overcoming barriers to engagement in active activities. Start education and self-management skill development about leisure/ recreation activities during and in conjunction with in-patient rehabilitation.

4.32 Return to work:

Vocationally targeted therapy or vocational rehabilitation is reasonable for individuals with stroke considering a return to work. An assessment of cognitive, perception, physical, and motor abilities may be considered for stroke survivors considering a return to work.

4.33 Advice for self-care and care giver:

This should be the integral part of rehabilitation and have to ensure that the patients and care givers should be taught and prescribed above mentioned intervention depending upon the patients need. Home visits and assessments, analysis of critical functional demands of job (work site visit, if possible) and modification should be done as per need. Review in each follow up whether self-care and care giver has been following as per instruction and necessary training has to be given during each follow up visits so that it can be done at the home in right way. Provide information and encourage to involve with peer support organization or peer support group.

Chapter: 5 Developmental Delay and Cerebral Palsy

Cerebral palsy (CP) describes a group of permanent disorders of the development of movement and posture, causing activity limitation that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior, by epilepsy, and by secondary musculoskeletal problems. Developmental Delay and Cerebral Palsy (DD&CP) rehabilitation requires a sustained and coordinated effort from a large team, including the patient and his or her goals, family and friends, other caregivers (e.g, personal care attendants), physicians (Physical medicine and rehabilitation physicians or pediatric neuro-physicians or developmental pediatrician) , nurses, physiotherapists, occupational therapists, speech-language therapists, orthotists and assistive technology specialist, recreation therapists, clinical psychologists, nutritionists, social workers, and others. There should be a regular multidisciplinary round in interdisciplinary approach (at least a week) and goal setting/ family conference 2-4 weeks interval.

In situations where it is not possible to have a multidisciplinary team with all the rehabilitation professionals available, other medical/rehabilitation staff may acquire skills and knowledge in the missing disciplines, in order to ensure the rehabilitation treatment will be as comprehensive as possible. This should be continued until there are qualified staffs in all required disciplines. Detail assessments including medical history, imaging and laboratory investigation for diagnosis is beyond the scope of this protocol, however detail functional assessments should be made as a principle of ICF. Developmental Therapy looks at a child's development globally, or across all five areas of development. These are cognitive skills, language and communication, social-emotional skills and behavior, gross and fine motor skills, and self-help skills.

5.1. Assessments:

Medical and functional assessments as per ICF-CY bio psychosocial approach by multidisciplinary team should be done within 24 hours of admission, identify the problems, set the goals and apply intervention from each discipline in coordinated way with greater emphasis on recognizing associated impairments and functional limitations as well as frequently coexisting medical conditions, aside from the primary abnormalities. Assessments on residual neurological deficits, activity limitations, cognitive, communicative, and

psychological status, swallowing ability, previous functional ability and medical comorbidities, level of family/caregiver support, capacity of family/ caregiver to meet the care needs of the stroke survivor, likelihood of returning to community living and ability to participate in rehabilitation. Commonly used functional classification and outcome measures are Gross Motor Functional Assessment (GMFCS), Manual Ability Classification System (MACS), Communication Function Classification System (CFCS), Eating and Drinking Ability Classification System (EDACS) **please see the appendix VI,** and it should be measured at least during admission and discharge, and however it can be measured multiple times during rehabilitation stay as per need. The Canadian Occupational Outcome Measure (COPM) is an outcome measure designed to assess client outcomes in the areas of self-care, productivity and leisure.

5.2. Patients/family/care giver education, reassurance, and self-management:

With empathy and dignified way, patient/family/care giver should be informed about the diagnosis, causes, pathophysiology, investigation, management, and prognosis and follow up plan. Education can be provided through one to one discussion, written literature, patient led group education classes and interactive computer programs. Education about rehabilitation interventions, positioning, exercises, goal and approaches should be well explained to patient/family. IEC/BCC materials of developmental delay and cerebral palsy should be used during education session which enhance adherence and compliance to the treatment.

5.3. Exercises:

5.3.1. Flexibility exercise: To reduce the risk of contracture development as a result of muscle imbalances and hypertonicity. Please see in chapter 1 about flexibility exercises. Sustained stretching can be achieved through the use of positioning devices, orthoses, and serial casting.

5.3.2. Strengthening exercise: Strength training programs in CP reported increased strength, proprioception, balance, coordination and overall improve in function, participation, improved self-esteem and minimize disability. Please see at **1.12.**

5.3.3. Parental involvement and different kind of play therapy should be taught by the therapist and should be taught to the child and to the parents.

5.3.4. Aerobic exercise: Improved physiologic measures of aerobic fitness without adverse effects. Improvement in aerobic fitness with around 45 minutes four times a week of "high-

intensity" activities such as wheelchair sports, swimming, matt exercises, or cycling. Please see at **1.12.**

5.3.5 Constraint-induced movement therapy (CIMT): CIMT is a treatment for hemiparesis to improve motor function in the affected upper limb. In children with hemiplegic CP, the unaffected limb is restrained with a removable cast, typically for 3 weeks, and the child undergoes intensive, structured therapy in addition to daily activities and play.

5.3.6 Neuro-motor therapy: There are many forms of neuro-motor therapy interventions which show can be given however there is minimal evidence to suggest which therapeutic intervention is superior. Combined use of these approaches while tailoring their therapy program to the child's needs would have benefits. The main goals of all therapies are to promote and facilitate development in all domains of function. The setting and frequency of formal neuro-motor therapy sessions vary like in-patients, out-patients and community based. The most common therapy settings are school-based outpatient models with a frequency of 1 to 3 times a week per discipline. Other models include intensive "pulse" or "episode" therapy through camps or day rehabilitation programs. Regardless of the setting, it is imperative that the family and child are included in the therapy plan to promote carryover and reinforcement in the home setting. Please see the details of neuro-motor therapies approach at **1.12**. **(1.12.9 – 1.12.11.).**

5.3.7. Partial body weight support treadmill training (PBWSTT): These forms of therapy involve a repetitive and task-specific approach to facilitate attainment of stepping and locomotion and to achieve a more normalized gait pattern based on current theories of motor learning.

5.4. Durable medical equipment:

The goal in prescribing durable medical equipment (DME) should focus on maximizing function, improving safety, and enabling independence using the ICF-CY model of health. Supportive or adaptive seating systems and standing frames facilitate a developmentally appropriate upright posture, strengthening, flexibility across the lower extremities, weight bearing/bone density, upper limb function, communication, and feeding by freeing the child's hands to perform bimanual tasks, improving breath support, and optimizing the head and trunk position to facilitate a safe swallow.

5.5. Specialized seating devices:

Available for sitting on the floor or toilet, feeding, and bathing, as well as for incorporation in a mobility device. The goal of supportive seating is to provide an upright seated posture to facilitate interaction with the environment and minimize deforming forces secondary to postural abnormalities.

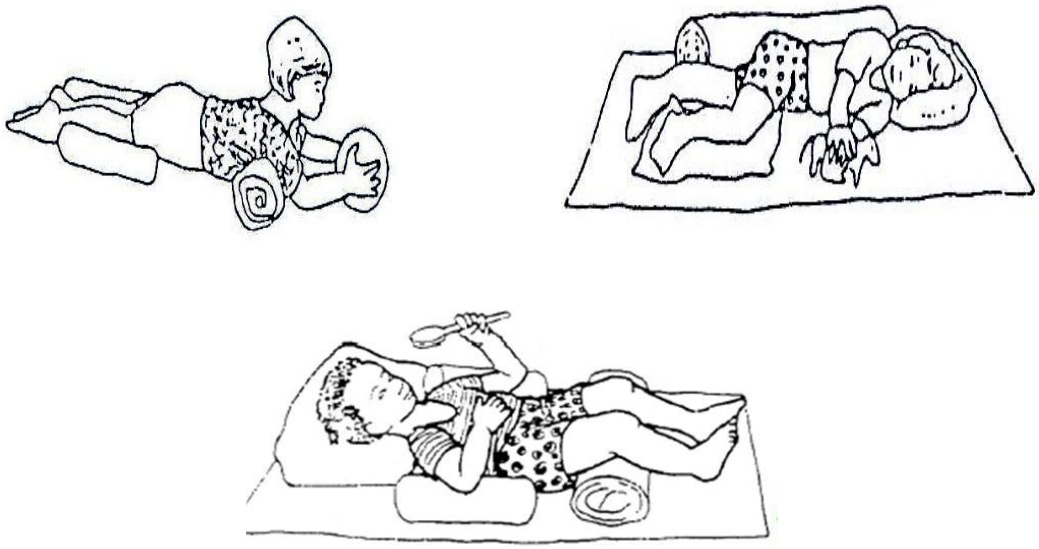


Fig: 19 proper positioning while prone, side lying and supine position

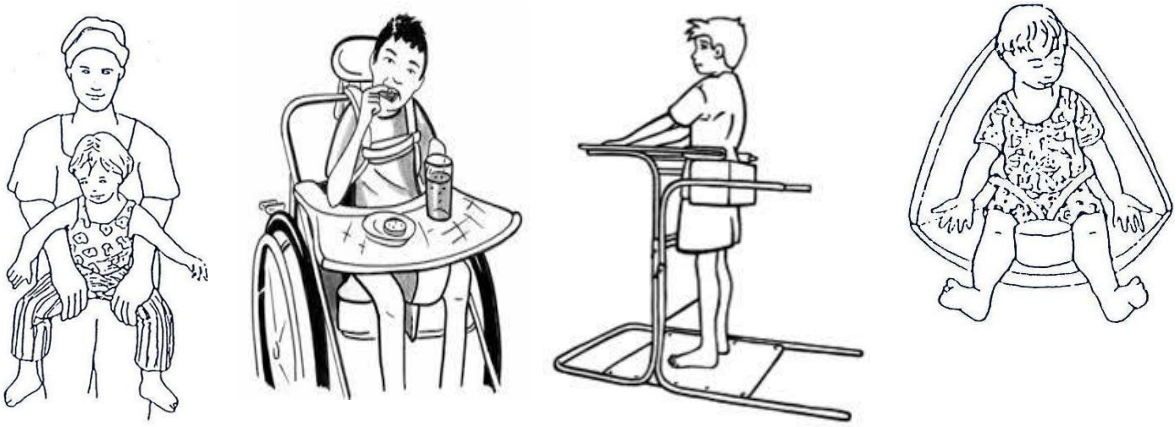


Fig: 20 Sitting and standing position

The clinician must consider both the seating goals and the family's needs. One decision once unique to pediatrics is whether to use either a conventional wheelchair base or a stroller base for the mobility device. Power mobility can be pursued in children as young as 18 months old if they have fair motor control, no visual deficits, and good cognition. For children with adequate head and trunk support, a gait trainer, walker, or crutches might help facilitate gait training and provide external support and improve upright posture. The gait trainer is a

wheeled walker with a sling seat and various support options, which allows the patient to propel the device without necessarily having a coordinated, reciprocal gait pattern. For the dependent child and adult, families might benefit from equipment to facilitate transfers and floor recovery such as a mobile mechanical lift or overhead lift device.

5.6. Speech, language, and gesture:

The production of speech, language, and gesture for communication is also commonly affected because of motor, sensory, and intellectual impairments. In augmentative communication, meaningful communication and expression of needs are facilitated with the use of computers, switch devices, signboards, and similar adaptive equipment.

5.7. Splinting and orthoses

These are commonly used in DD&CP to manage spastic but flexible dynamic deformities of the extremities. There are a variety of passive and dynamic splints. Orthoses must be tailored to the child's age, deformity, motor control, and tolerance. With lower limb orthoses, the clinician should clearly identify the gait deviation and goals to be addressed, with special consideration of ankle-foot alignment, range of motion and tone. Ankle foot orthoses have been demonstrated to decrease the energy cost of walking in children with CP, compared with barefoot walking, and to improve gait parameters of stride length and velocity.

5.8. Hypertonia/spasticity:

The most common forms of hypertonia observed in CP are spasticity, dystonia, and a combination of both which could be focal or generalized and can affect the limbs and trunk. If left untreated, it can interfere with function and development, however functional advantages and disadvantages should be always in mind while treating spasticity. Hypertonia can lead to secondary musculoskeletal complications such as joint contractures and dislocations. It can also be a significant source of pain. Treatment must be tailored to goals and may change with growth and development. Goals should be identified before initiation of any treatment. Any spasticity reducing treatment option should translate into improved mobility, self-care, skin breakdown prevention, ease of care, and comfort.

Physical therapy in the form of positioning, ROM and stretching, orthoses, and casting and augmented with oral medications. The most common medications include baclofen, diazepam, dantrolene sodium, tizanidine, clonazepam, and clonidine. Pediatric dosing is quite variable, and the side effects and risks of these medications limit their use. The treatment of

generalized secondary dystonia in children with CP is more challenging as it responds poorly to oral medications. Commonly used drugs include trihexyphenidyl hydrochloride, oral baclofen, and levodopa-carbidopa.

Chemo-denervation botox intramuscular injections and phenol neurolysis are used in the treatment of focal hypertonicity (spasticity and dystonia). Injections are most effective as a localized treatment for dynamic contractures or shortened muscles. Both forms of chemo denervation (BTX and phenol) can be used at the same time to maximize the dose and number of muscles, as well as in combination with systemic medications. Typically, electrical stimulation, electromyogram, or ultrasound guidance has to use for localization, though phenol neurolysis requires electrical stimulation for nerve identification.

The child's age, weight, severity of hypertonia, and muscle localization are taken into consideration when determining dosage. The period of clinically useful relaxation is usually 12 to 16 weeks, and it is recommended that injections be spaced a minimum of 3 months apart because of concern for neutralizing antibody formation.

Details of surgical management is beyond the scope of this protocol. However, rehabilitation professionals specially rehabilitation or PM&R physicians or pediatric neurologist should have basic knowledge on how and when to have a surgical consultation and its possible outcomes which help to rehabilitate even after the corrective surgery. It is important to note that surgical complications are high and expensive. Therefore, goal setting, patient selection, and preoperative preparation and post-operative management are of utmost importance. Intrathecal baclofen, deep brain stimulation and selective dorsal rhizotomy can be the choice if safely available, affordable and proper follow up program.

5.9. Hips:

Hip displacement, the muscle imbalance between the strong hip adductors/
flexors and the weak hip abductors/extensors. This imbalance causes the head of the femur to gradually migrate out of the socket compromising the hip joint integrity. The two muscle groups responsible are the iliopsoas and the adductors.

Note – Orthopedic surgical consultation for soft tissue surgeries to counteract hip subluxation often include some combination of hip adductor tenotomy, psoas recession, iliopsoas tenotomy, or medial hamstring lengthening and are performed after the hip has demonstrated subluxation.

5.10. Lower limb contractures include lengthening and transfers:

The ultimate goal is to achieve satisfactory joint position during gait without restriction. In the non-ambulatory cohort, goals include facilitating sitting (hamstrings) and perineal care (adductors) as well as first line of surgery to help contain hips (psoas and adductors) without including bony surgery.

5.11. Upper limb spasticity management:

Conservative treatment with physical therapy, splinting (functional and passive orthoses), casting, oral medications, and chemo neurolysis are used to preserve range of motion and delay muscle contractures. Upper limb surgical procedures are recommended to improve function, ease of care in patients with severe contractures, and sometimes as a cosmetic point of view.

5.12. Spine:

The scoliotic severity directly correlates with the degree of total body involvement and inversely correlates with functional and ambulatory status. Onset occurs from 3 to 10 years of age with rapid progression during the adolescent growth spurt. Positioning, stretching and strengthening exercises for back would be helpful. Bracing has a very limited role in decreasing curve progression. Examination of spine should be performed every 6 to 12 months and a radiograph obtained if a curve is detected. Observation is warranted for flexible curves less than 40 degrees that do not compromise sitting balance. In most cases of scoliosis in CP, spinal instrumentation and fusion are considered because of significant curve progression, loss of sitting balance, and comfortable function. Ideally this can be delayed in children with flexible deformities until they approach skeletal maturity.

5.13. Childhood disabilities and education:

Early intervention programs help to evaluate children at risk or with delays in one or more areas of function between the ages of 0 and 36 months. Services include therapies, nutrition monitoring, care coordination, audiovisual, and social work, among others. After 36 months of age, children with disabilities may qualify to receive ongoing services through their local public school system. An individualized education program ensures that classroom accommodations are provided, along with a document provided to the family with present level of functioning, short- and long term goals, specific educational services needed, participation in regular educational programs, and assurance that the necessary services are available. Disability identity card recommendation has to be provided by the clinical team.

5.14. Transition to adulthood and aging with cerebral palsy:

A child must be encouraged to become as independent as possible and to separate if appropriate from caregivers in a developmentally appropriate fashion during the teenage years. Throughout the course of care for the child, the medical rehabilitation team is responsible for providing guidance, ensuring comprehensive assessments of medical and psychosocial issues encountered with direction on management of associated conditions, with educational and community support needs, and with suggested referrals to specialists for specific issues.

Therapy services for older individuals with CP are indicated for specific goals that will enhance functional independence or exercise capacity. For some individuals, independent living with employment is very realistic. Others may thrive in a supported environment with some daily assistance but not require constant supervision or care. Children with significant cognitive and physical delays may require long-term support but may enjoy opportunities for socialization with peers other than their primary caregivers. Children with disabilities may need encouragement and training on self-advocacy. Teens benefit from having advocates or champions to help with the transition process. Patient counseling needs to include reminders about preventative health measures and screens. Specific conditions that occur more frequently or earlier in the adult CP population as the result of aging and chronic alterations in biomechanics such as cervical myelopathy, degenerative joint disease, musculoskeletal conditions may worsen and energy consumption may increase for tasks previously accomplished easily, they likely to experience chronic pain, fatigue and depression.

Spectrum of associated medical conditions affecting individuals which may need coordinated care from non-core team of rehabilitation of CP. In details of medical management is beyond the scope of this documents, however the following issues need to be address from multidisciplinary team in and or outside the rehabilitation set up.

5.15. Feeding, growth, and nutrition:

Impaired oropharyngeal strength and coordination place a child at risk for not meeting caloric and fluid which causes malnutrition and risk of aspiration, weight gaining and take considerable time for care givers as well for feeding. Eating and Drinking Ability Classification System (EDACS) can be used for the assessment of feeding and nutrition. Please see the **Appendix VI.** Indications for swallow studies include impaired oropharyngeal skills with a wet vocal quality or increased congestion during feeding. Early on, children should receive nutritional counseling and supplemental caloric and fluid intake if necessary.

Oral hygiene may be compromised and children may have excessive sialorrhea, which can contribute to aspiration events and cause secondary skin irritation placement of gastrostomy tubes may need if all the measures failed to gain adequate nutrition.

Questions	Red Flags
• How long does it take to feed your child?	More than 30 min, on any regular basis
• Are meal times stressful to child or parent?	Yes, if one or other or both
• Is your child gaining weight adequately?	Lack of weight gain over 2-3 months in young child, not just weight loss.
• Are there signs of respiratory problems?	Increased congestion at meal times, gurgly voice, respiratory illness

5.16. Pulmonary issues:

Occur as a result of repeated aspiration events, infections, decreased mucociliary clearance, kyphoscoliosis, and airway obstruction. Prevention of pulmonary aspiration require modified feeding consistencies, treatment of reflux, alternative means of feeding such as gastrostomy with or without fundoplication, and control of sialorrhea with anticholinergic medications, botulinum injections, and sometimes surgery. Chest physiotherapy and bronchodilators can assist with decreased mucociliary clearance. They may require noninvasive ventilator support and external aids for mobilization of secretions and assistance with cough generation.

5.17. Neurological/neuropsychological issues:

There is increased risk of seizures in CP, while prescribing anti-seizures medications cognitive dulling should consider in mind. Intellectual disability is very common. Mood disorders like anxiety and depression affects function and participation. Vision and hearing impairment should be dealt in special way.

5.18. Genitourinary issues:

Voiding dysfunction may result from incoordination of muscular functions responsible for bladder wall contractions and sphincter relaxation: detrusor sphincter dyssynergia. Urinary retention can increase chances of urinary tract infections and if a high intravesical pressure is generated, vesicoureteral reflux with resultant hydronephrosis and pelviectasis may occur. Clean intermittent catheterization is required when children are experiencing chronic urinary retention with urinary stasis. Reproductive issues including menstruation, sexuality, fertility and pregnancy issues have to be address in details to the patients or family/care givers.

5.19. Gastrointestinal issues:

Gastroesophageal reflux disease (GERD) and constipation, which are commonly observed in CP, may produce discomfort and exacerbate hypertonicity.

5.20. Musculoskeletal pain and osteopenia:

Common sites of musculoskeletal pain include the hips, spine, knee, foot and ankle complex. With aging, may experience worsening pain. Children with CP are at risk for osteopenia and related fragility fractures with patella alta, spondylolysis with spondylolisthesis, and degenerative hip conditions. Regular weight bearing, sunlight exposure, supplementation with calcium and vitamin D is routinely used to improve bone density.

5.21. Neuro-psychological assessment:

5.21.1. Setting for interview: Child friendly space starts with rapport.

5.21.2. Activities like drawing, playing, story- telling, moving around with child, quickly finds out something the child is able to do; appreciate and comment. At a minimum such activities will reveal important parts of mental state examination of children.

5.21.3. For difficult children may need multiple sessions for evaluation as they may take time for rapport building and it's absolutely fine.

5.21.4. While interviewing children use simple, structured, brief, concrete questions, ask and involve parents whenever necessary. Always appreciate parents for the right things they have done that surface during interview.

5.21.5. Details history including developmental milestone, academics, learning, behavioural and psychological status, speech, personal and familial information, and medical history.

5.21.6. Mental Status examination: memory and language skills.

5.21.7. Neuro-psychological testing:

5.21.7a. Intelligence Quotient (IQ)/Spiritual Quotient (SQ): Can be used any standardized test of IQ and SQ assessment available in the clinical set-up (such as Wechsler Intelligence Scale for Children (WISC), Visual and Motor Integration, Development Test (VMI), Vineland Social Maturity Scale(VSMS).

5.21.7b. Questionnaires and rating scales:

Emotion &Behavior Assessment Scales for Children: Can be used any behavior assessment scale which helps to detect strengths and limitations of the children and available in the clinical set-up (such as Behavioural analysis pro forma, Child Behavior Checklist (CBCL), Child and Adolescent Symptom Inventory -5 (CASI-5), Attention Deficit Hyperactive Disorder – Rating Scale (ADHD-RS), Childhood Autism Rating Scale (CARS).

5.21.7c. Tests of adaptive behavior:

Adaptive Behaviour Scale: Any related scale available in the clinical set -up which can provide the information about children's communication, socialization, motor skills and other everyday behavior relative to their age (such as Vineland Adaptive Behavior Scales (VABS).

5.21.7d. Others: Assessment of family & psycho-social issues: Awareness level, stress levels and expectation level.

5.21.7e. Educational assessment: Pre-reading and writing assessment which gives the impression that whether the child can be included in normal stream or needs special education. If child is already in school assess the level of academic achievement (Such as Kaufman Survey of Early Academic Language Skills or any related culturally appropriate scale available in the clinical set up)**.**

5.21.8. Psychological/psycho-social interventions:

5.21.8a. **Psychoeducation:** Start immediately after assessment is completed and the area of problem is identified.

5.21.8b. Help them to access the community and governmental resources and benefits (i.e. recommendation letter on the basis of assessment findings)

5.21.8c. Parent counseling: Alleviation of stress & enhancing coping & adaptation, self-care techniques, Importance of giving quality time for children should be discussed.

5.21.8d. **Parent training:** For home-based intervention for problematic issues (Behavior Therapy Principles). Weekly targets should be set. The targets should be realistic. Once the target is met, the child should be reinforced and repetition should be made on regular basis. Guide the parent/caregiver be creative with helping the child. Try making learning fun for the child. Reinforce the child for any improvement in performance.

5.21.9. Sensory-motor & cognitive stimulation.

5.21.10. Self-help and social skills training.

5.21.11. If the child has already started school and having academic difficulties, give psychoeducation by involving the child as well as relevant caregivers and school teachers if possible, if not then professionals could write a note or communicate through the phone call. Psychoeducation should be provided at the beginning of the treatment. Show the care givers the area where the child is having difficulties.

5.21.12. Educate the intervention strategies to improve learning:

Multimodal approach: Instead of the traditional black and white black board learning modality, all the sense organs as a learning medium. For example, hearing the alphabets in the form of a song, or games involving writing in the air or guessing game, like writing in someone's back and guessing the alphabet.

If the child begins to practice academic areas the test results shows the child having difficulties. The School authorities should be informed and the home work given should be tailored according to the abilities.

Encourage to use flash cards as a learning tool to aid learning.

Teach behavior management techniques (positive and negative reinforcements) at school.

5.21.13. Refer for further assessment and psycho-pharmacotherapy for co-morbid conditions (if needed)

5.21.14. Encourage to do regular follow-up to monitor for progress and needful assistance for further improvement during the period of discharge.

5.22. Advice for self-care and care giver:

This should be the integral part of rehabilitation and have to ensure that the patients and care givers should be taught and prescribed above mentioned intervention depending upon the patients need. Home visits and assessments, analysis of critical functional demands of job (work site visit, if possible) and modification should be done as per need. Review in each follow up whether self-care and care giver has been following as per instruction and necessary training has to be given during each follow up visits so that it can be done at the home in right way. Provide information and encourage involving peer support organization or peering support group.

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Appendix – I: Western Ontario and McMaster Universities Arthritis Index (WOMAC)

The Western Ontario and Mc master universities Osteoarthritis Index (WOMAC)

नाम :..... मिति :.....

तल दिइएको क्रियाकलाप गर्न, तपार्यलाई कत्तिको अफ्टयारो हुन्छ। सोही अनुसार तल दिइएको अंकमा ठीक चिन्ह लगाउनुहोस्।

दुखाईको परिमाण

० = गाह्रो छैन १ = अलि गाह्रो २ = अलि बढी गाह्रो ३ = धेरै गाह्रो ४ = असाध्यै गाह्रो

प्रत्येक क्रियाकलापको एउटा अंकमा चिन्ह लगाउनुहोस्।

दुखाई					
१. हिँड्न	०	१	२	३	४
२. सिँडी चढ्न/ओर्लन	०	१	२	३	४
३. राति निद्रमा	०	१	२	३	४
४. आराम गर्दा	०	१	२	३	४
५. भारी सामान उठाउदा	०	१	२	३	४
जीउ कक्रिने					
१. बिहान उठ्दा	०	१	२	३	४
२. दिउँसोदिर	०	१	२	३	४
काममा सहजता					
१. सिँढी चढ्दा	०	१	२	३	४
२. सिँढी ओर्लन	०	१	२	३	४
३. कुर्सीबाट उठ्न	०	१	२	३	४
४. उभिन	०	१	२	३	४
५. निहुरिन/कम्मरबाट निहुरिन	०	१	२	३	४
६. सम्म भुइँमा हिँड्न	०	१	२	३	४
७. गाडी चढ्न/ओर्लन	०	१	२	३	४
८. सामान किन्न जान	०	१	२	३	४
९. मोजा लगाउन	०	१	२	३	४
१०. खाटमा पल्टिन	०	१	२	३	४
११. मोजा फुकाल्न	०	१	२	३	४
१२. खाटबाट उठ्न/खाटमा चढ्न	०	१	२	३	४
१३. पिर्काबाट उठ्न	०	१	२	३	४
१४. पिर्कामा बस्न	०	१	२	३	४
१५. चर्पी बस्न वा चर्पीबाट उठ्न	०	१	२	३	४
१६. भारी घरायसी काम गर्न	०	१	२	३	४
१७. हलुका घरायसी काम गर्न	०	१	२	३	४

Appendix – II: Red flags for back pain

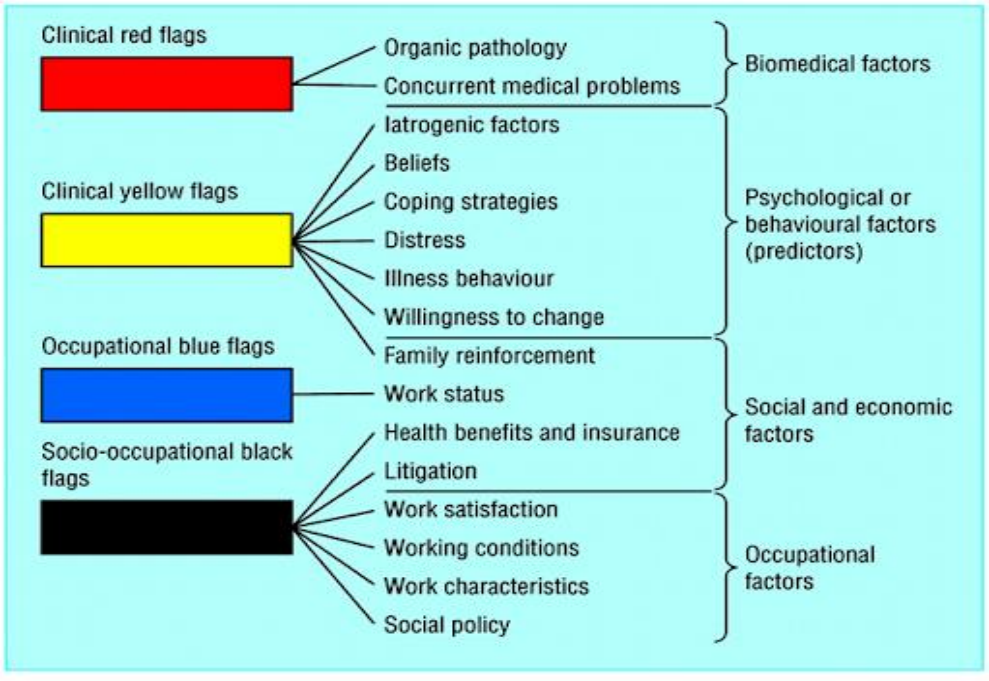
Red flags of back pain due to possible spinal pathology

History:

- Age: presentation < 20 yrs or > 55 yrs
- Character: constant, progressive pain unrelieved by rest
- Location: thoracic pain
- Past medical history: carcinoma, tuberculosis, HIV, systemic corticosteroid use
- Constitutional: systemic upset, sweats, weight loss
- Major trauma

Examination:

- Painful spinal deformity
- Severe/symmetrical spinal deformity
- Saddle anaesthesia
- Progressive neurological signs/muscle-wasting
- Multiple levels of root sign



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Appendix – III: Oswestry Low Back Pain Disability Questionnaire

असवेष्ट्री असक्तता प्रश्नावली

यो प्रश्नोतर तपाईको ढाड वा खुट्टा दुखाईले तपाईको दैनिक जीवनमा व्यवस्थित गर्ने क्षमतालाई कसरी प्रभाव पारिरहेछ भन्ने सम्बन्धमा जानकारी दिनको लागी तयार गरिएको हो । प्रत्येक खण्ड एउटा वाकसलाई आफुलाई अनुकुल हुने वाक्यांशलाई छानेर उत्तर दिनुहोला । हामी अनुभव गर्न सक्छौ कि तपाइलाई कुनै एक खण्डको दुई वा सो भन्दा बढी वाक्यांश लागु हुन सक्छ तर कृपया तपाईको समस्यालाई सबैभन्दा प्रष्टसित प्रस्फुटन गर्छ त्यसलाई छायाँ दिनु होला ।

खण्ड १ दुखाईको मात्रा

- ☐ अहिले मलाई दुखेको छैन ।
- ☐ अहिले मलाई अलि अलि मात्र दुखेको छ ।
- ☐ अहिले मलाइ सामान्य दुखेको छ ।
- ☐ अहिले मलाई अलि बढि दुखेको छ ।
- ☐ अहिले मलाई एकदम तिब्र दुखेको छ ।
- ☐ अहिले मलाई सोच्नै नसकिने गरि दुखेको छ ।

खण्ड २ व्यक्तिगत हेरचाह (नुहाउने, लुगा लगाउने आदि)

- ☐ म आफ्नो साधारण हेरचाह थप दुखाई बिना आफै गर्न सक्छु ।
- ☐ म आफ्नो साधारण हेरचाह आफै गर्न सक्छु , तर यसले थप दुखाई हुन्छ ।
- ☐ मलाई आफ्नो हेरचाह गर्दा दुख्छ र म बिस्तारै र होसियारपूर्वक गर्छु ।
- ☐ मलाई केही सहयोगको आवश्यकता छ , तर मेरा धेरै जसो हेरचाह आफै गर्न सक्छु ।
- ☐ व्यक्तिगत हेरचाहको धेरै जसो प्रसंगमा मलाई प्रत्येक दिन सहयोग चाहिन्छ।
- ☐ म आफै लुगा लगाउन सक्दिन कठिनाई का साथ धुन्छु र ओद्यानमै बसिरहन्छु।

खण्ड ३ उचाल्दा

- ☐ म गह्रौं सामानहरु थप दुखाई बिना उचाल्न सक्छु ।
- ☐ म गह्रौं सामानहरु उचाल्न सक्छु तर यसले थप दुखाई दिन्छ ।
- ☐ दुखाईले मलाई भुइँको गह्रौं सामानहरु उचाल्न रोक्छ तर सामानहरु सुविधाजनक ठाउँमा राखिएका छन् भने उठाउन सक्छु जस्तै कुर्सिमा राखिएका सामानहरु ।
- ☐ दुखाईको कारणले गह्रौं सामानहरु उचाल्न सक्दिन तर तिनिहरु हलुका छन् र सुविधाजनक ठाउँमा राखिएका छन् भने उठाउन सक्छु ।
- ☐ म एकदम हल्का खालका सामानहरु मात्र उचाल्न सक्छु ।
- ☐ म कुनैपनि सामानहरु उठाउन वा बोक्न सक्दिन ।

खण्ड ४ हिंडडुल

- [ ] दुखाईले मलाई कुनै पनि दुरी सम्म हिड्न रोक्दैन ।
- [ ] दुखाईले मलाई २ किलोमिटर दुरी भन्दा बढि हिड्न रोक्छ ।
- [ ] दुखाईले मलाई १ किलोमिटर दुरी भन्दा बढि हिड्न रोक्छ ।
- [ ] दुखाईले मलाई ५०० मिटर दुरी भन्दा बढि हिड्न रोक्छ ।
- [ ] म लट्ठि वा बैशाखी प्रयोग गरेर मात्र हिड्न सक्छु ।
- [ ] म धेरैजसो समय ओछ्यानमा नै हुन्छु र घिस्रिएर शौचालय जानु पर्छ ।

खण्ड ५ बस्दा

- [ ] म आफुले चाहेको समय जति कुनै पनि कुर्सिमा बस्न सक्छु ।
- [ ] म आफुले चाहेको समय जति मेरो मनपर्ने कुर्सिमा बस्न सक्छु ।
- [ ] दुखाईले मलाई १ घण्टा भन्दा बढि बस्नबाट रोक्छ ।
- [ ] दुखाईले मलाई ३० मिनेट भन्दा बढि बस्नबाट रोक्छ ।
- [ ] दुखाईले मलाई १० मिनेट भन्दा बढि बस्नबाट रोक्छ ।
- [ ] दुखाईले गर्दा म केही समय पनि बस्न सक्दिन ।

खण्ड ६ उभिदा

- [ ] म आफुले चाहेको समय जति थप दुखाई बिना उभिन सक्छु ।
- [ ] म आफुले चाहेको समय जति बिना दुखाई उभिन सक्छु तर यसले थप दुखाई दिन्छ ।
- [ ] दुखाईले मलाई १ घण्टा भन्दा बढि उभिनबाट रोक्छ ।
- [ ] दुखाईले मलाई ३० मिनेट भन्दा बढि उभिनबाट रोक्छ ।
- [ ] दुखाईले मलाई १० मिनेट भन्दा बढि उभिनबाट रोक्छ ।
- [ ] दुखाईले गर्दा म केही समय पनि उभिन सक्दिन ।

खण्ड ७ सुत्दा

- [ ] दुखाईले गर्दा मेरो निन्द्राकहिलै पनि अवरोध हुदैन ।
- [ ] दुखाईले गर्दा मेरो निन्द्रा कहिले काहिं अवरोध हुन्छ ।
- [ ] दुखाईको कारणले गर्दा म ६ घण्टा भन्दा कम सुत्छु ।
- [ ] दुखाईको कारणले गर्दा म ४ घण्टा भन्दा कम सुत्छु ।
- [ ] दुखाईको कारणले गर्दा म २ घण्टा भन्दा कम सुत्छु ।
- [ ] दुखाईले गर्दा म केहि समय पनि सुत्न सक्दिन ।

खण्ड ८ यौन जीवन (सम्बन्धित व्यक्तिको लागी)

- [ ] मेरो यौन जीवन साधारण छ र यसको कारणले थप दुखाई हुदैन ।
- [ ] मेरो यौन जीवन साधारण छ तर यसको कारणले केहि दुखाई हुन्छ ।
- [ ] मेरो यौन जीवन साधारण छ र यसको कारणले अति धेरै दुखाई हुन्छ ।
- [ ] मेरो यौन जीवन दुखाईले गर्दा अति नै प्रभावित छ ।
- [ ] दुखाईले मेरो यौन जीवन लगभग छैन ।
- [ ] दुखाईको कारणले मेरो यौन जीवन पटक्कै छैन ।

खण्ड ९ सामाजिक जीवन

- [ ] मेरो सामाजिक जीवन साधारण छ र थप पिडा पनि हुदैन ।
- [ ] मेरो सामाजिक जीवन सामान्य छ तर दुखाईको स्तर बढ्छ ।
- [ ] मेरो इच्छाको कामहरु जस्तै खेलकुद वाहेक दुखाईले मेरो सामाजिक जीवनलाई उल्लेखनीय प्रभाव पारेको छैन ।
- [ ] दुखाईले मेरो सामाजिक जीवन सिमित भएको छ र म धेरै जसो बाहिर जान्न दुखाईले मेरो सामाजिक जीवनलाई घरमा नै सिमित गरेको छ ।
- [ ] दुखाईले गर्दा मेरो सामाजिक जीवन छैन ।

खण्ड १० यात्रा

- [ ] म विना दुखाई जहाँ पनि यात्रा गर्न सक्छु ।
- [ ] म जहाँ पनि यात्रा गर्न सक्छु तर यसले थप दुखाई दिन्छ ।
- [ ] मेरो दुखाई नराम्रो छ तर म २ घण्टा भन्दा बढिको लागि व्यवस्था गर्न सक्छु ।
- [ ] दुखाईले मेरो १ घण्टा भन्दा कमको यात्रा गर्न बाट पनि अवरोध गर्छ ।
- [ ] दुखाईले मेरो ३० मिनेट भन्दा कमको छोटो आवस्यक यात्रा गर्न बाट पनि अवरोध गर्छ ।
- [ ] दुखाईले मेरो उपचार गराउन वाहेक अरु यात्रा गर्न बाट अवरोध गर्दछ ।

Appendix – IV: Functional Independence Measure

FIM™ instrument

LEVELS		
	7 Complete Independence (Timely, Safely) 6 Modified Independence (Device)	NO HELPER
	Modified Dependence 5 Supervision (Subject = 100%+) 4 Minimal Assist (Subject = 75%+) 3 Moderate Assist (Subject = 50%+) **Complete Dependence** 2 Maximal Assist (Subject =25%+) 1 Total Assist (Subject = less than 25%)	HELPER

	ADMISSION	DISCHARGE	FOLLOW-UP
Self-Care			
A. Eating			
B Grooming			
C. Bathing			
D. Dressing - Upper Body			
E. Dressing - Lower Body			
F. Toileting			
Sphincter Control			
G. Bladder Management			
H. Bowel Management			
Transfers			
I. Bed, Chair, Wheelchair			
J. Toilet			
K. Tub, Shower			
Locomotion			
L. Walk/Wheelchair	W Walk C Wheelchair B Both	W Walk C Wheelchair B Both	W Walk C Wheelchair B Both
M. Stairs			
Motor Subtotal Score			
Communication			
N. Comprehension	A Auditory V Visual B Both	A Auditory V Visual B Both	A Auditory V Visual B Both
O. Expression	V Vocal N Nonvocal B Both	V Vocal N Nonvocal B Both	V Vocal N Nonvocal B Both
Social Cognition			
P. Social Interaction			
Q. Problem Solving			
R. Memory			
Cognitive Subtotal Score			
TOTAL FIM Score			

NOTE: Leave no blanks. Enter 1 if patient not testable due to risk

Appendix – V: Berg Balance Scale

Name: _____ Date: _____

Location: _____ Rater: _____

ITEM DESCRIPTION	SCORE (0-4)
1. Sitting to standing	_____
2. Standing unsupported	_____
3. Sitting unsupported	_____
4. Standing to sitting	_____
5. Transfers	_____
6. Standing with eyes closed	_____
7. Standing with feet together	_____
8. Reaching forward with outstretched arm	_____
9. Retrieving object from floor	_____
10. Turning to look behind	_____
11. Turning 360 degrees	_____
12. Placing alternate foot on stool	_____
13. Standing with one foot in front	_____
14. Standing on one foot	_____
Total	_____

1. SITTING TO STANDING
INSTRUCTIONS: Please stand up. Try not to use your hand for support.
( ) 4 able to stand without using hands and stabilize independently
( ) 3 able to stand independently using hands
( ) 2 able to stand using hands after several tries
( ) 1 needs minimal aid to stand or stabilize
( ) 0 needs moderate or maximal assist to stand

2. STANDING UNSUPPORTED
INSTRUCTIONS: Please stand for two minutes without holding on.
( ) 4 able to stand safely for 2 minutes
( ) 3 able to stand 2 minutes with supervision
( ) 2 able to stand 30 seconds unsupported
( ) 1 needs several tries to stand 30 seconds unsupported
( ) 0 unable to stand 30 seconds unsupported

3. SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL
INSTRUCTIONS: Please sit with arms folded for 2 minutes.
( ) 4 able to sit safely and securely for 2 minutes
( ) 3 able to sit 2 minutes under supervision
( ) 2 able to able to sit 30 seconds
( ) 1 able to sit 10 seconds
( ) 0 unable to sit without support 10 seconds

4. STANDING TO SITTING
INSTRUCTIONS: Please sit down.
( ) 4 sits safely with minimal use of hands
( ) 3 controls descent by using hands
( ) 2 uses back of legs against chair to control descent
( ) 1 sits independently but has uncontrolled descent
( ) 0 needs assist to sit

5. TRANSFERS
INSTRUCTIONS: Arrange chair(s) for pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.
( ) 4 able to transfer safely with minor use of hands
( ) 3 able to transfer safely definite need of hands
( ) 2 able to transfer with verbal cuing and/or supervision
( ) 1 needs one person to assist
( ) 0 needs two people to assist or supervise to be safe

6. STANDING UNSUPPORTED WITH EYES CLOSED
INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.
( ) 4 able to stand 10 seconds safely
( ) 3 able to stand 10 seconds with supervision
( ) 2 able to stand 3 seconds
( ) 1 unable to keep eyes closed 3 seconds but stays safely
( ) 0 needs help to keep from falling

7. STANDING UNSUPPORTED WITH FEET TOGETHER
INSTRUCTIONS: Place your feet together and stand without holding on.
( ) 4 able to place feet together independently and stand 1 minute safely
( ) 3 able to place feet together independently and stand 1 minute with supervision
( ) 2 able to place feet together independently but unable to hold for 30 seconds
( ) 1 needs help to attain position but able to stand 15 seconds feet together
( ) 0 needs help to attain position and unable to hold for 15 seconds

8. REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING
INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at the end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the fingers reach while the subject is in the most forward lean position. When possible, ask subject to use both arms when reaching to avoid rotation of the trunk.)
( ) 4 can reach forward confidently 25 cm (10 inches)
( ) 3 can reach forward 12 cm (5 inches)
( ) 2 can reach forward 5 cm (2 inches)
( ) 1 reaches forward but needs supervision
( ) 0 loses balance while trying/requires external support

9. PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION
INSTRUCTIONS: Pick up the shoe/slipper, which is place in front of your feet.
( ) 4 able to pick up slipper safely and easily
( ) 3 able to pick up slipper but needs supervision
( ) 2 unable to pick up but reaches 2-5 cm (1-2 inches) from slipper and keeps balance independently
( ) 1 unable to pick up and needs supervision while trying
( ) 0 unable to try/needs assist to keep from losing balance or falling

10. TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING
INSTRUCTIONS: Turn to look directly behind you over toward the left shoulder. Repeat to the right. Examiner may pick an object to look at directly behind the subject to encourage a better twist turn.
( ) 4 looks behind from both sides and weight shifts well
( ) 3 looks behind one side only other side shows less weight shift
( ) 2 turns sideways only but maintains balance
( ) 1 needs supervision when turning
( ) 0 needs assist to keep from losing balance or falling

11. TURN 360 DEGREES
INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.
( ) 4 able to turn 360 degrees safely in 4 seconds or less
( ) 3 able to turn 360 degrees safely one side only 4 seconds or less
( ) 2 able to turn 360 degrees safely but slowly
( ) 1 needs close supervision or verbal cuing
( ) 0 needs assistance while turning

12. PLACE ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED
INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touch the step/stool four times.

( ) 4 able to stand independently and safely and complete 8 steps in 20 seconds
( ) 3 able to stand independently and complete 8 steps in > 20 seconds
( ) 2 able to complete 4 steps without aid with supervision
( ) 1 able to complete > 2 steps needs minimal assist
( ) 0 needs assistance to keep from falling/unable to try

13. STANDING UNSUPPORTED ONE FOOT IN FRONT
INSTRUCTIONS: (DEMONSTRATE TO SUBJECT) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width.)

( ) 4 able to place foot tandem independently and hold 30 seconds
( ) 3 able to place foot ahead independently and hold 30 seconds
( ) 2 able to take small step independently and hold 30 seconds
( ) 1 needs help to step but can hold 15 seconds
( ) 0 loses balance while stepping or standing

14. STANDING ON ONE LEG
INSTRUCTIONS: Stand on one leg as long as you can without holding on.

( ) 4 able to lift leg independently and hold > 10 seconds
( ) 3 able to lift leg independently and hold 5-10 seconds
( ) 2 able to lift leg independently and hold ≥ 3 seconds
( ) 1 tries to lift leg unable to hold 3 seconds but remains standing independently.
( ) 0 unable to try of needs assist to prevent fall

Interpretation: **41-56 = independent**
21-40 = walking with assistance
0 –20 = wheelchair bound

Appendix – VI: Gross motor functional classification system, Manual ability classification system, communication functional classification system, Eating and Drinking Ability Classification System

	Classification systems		
Levels	*GMFCS*	*MACS*	*CFCS*
I	Walks without limitations	Handles objects easily and successfully	Sends and receives with familiar and unfamiliar partners effectively and efficiently
II	Walks with limitations	Handles most objects but with somewhat reduced quality and/or speed of achievement	Sends and receives with familiar and unfamiliar partners but may need extra time
III	Walks using a hand-held mobility device	Handles objects with difficulty; needs help to prepare and/or modify activities	Sends and receives with familiar partners effectively, but not with unfamiliar partners
IV	Self-mobility with limitations; may use powered mobility	Handles a limited selection of easily managed objects in adapted situations	Inconsistently sends and/or receives even with familiar partners
V	Transported in a manual wheelchair	Does not handle objects and has severely limited ability to perform even simple actions	Seldom effectively sends and receives, even with familiar partners

(Reproduced with permission from Cooley M, et al. Developmental Medicine & Child Neurology, Mac Keith Press; 2011).

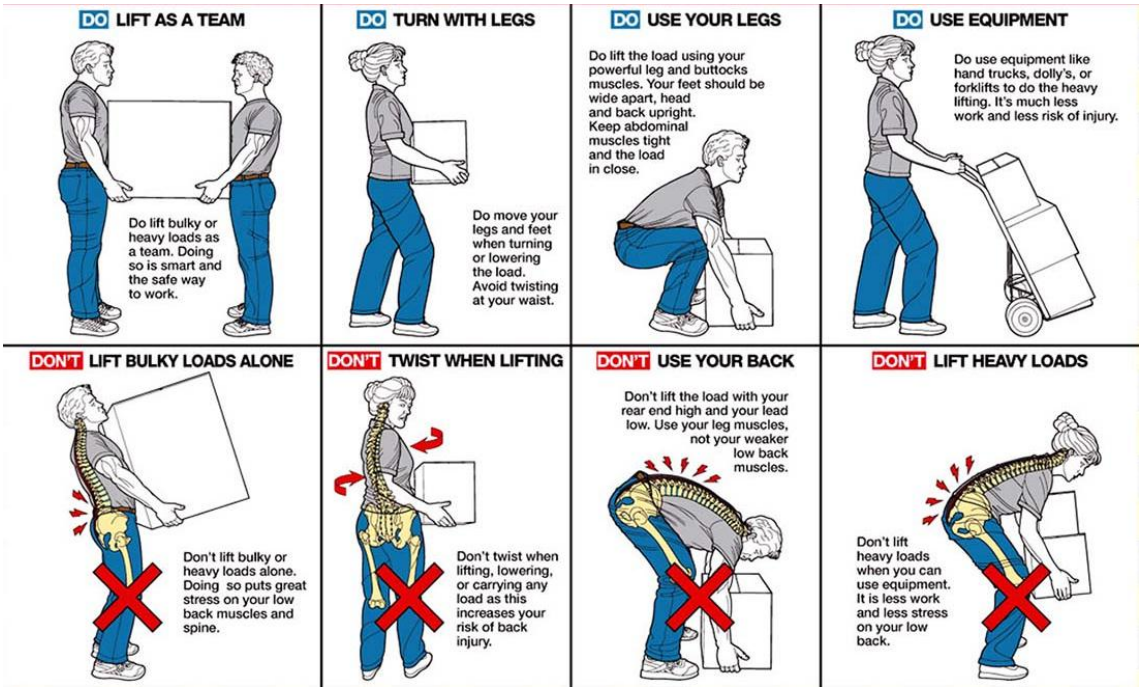
Eating and Drinking Ability Classification System (EDACS)

Level I	Eats and drinks safely and efficiently
Level II	Eats and drinks safely with some limitations to efficiency
Level III	Eats and drinks with some limitations to safety; there may be limitations to efficiency
Level IV	Eats and drinks with significant limitations to safety
Level V	Unable to eat or drink safely – tube feeding may be considered to provide nutrition

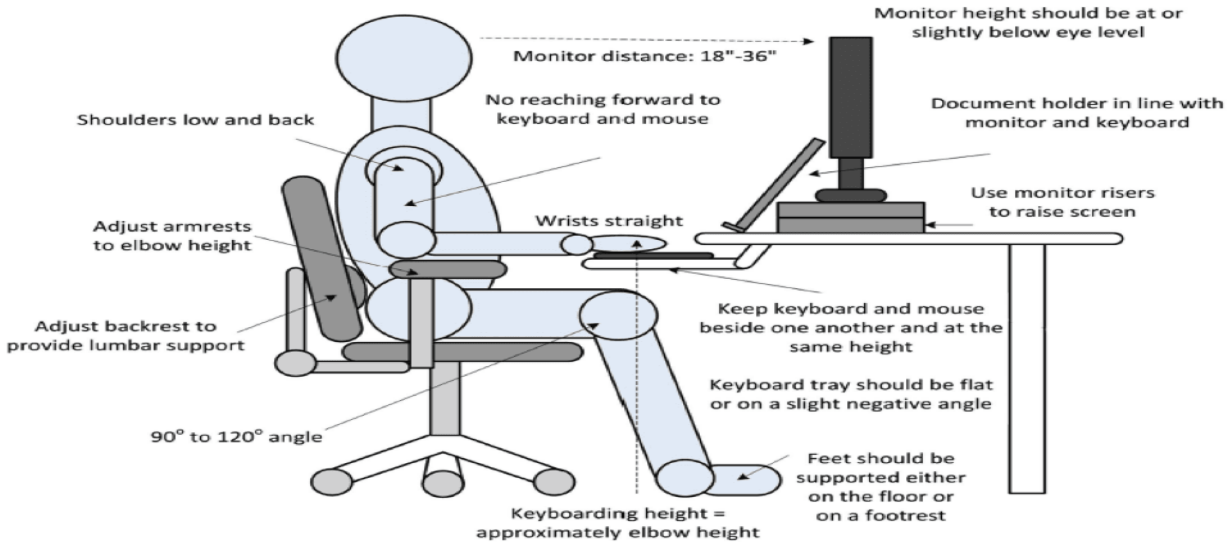
Appendix – VII: Advanced technologies (may be available in future in Nepal) which improve outcomes in rehabilitation settings

1. Motor cortex stimulation might be reasonable for the treatment of intractable central post stroke pain that is not responsive to other treatments in carefully selected patients.
2. Robot-assisted movement training to improve motor function and mobility after stroke in combination with conventional therapy may be considered. Robotic therapy is reasonable to consider to deliver more intensive practice for individuals with moderate to severe upper limb paresis.
3. CP - Robotic and Partial Body Weight Support Treadmill Training (PBWSTT): These forms of therapy involve a repetitive and task-specific approach to facilitate attainment of stepping and locomotion and to achieve a more normalized gait pattern based on current theories of motor learning.
4. Intrathecal baclofen therapy (ITB) - Indications include interfere with function or the ability to provide care, modified Ashworth scores >3. Helped to improve motor function, functional independence and reduce the disability.
5. Deep brain stimulation (DBS) - DBS is the treatment of choice in primary dystonia. In those who do not respond adequately to ITB, DBS should be considered.
6. Selective dorsal rhizotomy (SDR) - The ideal candidate is a child between the ages of 3 and 8 years old with diplegic CP and predominantly spastic tone (typically GMFCS levels I to III), little upper limb involvement, sufficient underlying strength, good selective motor control, and minimal contractures. Positive preoperative functional predictors for a good SDR outcome include the ability to rise from a squatted position with minimal support and a younger child's ability to crawl on hands and knees or tall kneel. Children must have the cognitive and social capacity for such an intensive intervention.

Appendix – VIII: Ergonomics and lifting techniques for healthy back and knee



Do's and Don'ts for healthy back while lifting



Ergonomics for healthy back and knee

Appendix – IX: List of participants/contributors -Consultative Workshop for the finalization of Rehabilitation Clinical Protocol

Date: 2077/12/31, **Venue:** Kathmandu

SN	Name	Designation	Institution
1.	Dr. Dipendra Raman Singh	Director General	Department of Health Services, Teku
2.	Dr. Krishna Prasad Paudel	Director	Epidemiology and Disease Control Division (EDCD)
3.	Dr Pawan Jung Rayamajhi	Sr. Med. Superintendent	Ministry of Health and Population (MoHP)
4.	Dr. Uttam Ghimire	Sr. Integrated Medical Officer	Epidemiology and Disease Control Division(EDCD), Leprosy Control and Disability Mgmt Section (LCDMS)
5.	Mitha Ram Thapa	Sr. Leprosy Officer	EDCD, LCDMS
6.	Tara Gyawali Sharma	TB/Leprosy Officer	EDCD, LCDMS
7.	Asso. Prof. Dr. Bina P. Manandhar	Chief Consultant Pediatrician	Kanti Children Hospital
8.	Dr. Kedar Marahatta	NPO	World Health Organization (WHO)
9.	Gaetan Mareschal	Chief of Party-PRA	Handicap International (HI)
10.	Sunil Pokhrel	Rehabilitation Specialist	Handicap International (HI)
11.	Smriti Suwal	Technical Advisor- Health & Rehabilitation	Handicap International (HI)
12.	Yeti Raj Niraula	Sr. Prosthetist & Orthotist	Handicap International (HI)
13.	Ngawang Dolma Tamang	Admin and Data Officer	Handicap International (HI)
14.	Doma Tshering Lama	Project Assistant	Handicap International (HI)
15.	Thakur Mani Dhahal	Account Officer	Department of Health Service
16.	Dr. Raju Dhakal	Consultant of Rehab Clinical Protocol Medical Director	Spinal Injury Rehab Centre
17.	Shamed Kumar Katila	Pediatric Physiotherapist	Orthoplast Rehab Center P. Ltd
18.	Nitra Bdr. Deuja	CBR Coordinator	Hospital for Rehabilitation of Disabled Children
19.	Pravin Kumar Yadav	Physiotherapist	National Trauma Centre
20.	Kabiraj Khanal	Sr. Speech Pathologist	TUTH
21.	Ram Kumar Mahato	Public Health Officer	Epidemiology and Disease Control Division
22.	Sadikshya Mulepati	Sr. Physiotherapist	Bir Hospital
23.	Dr. Pragya Karmacharya	Pediatrician	Self Help Group for Cerebral Palsy
24.	Medha Koirala	Speech therapist	Self Help Group for Cerebral Palsy
25.	Prof. Dr. Rohit Pokhrel	Chief of Spine Unit, Dept. of Orthopedics and Trauma Surgery	TUTH
26.	Prayoush Neupane	Asst. Professor,	TUTH

SN	Name	Designation	Institution
		Physiotherapist	
27.	Narmada Devkota	Clinical Psychologist	Kanti Children Hospital
28.	Dev Kumari Parajuli	Central Member	National Federation of Disabled Nepal
29.	Govinda Mani Nepal	Asst. Professor, Physiotherapist	Kathmandu University School of Medical Science
30.	Amit Ratna Bajracharya	Prosthetist & Orthotist/ Chairperson	POS Nepal
31.	Suna Laxmi Karmacharya	Sr. Community Nursing Officer	Ministry of Health and Population
32.	Sukdev Paudel	Prosthetist & Orthotist	Army Rehab Centre
33.	Dr. Pradip Sapkota	Orthopedic and Reconstructive Surgeon	Anandaban Hospital

List of other contributors

S.N	Name	Designation	Institution
1.	Prof. Dr. Mohan Raj Sharma	HOD, Dept. of Neurosurgery, Neurosurgeon	Institute of Medicine, TUTH.
2.	Associate. Prof. Dr. Bikram P. Gajurel	Dept. of Neurology Neurologist	Institute of Medicine, TUTH.
3.	Associate. Prof. Dr. Ranjeeta S. Acharya	Dept. of Physiotherapy Physiotherapist	Dhulikhel Hospital, KUSMS.
4.	Debendra Moya Shrestha	Physiotherapist	Kanti Children`s Hospital
5.	Deepa Lamichane	Occupational Therapist	Spinal Injury Rehabilitation Center
6.	Prativa Gautam Poudel	Rehabilitation Nurse	Spinal Injury Rehabilitation Center
7.	Mandira Baniya	Rehabilitation Nurse	Spinal Injury Rehabilitation Center
8.	Chanda Rana	Neuro-physiotherapist	Spinal Injury Rehabilitation Centre
9.	Prabesh Bista	Dept. of Psychology Psychologist	Spinal Injury Rehabilitation Center

नेपाल सरकार
स्वास्थ्य तथा जनसंख्या मन्त्रालय
स्वास्थ्य सेवा विभाग
इपिडिमियोलोजी तथा रोग नियन्त्रण महाशाखा
कुष्ठरोग नियन्त्रण तथा अपाङ्गता व्यवस्थापन शाखा
टेकु, काठमाडौं
सम्पर्क नं: ०१-५३५२००९, ५३५८५३५
इमेल: leprosycontrol@gmail.com,
वेभ: www.edcd.gov.np