Clinical reasoning in neurological physiotherapy: A framework for the management of patients with movement disorders

Article *in* Archives of Hellenic Medicine · January 2016

DOI: 10.1016/j.ahm.2016.02.001

CITATIONS
0

READS
6,220

3 authors, including:

Zacharias Dimitriadis
University of Thessaly
73 PUBLICATIONS **398** CITATIONS

SEE PROFILE

Vasileios C Skoutelis
National and Kapodistrian University of Athens
32 PUBLICATIONS **15** CITATIONS

SEE PROFILE

ARCHIVES OF HELLENIC MEDICINE: ISSN 11-05-3992

REVIEW
ΑΝΑΣΚΟΠΗΣΗ

ARCHIVES OF HELLENIC MEDICINE 2016, 33(4):447–457
ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2016, 33(4):447–457

Clinical reasoning in neurological physiotherapy
A framework for the management of patients with movement disorders

Z. Dimitriadis,[1,2]
V. Skoutelis,[1]
E. Tsipra[3]

[1]Department of Physiotherapy, School of Health and Caring Professions, Technological Educational Institute of Athens, Athens, Greece
[2]Department of Physiotherapy, School of Sciences, European University of Cyprus, Nicosia, Cyprus
[3]Laboratory of Physiotherapy, Athens, Greece

Neurological physiotherapy is a scientific field which has evolved considerably over recent decades. This advancement is based to a great extent on the simultaneous increase in knowledge about neuroscience, motor control and motor (re)learning, which has led to the development of further assessment and treatment techniques and new considerations for practice, necessitating sound clinical reasoning and well-structured management for their appropriate incorporation into clinical practice. Although the current literature provides information regarding clinical reasoning and decision-making in physiotherapy, few articles discuss these matters in relation to patients with neurological disorders. This article presents a framework for the management of patients with neurological disorders and develops the rationale for establishing treatment goals. The model described places function as the basis for establishing treatment goals, highlights the importance of the views of the patients and their carers in clinical decision-making and supports individualization of treatment, with flexibility in the incorporation of the assessment/treatment strategies of many clinical schools of thought. It is hoped that this model will be a useful addition to current knowledge and provide a guide for the clinical reasoning and decision-making of current and future clinicians.

Κλινικός συλλογισμός στη νευρολογική Φυσικοθεραπεία: Ένα μοντέλο για τη διαχείριση ασθενών με κινητικές διαταραχές

Περίληψη στο τέλος του άρθρου

Key words

Activity-based
Clinical reasoning
Decision-making
Elective approach
Functional approach

Submitted 12.12.2015
Accepted 21.12.2015

1. INTRODUCTION

Clinical reasoning has been described as "a process in which the therapist, interacting with significant others (e.g., family and other health-care team members), structures meaning, goals and health management strategies based on clinical data, client choices, and professional judgement and knowledge".[1]

In neurological physiotherapy the clinical reasoning for practice is usually provided by the content of each approach.[2–4] The adoption of a model which supports specific assessment and treatment strategies may render the model too inflexible to be acceptable to clinicians of different schools of thought. Such conceptual and practical differences may impede optimal communication among clinicians. It could therefore be suggested that communication should be based within a framework which is designed to guide clinical reasoning and decision-making, but with the flexibility to allow clinicians to incorporate specific elements of their preferred approach.

The literature provides a number of types of framework for clinical practice.[5–9] Although each of these models and concepts makes its own contribution to the advancement of clinical reasoning, a strong need remains for a framework that (a) is focused on the specific aims and aspects of neurological physiotherapy, (b) offers a comprehensive guide for the procedure of decision-making, (c) is sufficiently flexible for clinicians of different schools of thought, and (d) provides clear implications and goals for clinical practice.[6] The provision of such types of framework could integrate various different views, opinions and implications, giving clinicians the opportunity for more informed clinical reasoning and better decision-making.

The aim of this article is to provide a new framework for clinical reasoning and decision-making which can be used

widely by adult and pediatric neurological physiotherapists of different clinical schools. It delineates an additional model, the movement dysfunction tree, which guides the analysis, recording and planning of the management of movement dysfunction.

2. A FRAMEWORK FOR THE MANAGEMENT OF PATIENTS WITH NEUROLOGICAL PROBLEMS

The framework proposed here (fig. 1) supports the provision of highly individualized interventions and considers the patient and his(her) carers to be an important part of the process of decision-making. The framework recognizes the management of movement dysfunction as the crucial element of neurological rehabilitation and demonstrates that assessment and treatment should be guided by a thorough analysis of the patients' functional activities.

The model shown in figure 1 has been influenced by the work of a variety of renowned scientists and associations.[2,3,5,6,10–12] It does not aim to suggest the "best" therapeutic treatment or techniques, but proposes a way of thinking, assessing and planning physiotherapeutic interventions. This model is designed to be sufficiently flexible for therapists to plan their treatment programs according to their own clinical preference and beliefs.

According to this model, the management program of a patient with neurological problems can be divided into 6 discrete phases: History, physical examination, evaluation, planning, intervention, and reassessment.

2.1. History

The history includes the gathering of information about the patient through a thorough interview, the examination of medical records (medical files, charts, previous examinations, etc.) and possible other sources. The importance of this phase lies not only in the invaluable information that the physiotherapist collects about the patient, but also in the opportunity that it provides for establishing rapport and confidence. During this phase, the physiotherapist obtains information about the present condition and the medical, family, functional and social history of the patient. Interview questions should be addressed from both the enablement and the disablement perspective.[6] This information helps the physiotherapist not only to understand the current condition of the patients clearly and direct the physical examination phase appropriately, but also to recognize important outcome measures for recording progress, i.e., monitoring outcome measures (MOMs). The medical records review and the interview are also important for recognizing positive and negative treatment modifiers. This phase may

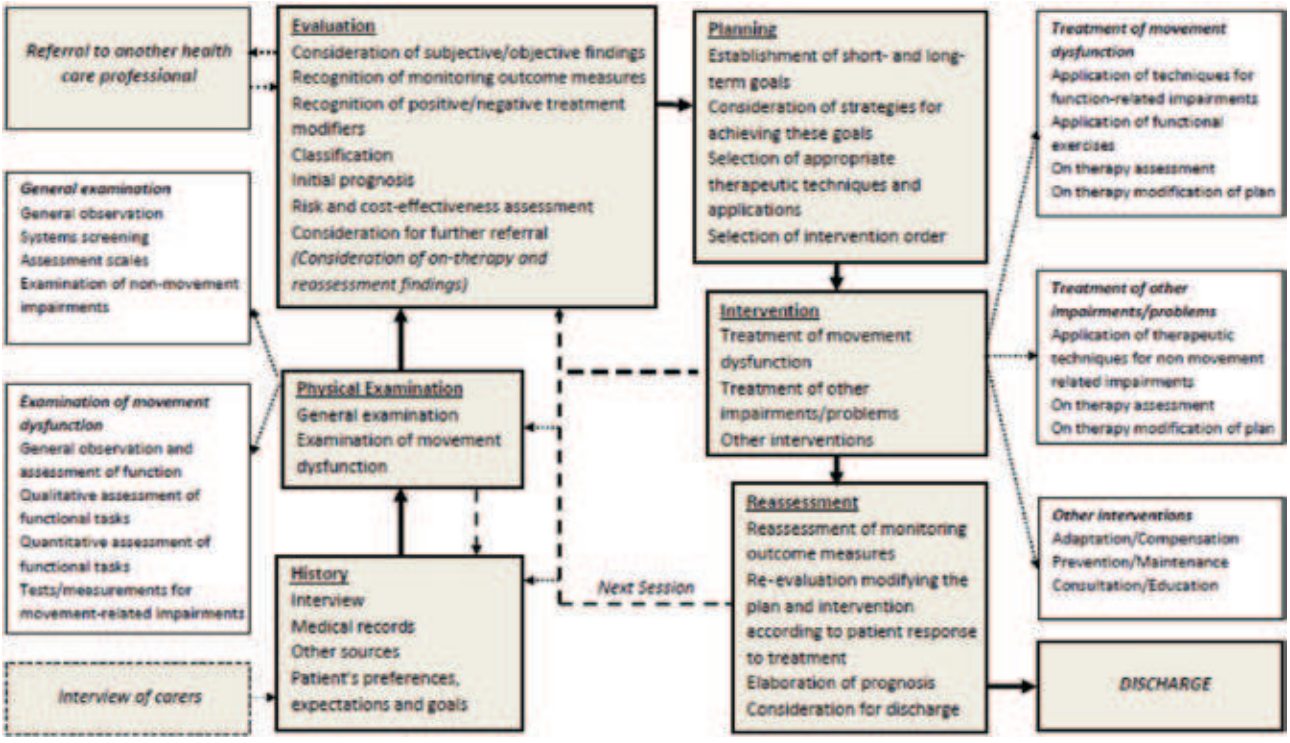

Figure 1. The clinical decision-making process for the management of patients with neurological disorders.

also reveal risk factors and determine the need for further referral to a doctor or other health scientist.

The recording of the preferences, expectations and goals of the patient and carers is also critical during this phase.[13] Assessment and therapy should be guided not only by the scientific knowledge of each therapist, but also by reasonable and feasible goals proposed by patients and carers. Their views regarding the appropriateness, effectiveness and acceptance of previous medical and physiotherapeutic interventions may also lead to a more individualized, acceptable and effective therapeutic plan. The consideration of their opinion can lead to treatment goals that are more relevant to the patient's daily life and likely to enhance self-confidence.[14]

2.2. Physical examination

The physical examination follows on from, and is directed to a great extent by the interview. Questioning of the patient may also continue during this phase as new data emerge. The physical examination can be divided into general examination and examination of movement dysfunction.

2.2.1. General examination

The examination starts with general observation of the patient, to provide elementary information about the patient's character, personality, cognitive, functional and psychological status and independence, and help in the recognition of positive and negative treatment modifiers and guide the later examination. The general observation of the patient may start during the interview. The general review of body systems, including the musculoskeletal, cardiorespiratory, neurological and integumentary systems, and especially the recording of vital signs, such as respiratory rate, heart rate, blood pressure and oxygen saturation may be of high importance, especially for patients with comorbidities or those in the acute phase of their disorder. The examination and quantification of non-movement impairments may also help in the recognition of positive and negative treatment modifiers, risk factors or potential treatment goals. The completion of valid, reliable scales for the quantification of independence, activities of daily living, disability and quality of life (QoL) may also provide important information for the planning phase or identify significant MOMs.

2.2.2. Examination of movement dysfunction

The approach to the examination and treatment of movement dysfunction proposed here is influenced by the International Classification of Functioning, Disability and Health (ICF) model.[10] This approach weights differently the different components of disability, as assessment and treatment at the function/activity level has been highly prioritized. This has led to unidirectional rather than bi-directional associations between the different components of disability (impairments, activities/function, participation) as the aim is not to classify and describe disability, but to guide the analysis and recording of movement dysfunction.

This approach led to the development of a movement dysfunction tree (fig. 2). This therapist-developing tree can be considered the basis for decision-making during the rehabilitation of movement dysfunctions. A fundamental principle of this model is that the rehabilitation of a patient with neurological problems should be based on the recorded functional activities and the context within which they can be performed. The selection of these functional activities should be based on the views of the patients and carers, the understanding of their connection to social participation and disability, in addition to the therapist's scientific knowledge about their relative importance and findings on examination. Functional activities should be assessed both qualitatively (descriptive task-analysis) and quantitatively (task-specific tests and scales). Information from the interview or physical examination may be important for deciding which functional activities could optimize the activities of daily living, independence, social participation, QoL and self-esteem. These parameters can be recorded as scale scores in order to monitor progress and guide decisions for the patient's discharge. Analysis of these functional activities can lead to hypotheses regarding the underlying impairments, which also need quantification. The "movement dysfunction tree" is not simply a chart for analyzing movements, but it is also a basis for establishing function-related treatment goals. This model is quite flexible, allowing therapists to design their own "movement-dysfunction trees" based on the functions and impairments and their own interests and beliefs. Although this model can be a time-efficient and structured method of understanding and making decisions about the management of movement dysfunction, it is not a substitute for the other components of decision-making (fig. 1).

2.2.2.1. Examination at function/activity level. Currently there is a relatively universal acceptance of the fact that the rehabilitation of patients with neurological problems should be focused on their functional activities. Despite lack of agreement regarding the specific therapeutic tools or priorities for achieving improvement, restoration of functional status is central to the methods which traditionally

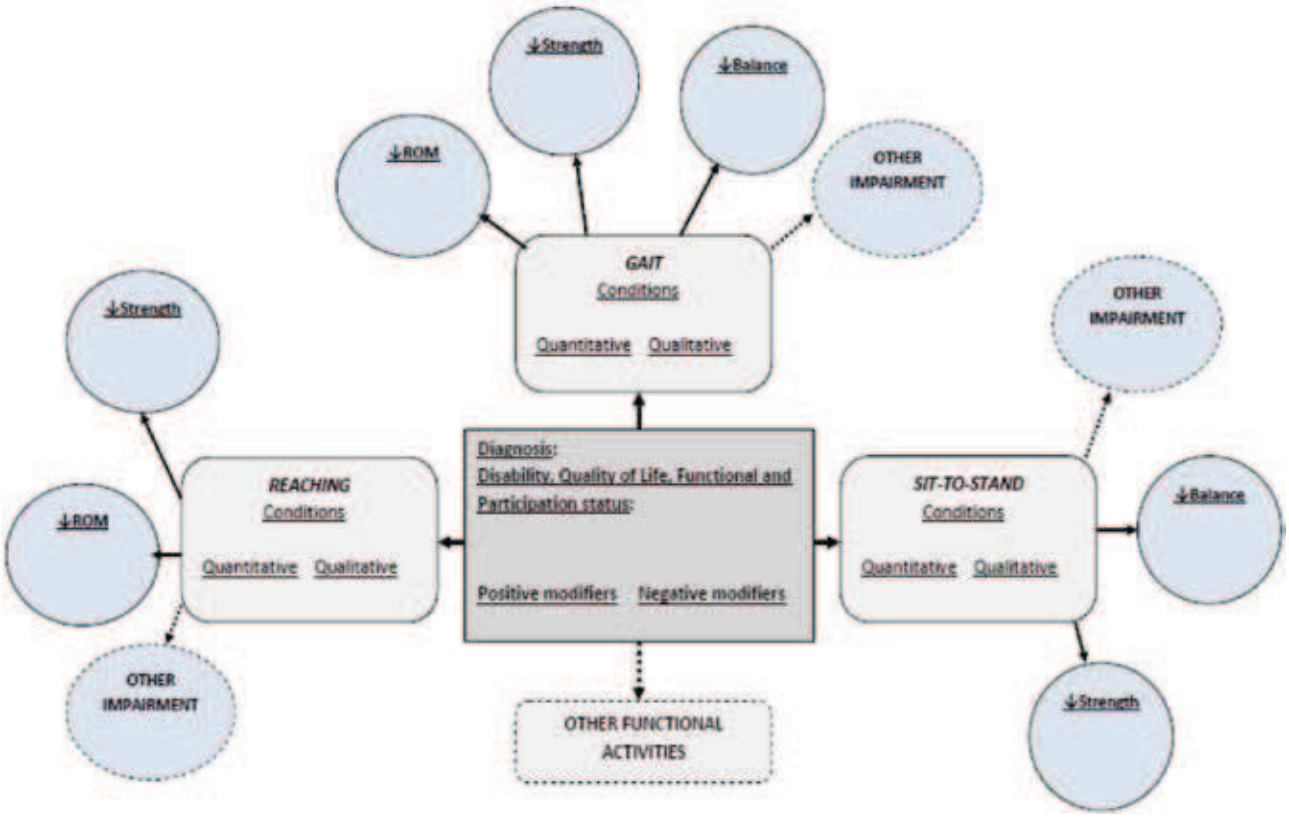

Figure 2. Movement dysfunction tree – a model for the analysis and recording of movement dysfunction and for designing an intervention for its management.

followed a more neurodevelopmental/neurophysiological approach.[2,15] Examination of functional activities should be the basis for the establishment of therapeutic goals and implementation of therapeutic strategies.

This phase begins with a general observation of the patient's functional abilities. This observation may be paralleled with the completion of scales and or tests for quantifying the functional status of the patient and monitor the progress during sessions. The screening of these functional activities in parallel with the expectations of the patients and carers may be important in the selection of further examinations for functional tasks and impairments.

Although function is central to the examination procedure, there is still no consensus on whether the main focus of assessment should be the extent (i.e., quantity) or quality of each functional activity. Regardless of the clinical preference or belief of each therapist, qualitative and quantitative assessment of functional activities may both have implications for clinical practice.

Qualitative analysis includes the assessment of the patient's coordination, quality of movement and its kinematic characteristics during the performance of a task. Important findings from such an analysis derive from each phase of the task, including initial and terminal positions. The personal and environmental context within which the task can be completed should be also recorded. Qualitative analysis of functional tasks may reveal the kinematic patterns of patients and their deviation from normal. Although the restoration of normal patterns may not always be achievable or even beneficial for the patients,[16] such an assessment can provide therapists with hypotheses regarding the underlying impairments of that may be associated with the patient's impaired functional activity.

Quantitative analysis of the task includes the quantification of the ability of the patient to complete the task into scores according to valid and reliable scales and tests. These scores can help clinicians to obtain MOMs to monitor the progress of the patient before and after one or more therapeutic sessions. The scores obtained from the quantitative assessment of a task can also be compared with norms in order to understand the magnitude of limitation of functional activity or make predictions guiding prognosis.

2.2.2.2. Examination at impairment level. According to the ICF,[10] impairments of body structures or functions

have a close connection with function/activities and the resulting disability. The examination of functional activities can therefore lead to hypotheses and decisions regarding the examination at impairment level. The impairments should be assessed with valid and reliable measurement tools capable of providing clinicians with confidence for taking decisions and evaluating the effectiveness of their therapeutic approach. The recognition and quantification of relevant impairments may provide not only important MOMs, but also short- and long-term treatment goals. According to the rationale of the current model, however, the assessment of impairments that are not definitely related to the functional activity of interest may be of questionable importance.

2.3. Evaluation

The evaluation phase is the core of clinical reasoning. During this phase, therapists have to consider all the recorded subjective and objective findings and draw conclusions to guide the therapeutic plan. This phase includes recognition of the most important findings of the assessment and recording them as MOMs. These outcome measures should be selected based on their clinical utility as indices of recovery at the level of impairment, function/activity and participation and should depict to a great extent the goals of the patients and carers. These outcome measures should be assessed frequently and comprise the indices for determining improvement or deterioration after one or more sessions, and ultimately the criteria for discharge.

Thoughtful consideration of these findings should lead therapists to recognize positive and negative treatment modifiers. The concept of positive/negative modifiers is recognized by the current model as a key factor for clinical decision-making. A positive modifier can be defined as a personal (internal modifier) or environmental factor (external modifier) which can directly or indirectly optimize the expected therapeutic outcomes. For example, a great potential for natural recovery due to the recent onset of a stroke[17] can be considered as a positive modifier. A negative modifier can be defined as a personal or environmental factor which can directly or indirectly compromise the expected therapeutic outcomes. For example, poor adherence to treatment could have a significant negative effect on the expected therapeutic outcomes[18] and therefore therapists would be challenged to discover additional or alternative strategies to reduce this negative impact on recovery. These modifiers can be adjustable or non-adjustable. Adjustable modifiers are those that can be enhanced or eliminated by specific strategies. For example, poor adherence to treatment may be changed by appropriate consultation and education of patients and carers. Non-adjustable modifiers are those which cannot be changed and therefore the treatment plan should be modified, accordingly. For example, the age of patients, which can significantly affect the potential for recovery[12] cannot be changed and therefore therapists should appropriately modify their intervention in order to reduce risks, establish realistic goals and optimize therapeutic outcomes. Therapists are challenged to recognize all the relative positive and negative modifiers and plan their intervention, accordingly.

During this phase, patients may be also classified according to their clinical presentation and functional status. This classification, which is referred to as diagnosis in other models[5,6] may help in making predictions or directing treatment policies. Such classification may also facilitate the communication between therapists as it offers a time-efficient way to describe the clinical presentation of the patients.

The findings derived from the history and physical examination, in parallel with the recognition of positive and negative modifiers and the classification of patients according to their symptoms or functional status, can enable clinicians to predict the achievement of a stated outcome over a specified period of time, thus formulating an initial prognosis.[5,6] This prognosis can help clinicians to establish realistic short- and long-term goals after considering the views of patients and carers on the expected outcomes. In addition, a cost-effectiveness analysis informed by the views of all stakeholders could lead to better informed decisions about the participation of a patient in the programme, the establishment of goals and the selection of intervention strategies.

Decisions about the participation of a patient in a physiotherapeutic programme should also involve risk assessment. Therapists should carefully weigh the potential gains of their selected treatment with the potential dangers underlying it. Such an assessment should be analytically discussed with carers and patients in order to select the most effective interventions which can be performed within a safe context. A written informed consent by the patient or carer could sometimes be useful, especially when the application of more "aggressive" interventions has been agreed.

During this phase therapists should also strongly consider the referral of the patient to another health care professional. The recognition of "red flags" or previously undetected signs which need a medical diagnosis should lead therapists to the referral of their patients to an appropriate medical specialist. The suspicion of neuropsychological

problems should also lead to referral to a neuropsychiatrist for diagnosis and advice on their therapy. Similarly, physiotherapists should actively seek advice from other health scientists (speech therapists, occupational therapists, etc.) when there are concerns about conditions which are out of the scope of physiotherapeutic assessment and intervention.

Evaluation is not a static phase. It is a continuous process which necessitates continuous examination of any new information received during the therapy or reassessment. The incorporation of this new information into that obtained in the earlier assessment stages could lead to acceptance or rejection of initial hypotheses and further modification of the treatment plan.

2.4. Planning

Planning is the direct product of the evaluation phase, often described in parallel with the evaluation phase, although the model shown in figure 1 separates the evaluation, planning and intervention phases. This separation highlights the "thinking nature" of the evaluation component, the "decision nature" of the planning component and the "practical nature" of the intervention component, three components which are frequently interrelated.[11]

During the planning phase therapists establish realistic and meaningful short- and long-term goals for their patients. They must consider the potential strategies for achieving these goals and select the most appropriate therapeutic modalities and techniques and the order of each intervention. The selection of these strategies, modalities and techniques vary between clinicians of different clinical schools, but the choice should be based on the concept of evidence-based practice enriched by clinical experience and supported by thorough clinical reasoning.

2.5. Intervention

The intervention phase can be considered the phase of the clinical application of thoughts and decisions. The suggested model (fig. 1) divides the intervention phase into three discrete categories aimed at focusing on the treatment of movement dysfunction. Based on this model, the intervention phase includes the treatment of movement dysfunction, the treatment of other impairments/problems and other interventions.

2.5.1. Treatment of movement dysfunction

The treatment of movement dysfunction follows the rationale of the "movement dysfunction tree" (fig. 2), which according to the current framework is the preeminent part of decision-making in the management of patients with neurological problems.

2.5.1.1. Treatment at function/activity level. Evidence is accumulating showing that task-oriented exercises can significantly improve the functional performance of patients with neurological problems.[19] The restoration of functional ability in patients with neurological disorders appears to be the focus of contemporary physiotherapy even when the approach is traditionally more neurodevelopmental/neurophysiological in nature.[20]

Functional activities of interest can be initially identified during the interview of the patients and carers. Patients should be encouraged to express their opinions regarding which functional activities can be performed, which are performed with difficulty and which cannot be performed at all, and the relative importance of each functional activity. Functional activities of interest can be also recognized in the social history of patients, since limitations in social participation are partly connected with certain functional activities. Physiotherapists should consider whatever findings provide information regarding functional activities of interest to ensure a meaningful and highly individualized therapeutic approach to their improvement.

Treatment at the level of function should be aimed mainly at the ability of a patient to complete functionally meaningful tasks in relevant environments and if possible to perform these activities in a time-efficient, coordinated and convenient way. There is currently a great amount of discussion about the importance of recovery of quality of movement. In some cases the improvement of quality is important, since an abnormal pattern could have detrimental effects on the musculoskeletal system, e.g., a highly supinated foot during a sit-to-stand activity. In other cases, the quality of movement may also be of importance since lack of coordination may constitute a significant constraint to optimal motor control, leading to functional abnormalities and limitations.[12] The notion of improving quality in order to restore normality, however, is highly controversial since the "normal" for a patient may differ from the normal of healthy individuals, and may not be related to function.[16] Quality of movement may be viewed as a target of intervention, but not at the cost of function.[21]

The application of task-oriented exercises is considered critical for promoting optimal neuroplastic mechanisms and subsequent recovery.[3] The improvement of functional activity necessitates a number of repetitions,[22] and the prescribed exercises should be performed under the principles of motor (re)learning according to the learning

stage of each patient.[12] It is suggested that the exercises are designed to be progressive and variable,[12] with a level of difficulty low enough for the patient to be able to perform them but high enough to pose a real challenge. The difficulty of the tasks can be gradually increased according to the functional recovery of the patient.

Clinicians should also consider providing variability in the tasks by changing the context within which each task is performed at either the individual or the environmental level. Such changes may include simultaneous challenges to other body systems, kinematic and kinetic modifications, cognitive challenges, balance challenges, environmental changes, position changes, combination with other functional activities, use of internal/external cues or the use of specific supportive/guiding/assisting or exercising equipment. This variability appears to be necessary for the patients to improve, adapt and generalize their motor skill acquisition.[3,12] The performance of these exercises should be as active and independent as possible, but additional manual guidance may be provided when a patient does not have the potential to begin or complete the task on his(her) own[23] or when the biomechanics during the performance of the task may lead to musculoskeletal injuries. Manual facilitation for obtaining normality is highly controversial and should be suggested only when it is not applied at the cost of function.[21] Tasks can be provided that target the improvement of certain impairments in a functionally meaningful manner.[3] An example of a variable task-oriented programme is presented in table 1.

The improvement of functional activities may lead to increased participation of patients with neurological problems in daily life and social activities. Physiotherapists should be continually aware that the improvement of these functional activities should additionally target the participatory improvement of their patients and ultimate (re)integration into their social environment. In addition to programs for functional recovery, physiotherapists should also consider additional strategies for improving the participation of their patients, such participating in common activities with their patients, therapeutic sessions in the patients' own environment, group exercise therapy, use of assistive equipment, learning of transfers in relevant environments, participation in community re-entry programs, learning of safety guidelines and participation in complementary therapies, e.g., hippotherapy and swimming therapy.

2.5.1.2. Treatment at impairment level. According to the ICF,[10] impairments of body structures or functions have a close connection with overall function and the resulting disability and various approaches may give differing weight to the restoration of these impairments.[3,15] The improvement of impairments which are closely associated with functional activities may lead to better performance,[24] so that, although therapists should mainly prescribe functional exercises, the functional activities of interest should be analyzed in order for related impairments to be recognized and improved.

The focus on impairment level is variable, not only in terms of the amount of time spent on it during each session, but also in terms of the impairments that are targeted. For example, strength improvement may be considered less[15] or more important[3] based on the rationale of each therapist's approach, and the focus on muscle tone may also vary.[3,15] The aim of the "movement dysfunction tree" proposed here is not to suggest which impairments and treatment techniques are the most relevant or optimal. That is something which is highly dependent on the evidence provided in the literature combined with the clinical experience of each

Table 1. Example of a variable programme for improvement of functional activities in patients with neurological disorders.

Parameter	Example
Position changes	*Sit-to-stand:* Start a sit-to-stand activity with the feet 10 cm behind the vertical knee line, start movement from a flexed position of the torso
Environmental changes	*Gait:* Walking by using obstacles or abnormal surfaces, change the height or width of the obstacles
External cues	*Gait:* Verbal or visual guidance during walking
Internal cues	*Sit-to-stand:* Mental preparation or rocking before a sit-to-stand activity
Cognitive challenges	*Gait:* A two-by-two reverse counting during walking, solving quizzes during walking
Manual guidance/facilitation	*Sit-to-stand:* Facilitation of the sit-to-stand activity from the patients' knees and buttocks
Assisting/supporting equipment	*Gait:* Walking with a cane or an ankle-foot orthosis
Exercising equipment	*Gait:* Walking on a treadmill or robotic therapy
Balance challenges	*Gait:* Walking on a foam or with low lighting
Combination with other activities	*Gait:* Walking while gathering plastic glasses from different tables or while holding a glass of water

therapist. This model highlights instead the importance of considering intervention strategies for impairments that are closely connected with the impaired functional activity and it is suggested that clinicians ask themselves the following question before the implementation of treatment at the impairment level: "Is there evidence or are there sound theoretical grounds to believe that this impairment is connected to the functional performance?". In the case of a positive answer, it is suggested that the impairment under question be considered as a target for intervention, using either purposeful activities or passive procedures.[23]

2.5.1.3. On therapy assessment and modification of plan. Although treatment is related mostly to the application of modalities and techniques, it also has a trial-and-error nature. Therapists can obtain invaluable information by recording their patients' response to a selected treatment. On-therapy assessment can help to timely recognition of treatment techniques or modalities which are not appropriate or helpful. This information can lead therapists to change their treatment plan and selected techniques and provide new findings and hypotheses for consideration during the reassessment/re-evaluation phase.

2.5.2. Treatment of other impairments/problems

Although the main focus of treatment in patients with neurological disorders is the optimization of movement dysfunction, physiotherapy should also target and intervene appropriately to improve other non-movement related impairments.[25,26] The management of these non-movement impairments can occasionally be of higher priority than functional recovery, especially in patients in the acute stage of their disorder. For example, physiotherapy for respiratory problems (e.g., airway clearance) or cardiovascular problems (e.g., management of edema) may be of high physiotherapeutic interest to the patients. A global consideration of body systems and functions is necessary in order to optimize therapeutic outcomes and avoid potential complications. As in the treatment of movement dysfunction, continuous on-therapy assessment and modification of the initial plan is a necessary part of physiotherapeutic practice.

2.5.3. Other interventions

Physiotherapists not only intervene for the treatment of impairments and functional limitations, but they are also concerned with the adaptation and support of functional activities, the maintenance of body structures and function and the prevention of complications, and with counseling and education of patients and carers.

Contemporary advances in neuroscience and motor learning highlight the potential of patients with neurological problems to achieve functional recovery.[12] Treatment should therefore be focused mostly on recovery rather than the use of adaptive strategies to compensate for functional limitations. Adaptive or compensatory strategies can be considered when it has been agreed or proven that there is no potential for recovery,[6] as a necessary first step in order to obtain potential for recovery, or even when there are considerable psychological effects from the experience of disability.

Prevention and maintenance also guide the establishment of important rehabilitation goals.[26] Therapists should consider strategies for preventing potential complications with detrimental effects on the health of their patients. For example, muscle pump exercises for preventing potential deep vein thrombosis are frequently used, especially in the early stages of acute neurological disorders. Maintenance of optimal muscle length is also a clinical point of interest for preventing potential contractures.

Physiotherapists may also improve the expected outcomes through appropriate counseling and education.[27] Education and counseling can be directed towards many aspects of the management of patients' problems, including education on the appropriate performance of home exercises, on self-management strategies such as transfers, counseling about the patients' health condition and current problems, education through approved websites and leaflets and provision of advice to patients and carers about the self-management of the condition. Appropriate education and counseling of patients and carers may lead to their active engagement in the rehabilitation program, promoting recovery and independence.[28]

2.6. Reassessment

Reassessment follows the intervention phase and includes the assessment of MOMs, which have been decided on as progress markers, and it is advised to be conducted after the end of each treatment session. Reassessment of MOMs can reveal the effectiveness of a treatment technique, although the validity of conclusions from an after-treatment assessment of MOMs might be affected by learning/tiredness effects and therefore it cannot always provide by itself definite answers about the appropriateness of a certain treatment. Recording of reassessment findings over a sufficient number of sessions may give more valid and comprehensive answers about the progress of patients and lead to elaboration of the initial prognosis. These outcome measures may also be used as criteria for the discharge of

patients from each rehabilitation phase. When a patient has achieved certain predetermined scores and goals, he(she) can be considered eligible for discharge, but it is recommended that such decisions include a discussion with the patients and carers, with sufficient explanation regarding the underlying rationale.

The importance of reassessment is not restricted to recording the progress of patients, but it may also lead to considerable changes in the planning and selected intervention strategies. Reassessment leads directly to re-evaluation of the initial assessment findings and permits the acceptance or rejection of the hypotheses developed about the appropriateness of specific treatment strategies. This phase might also lead to additional questions or examination procedures for consideration during re-evaluation. Reassessment and re-evaluation are therefore necessary steps for formulating specific hypotheses and more appropriate design of the plan of care.

3. DISCUSSION

Clinical reasoning and decision-making are prerequisites for optimal clinical practice. The model described in this article can lead clinicians to establish realistic, achievable and meaningful short- and long-term goals during the management of patients with neurological problems. The model supports functional status of a patient as the basis for designing effective interventions and is flexible in terms of the selected interventions, recognizing the need for amendment according to the progress of neuroscience, motor learning science and research evidence.

In addition, the model strongly supports the involvement of patients and their carers in the whole procedure of decision-making. Their views, in parallel with the principles of motor learning and neuroscience as along with the therapists' clinical experience and feelings can lead to thoughtful clinical decisions. This model strongly supports the necessity for a highly individualized intervention plan, as each patient comprises a unique entity with his(her) own clinical presentation and treatment needs, and for recording positive and negative treatment modifiers which can lead to significant variance in the treatment of patients even though their clinical presentation may appear to be quite similar.

In contrast to previous similar decision-making models,[6,11] the current model does emphasize diagnosis, but the term "classification" was selected as the term "diagnosis" might not be eligible in all healthcare systems. Although the importance of prognosis and classification (diagnosis) has been recognized, it is not believed that they should constitute an independent category of clinical decision-making as the other parts of the model (i.e., history, physical examination, evaluation, planning, intervention, reassessment) and therefore they have been considered as a part of the evaluation component of the model.

This article also presents a "movement dysfunction tree" incorporated into the procedure of decision-making. This therapist-developed model can significantly help in the analysis of movement dysfunction and in breaking a functional problem into impairment components. Such an analysis can help to obtain a clearer understanding of the movement dysfunction and more appropriate design of a plan for the management of the movement disorders of a patient with neurological problems.

This model provides a further suggestion for clinical decision-making which it is hoped will enrich clinical reasoning. It can be a template for teaching decision-making and clinical reasoning and guide future clinicians and professionals in the field of neurological physiotherapy. The future development of additional models with additional modifications, ideas, concepts and opinions could provide clinicians with additional options and promote physiotherapeutic clinical reasoning.

ΠΕΡΙΛΗΨΗ

Κλινικός συλλογισμός στη νευρολογική Φυσικοθεραπεία: Ένα μοντέλο για τη διαχείριση ασθενών με κινητικές διαταραχές

Z. ΔΗΜΗΤΡΙΑΔΗΣ,[1,2] Β. ΣΚΟΥΤΕΛΗΣ,[1] Ε. ΤΣΙΠΡΑ[3]

[1]Τμήμα Φυσικοθεραπείας, Σχολή Επιστημών Υγείας και Πρόνοιας, Τεχνολογικό Εκπαιδευτικό Ίδρυμα Αθήνας, Αθήνα, [2]Τμήμα Φυσικοθεραπείας, Σχολή Επιστημών, Ευρωπαϊκό Πανεπιστήμιο Κύπρου, Λευκωσία, Κύπρος, [3]Εργαστήριο Φυσικοθεραπείας, Αθήνα

Αρχεία Ελληνικής Ιατρικής 2016, 33(4):447–457

Η νευρολογική Φυσικοθεραπεία είναι ένα επιστημονικό πεδίο που έχει εξελιχθεί σε μεγάλο βαθμό τις τελευταίες δεκαετίες. Η εξέλιξη αυτή μπορεί να ερμηνευτεί σε σημαντικό βαθμό από την ταυτόχρονη πρόοδο στη γνώση σχετικά με τις νευροεπιστήμες, τον κινητικό έλεγχο και την κινητική μάθηση και επανεκμάθηση. Το εν λόγω γεγονός έχει οδηγήσει στην ανάπτυξη περισσότερων τεχνικών αξιολόγησης και θεραπείας, καθώς και σε νέες θεωρήσεις για κλινική πρακτική. Ωστόσο, αυτή η αποκτώμενη γνώση απαιτεί έναν εμπεριστατωμένο κλινικό συλλογισμό και ένα άρτια δομημένο πλάνο διαχείρισης προκειμένου να ενσωματωθεί κατάλληλα στην κλινική πρακτική. Παρ' όλο που η τρέχουσα αρθρογραφία παρέχει πολλές πληροφορίες σχετικά με τον κλινικό συλλογισμό και τη λήψη αποφάσεων στη Φυσικοθεραπεία, υπάρχουν ελάχιστα άρθρα τα οποία συζητούν τα συγκεκριμένα θέματα σχετικά με τους ασθενείς που παρουσιάζουν νευρολογικές διαταραχές. Το παρόν άρθρο έχει ως σκοπό την παρουσίαση ενός μοντέλου για τη φυσικοθεραπευτική διαχείριση των ασθενών με νευρολογικές διαταραχές και την ανάπτυξη της λογικής που απαιτείται για τη λήψη αποφάσεων σχετικά με τους θεραπευτικούς στόχους. Το περιγραφόμενο μοντέλο θεωρεί τη λειτουργικότητα ως τη βάση για τη λήψη κλινικών αποφάσεων σχετικά με τους θεραπευτικούς στόχους, τονίζει τη σημασία των απόψεων των ασθενών και των φροντιστών στη λήψη των κλινικών αποφάσεων, υποστηρίζει την υψηλή εξατομίκευση του θεραπευτικού προγράμματος και είναι ευέλικτο προκειμένου να ενσωματώνει τις στρατηγικές αξιολόγησης και θεραπείας των διαφόρων σχολών κλινικής σκέψης. Το συγκεκριμένο μοντέλο πιστεύεται ότι θα είναι μια χρήσιμη προσθήκη στην τρέχουσα γνώση και θα αποτελέσει οδηγό για την ανάπτυξη της ικανότητας του κλινικού συλλογισμού και της λήψης αποφάσεων τόσο για τους παρόντες όσο και για τους μελλοντικούς κλινικούς.

Λέξεις ευρετηρίου: Βασισμένη στη δραστηριότητα, Εκλεκτική προσέγγιση, Κλινικός συλλογισμός, Λειτουργική προσέγγιση, Λήψη αποφάσεων

References

1. JONES MA, RIVETT DA. *Clinical reasoning for manual therapists.* Butterworth-Heinemann, Oxford, 2004
2. RAINE S, MEADOWS L, LYNCH-ELLERINGTON M. *Bobath concept: Theory and clinical practice in neurological rehabilitation.* Wiley-Blackwell Publ, Cornwall, 2009
3. CARR J, SHEPHERD R. *Neurological rehabilitation: Optimizing motor performance.* Butterworth-Heinemann, Oxford, 1998
4. ADLER SS, BECKERS D, BUCK M. *PNF in practice: An illustrated guide.* 3rd ed. Springer Medizin Verlag, Heidelberg, 2008
5. AMERICAN PHYSICAL THERAPY ASSOCIATION. Guide to physical therapist practice. Second edition. American Physical Therapy Association. *Phys Ther* 2001, 81:9–746
6. SCHENKMAN M, DEUTSCH JE, GILL-BODY KM. An integrated framework for desicion making in neurologic physical therapist practice. *Phys Ther* 2006, 86:1681–1702
7. BAINBRIDGE LA, HARRIS SR. Informed-shared decision making: A model for physical therapy education and practice? *Physiother Can* 2005, 58:74–81
8. DARRAH J. Using the ICF as a framework for clinical decicion making in pediatric physical therapy. *Adv Physiother* 2008, 10:146–151
9. DEL BELLO-HAAS V. A framework for rehabilitation for neurodegenerative diseases: Planning care and maximizing quality of life. *Neurol Rep* 2002, 26:115–129
10. WORLD HEALTH ORGANIZATION. International classification of functioning, disability and health (ICF). WHO, Geneva, 2001
11. MOFFAT M. *Neuromuscular essentials: Applying the preferred physical therapist practice patterns.* Slack Incorporated, NJ, USA, 2008
12. SHUMWAY-COOK A, WOOLLACOTT MH. *Motor control: Translating research into clinical practice.* 3rd ed. Lippincott Williams and Wilkins, USA, 2007
13. KING G, LAW M, KING S, ROSENBAUM P. Parents' and service providers' perceptions of the family-centredness of children's rehabilitation services. *Phys Occup Ther Pediatr* 1998, 18:21–40
14. ROSENBAUM P, KING S, LAW M, KING G, EVANS J. Family-centred service: A conceptual framework and research review. *Phys Occup Ther Pediatr* 1998, 18:1–20

15. BOBATH B. *Adult hemiplegia: Evaluation and treatment*. William Heinemann Medical Books Ltd, London, 1978
16. LATASH ML, ANSON JG. What are "normal movements" in atypical populations? *Behav Brain Sci* 1996, 19:55–106
17. KOLB B. Mechanisms of cortical plasticity after neuronal injury. In: Ponsford J (ed) *Cognitive and behavioural rehabilitation: From neurobiology to clinical practice*. Guilford, USA, 2004:30–58
18. KERN S, REICHMANN H, ZIEMSSEN T. Adherence to neurologic treatment: Lessons from multiple sclerosis. *Nervenarzt* 2008, 79:877–878, 880–882, 884–886
19. NOVAK I, McINTYRE S, MORGAN C, CAMPBELL L, DARK L, MORTON N ET AL. A systematic review of interventions for children with cerebral palsy: State of the evidence. *Dev Med Child Neurol* 2013, 55:885–910
20. HOWLE JM. *Neuro-developmental treatment approach: Theoretical foundations and principles of clinical practice*. The North American Neuro-Developmental Treatment Association, California, 2002
21. MAYSTON M. Bobath concept: A view from the United Kingdom. *NDTA Network* 2005, 12:10–11
22. KETELAAR M, HERMEER A, HART H, VAN PETEGEM-BEEK E, HELDERS PJ. Effects of a functional therapy program on motor abilities of children with cerebral palsy. *Phys Ther* 2001, 81:1534–1545
23. VALVANO J, RAPPORT MJ. Activity-focused motor interventions for infants and young children with neurological conditions. *Infant Young Child* 2006, 19:292–307
24. ADA L, DORSCH S, CANNING CG. Strengthening interventions increase strength and improve activity after stroke: A systematic review. *Aust J Physiother* 2006, 52:241–248
25. EDWARDS S. *Neurological physiotherapy*. 2nd ed. Churchill Livingstone, Edinburgh, 2002
26. STOKES M. *Physical management in neurological rehabilitation*. 2nd ed. Elsevier Mosby, London, 2004
27. PALISANO RJ, CHIARELLO LA, KING GA, NOVAK I, STONER T, FISS A. Participation-based therapy for children with physical disabilities. *Disabil Rehabil* 2012, 34:1041–1052
28. KIM JI, LEE S, KIM JH. Effects of a web-based stroke education program on recurrence prevention behaviors among stroke patients: A pilot study. *Health Educ Res* 2013, 28:488–501

Corresponding author:
Z. Dimitriadis, Department of Physiotherapy, School of Health and Caring Professions, Technological Educational Institute of Athens, Athens, Greece
e-mail: Zachariasd@hotmail.com