



# International Bobath Instructors Training Association

An international association for adult neurological rehabilitation

## IBITA

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Terminology workgroup. Bohman I., Gjelsvik B., Gjelsvik O., Rabou A./1999 - 2000

### Alignment

- State of being adjusted; a formation of a straight line (Websters collegiate dictionary 1916)
- Arrangement in a straight line (Hornby 1974).
- The arrangement of body segments (keypoints) in the sagittal, coronal or horizontal planes (Edwards 1996). This fits with Sahrman (1992).
- The positional relationship of component parts over the base of support (NDTA Glossary)
- Clinically understood as the dynamic interaction of body segments to each other (including the extremities) in 3 planes, produced as a result of activity of the neuro-musculo-skeletal system.
- The arrangement of body segments to one another, as well as the position of the body with reference to gravity and the base of support. Alignment determines the constellation of movement strategies that will be effective in controlling posture (Shumway, Woollacutt '95)

### Assessment

- Mosby (1994)
  - Evaluation or appraisal of a condition.
  - The process of making such an evaluation.
  - The process (in a problem orientated medical record) an examiner's evaluation of the disease or condition based on the patient's subjective report of the symptoms and course of the illness or condition and the examiner's objective findings, including data obtained through laboratory tests, physical examination and medical history.
- Taber's (1997)
  - Appraisal or evaluation of a patient's condition by a physician or nurse, based on clinical and laboratory data, medical history and the patient's account of symptoms.
  - The process by which a patient's condition is appraised or evaluated.
  - Functional assessment. In rehabilitation, the determination of a person's ability to perform everyday tasks and requirements of living.
- Miller K.
  - An appraisal or evaluation. Functional assessment: an objective review of an individual's skills and activities of daily living, used to predict rehabilitation outcomes and to evaluate therapeutic interventions.

### Associated movements and associated reactions

#### Similarities

Muscle activation which are in excess of those necessary to perform an action (Shepherd RB. A response. In Stephenson et al, 1998)

#### Differences

#### Associated movements

- Reinforced normal activity in response to stress (See Stephenson et al 1998).
- Synkinesia (physiological); a non-voluntary movement in any part of the body, as a reaction of a movement of other body parts, often because of extreme physical or psychological conditions (v.Cranenburg, B. '89)
- In the Bobath Concept AM are associated with the development of a skill or effort. The AM decline when a new action is learned and re-emerges whenever maximum force, speed of response or dexterity are required and when a new action is being learned. They can be stopped voluntarily when attention is called to them.

Associated reactions

- AR are pathological movements that are indicative of the potential for development of spasticity or the accentuation of the prevailing spastic synergy (Edwards 1996).
- AR are involuntary tonal reactions or responses to a stimulus that exceeds the individuals inhibitory control (Bobath 1990, Lynch and Grisogono 1991 a.o.).
- Synkinesia (pathological); a non-voluntary movement in an effected limb (or face (AR)) as a reaction of a movement of other body parts, (v. Cranenburg, B. '89) because of any physical or psychological overloading (Ans R)
- The results of a the CNS' attempt to reorganise itself after damage; they are an activity dependent learning process, when the patient attempts to interact without the background of postural activity and movement. Associate reactions are pathological movements that are indicative of the potential for development of spasticity or the accentuation of the prevailing spastic synergy (Edwards '96).
- In the literature different terms are used, which we understand to be synonymous:
  - Abnormal patterns, abnormal spastic patterns, abnormal behaviour (Carr, Shepherd and Ada 1995)
  - Abnormal movement or mobility (Shumway-Cook and Wollacott 1995)
  - Abnormal muscular synergies (Tyldesley and Grieve 1996)
  - Spastic synergy (Edwards 1996)

Clinically, we understand AR to be the result of the CNS' attempt to reorganise itself after damage. They can be viewed as an activity dependent learning process when the patient attempts to interact with the environment without the necessary background of postural activity and movement. This may lead to behavioural change. Repeated and/or persistent ARs may lead to the development of a spastic state.

*Associated reactions tend to be stereotyped to the individual.*

**Balance**

- A sensory-motor interplay based on dynamic, adaptive alignment. Balance provides the individual with the ability to move against and within the force of gravity. The aim of balance is to maintain midline when external or internal forces disturb, and to allow free extremities (Bobath 1990, Edwards 1996, Lynch and Grisogono 1991). Balance is provided by the equilibrium reactions (ER), the righting reactions (RR) and the protective reactions (Bobath 1990, Edwards 1996).
- The ability to control the centre of gravity (COG) over the base of support (BOS) in a given sensory environment. (Glossary, Neurological Rehabilitation 1990).
- The ability to control the centre of gravity (COG) over the base of support (BOS) in a given environment; both stationary (static stability) and in motion (dynamic stability) (NDTA 1996).

**Base of support (BOS)**

- The ability to control the centre of gravity over the base of support in a given sensory environment. (Glossary, Neurological Rehabilitation 1990).
- The surfaces of the body, which experience pressure as a result of body-weight and gravity, and the projected area between them. (Glossary, Neurological Rehabilitation 1990).
- Clinically, the acceptance of the base of support requires that the individual both can adapt and move in relation to the contact areas. The BBTA (1994) describes this as a relationship through which man interacts with afferent information from the environment.
- The smallest area, enclosed by the contact points of activated body parts with their surface. (Klein-Vogelbach, 1995).

**Behavioural Strategy**

- Miller K.
  - Behaviour: The manner in which an individual acts or performs.
  - Adaptive behaviour: Behaviour that fosters appropriate individual interaction with the environment.
- Mosby (1994)
  - The manner in which a person acts or performs.
  - Any or all of the activities of a person, including physical actions, which are observed directly, and mental activity, which is inferred and interpreted.

- Taber's (1997)
  - The manner in which one acts; the actions or reactions of individuals under specific circumstances.
  - Movement behaviour: the act of passing from place to place or changing positions of the body or its parts.
- Stedman (1997)
  - Any response emitted by or elicited from an organism.
  - Any mental or motor act or activity.
  - Specifically, parts of a total response pattern.
  - Adaptive behaviour: any behaviour that enables an organism to adjust to a particular situation or environment.

### **Biopsychosocial**

- Mosby (1994): Of, or pertaining to the complex of biology, psychology and social aspects of life.
- Taber's (1997): Biological, psychological and social; pertinent to the application of knowledge from the biological and behavioural sciences to solve human problems.
- Stedman (1997): Involving interplay of biological, psychological and social influences.

### **Central set**

- The smallest area, enclosed by the contact points of (activated) body parts with their surface.
- Central set is the central programming of postural movements (Horak and Nashner 1986), it is the feedforward activation of neuromuscular activity in preparation for movement or postural change.
- Central set mechanisms (Horak and Diener 1994): prior experience, practise and expectation.
- The ability of the CNS to prepare the motor system for upcoming sensory information and the sensory system for upcoming movements. (Neurophysiological Approaches to higher brain functions; Evarts et al '84)
- The activated state of the CNS, that includes anticipation (Ans R.)

### **Centre of gravity (COG)**

- An imaginary point in space about which the sum of forces and moments equals zero (equilibrium). (Glossary, Neurological Rehabilitation 1990).
- COM (vs. COG): an imaginary point within the body at which the total body mass is considered concentrated (Combination: Neurological Rehabilitation; D. Umphred '90 / NDTA '96 / Ans R.)

### **Cognition**

- Includes the processes of knowing and understanding; awareness, judgement and decision making. (Siev, Freishtat and Zoltan 1986)
- Includes higher level neural processes such as planning, attention, motivation, and emotional aspects of motor control that underlie the establishment of intent on goals (Shumway, Woollacott '95)
- Thinking (Luria 1989). Stages:
  - confrontation with the task
  - analysis of the framework and the components of the task which may lead to a solution
  - choose a plausible solution
  - choice of solving methods
  - operative stage
  - solving the problem
  - comparison between the results and the task

### **Compensation, compensatory strategies**

Are understood as synonymous with 'behavioural substitution' (Shumway-Cook and Wollacott 1995, Held 1987): alternative behavioural strategies adopted to complete a task.

### **Concept**

- Taber's (1997): Something understood. An idea.
- Mosby (1994):
  - A construct or abstract idea or thought that originates and is held within the mind.

- Conceptual framework: a group of concepts that are broadly defined and systematically organised to provide a focus, a rationale, and a tool for the integration and interpretation of information. A conceptual framework is the conceptual basis for many theories.
- Miller K.
  - A concept is an element used in the development of a theory.
  - Conceptual model: a set of concepts together with a set of propositions that describe the concepts, or set forth the basic assumptions of the model.

### Environment

- Mosby (1994): All of the many factors, as physical and psychologic, that influence or affect the life of a person.
- Taber's (1997): The surroundings, conditions or influences that affect an organism or the cells within it.
- Stedman (1997): The milieu: the aggregate of all the external conditions and influences affecting the life and development of an organism. It can be divided into physical, biological, social, cultural etc., any or all of which can influence the health status of the population
- Miller K.: The sum total of all the conditions and elements that make up the surroundings and influence the development of an individual.

### Equilibrium reactions (ER) (See Balance)

- The equilibrium reactions are postural adjustments which occur throughout daily life, and may as such be considered as one with reciprocal innervation (Edwards 1996). They are continuous automatic adaptation of postural tone in response to gravity and displacement. Functionally they maintain postural alignment, 'placing', and cannot be performed voluntarily (BBTA 1997). The ERs are always present and aim to keep the body stable in any situation and they follow movement like a shadow.
- A response that maintains the body's posture against gravity in response to an internal or external stimulus. This automatic response, which may vary from a small imperceptible tone change to a gross movement of the trunk and limbs, is equal to the amount of force of the disturbance and in an opposite direction. It is just enough to keep the COG over the BOS (NDTA '96 / Orthopaedic Dictionary '94)
- Clinically we understand ER as being synonymous with postural control.

### Facilitation

- Make easier; lessen the difficulty. (Oxford advanced learner's dictionary, Hornby 1974)
- Is an active (sensory-motor) learning process. This interaction between the patient and the therapist makes the performance of function possible and easier (IBITA 1996).
- To bring the patient into a situation which requires a movement strategy, a response, with optimal dynamic alignment and neuromuscular activity, thereby making movement possible (to make necessary) and to allow movement to take place (to let it happen) (Fletcher L. '98)
- The input that a therapist provides allowing movement to take place with appropriate rhythm and coordination. Just enough input is provided to allow the patient to perform as much of the activity as possible and to maintain continuity of movement. (Hoppenfeldt and Zeide 1994: calling this Guiding. See NDTA Glossary).
- A bio-(sensory-motor)psychosocial process between therapist (and/or other persons) and patient, to make the performance of function possible and easier (IBITA '96 adapt. Ans R.)

IBITA member Lynne Fletcher has made the following model (personal communication):

- |                             |  |
|-----------------------------|--|
| <b>To make it possible</b>  | - Making movement possible by improving alignment and neuromuscular activity.  |
| <b>To make it necessary</b> | - Bringing the patient into a situation which requires a movement strategy, a response, for example in standing; by bringing the patient's centre of gravity towards the edge and outside the base-of-support through optimal dynamic alignment and neuromuscular activity, thereby making movement necessary. |
| <b>Let it happen</b>        | - Allowing movement to take place, for example let the patient take the step as a protective strategy.   |

To make it necessary and Let it happen are the processes of facilitation.

- Providing input to make movement easier (NDTA Glossary 1996)
- Treatment techniques that increase the patient's ability to move in ways judged to be appropriate by the clinician. (Louise Rutz-LaPitz. Ref?)

## Function

- Ability- and psychosocial level:
- The whole organisms complex behaviour aimed at the performance of a behavioural task (Held 1987).  
Recovery of function is defined as a gradual return of a specific function after an initial deficit that is observed after CNS damage.  
Spared functions: the absence of deficits after CNS damage, or less deficit than normally observed.
- Is here defined as a goal directed activity in which a person relates to the environment in a variable and efficient manner (IBITA 1996)
- Those activities identified by the individual as essential to support physical, social and psychological well-being and to create a personal sense of meaningful living (Glossary Physical Therapy 1997)
- Organ level:
- Clinically, we understand function also to relate to muscle function, tonus, recruitment order, alignment and the ability to be selective in movement (see Motor behaviour, Craik 1991).

## Functional skills

- The ability to accomplish necessary daily activities. (Glossary, Neurological Rehabilitation 1990)

## Goal

- Miller K.
  - Goals – measurable milestones that are established to indicate the success of a plan.
  - LTG – goals that are the ultimate results desired when a plan is established or revised.
  - STG – goals that can be achieved in a limited period of time and frequently lead to the achievement of a LTG
- Stedman (1997): Goal – in psychology, any object or objective that an organism seeks to attain or achieve.
- Taber's (1997): Goal – the desired outcome of actions to alter status or behaviour.
- Mosby (1994): Goal – the purpose to which an endeavour is directed, such as the outcome of diagnostic, therapeutic and educational management of a patient's health problem.

## Handling

- In this context refers to physical contact with the client's body to guide (facilitate) directly the movement and postural adaptation to a more normal pattern. Usually refers to functional movement patterns used in daily life. (Glossary, Neurological Rehabilitation 1990)
- Physical contact with the client's body to guide directly the movement and postural adaptation to a more normal pattern; usual refers to functional movement patterns used in daily care (Neurological Rehabilitation: D. Umphred '90)
- Using the hands in such ways as to normalise tone and facilitate normal movement (Davies P. '98)
- Using the hands (and or other body parts) to sustain the performance of function (Ans R.)

## ICIDH-2 Beta 2 Draft 1999

International Classification of Functioning and Disability

Describes 3 dimensions:

1. Body Functions and Structures
2. Activity
3. Participation

### 1. *Body Functions and Structures*

Physiological and psychological functions of body systems. Anatomical parts of the body. Impairments are problems in body functions or structures.

### 2. *Activity*

The performance of a task or action.

Limitations are difficulties in the performance of activities.

### 3. *Participation*

Involvement in life situations in relation to Health Conditions, Body Functions and Structures, Activities and Contextual factors.

*Participation Restrictions* are problems an individual may have in the manner or extent of involvement in life situations.

“ICIDH-2 provides a multi-perspective approach to the classification of functioning and disability as an interactive and evolutionary process.” (ICIDH-2, Beta-2 Draft 1999, p.24)

(ICIDH-2. International Classification of Functioning and Disability. Beta-2 Draft, Short Version. Geneva, World Health Organisation, 1999)

### **Inhibition**

- The regulation/modification of CNS activity (Brodal 1998) due to specific inhibitory neuro-transmitters.
  - Postsynaptic inhibition*: when a neuron inhibits another by increasing the threshold for postsynaptic depolarisation.
  - Presynaptic inhibition*: inhibition through axo-axonic synapses whereby the presynaptic bouton is inhibited in its release of excitatory transmitter substances.
  - Recurrent inhibition*: via the Renshaw cell (inhibitory interneuron), whereby a motorneuron may be modulated by higher centres (Corticospinal system), **the agonist  $\alpha$ - and  $\gamma$ -motor-neurons, the antagonist  $\alpha$ - and  $\gamma$ -motorneurons**, other Renshaw cells and Ia inhibitory interneurons (from the muscle spindle).
- The regulation / modification of CNS activity due to specific inhibitory neurotransmitters; that means postsynaptic, presynaptic and recurrent inhibition (Brodal '98)
- The prevention of non appropriate responses which interfere with normal function; this is achieved through the modulation of the motor output by various means of interaction between the client, the therapist and the environment such as behavioural modification, cognitive control, handling, positioning, splinting. (IBITA '97)
- Providing input to prevent or reduce incorrect or undesired components of movement (NDTA glossary)
- Miller K.
  - Arrest or restraint of a process.
  - In psychoanalysis, the conscious or unconscious restraining of an impulse or desire.
- Stedman (1997)
  - Depression or arrest of a function.
  - In psychoanalysis, the restraining of instinctual or unconscious drives or tendencies, especially if they conflict with one's conscience or with societal demands.
- Taber's (1997)
  - The repression or restraint of a function.
  - In psychology, a stopping of an action or function of an organ, as in the slowing or stopping of the heart produced by the electrical stimulation of the vagus.
- Mosby (1994)
  - Restraining, checking or arresting the action of an organ or cell or the reducing of a psychologic activity by an antagonistic stimulation.

### **Interdisciplinary**

- Stedman (1997): Denoting the overlapping interests of different fields of medicine and science.
- Taber's (1997): Involving or overlapping of two or more health care professions in a collaborative manner or effort.

### **Key point (of control)**

- Area of input from which the therapist may control the sequence of movement and may facilitate or inhibit a response. These may be proximal or distal, are interchangeable, and must be adapted to the patient's reactions. (Hoppenfeld and Zeide 1994)
- Place/area from which the therapist provides input to facilitate or inhibit movement:
  - may be proximal or distal
  - may assist with dissociation of total patterns
  - may assist with voluntary and selective movements

- is interchangeable
- must be adapted to the patient's reactions
- may facilitate stability in one area for selective movement elsewhere
- control may require changing of key points

The key points are not points, but areas. The name is therefore misleading. Should we therefore suggest a new name: key areas or functional units (of control)?

### **Lifespan**

- Stedman (1997)
  - The duration of life for an individual.
  - The normal or average duration of life of members of a given species.

### **Motor behaviour**

- (Normal) The proper sequencing and tension development by the muscles, the necessary intralimb and interlimb joint excursion and sequencing, and adequate torque development. These subsystems work together to produce an efficient and accurate motion of the body to complete a task successfully. Such a model assumes intact sensation and unimpaired cognitive ability (Craik 1991)
- Mulder and Hochstenbach (1998)
  - The interaction between perception, action and knowledge
  - A problemsolving approach
  - The outcome of solutions for the problems which appear in the continuous changing environment and which are dynamic, always tailored to the actual requirements.

### **Motor control**

- The ability of the central nervous system to control or direct the neuromotor system in purposeful movement and postural adjustment by selective allocation of muscle tension across appropriate joint segments (Glossary, Physical Therapy 1997).
- The ability of the central nervous system to regulate and/or direct musculoskeletal systems in purposeful acts. (Glossary, Neurological Rehabilitation 1990)
- Mulder and Hochstenbach (1998)
  - The activity of a non-hierarchical, self-organising system, driven by multisensory input.
  - The interaction of motor processes with cognitive and perceptual processes.
  - The interaction between the environmental context and the state of the organism which shapes the output.

### **Motor function (motor control and motor learning)**

- The ability to learn or demonstrate the skilful and efficient assumption, maintenance, modification and control of voluntary postures and movement patterns.  
Fine: refers to relatively delicate movements, such as using a fork and tying a shoelace.  
Gross: refers to larger-scale movements, such as assuming an up-right position and carrying a bag (Glossary, Physical Therapy 1997).

### **Motor learning**

- The acquisition of skilled movement based on previous experience. (Glossary, Neurological Rehabilitation 1990)
- A set of processes associated with practise or experience leading to relatively permanent changes in the capability of producing skilled action (Glossary, Physical Therapy 1997).
- Mulder and Hochstenbach (1998)
  - A dynamical (non-linear) and problemsolving approach.
  - The learning of solutions to motor problems, which implicates optimal sensory information, variability of practise and similarity between the context of training and the context of application.
- Shumway, Woollacutt (1995)
  - The study of the acquisition and/or modification of movement.
  - A set of processes associated with practice or experience leading to relatively permanent changes in the capability for producing skills action.
  - It emerges from a complex of perception-cognition-action processes.

- Involves the search for a task solution, which emerges from an interaction of the individual with the task and the environment.

### Motor plan

- Involves the selection, sequencing and delivery of motor programmes to achieve intended behaviour (Marsden 1984).
- A term from motor control theory implying the basic components of motor control including motivation, memory and preparatory premotor activity (NDTA glossary).
- A motor plan can be considered the conceptualization of a motor action.

### Motor programme

- A group of muscle commands that are structured before a movement sequence is initiated, and that allows the execution of the whole sequence uninterrupted by peripheral feedback (Marsden 1984 refers to Keele 1968).
- The term may be used to identify a central pattern generator (CPG), that is, a specific neural circuit like that for generating walking in the cat. In this case, the term represents neural connections that are stereotyped and hard-wired. The term is also used to describe higher-level hierarchically organised neural processes that store the rules for generating movements so that tasks can be performed with a variety of effector systems. (Shumway-Cook and Wollacott 1995)
- A term from motor control theory encompassing the execution of plans. The components of motor programs include initiation, execution and termination of the motor action (NDTA glossary).

### Motor Skills (including acquisition)

Acquisition - attainment; accomplishment. (Webster 1981)

Skill - technical proficiency; a developed or acquired ability. (Webster 1981)

Motor skills - acquired motor ability or attainment of technical proficiency in movement. (Bohman, I. 2000)

### Motor Task

Motor - pertaining to movement or a change in posture. (Webster 1981)

Task - an undertaking or work. (Webster 1981)

Motor task - a specific activity which pertains to movement. (Bohman I. 2000)

### Movement

- The result of a flexible system, continuously interacting with the environment; a system where motor, sensory and cognitive processes interact in order to find the most optimal solutions to problems (Mulder, Hochstenbach, '98)

*Voluntary*: movement that is initiated by a decision to act (eg. premeditated, psychologically instigated, directed)(Martin 1977).

*Willed*: voluntary movement in which conscious control is used throughout the performance and in which attention is constantly used to correct the evolving movement (Schenkman and Buter 1989). It is a feedback appendant activity. Clinically it must also have a strong element of feedforward; planning the next trial in response to feedback?

(We do not see voluntarily and willed as the same. Voluntarily is related to the goal of the action, while willed is related to the component parts of the movement, ie. the process.

The level of concentration and consciousness in moving component parts is therefore different.)

*Automatic*: voluntary movement that is carried out without conscious attention to the evolving movement. These movements do not require conscious attention to sensory feedback and might use preprogrammed sequences of muscle activity. Automatic movements generally appear to be learned (Schenkman and Buter 1989).

### Movement components

Component - component applies to the parts which make up a compound or the parts which make up the whole (Webster 1981)

Movement components - the specific parts within a movement to support movement of the body or a part of it (Rabou, A. 2000)



## Movement science

Science - a branch of study concerned with observation and classification of facts, especially with the establishment with verifiable general laws; accumulated knowledge systematised and formulated with reference to the discovery of general truths or operation of general laws or systematized knowledge. (Webster 1981)

Movement science - systematized knowledge concerning movement. (Bohman, I. 2000)

## Muscle tone

- Not properly defined in the literature. It is described as the relationship between the tension and the length of a muscle, ie. as the degree of stiffness (stiffness control) Increased stiffness leads to increased tension (Brodal 1998).
- The force with which a muscle resists being lengthened, that is, its stiffness; both neural (reflexes/muscle spindle) and non-neural (cross-bridges between muscle fibres) mechanisms contribute to muscle tone (Shumway, Woollacott '95).
- Tension or resistance in a muscle that may be present in resting muscles or may be the resistance to passive elongation or stretch (Hoppenfeld, Zeide '94)
- *Tone*: the resistance to passive elongation or stretch of a muscle. (Dorlands Medical Dictionary 1981)
- *Tonus*: the slight continuous contraction of muscle, which in skeletal muscle aids in the maintenance of posture (and in the return of blood to the heart). (Dorlands Medical Dictionary 1981)
- *Postural tonus*: increased activity in muscles that act in maintaining the body up against gravity (Shumway-Cook and Wollacott 1995).
- Tension or resistance in a muscle that may be present in resting muscles or may be the resistance to passive elongation or stretch (Hoppenfeld & Zeide)

## Neuromuscular (neuromotor) activity

- All movement is neuromotor activity (normal or not).
- A goal orientated sensory-motor activity. Normal movement depends on an intact neuromuscular system. Normal movement is characterised by coordination, efficiency and not more effort than necessary in relation to the functional goal (understood from Bobath 1990, Edwards 1996, Lynch and Grisogono 1991).

## Outcome of treatment

Outcome - result or consequence. (Webster 1981)

Treatment - management and care of a patient. (Dorland 1944)

Outcome of treatment - the result of the management and care of the patient by the therapist (if limited to physical or occupational therapy). (Bohman, I. 2000)

## Pattern

- A set or arrangement (Taber's Cyclopaedic Medical Dictionary 1994).
- The way in which something develops, is arranged. (Hornby 1974).
- Sequences of selective movements. in an appropriate alignment (Bobath '90)
- Functional coupling of groups of muscles such that they are constrained to act together as a unit (synonym: coordinative structures). (Shumway-Cook and Wollacott 1995). (See synergy).
- Clinically we understand 'patterns' as the organisation of muscle activation (ref. the recruitment principle); sequences of selective movements performed on a background of stability. These are dynamic, changeable and variable in relation to the performer, the environment and the goal. 'Pattern' can therefore be described as a functional unit of neuromuscular activity.

## Perception

- Impression, analysis; hypothesis as to meaning, comparison between the hypothesis and the real object. (Luria 1989)
- The active, goal-orientated search for information that is body-related/internal (proprioceptive, visual, vestibular) and environment-related/external (auditory, olfactory, haptic and visual). (Mulder and Hochstenbach 1998)
- The integration and interpretation of incoming sensory information. (Shumway-Cook ?. From Louise)
- The ability to interpret sensory messages from the internal and external environment such that the sensation makes sense. (Siev, Freishtat and Zoltan 1986)

- Psychological processes that encompass meaning by relating past experience, memory and judgement to the sensations experience (Montgomery, II Step Conference).

### Placing

- The ability to automatically follow and support any movement when being moved: the automatic ‘take-over’ of activity, the automatic and active control at every stage of a movement . (Bobath 1990).
- Clinically, placing is used in both assessment and treatment to explore the patients automatic response to being moved. Placing requires that the patient’s central nervous system is able to receive and respond to somatosensory information.

### Plasticity

- The ability of structural (anatomical) and functional (physiological) changes. It means both the goal-directed and spontaneous flexibility of moving without learning processes and the goal-orientated changes in movement as a result of experience and exercising. It implicates (v. Cranenburg, 1989):
    - The possibility of motor development.
    - Learning and memory.
    - Anatomical regeneration after damage because of collateral sprouting and denervation-hypersensitivity.
  - *Neuroplasticity*: the adaptive phenomena that occur in neural tissue when structural changes coincide with functional modification (Bishop 1982).
  - *Neuroplasticity* is a concept based upon the CNS’ ability to adapt, rebuild and reorganize itself, in respect of both its
    - molecular form (anatomical structure), and
    - function.
- Form and function are interrelated and interdependent (Kidd et al 1992).
- Anatomical and electro physiological changes in the central nervous system. (Glossary, Neurological Rehabilitation 1990)
  - The ability to show modification or change. Short-term plasticity refers to changes in the efficiency or “strength” of synaptic connections. Structural plasticity refers to changes in the organisation and numbers of synaptic connections (Shumway, Woollacutt 1995)

### Posture

- In the strictest sense: the position of the body or body part in relation to space and/or other body parts. Functionally, the anticipation of and response to displacement of the body’s centre-of-mass. (Glossary, Neurological Rehabilitation 1990)
- The alignment and positioning of the body in relation to gravity, centre-of-mass (-gravity), and the base-of-support (Glossary, Physical Therapy 1997).

### Postural control

- Regulating the body’s position in space for the dual purposes of stability and orientation (Shumway-Cook and Wollacott 1995).
  - Adaptive Modifying sensory and motor systems in response to changing task and environmental demands.
  - Anticipatory Pretuning sensory and motor systems in expectation of postural demands based on previous experience and learning.
- Is a multidimensional task, whereby the CNS must assure a specific relationship between the centre of gravity of the body and the base of support (Bergland 1994).
- Includes CNS processes for the modification of sensory information and motor activity to control the posture of the body in relation to the external (eg. gravity, base of support) and the internal environment (forces). (Hirschfeld 1994).
- Clinically we understand postural control as synonymous with equilibrium reactions.

**Postural set**

- Adaptation of body/posture which precede movement. Allows for smooth, economical movement (Bobath.1990) (Same as central set or anticipatory postural control.)
- A postural set is a position or posture of symmetry or alignment of key-points from which a normal person evolves a movement or sequences of selective movements. (BBTA)
  1. Either up against gravity - agonistic activity,
  2. or with gravity assisting the movement - letting go of the agonistic activity and is a foundation control for selective movement.
- Clinically, we understand the term to refer to the relationship between neuromuscular activity, alignment, gravity and the base of support.
- May be included under anticipatory postural control.
- The relationship between neuromuscular activity, gravity, biomechanical factors and the BOS. (no reference)

**Preventive**

Preventive - Making or aiming to make unlikely or impossible. (Webster 1981)

**Promotive**

Promotive - tending to further or encourage. (Webster 1981)

**Proprioception**

- The process of getting information from deep, peripheral receptors (muscle spindle, Golgi tendon organ, joint receptors) (Cranenburg, v. '89; Neurol. Rehabilitation, Umphred 1990)
- The reception of stimuli from within the body (eg. from muscles and tendons), includes position sense (the awareness of the joints at rest) and kinesthesia (the awareness of movement) (Glossary. Physical Therapy 1997).

**Proprioceptor**

- A receptor that responds to stimuli originating within the body itself, resp. those responding to pressure, position, or stretch. For example: muscle spindles, Golgi tendon organs, pacinian corpuscles, and labyrinthine receptors. (Taber's Cyclopaedia Medical Dictionary 1974).

**Protective reaction**

See Balance.

- The protective reactions are activated when the centre of gravity is displaced outside the base of support and when the ERs and RRs are unable to regain balance (Edwards 1996).  
They include protective reactions of the arms and stepping reactions of the legs and involves the acquisition of a new base-of-support (BBTA).
- Clinically we understand these movements to have elements of both reaction and strategy.
- Response by the body when other balance (equilibrium) reactions have failed.
  - Occurs in the direction of the disturbance or stimulus.
  - Is necessary because the centre of mass (COM) has moved outside the base of support (BOS).
  - If successful, results in a new BOS which is appropriate to the changed COM.

( NDTA glossary)

**Reaction (vs. Reflex)**

- Action resulting from; in response to a stimulus (Taber's Cyclopaedic Medical Dictionary 1974).
- Variable, automatic, voluntary muscle response to a (sensory) stimulus (Magnus: midbrain)
- Reflex: a stereotyped, non-voluntary muscle response to a stimulus (Magnus: brainstem), modulated by higher centres, depending on the task and the context (Shumway, Woollacutt 1995 / P.55)

**Reciprocal inhibition**

- The inhibition of antagonist by excitation of the agonist (Brodal 1998).

### Reciprocal innervation

- The harmonious interplay between agonists, antagonists and synergists to coordinate motor activity in an effective, smooth and rhythmical manner without more effort than is required by the task (Warwick and Williams 1973, Bobath 1990, Tyldesley and Grieve 1996, Edwards 1996).
- Reciprocal innervation is by some authors called reflex modulation, and described as a stretch reflex being elicited in a muscle without inhibition of its antagonist. This is functionally appropriate when agonists and antagonists are required to co-contract to stabilise a joint (Brodal 1998).

### Recruitment

- The ability to activate more and more motor units and vary the impulse frequency of the motoneurons (Brodal 1998). The size principle (Henneman) states that small motor units (tonic) are recruited before larger motor units (phasic) (Brodal 1998, Rothwell 1995, Henneman and Mendell 1981).
- Clinically, this implies that stability is a prerequisite for mobility/movement.
- A graded increase in response to a stimulus which has a constant intensity, but prolonged duration (Dox et al. 1979).

### Righting reactions (RR)

See Balance.

- Sequences of selective movement in pattern in response to displacement. Functionally they allow the loss and regaining of midline through trunk righting, head righting, stepping reactions and protective extension of the upper limb. Components of the righting reactions can be performed voluntarily (BBTA 1997).
- The righting reactions are activated on displacement of the body's centre of gravity outside its base of support (Edwards 1996).
- Clinically we understand the RRs as visible movement of the body segments in relation to each other as the relationship between the centre of gravity and the base-of-support changes. This includes movement within a position; changing from one postural set to another and encompasses the acquisition of a new base of support when appropriate. Examples: turning round in sitting, standing and supine, standing to sitting v.v., supine to sitting v.v., stepping.

### Selective movement

- Selective means 'chosen' (Webster's Collegiate Dictionary 1916).
- Clinically 'selective movement' means isolated, chosen movement of one joint or segment based on stability through appropriate muscle activity.

### Skilled action

Consistency in attaining a goal with some economy of effort.

Skilled action involves consistency in achieving a goal efficiently through movement patterns shaped by dimensions of the performer and configured to fit the environment. (Gentile AM. 1987)

### Spasticity

Not properly defined in the literature. It is described as:

- 'A syndrome' (Brown 1994, Bruke 1988)
- 'A state' (Toft 1995)
- The result of a development (Brodal 1998, Carr, Shepherd and Ada 1995, Stokes 1998).
- Most authors relate secondary muscular and connective tissue changes to spasticity (Brodal 1995, Brown 1994, Carr, Shepherd og Ada 1995, Given, Dewald og Rymer 1995, Goldspink og Williams 1990, Hufschmidt og Mauritz 1985, O'Dwyer, Ada og Neilson 1996, Toft 1995, Yarkoni og Sahgal 1987).
- Is a part of a syndrom that means changes in the supraspinal and spinal regulation of movement:
  - morphological changes: collateral sprouting and denervation-sensitivity.
  - mechanical changes in muscle (contractile and non-contractile elements) (v.Cranenburg 1989)
- A motor disorder characterised by a velocity-dependent increase in tonic stretch reflexes with exaggerated tendon-jerks, resulting from hyper-excitability of the stretch-reflex. Spasticity is one component of the upper motor-neuron syndrome (Shumway-Cook and Wollacott).

### Somatosensory

- The term somatosensory includes, strictly speaking, all sensations pertaining to the body (soma) (Brodal 1998). From all sense organ receptors: skin, joints, muscles, internal organs, the retina, tastebuds, inner ear.

### Stability (vs. Equilibrium)

- *Static stability*: A physical term: at rest, in a state of balance, state resulting from forces which balance each other (Hornby 1974).
- *Dynamic stability*: Results when a segment or a set of segments are more dependent on muscles than on joint structures for maintenance of integrity. (Norkin and Levangie 1992).
- Clinically, many therapists understand ‘static’ to mean ‘fixed’, stereotyped. In relation to posture and balance the ability to hold a position requires changes, adaptations in neuromuscular activity and is therefore physiologically dynamic.
- *Static equilibrium*: The ability of an individual to adjust to displacements of his or her COG while maintaining a constant BOS (Neurol. Rehabilitation, Umphred 1990)
- *Dynamic equilibrium*: The ability of an individual to adjust to displacements of his or her COG by appropriately changing their BOS (Neurol. Rehabilitation, Umphred 1990)

### Strategy

- A plan for action; an approach to organizing individual elements within a system into a collective structure (Shumway-Cook and Wollacott 1995).

### Successful performance (including efficiency and proficiency)

Successful performance - to accomplish a movement of function efficiently and proficiently. (The latter may not apply to all patients.) (Bohman, I. 2000)

Efficiency - producing the desired result with a minimum of effort, expense or waste. (Webster 1981)

Proficiency - is well advanced in any business, art, science, or branch of learning (Webster 1981)

### Synergy

- Functional coupling of groups of muscles such that they are constrained to act together as a unit (synonym: coordinative structures). (Shumway-Cook and Wollacott 1995)
- Fixed set of muscles contracting with a present sequence and time of contraction (Neurol. Rehabilitation, Umphred 1990)

### Systems theory

- A theory describing movements emerging as a result of an interaction among many peripheral and central nervous system components with influence changing depending on the task. (Glossary, Neurological Rehabilitation 1990)
- *Systems model/approach*: A cyclical framework for understanding postural control which includes (1) environmental stimuli, (2) sensory reception, perception and organisation, and (3) motor planning, execution and modification (Neurol. Rehabilitation, Umphred 1990)
- *Systems approach*: The foundation for many clinical applications; it implicates, that movement arises from the interaction of multiple processes, including (a) perceptual, cognitive and motor processes within the individual, and (b) interactions between the individual, the task and the environment (Shumway, Woollacott 1995)

### Tone

- Healthy or normal elasticity of a muscle. (Webster 1981)
- Normal degree of vigour and tension, particularly the tension in normal muscle which exists independent of voluntary contraction. (Dorland 1947)
- Tabor (1985)
  - That state of a body or any organ in which functions are healthy and normal. In a more restricted sense, the resistance of muscles to passive elongation or stretch.
  - Normal tension or responsiveness to stimulation as of arteries and muscles.

**Theoretical Assumptions**

Theory - Supposition put forward to explain something; speculation. (Webster 1981)

Theory - A group of abstract ideas about the nature and cause of something. (Shumway-Cook A. & Woolacott M. H. 1995)

Theoretical - pertaining to or based on theory. (Webster 1981)

Assumption - the act of taking for granted; the thing supposed to be true or to have happened. (Webster 1981)

Assumptions are derived from theories. Theories provide: framework for interpreting behaviour guide for (clinical) action new ideas working hypothesis for assessment and treatment. Theories are dynamic and change to reflect greater knowledge. Theories generate hypotheses that are testable. Information gained from hypothesis testing is used to validate or invalidate a theory. (Shumway-Cook A. & Woolacott M. H. 1995)

**Validity**

The degree to which data or results of a study are correct or true. (Tabor 1985)

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