

An Innovative model for the Dynamic Neurocognitive Rehabilitation for individuals with Acquired Brain Injury

IDIT DORFZAUN-HARIF¹

TAL FEUERSTEIN¹

WENDY OVADIA¹

SHIRA ETTINGER¹

YARDENA LOEWINGER¹

HADAR TVITO¹

MORDECHAI ETZION¹

DIANA ROSENFELDER¹

NOAMI HADASS-LIDOR²

Abstract

This article presents the work carried out at the Feuerstein Institute in Jerusalem with people who have suffered Acquired Brain Injury (ABI). Over the last decade 105 people suffering from ABI have been treated: 61 people after a traumatic brain injury, 20 people after cerebrovascular accident, 11 after anoxic brain damage, 9 after brain tumours and 4 suffering from ABI, due to different diseases. The neurocognitive rehabilitation approach is based on Reuven Feuerstein's theory of Structural Cognitive Modifiability (SCM). The theoretical and practical aspects of working with this population are expounded, and examples of treatment descriptions based on case studies are included.

We will explain the special value of working in the dynamic neurocognitive rehabilitation approach with the population of Acquired Brain Injured clients after they have completed the hospitalized rehabilitation phase.

Keywords

Acquired brain injury; dynamic neurocognitive rehabilitation; mediated learning experience; dynamic assessment; cognitive modifiability

1. Feuerstein Institute Jerusalem

2. School of Occupational Health, Tel Aviv University. Address of correspondence
noami.h@gmail.com

Target population

Acquired Brain Injury (ABI) is a common injury, that can be caused by a variety of occurrences: falls, road accidents, injury in combat and shooting incidents, terrorist attacks, stroke, anoxic damage (lack of oxygen supply to the brain following a cardiac arrest or drowning), intracranial tumours, women who have survived amniotic fluid embolism and as a result, suffer severe neurological damage.

Acquired brain injury is an incident that dramatically changes a person's life as well as that of their family and friends. The brain injury can affect their functioning in different areas – motor, cognitive, verbal, emotional and social skills (s.s). With the development of medical science and the improvement of treatment methods for ABI sufferers, an increasing number of people survive the experience from a physiological point of view (Woo & Nesathurai, 2000).

Following brain injury, people can lose numerous skills that they possessed previously, and as a result, their old lifestyle is fundamentally impaired, causing a state of crisis that requires constant care and support.

The injury may result in diverse motor and sensory deficiencies, with life changing consequences (Boyle & Haines, 2002):

1. Loss of basic functional skills such as Activities of Daily Living (ADL): eating, dressing, bathing and independent toileting.
2. A variety of cognitive problems, such as attention and memory deficits, organization and planning problems; loss of language skills – speech, reading, writing and comprehension of the latter, lack of basic judgement skills;
3. Emotional problems; disruption of family life; a change in the husband-wife relationship which is transformed into a patient-therapist one;
4. The inability to work, and as a result, a major drop in income;
5. The inability to take part in recreational activities, sports and previous hobbies; a loss of social ties because of unsociable behaviour.

Following ABI, a patient initially requires surgical or conservative medical procedures followed by a lengthy period of hospitalization to stabilize their condition, and some may be in a coma for a long time. Once their medical conditions have been stabilized, patients are transferred to rehabilitation

hospitals, where they begin the remedial process. The duration of hospital rehabilitation is generally determined by the nature of the injury, sources of financing, extent of progress and the rehabilitation prognosis. Hospitalization can range from a number of weeks to over a year, but in rare cases, it may even go beyond that.

In the hospital, the goals of rehabilitation consist mainly of physical rehabilitation, so that the patient can stand, and if possible, walk. Cognitive rehabilitation begins at the level of basic daily functioning such as independent eating, dressing, etc. (BASIC ADL) Usually, during the rehabilitation period, time and resources are lacking, as is the ability of the patient and staff to engage in higher level functioning, such as preparing a meal, shopping and other daily activities) secondary ADL.

At the end of the rehab-hospitalization period, there is a significant improvement in the patient's physical functioning. Occasionally discharge is approved when the patient is able to physically take care of himself. In many cases, the patient is suffering from physical and cognitive deficiencies that preclude complete independence and require supervision/assistance. Mostly, the patient is released before attaining true functional independence and must depend on help from family members. He/she may have trouble with physical spatial orientation, may be unable to prepare a drink/food, arrange and attend meetings independently, may have memory lapses, and lack awareness of his/her own difficulties and judgment. This impairs the patient and prevents him from being left alone for safety reasons, creating the need for constant accompaniment. Needless to say, this state prevents patients from returning to their prior occupation. It is also extremely difficult to create a new vocational or professional identity.

Apart from impaired functioning, patients and their family see their ability as being static and more often than not, they are unable to envisage rehabilitation. The patient's functioning is characterized by extreme passiveness considered by the environment as unchangeable.

When hospitalized rehabilitation ends, patients and their family find themselves alone to deal with the new situation – the skills and functioning of their loved ones are no longer, what they were. True, there has been considerable improvement as compared to the patient's initial acute state, but there still is a long way until the patient becomes active and functioning.

Patients are released from hospital back into society with insufficient rehabilitation follow-up. Israel does not have sufficient rehabilitation facilities

for outpatient treatment, as is the problem in many other countries around the world. In Israel, community services are allocated to patients as a series of 12 treatment sessions in the areas of their difficulties: physiotherapy, speech therapy or occupational therapy. Once this treatment is completed, shortly after discharge from the rehabilitation hospital, the families and the patients are forced to cope alone with the substantial change in the patient's functioning. Some of the families arrange for a live-in caregiver who acts as a 'babysitter', which may mean an end to any further improvements in the patient's condition, as the patient becomes further dependent. Other families will search relentlessly for further cognitive rehabilitation options, and the Feuerstein Institute is one of the few facilities to offer this in Israel.

Today, there is evidence from brain research studies carried out in recent years that proves the enormous advantage of continued rehabilitation over long periods of time (Doidge, 2007), and that informs about mechanisms allowing neuroplasticity (Wieloch and Nikolich, 2006).

This along with families of people who had suffered an ABI and required help led to the application of Feuerstein's theory of Structural Cognitive Modifiability and its practical tools on this population.

Over the last decade, we have worked with over 100 people suffering from ABI.

61 people after a traumatic brain injury, 20 people after CVA, 11 after anoxic brain damage, 9 after brain tumours and 4 suffering from other ABI, due to different diseases.

In this article, we will present our model of neurocognitive dynamic rehabilitation of individuals with Acquired Brain Injury. We have developed a model based on Feuerstein's theory and many years of practice. In our work, we have seen that using this model, people with ABI can make great progress- both cognitively and functionally – despite their disabilities. The model for the ABI population was built on matching the tools and strategies of Feuerstein to this population.

Methods

The model of the neurocognitive dynamic rehabilitation of individuals with Acquired Brain Injury was developed by Professor Reuven Feuerstein and his team. All applications were derived from the theory of Structural Cognitive Modifiability (SCM) and DCI (Dynamic Cognitive Intervention) and Recovery approaches (Feuerstein et al, 2010; Hadas-Lidor, Weiss & Kozulin, 2011; Anthony, 1993). Reuven Feuerstein began providing rehabilitation services to people suffering from ABI in 1997. This theory considers brain structures to be modifiable following cognitive intervention by means of mediation.

Mediated Learning Experience (MLE) is defined as an interaction between a more initiated person with a specific intention to transmit something, and a learner, whereby the mediator interposes himself between the stimuli and the learner to adapt the stimuli so that the learner can gather information, elaborate on it and give an answer to it. It is different to learning from direct exposure to stimuli (Feuerstein et al., 2010). The treatment goals of the Dynamic Neurocognitive Rehabilitation model for individuals with Acquired Brain Injury are as follows:

1. Improvement of cognitive, functional, linguistic and occupational skills and independence.
2. Improvement of the patient's emotional state as well as that of those close to them.
3. At a later stage of the program, finding a meaningful occupation for the patient, training and follow-up.

These goals are attained very gradually. Treatment at the Institute is conducted over a long period of time - over months, often years.

The model for the neurocognitive dynamic rehabilitation of individuals with Acquired Brain Injury

In this section, we will present the model for the neurocognitive dynamic rehabilitation for individuals with Acquired Brain Injury.

The model will be presented first in a scheme and then we will describe in depth some of its parts.

INNOVATIVE MODEL FOR THE NEUROCOGNITIVE DYNAMIC REHABILITATION FOR INDIVIDUALS WITH ACQUIRED BRAIN INJURY



General Goals

1. Improvement of cognitive, functional, ADL, linguistic and occupational skills of the patient
2. Finding a suitable and meaningful occupation for the patient

Specific goals

1. **For the patient's family or partners**
 - a. Shaping modifying environments
2. **For the patient him/herself**

With the patient

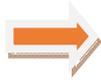
 - a. ADL
 - b. Cognitive remediation
 - c. Transition from passiveness to activeness
 - d. Meaningful occupation
 - e. Awareness of difficulties and potential



Approach

MLE (Mediated Learning Experience)

1. Mediation of intentionality and Reciprocity
2. Mediation for Transcendence
3. Mediation of Meaning
4. Mediation of Competence
5. Mediation of Belief in modifiability



Intervention tools



Phases of rehabilitation

Phase 1:

Data Gathering

- A. Analysis of patient's' medical and paramedical file
- B. Interview/ Anamnesis
 - a. with client
 - b. with family
- C. Admission assessment
 - a. LPAD
 - b. Occupational therapy assessment
 - c. Reading comprehension and writing assessment
 - d. Assessment of computer skills

Phase 2:

Treatment program

- A. Remedial phase – short term goals:
 - a. ADL
 - b. Cognition
 - c. Speech
 - d. Moving from passive to active attitude
 - e. Reading and writing

- B. Occupational phase (work, study, leisure activities)
 - a. Defining the field of occupation
 - b. Searching for suitable occupational placement
 - c. Occupational training and matching the identified placement to patient's abilities
 - d. Accompaniment and support of patient him/herself and the occupational team at the work-place

Phase 3:

Follow up

Further, we will describe some of the process, which we referred to, on the model:

1. Admission assessment

Following an initial introductory meeting, the assessment battery is administered incorporating the LPAD (Learning Propensity Assessment Device) tests (Feuerstein, Falik & Rand, 2002), and some assessment testing speech and language skills and ADL. Additional neuropsychological tests are administered mainly for research use. In addition, a comprehensive intake session is conducted with the patient and/or family members covering past and present functioning, family conditions, and so on. A treatment plan is drawn up for the patient based on the assessment findings.

The period of assessment in fact constitutes the period of admission to the Institute. The assessment is spread over four to ten sessions lasting be-

tween one and a half to three hours each, depending on the patient's condition. Assessment offers the staff and patient an opportunity to get to know each other. As the process is an intensive one, the patient becomes aware of his/her difficulties and abilities, and an emotional relationship is struck with the assessor who will later be on the treatment team of the patient. The uniqueness of the LPAD assessment is due to its' dynamic nature, in that the assessment process is conducted adhering strictly to the three stages of pre-test, mediation and re-test.

The process of dynamic assessment is designed to assess a person's propensity for modification, characterizing the way in which the modification is likely to occur in a person, assessing the extent of the possible modification under given conditions, and assessing the significance of the demonstrated modification its implications for adaptability. This leads to understanding the person's future potential functioning, and is in opposition to conventional static assessments that focus on evaluating current ability (Feuerstein et al, 2002).

Most of the patients come to the centre after undergoing a "static" neuropsychological assessment (as opposed to the "dynamic" approach) that reveals the cognitive deficiencies in their functioning sustained following their injury. From the assessment and its subsequent report, the examiner can gain considerable knowledge regarding the patient's deficiencies. The dynamic assessment, on the other hand, offers the patient and his family an insight into his abilities as well a feeling of competence and faith in his ability to progress.

Often, when patients recognise they are improving and progressing, and have a feeling of success and competence, which they relate to their abilities, they can see the possibility of improving their condition. In other words, when a significant difference is noted between test results prior to mediation and those following mediation, this indicates significant learning potential, meaning that the patient has benefitted considerably from the learning process, or is able to use strategies mediated to him/her efficiently. During the lengthy rehabilitation period, feelings of hopelessness and inability often become ingrained in the patient, so the assessment can be vital to rebuilding the patient's feeling of competence and progress.

For example, Assaf, a young man who suffered T.B.I. (Traumatic Brain Injury) was so excited about the improvement in his functioning from test A to test B in the Organization of Dots task (LPAD), that he asked if he could pho-

tograph both pieces of work to show his family. He was thrilled and elated as he cried out, "It's a miracle!"

When Assaf, or other patients, see that following mediation or practice they are able to remember more information than they thought they could, the patients have more confidence in their progress, resulting in a renewed feeling of competence, independence and motivation. They begin to acknowledge optimism in restoring their abilities, seeing it as a real possibility. After the assessment, we often see a change in the person's perception of his/her ability and self-image. The assessment is a critical first step in building up trust and a positive relationship between the patient and the therapist. The significant feeling of competence that was achieved throughout the test results in motivation previously not seen in the patient.

The drawings in figure 1 and 2 show the change in the ability of one patient, in the visual-configurational memory test of Rey-Osterrieth, before and after mediational intervention. The patient was asked to copy the figure that they were presented whilst looking at it and then again from memory. Contrary to the modality used in static neuropsychological tests with Rey-Osterrieth figure, in the LPAD assessment we repeat these 2 phases twice, having a session of mediation of strategies in between them.

It is clear that before mediation, perception and ability to remember the figure was only fractional. Following mediation there was a considerable improvement in organization, internalization and memorization of the figure, resulting in the patient's belief in his abilities to use his memory.

At the end of the assessment, we are able to point out both the mediation the specific patient needs in order of learning as well as his deficient cognitive functions, which we categorize by the three phases of Input, Elaboration and Output. This allows the planning of an individually tailored treatment program.

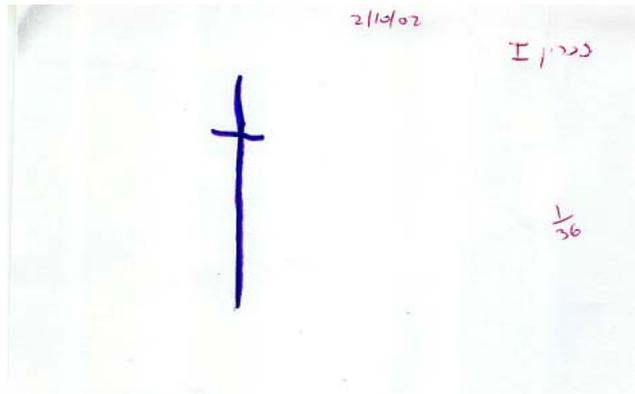


Figure 1 Rey-Osterrieth Complex figure Design according to Feuerstein's Dynamic Assessment Method: phase 2, from memory, before mediation. Patient X, male, aged 29, penetrating brain injury due to a terrorist attack. A screw penetrated his brain, going from occipital lobe and stopping in left temporal lobe, through the hypotalamus, thalamus and capsula interna. As a result he has right hemiparesis, aphasia, cognitive disturbances, recurrent epilepsy.

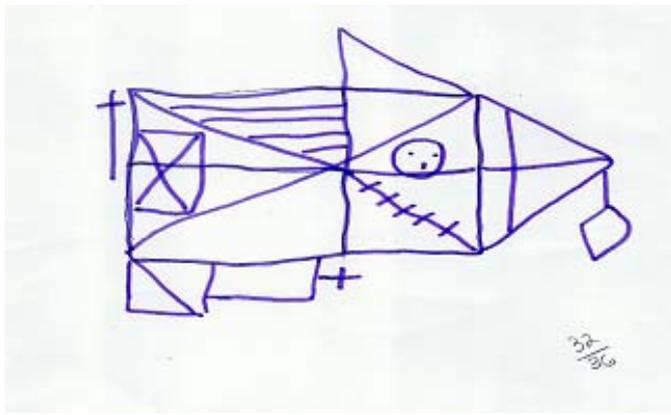


Figure 2 Rey-Osterrieth Complex figure Design according to Feuerstein's Dynamic Assessment Method: phase 5, from memory, after mediation. Same patient as in figure 1.

2. Treatment program

The treatment program at the Feuerstein Institute addresses different areas relevant to rehabilitation, some which are familiar to the patient and his/her family from the rehabilitation hospital, such as occupational therapy and speech therapy. In addition, at the Institute, other therapies are offered which are specific to rehabilitation, primarily the use of Feuerstein's Instrumental Enrichment Program [IE]. Emphasis is placed on re-acquisition of reading, writing, reading comprehension and speech comprehension skills. Treatment programs are intense, involving two to four treatment sessions per week, of three to five hours duration each. In addition, we provide emotional therapy and group therapy.

A major feature of all treatments is the use of Mediated Learning Experience [MLE] principles. This differentiates our treatment from the treatment received by the patient in hospital. The use of MLE principles underlies all treatment sessions in the belief that people who have sustained ABI have limitations in their ability to learn from direct exposure, and require intense mediated learning to progress. Highlights of the application of mediated learning are described in the next section.

Each program consists of a few of the following therapies, which suit the person's needs, as assessed in the admission assessment phase.

- a. **Feuerstein Instrumental Enrichment (FIE) Program** - FIE is a structured application of the method of mediated learning. It is a program, which is made up of 14 "instruments" – consisting of paper and pencil sets of tasks and exercises covering different thinking skills such as organization, comparison, categorization, deduction, etc. The exercises give the patient an opportunity to take on thinking challenges, learn strategies, experience success, and carry out transfer (transcendence) from the exercises to everyday life (Feuerstein, Feuerstein, Falik and Rand, 2006). Tackling the FIE program helps patients to rebuild their impaired cognitive functions. The FIE can be considered a cognitive rehabilitation programme, exercising a number of executive functions: control of impulsivity, systematic search, integrating several sources of information, hypothetical thinking, problem solution, feedback and checking behaviour, planning behaviour, organizing behaviour. Characteristically, the patient

first exercises on paper and pencil exercises, under the guidance of a trained mediator. The task of the mediator is to mediate the transfer of the acquired principles into real life. In progressing stages of working with the client, he is expected to transfer this on his own or with less help.

- b. **Teaching of reading, writing, reading comprehension and speech comprehension** - functions that often become impaired with head injuries. Some patients suffer from aphasia, which constitutes damage to all of the language channels (speech, comprehension, reading and writing). Our speech therapists work with these patients on re-acquisition of all the above skills.

All ABI patients have difficulty understanding text and verbal-auditory information. The problems can be connected to attention deficit, analysis and synthesis, conservation of sequence, abstraction and memory. We work with the patients to restore these functions within the context of reading, text comprehension and comprehension of auditory information.

Some of the patients are at an advanced stage in which they have re-acquired normal functioning in everyday life; however, they have great difficulty tackling advanced functioning such as reading a book during their free time, or academic studies.

Aharon, one such patient, finished his period of rehabilitation at hospital. He was able to function independently in everyday life but when he attempted to return to Yeshiva study, he encountered many problems. He found it difficult to sit for long periods of time, listen and understand lessons and do required assignments. Treatment worked on understanding text, organizing information, organizing time, prioritizing, characterizing optimal study situations, to address his specific needs. As a result of these processes which we took him through over a period of time, he was able to improve his functioning within the study cadre and go on to academic studies.

- c. **Occupational therapy** – This includes working on appropriate functional independence tasks encountered in every-day life, such as budget-management, personal self-care, domestic maintenance, etc. These tasks are selected together with each client and individually structured. This involves several cognitive strategies.

Sometimes we help a patient plan a special event, like organising a birthday party for their child, while being as independent as possible, or as was the case with another patient, who enjoyed taking his children on trips, we helped him organize an outing to the museum for them. In a third example, a patient surprised his wife on their anniversary with an appropriate gift and greeting card. In another case, we tried to find a professional dog-training course for a young man who is very interested in the subject. It is astounding how clients, once initiated, take on the task and the responsibilities that are entailed within, and are so motivated by the goal, that it allows us to see "isles of normalcy".

- d. **Speech therapy** – speech therapy at the Institute differs in two major aspects from the approach in any other clinic:
 - (i) The use of mediated learning as a major means to re-acquisition of the components of language.
 - (ii) Providing prolonged treatment as supported by the belief held by the Feuerstein approach, that one must not give up on any patient and that everyone can be helped to progress. Based on our experience, prolonged treatment continues to prove its worth repeatedly with patients suffering from aphasia. We continue to work with them on the acquisition of communication skills, language and speech, for a long time after they have been discharged from rehab hospitals and we are proud of the fact that they continue to make progress.
- e. **Emotional support** – we consider it important to relate to the emotional state of the patient and his/her family and offer support and treatment as the need arises. In all types of treatment (IE, occupational therapy, etc.) attention is paid to the emotional state of the patient by means of a reciprocal relationship developed during therapy (see below, mediation for reciprocity).

3. Shaping Modifying Environments (SME)

Though patients come to the Institute for an intensive treatment week of four days, they are still spending most of their time at home and most of their motivation (or in many cases, their lack of motivation) stems from their ability to function or not within the home. For this reason work with the families and supporting people is of utmost importance. Work with the families is very complex due to the difficulties mentioned at the beginning of the article but it is essential as an incentive to change. Family members are the closest and the most significant environment and needless to say, they are with them most of the time. For this reason, we try to devote time and effort to work with families. Every patient's treatment is coordinated by a case manager. The use of this model allows close contact with each patient's family and escorts who are in fact a significant component of the treatment within the framework of SME. The role of the case manager is therefore to coordinate and integrate between the different treatments the client receives, define together with the patient and his/her family the goals of treatment and follow up their progress, offer guidance regarding how to work with the patient at home, answer questions, offer solutions to needs and difficulties that may arise amongst family members and escorts or the Institute treatment staff and teach people around the patient to shape a challenging environment for him/her thereby requiring him/her to change, be active and make progress. One of the additional roles of the case manager is to create a feeling of reciprocity with the patient and his/her family as described above in the section on emphasis on meditational criteria. We conduct home visits in the homes of the patients and as part of such, together with the patient and family, we define short-term goals. These goals are put into writing and submitted to them and this enables them and us to follow up and monitor their achievement.

In the course of our work, we have seen that there is utmost importance in cooperation between treatment staff and the patient's family. When there has been accord between the instructions of the treatment staff and the work of the family at home significant progress has been made. Unfortunately, there have been cases where the staff and the family did not always proceed in harmony and the result was that the progress of the patient was impeded.

An example of this happened with Udi who came to us with severe physical and cognitive damages. He had considerable memory and orientation dif-

ficulties. We tried to work with him using a diary in which he could write down permanent or special plans, experiences, events, etc. His family failed to respond to our requests to use a diary at home too and it simply was left uselessly at the bottom of his bag. In addition, we found out that at home, Udi would sit in a comfortable, upholstered chair but he had no means of getting around the house. The result of this was that he was passive in his functioning at home. He did not go into the kitchen, he made nothing for himself and he was not responsible for anything, in spite of our appraisal during treatment at the Institute that he was able to be responsible and carry out different things in the house and in this way increase his activity and his control of his world.

In contrast, another example is the case of Mike who came to us following a stroke in which he had lost his speech. Together with us, his wife set him goals, protected his position as the head of the family, shared family experiences with him and refrained from making significant decisions without him. She continued to refer their children to him for advice. As well as making great progress in the area of language, Mike went back to the work he had done in the past, he reassumed the management of an office staffed by several employees and in all this, he passed from a passive state to an active one.

4. Emphasis on Mediatlional Criteria

Mediatlional criteria applied in our work with the brain-injured is is a critical aspect of the treatment program. It includes the following aspects :

Belief in modifiability –This is illustrated by a new patients' first meeting with Professor Feuerstein. The change in the way the patients saw themselves was clear to see, as was their new optimism, and hope to improve. He always knew how to establish contact, rouse intent and reciprocity and mediate to the patients the significance of the long way they had come since the injury, prior to coming to us and the significance to their future and their ability to advance. He described to the patient and the family developments in brain research that prove that cognitive exercise has a positive effect on patients and helps them to progress even after the most severe cerebral injuries. In this way, he expressed his belief in human modifiability. He would occasionally ask past patients who had completed their rehabilitation and had attained a good level of functioning to come and talk to new patients and offer

them encouragement and hope. In this manner, he mediated and created an awareness of human modifiability – something that patients and their families were often unable to see for themselves both because of their experiences since the injury and the messages they received from the medical establishment, as mentioned above.

Thus, conveying the belief in modifiability was a vital tenet of Feuerstein's work with brain-injured individuals and today we strive to follow in his path and instil in our patients our belief in them and their ability to progress. Optimistic faith is conveyed by enhancing small achievements, i.e. determining small changes in functioning or learning and interpreting that small change as a sign of the possibility of a greater change. Together with this faith it is important for patients to receive mediation for reciprocity, and for them to feel that we will work through their difficulties with them, as a team, we will support them and not give up on them until they accomplish all possible progress .

Reciprocity is also manifested by an empathetic attitude toward patient's condition and their feelings, and their family members towards their condition and towards the difficulty of coping. We put great emphasis on the consideration of these aspects. Beyond this, we put effort into creating close and caring relationships between therapists and the patient and family members. In this way, the therapy setting becomes involved in the life of the patient.

Mediation of Meaning –Instilling content matter in work with the patient, with cognitive and emotional significance and values in order to raise the motivation of the patient to learn and change. We attempt to work with every patient on areas that are interesting to them and relevant to their lives and when we look for an occupation for the patients, we make sure we look in areas that will be meaningful for them. This gives meaning and values to the content and activities mediated to the patient and. links current acts/functioning to things to which they aspire, to life goals. The mediation of meaning illustrates the possibility of achieving their goals. It "heralds" the broader meaning of things currently done in rehabilitation. The ability to carry out a particular function which had been lost for a period of time is an indication of the ability to go back to a whole range of related functions, for example, "Your ability to draw a line today, something you could not do before, constitutes the basis for your future ability to write". It is incumbent upon us to explain the broader implications of this. "Your ability to remember today what you did yesterday – something you could not previously do – shows an

improvement in your memory and that in the future you will be able to remember much more”...

Meaning is the energetic/emotional factor that motivates human beings to cooperate and be willing to accept mediation and continue the process and then even seek further meaning. This is to say that mediation for meaning represents a message of hope, the connection and even the path from the seemingly small and localized aim currently achieved and the broader goals that are significant to the patient.

Mediation for transcendence – expanding the goal of reciprocal activity to a state in which it happens is an important aspect of the thinking of normative human beings. After a brain injury people cannot perform such a transfer independently and they need mediators to do so. In time and with the help of strategies, which patients learn in treatment we expect them to be able to become more independent in this area. This mediation can be carried out by linking a particular activity or event to other more distanced activities or events in space and time. This applies both in the broader sense and in the narrow sense of "let's think about a similar situation that you experienced this week at home."

Development of awareness of thinking processes (meta-cognition) – development of awareness of cognitive processes is an important aspect of our work. Awareness aids the transfer of functioning from automatic performance to planned and controlled functioning. Prior to the injury a large number of the person's thinking functions and performances were acquired gradually until becoming automatic. The injury disrupted the automatic processes and in order to reconstruct them it is necessary to work on the dismantling and development of awareness of the components of the thinking process. For example a patient who wants to buy a computer, who in the past conducted all the steps to this end automatically and unconsciously now, during the rehab experience needs to understand the components of the process and plan the steps of carrying it out – now consciously with explicit awareness of the needed planning .

Mediation of transcendence creates the need to understand and explain and it teaches clients to think about their own thinking (metacognition): what did they think about, why did they develop the strategies they are using, and what did they think about when they reacted in a certain way?

Mediation for a feeling of competence – a patient who has sustained a head injury often suffers from a low feeling of competence. In the majority of cases, the patient is aware of the large-scale losses experienced, of the change in their functioning and cognitive skills as compared to those they had before the injury. All this leads to a low feeling of competence. Sometimes there are patients who are not even aware of the different aspects of their injury and they think they are able to do everything, i.e. a high-level feeling of competence that is at odds with their condition. Dealing with the matter of a feeling of competence is critical to the patient's progress. When the patient sees that, from the assessment stage, gradual small instances of progress in functioning they are willing to put more effort into their rehab .

In order to create opportunities for mediation of a feeling competence it is important to create situations in which the patient can do well. Following this, it is important to interpret, together with the client, the importance of the success. As the patient gets stronger we sometimes analyse together the failures too, to enable learning how to avoid them and be more successful. In addition, it is important to help patients to emotionally estimate and accept the areas of competence and make them a part of their newly restored self-image – this gradually helps to increase feelings of competence .

For example, Tom reported serious difficulties with his attention and concentration. He found it difficult to sit in his place of study and listen to a lesson or study independently for more than a quarter of an hour. During the assessment, Tom sat and worked diligently for two hours, maintaining his concentration. At the end of the session, the mediator said to him, "Have you noticed how long you've been working? What does that say about your capacity "?

The Transition from Passiveness to Activeness in the Process of Treatment

As we described above, a large number of the patients come to us when they have just been discharged from rehab hospitals. Passive behaviour is very characteristic of this stage. One of our work methods to advance patients is a model we constructed by which we help them change their self-perception and their behaviour patterns from a passive to an active one in response to life tasks and experiences.

In discussions held with Feuerstein, he referred to passiveness as the result of a feeling of helplessness that is manifested in difficulty mustering one's skills to respond appropriately to stimuli. Activeness, in contrast, was defined by Feuerstein as a human tendency to respond to the appearance of stimuli, to expect the stimuli and to plan a reaction or appropriate action. In his opinion, activeness can occur when motivation and a feeling of ability has been created.

The patient's perception of the environment is reflected in this dimension. Many patients have become used to physical dependence caused by physical difficulties and mental dependence on the environment. If for example, the patient is taken from one treatment session to another without having any sort of control, because he can be rolled in his wheel-chair, without him being involved in the planning of where or when he is taken, meaning: without self-efficacy, passivity is reinforced.

For example, when Shuli came to us he had an orderly chart of his treatments. The chart was in a bag hanging on the back of his wheelchair so that it was neither accessible to him nor was he responsible for it. His daily timetable or the treatment sessions he was to attend were of no concern to him.

This is also reflected in the environment's perception of the patient: the close environment (usually the family) is very doubtful as to the patient's ability to carry out certain acts. These doubts are often accompanied by pity and the wish to compensate the patient for his/her past and present sufferings. In addition, there is an emotional difficulty in bearing the irreconcilability between accepting the injury and the need to fight its outcome and bring about a measure of progress in the patient's functioning. These two poles make it difficult to create a balance and aspire to improvement. This difficulty is felt by the family as well as by the patient. Due to all these factors and others too, at this stage the family finds it difficult to set functional goals for the patient or pursue them without outside help.

A major source of passivity is the severity of the crisis. A traumatic injury always brings about a sudden, severe and extreme crisis, breaking the person's life up into two parts that are difficult to reconcile – the past and the present can barely be joined. Because of the lack of continuity felt by patients they feel that they have lost their identity and often they spend time comparing past and present which only serves to make it even more difficult for them to feel competence and self-merit. Another aspect that affects passive-

ness is that the crisis came about unexpectedly and was experienced as a loss of control on life. This creates a feeling that there is no connection between what people do and what befalls them. As a result, there is no point in carrying out active functions that will have an effect on what happens.

Gadi was an active and sociable young man serving in a combat unit of the army. He was 20 years old when he was injured in the line of duty. Following his injury (which did not disable him physically); he became dispirited, showing distinct passive behaviour. He was a broken and depressed person. The comparison that he saw between the past and present was manifested as passiveness. Gadi greatly dreaded trying to deal with the tasks of life such as employment or studies due to his feeling that he had no chance of going back to what he had been and due to his great fear of what he expected to be a failure.

There are other causes that are beyond the scope of this paper's ability to explicate, among them neural/organic factors, family systems changes and resistances, economic and employment factors, which we are studying in an ongoing fashion, and subjecting to both clinical observations and research protocols.

Figure 3 portrays the cycle created during the patient's lengthy period of hospitalization. It describes how the patient is fixed in a state of passiveness; his/her lack of control and his/her dependence. When patients come to us following hospitalization, they are generally in such a condition.

The Client in the Passive stage

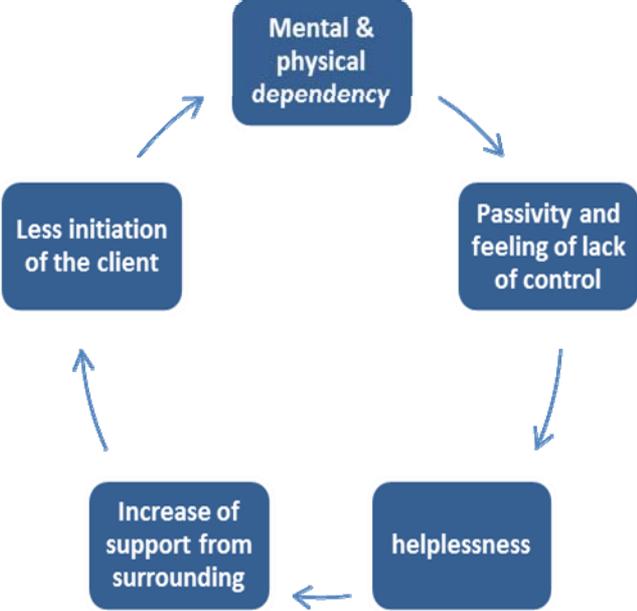


Figure 3. Showing the cycle of passivity

One dimension that we want to address, and will do so in future publications is that of the patient's lengthy period of hospitalization. We believe that it is a significant factor in creating a state of passiveness, affecting lack of control and dependence. When patients come to us following hospitalization, they are generally in such a condition. They show great passiveness and so it is difficult to cause them to be active and show motivation. Thus, our ultimate treatment goals are to promote activeness in our patients.

Therefore, we conclude this paper with a brief discussion of strategies for promoting the transition from passivity to activity, and some illustrative case examples. The critical question: How can an active approach be created?

- ***The performance component and leaving tracks.*** It is important to "see success", i.e. the way to the solution of the task should be a concrete one and it should leave "tracks". When the solution is abstract, success is not sufficiently felt in the patient's experience
- ***Avoiding errors.*** As therapists, we often tend to turn the task into a sort of assessment. In this way, we naturally create a situation that examines the condition of the patient but when we want to create an emotional change in the patient, we must aspire to success. In order to obtain this we must try to avoid the patient giving incorrect answers and help him/her to get the correct answer thereby creating more and more incidents of success.
- ***Development of independence.*** One of the most important and beneficial ways to create activation in the patient is to guide him/her to independence in as many areas as possible. An example of this was Debbie who really "enjoyed" having her own personal driver (her father) ever since she was hurt. In a gradual process with follow-up, we helped her to switch to public transport and in so doing, free her father and particularly create in her a feeling of ability, of normative skill and independence.
- ***Inclusion in a normative work/study environment.*** As long as patients see themselves in the rehab cycle, they have difficulty functioning actively because the demands are placed on them in an artificial manner. In contrast there is nothing like a normative occupational setting (work/study) to create a natural set of demands and in this way to create mechanisms of active operation.

David's passiveness was so prevalent that during lessons he had to be given instructions regarding even the smallest act such as opening up his notebook and taking his pencil out his bag. As time went by, normative life drove him forward. His parents bought him an apartment where he lived on his own. He had to learn how to do the basic domestic task. Initially with lots of mediation. Gradually, he saw he can cope with these tasks and started initiating them, not waiting to be helped. After two years of living on his own, David got married and now he has two children and he is fully involved in raising them .

Figure 4 describes the process, which we attempt to create in order to prompt patients to move away from their passive attitude towards active functioning. In the initial stages, patients are closely accompanied and the treatment staff is more involved. At the later stages, patients and families learn to set the process in motion more independently.

Change to the Active Phase



Figure 4. The cycle from passiveness to activeness

The processes of transition from passiveness to activeness bring about a change in the functioning of the patient by creating incidents of functional success that lead to a change in the patient's perception of his/her ability. We have witnessed many cases of patients whose perception of their own ability increased with the transition to activeness and their confidence in their ability and they learned to set themselves optimistic goals, which led them to further progress.

E.g. Donald, who sustained a serious injury with damage to all modalities of language. He had trouble understanding spoken language and text. Following lengthy treatment, he began to attend lectures on history, a subject that he had always found very interesting. This gave him a feeling of progress towards normative functioning. Later he began working and he felt he was contributing something to society rather than just taking from it. To him, the feeling that he had something to contribute was extremely significant. During the initial stages of his rehabilitation, he had trouble managing his relationships with his children. He felt that he was unable to deal with the complexity of behaviour difficulties, adolescence; he had trouble understanding and accepting his children's choices. Later he became active, responsible, involved in raising his children, and came to establish meaningful relationships with them.

Conclusions

To conclude, over the last decade we have worked with over one hundred patients who had sustained a variety of brain injuries. Following rehabilitation processes described in this article, in a large number of the cases we have succeeded in restoring to these people numerous lost functions. There are many more case examples that can be offered to illustrate and elaborate the processes we have described in this paper, but this will have to await further publications. A few returned to their previous occupations. Others managed, with our help, to select and build up a life in which they have an occupation in an area of interest and significance to them. In our experience, long-term treatment using the methods derived from the Feuerstein Structural Cognitive Modifiability theory with this population group produces the most significant rehabilitation results. Following the path of Professor Reuven Feuerstein, who did revolutionary work in the area of treatment of a variety of

population groups, it is important to us to present the information and show both theoretically and practically how people who have sustained brain damage which has disrupted their lives, can be helped and how their lives can be improved. This paper is a first attempt to do this, and identify both significant outcomes and point toward further potentials.

We will end with a quote from the writings of one of our patients, Eliezer, when he completed treatment at the Feuerstein Institute.

The Institute for the Reparation of Dreams– Eliezer

At Feuerstein Institute, I learned to consolidate my dreams, to contrive a way to make my dreams come true and I received help learning skills to make this possible and connecting dreams and reality. If the Institute were only to make people dream then one single meeting with Prof. Feuerstein would be enough, but at the Institute a person's dreams are analysed together with him and ways to make them come true are conceived. People are helped to understand which skills a person needs to make sure and steady progress. At the Institute people are helped to develop their skills, and in particular, potential qualities which are not necessarily manifested.

Acknowledgements

The authors wish to thank Lou Falik (emer. Psychologist of San Francisco State University and ICELP) and Alex Kozulin (Tel Aviv University and ICELP) for their valuable comments on an earlier version of the manuscript, as well as Jo Lebeer (University of Antwerp) for editing the final text.

References

- Anthony, W.A. (1993). Recovery from mental health illness: The guiding vision of the mental health service system in the 1990s. *Psychological Rehabilitation Journal*, 16, 11–24.
- Boyle, G. J., & Haines, S. (2002). Severe traumatic brain injury: Some effects on family caregivers. *Psychological reports*, 90(2), 415-425.
- Doidge, N. (2007). *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science*, New York: Penguin James H. Silberman Books.
- Feuerstein, R. (2003). *Dynamic assessment of cognitive modifiability*. Jerusalem: ICELP Publications (The International Centre for the Enhancement of Learning Potential).
- Feuerstein, R., Feuerstein, R., & Falik, L. H. (2010). *Beyond smarter: Mediated learning and the brain's capacity for change*. New York: Teachers College Press.
- Feuerstein, R., Falik, L., Rand, Y., & Feuerstein, R. S. (2006). *Creating and Enhancing Cognitive Modifiability: The Feuerstein Instrumental Enrichment Program: Part I, Theoretical and Conceptual Foundations: Part II, Practical Applications of the Feuerstein Instrumental Enrichment Program*. ICELP Publications.
- Hadas-Lidor, N., Weiss, P. & Kozulin, A. (2011). Dynamic Cognitive Intervention: Application in Occupational Therapy. In N. Katz (Ed.), *Cognition, Occupation and Participation Across the Life Span*. Bethesda, MD: AOTA, 323–350
- Woo, B. H., & Nesathurai, S. (2000). *The rehabilitation of people with traumatic brain injury*. Malden (Mass.): Blackwell Science.
- Wieloch, T., & Nikolich, K. (2006). Mechanisms of neural plasticity following brain injury. *Current opinion in neurobiology*, 16(3), 258-264.