The Institutes for the Achievement of Human Potential®

THE FIVE PRINCIPLES OF HUMAN DEVELOPMENT

THROUGH ORGANIZATION OF THE BRAIN

Glenn J. Doman

"....It must then be considered as a basic principle, that when a lesion exists within the confines of the brain, treatment, to be successful, must be directed to the brain wherein lies the cause rather than to that portion of the periphery where the symptoms are reflected. Whether the symptoms exist as an almost undetectable subtlety in human communication or in an overwhelming paralysis, this principle must not be violated by those who seek success with the brain-injured patient."

—Glenn Doman
conclusion of lecture to the staff of
The Institute of Physical Medicine and Rehabilitation
(New York, 1953)

NON-SURGICAL TREATMENT
UTILIZING PRINCIPLES OF NEUROLOGICAL ORGANIZATION

There are five principles of non-surgical and non-pharmacological treatment of brain injury. These principles are based on the fact that the function of the brain is to relate the organism to its environment. Utilizing each of these principles, we have established groups of effective procedures for the treatment of brain injury. Each procedure encompasses a large number of techniques.

THE FIVE PRINCIPLES

1. Procedures which supply basic discrete bits of information to the brain for storage.

2. Procedures which demand an immediate response from the brain to a basic discrete bit of information that has just been supplied to the brain.

3. Procedures which program the brain.

4. Procedures which permit the brain to respond to previous programming.

5. Procedures which provide an improved physiological environment in which the brain may function.

INTRODUCTION

It must be remembered that all brain pathways can be divided into two broad categories. These are (1) sensory (afferent) pathways that bring information into the brain and (2) motor (efferent) pathways through which the brain reacts by commanding motor responses to the information it has received.

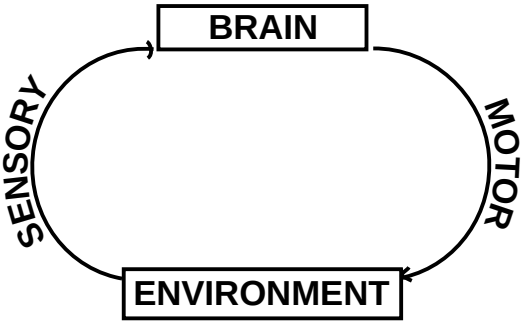
All incoming sensory (or afferent) pathways are a one-way road into the brain and incapable of carrying an outgoing message. All outgoing motor (or efferent) pathways are a one-way road out from the brain and are incapable of carrying a message into the brain. This is a long recognized and well-known fact of neurology that seems to have been completely overlooked in conventional rehabilitation of brain-injured patients. Until recent years, classical methods have treated the brain-injured patient in purely motor terms. The result of such motor (or efferently) oriented treatment has been that whatever information the brain has managed to received has been both accidental and incidental.

Between the sensory and motor pathways, deep within the central nervous system, lie the as yet inadequately defined and poorly understood integrative areas.

The normal cybernetic functioning of the brain is completely dependent upon the integrity of all of these pathways. The total destruction of all motor or all sensory pathways will result in total lack of functional performance of the human being. The partial destruction of one or the other will result in partial lack of functional performance of the individual.

Such lack of functional performance will continue until the former specific pathways are restored to function or until new pathways are established which are capable of completing the total cybernetic loop.

In the human organism, this loop, which begins in the environment, follows sensory pathways to the brain and motor pathways from the brain back to the environment.



All efforts in treatment of the brain-injured patient must therefore be directed at locating the break and again closing the circuit.

THE TREATMENT PROCEDURES

All of the treatment procedures of The Institutes can be placed within one of the five principles.

FIRST PRINCIPLE:
THOSE PROCEDURES WHICH SUPPLY BASIC DISCRETE BITS OF INFORMATION TO THE BRAIN FOR STORAGE.

All of these procedures are entirely sensory in nature and do not anticipate a motor response. They are intended purely to supply the brain with bits of information which are in themselves random. It is not possible to extract either function or information from a brain that has none. Such a brain is in a zero state and will remain so until information is supplied. These procedures provide basic sensory stimuli which range from such simple information as the presence of light, sound, or feeling (as differentiated from the absence of light, sound, or feeling) to such much more sophisticated bits of information as reading a word, hearing a word, or feeling a specific object.

There are only five pathways (all sensory or afferent) through which the brain can gain information, whether in the lowest state of human development or in the highest. These five means are seeing, hearing, feeling, tasting, and smelling. The first three, seeing, hearing, and feeling are supremely important to complete human function. The last two are most important to humans only in the earliest months of life and become less important with continuing development.

PROCEDURE ONE:
Supplying basic, discrete bits of visual information to the brain in keeping with the individual's present state of visual competence and in anticipation of his next higher level.

PROCEDURE TWO:
Supplying basic discrete bits of auditory information to the brain in keeping with the individual's present state of auditory competence and in anticipation of his next higher level.

PROCEDURE THREE:
Supplying basic, discrete bits of tactile information to the brain in keeping with the individual's present state of tactile competence and in anticipation of his next higher level.

PROCEDURE FOUR:
Supplying basic, discrete bits of gustatory information to the brain in keeping the individual's present state of gustatory competence and in anticipation of his next higher level
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PROCEDURE FIVE:
Supplying basic, discrete bits of olfactory information to the brain in keeping with the individual's present state of olfactory competence and in anticipation of his next higher level.

The techniques for supplying such basic, discrete bits of information to the brain are geared precisely to the patient's developmental stage in the particular area of sensory competence that is being treated. The patient's level of competence is determined and he is supplied all input normal to that level.

He is then supplied with all sensory input normal to the next higher level that he is unable to accomplish due to brain injury or due to environmental deprivation. However, in supplying the next higher level, a carefully planned program of greatly intensified and enriched auditory, visual, tactile, gustatory, and olfactory stimuli is made an integral part of the environment. This is accomplished by increasing such stimuli in frequency, intensity, and duration.

As an example, where a child has been traumatically brain-injured and has been in a coma for an extended period of time, let us say in excess of ninety days and for periods ranging up to many years, such a child has been traditionally provided with life-sustaining medical and nursing care in a room kept as quiet and free from a stimulating environmental impingement as possible. His bed is in a private room with curtains drawn, silence enforced, and as far from noisy areas as possible. He is handled only when necessary.

Exactly the opposite is required if such a child is to have his chance for recovery. All studies in auditory, visual, and tactile deprivation indicate that a well human being placed in such a sterile environment would degenerate neurologically. Such degeneration will have its effect both physically and intellectually.

In contrast to this, the principles of neurological organization demand that such a child should be provided with the greatest, rather than the least, impingement from his environment.

As a result of the foregoing, a child in such a coma, immediately following the subsidence of cerebral edema, should be placed in a room that is the center of stimulation in an auditory, visual, tactile, gustatory, and olfactory sense. Such a child is functionally blind, deaf, insensate, and without gustatory or olfactory appreciation.

At The Institutes for the Achievement of Human Potential, such a child's bedside table contained a flashlight, two blocks of wood, a tuning fork, pins, brushes, sniff jars containing various strong-smelling but unharmful substances, and a variety of other stimulus-producing tools.

In addition to regularly and frequently scheduled periods during which the above procedures are utilized, each professional person who passed the child's room was directed to stop long enough to open the child's eye and shine the flashlight into his eyes, to strike the blocks of wood together against each other sharply near his ear, to pinch his skin, to stick him gently with the pin, to place the tuning fork on various joints, to brush his skin briskly with various textured brushes, to pass the various aromas contained in the bottles under his nose briefly, and to place on his tongue very small amounts of strong-

tasting foods, insufficient in quantity for him to choke or aspirate.

Under classical methods of handling, many patients are maintained in such a vegetable-like state for many years until they eventually succumb, having survived as live human beings only in a technical sense.

When such stimulation as has just been specified is introduced, one frequently sees a patient respond by seeing, hearing, feeling, tasting, and smelling in a matter of days or a very few weeks, even though he may have been in a comatose state for months or even years.

In the case described, by supplying bits of discrete information to a brain which has been previously programmed by normal development prior to the accident, a state of consciousness is produced which supplants the previous, virtually enforced unconsciousness.

The same procedures apply to the severely brain-injured newborn child who has had no opportunity to see, hear, feel, taste, or smell because of brain pathology. They apply also to the older or less severely brain-injured child or adult whose neurological development is halted or delayed by pathology at a higher level. The basic, discrete bits of information supplied to such a child are those indicated by the highest level of accomplishment and the next higher anticipated level, which is the level of his present inability to perform.

These levels are indicated on *The Institutes Developmental Profile*™. The levels of competence may differ greatly in the various specific areas of sensory intake in a given patient due to the focality or diffuseness of the brain injury. Thus, an individual child may be receiving bits of auditory information at an extremely primitive level while receiving bits of visual or tactile information at a very advanced level.

PROCEDURE SIX:
Creating intelligence through bits of information simultaneously given to the visual and auditory pathways.

The techniques employed within this procedure provide sophisticated bits of information simultaneously through the visual and auditory pathways. The discrete, precise, unambiguous bits of information presented are more advanced than the individual's present level of visual and auditory competence. This is accomplished by presenting the information frequently, but briefly.

The information supplied in this procedure is stored exclusively in the cortex.

This process of supplying bits of information to the brain by the human developmentalist is very similar to the storage of precise bits of information in an electronic brain or computer by the engineer and physicist.

SECOND PRINCIPLE:
THOSE PROCEDURES WHICH DEMAND AN IMMEDIATE RESPONSE FROM THE BRAIN TO A BASIC, DISCRETE BIT OF INFORMATION WHICH HAS JUST BEEN SUPPLIED TO THE BRAIN.

All of these procedures are sensory-motor in nature and do demand an immediate motor response. While these basic discrete bits of information are in themselves random, they demand a related response. That is to say, they demand a motor reaction that is responsible and appropriate to the specific sensory input.

The brain level to which the stimulus is addressed may be the medulla, pons, mid-brain, or cortex. The stimulus may take the form of visual, auditory, tactile, gustatory, or olfactory. The response evoked will be from the brain level addressed and will take the form of mobility, language, or manual response. Depending on the level of brain addressed, the response may be reflexive, perceptive, appreciative, or understanding in nature.

All of these stimuli will begin in the environment and are initiated by the human developmentalist as part of that environment. They pass through the sensory tracts into the brain, which initiates the motor response, which will in turn pass through the motor tracts enroute back to the environment upon which they will have their effect.

PROCEDURE SEVEN:
Supplying basic, discrete bits of visual information to the brain in keeping with the individual's present state of visual competence and in anticipation of his next higher level. Following this stimulation the human developmentalist then immediately provides the opportunity for a motor response.

PROCEDURE EIGHT:
Supplying basic, discrete bits of auditory information to the brain in keeping with the individual's present state of auditory competence and in anticipation of his next higher level. Following this stimulation, the human developmentalist then immediately provides the opportunity for a motor response.

PROCEDURE NINE:
Supplying basic, discrete bits of tactile information to the brain in keeping with the individual's state of tactile competence and in anticipation of his next higher level. Following this stimulation, the human developmentalist then immediately provides the opportunity for a motor response.

PROCEDURE TEN:
Supplying basic, discrete bits of gustatory information to the brain in keeping with the individual's present state of gustatory competence and in anticipation of his next higher level. Following this

stimulation, the human developmentalist then immediately provides the opportunity for a motor response.

PROCEDURE ELEVEN:
Supplying basic, discrete bits of olfactory information to the brain in keeping with the individual's present state of olfactory competence and in anticipation of his next higher level. Following this stimulation, the human developmentalist then immediately provides the opportunity for a motor response.

The techniques for providing an immediate motor response are geared precisely to the development of the patient's motor pathways.

THIRD PRINCIPLE:
PROCEDURES WHICH PROGRAM THE BRAIN.

The procedures which program the brain are entirely sensory in nature and do not seek a motor response. They differ from the procedures of the first principle in that they do not supply basic, discrete bits of information to the brain but, rather, large amounts of RELATED COORDINATED INFORMATION. This information is presented in the same related and coordinated manner in which a totally integrated motor response will later be demanded from the brain in the form of human function.

These procedures range from those which are life-saving to those which add the final level of sophistication to human communication. To the lower and more primitive levels of the brain are supplied very basic programs of sensory input, such as the tactile programming of how it feels to breathe rhythmically or simple crawling movements. To the higher levels of the brain they supply very complex and advanced programs of sensory intake such as the tactile programming of complex walking movements, the auditory programming of human speech, and the visual programming of human writing.

These procedures place great reliance upon the tactile, auditory, and visual pathways which are prerequisite to human walking, talking, and writing. Little reliance is placed upon the gustatory and olfactory pathways.

These procedures place great reliance upon the tactile, auditory, and visual pathways which are prerequisite to human walking, talking, and writing. Little reliance is placed upon the gustatory and olfactory pathways.

PROCEDURE TWELVE:
Supplying tactile programming for that most basic of all functions, breathing.

This procedure imposes normal breathing patterns upon the abnormally, shallow, arrhythmic, and often life-threatening breathing of severely brain-injured individuals.

The techniques employed within this procedure are determined by taking into consideration the child's present breathing, the type of normal breathing which is appropriate for the patient's age level, and the patient's overall level of function.

PROCEDURE THIRTEEN:
Supplying tactile programming for various levels of total human movement.

This procedure reinforces the program of sensory input at the highest level of mobility competence attained by the child in order to be confident of this totality of function at that level. It also supplies total tactile programming at the next higher level of mobility competence that he has not yet attained.

The techniques employed within this tactile programming procedure consist of passively superimposing on the child's body reproductions, as precisely as possible, of the total patterns of movement involved in bodily mobility at his level of competence as well as the next higher level of total mobility that he has not yet attained.

The techniques involved in this procedure range from imposing the lower forms of movement patterns produced by early brain levels, such as simple truncal movement, through successively higher patterns of movement produced by more advanced levels of the brain, such as crawling patterns of movement and creeping patterns of movement. They culminate in the highest patterns of movement produced only by the exclusively human cortex, which includes the various levels of uniquely human walking.

In each case of the tactile programming procedure, what is supplied to the child is the total tactile patterns which are prerequisite to the motor accomplishment of the appropriate level of mobility. Without such tactile input, normal movement of limbs, crawling, or walking are impossible.

PROCEDURE FOURTEEN:
Supplying auditory programming for various levels of total human language.

This procedure reinforces the program of sensory input at the highest level of auditory competence attained by the child in order to be confident of his totality of function at that level. It also supplies total programming at the next higher anticipated level of auditory competence that he has not yet attained.

The techniques employed within this auditory programming procedure consist of passively superimposing on the child's hearing the total patterns of language involved in speech at the level of competence that he has thus far reached, as well as the next higher level of total language of which he is as yet incapable.

The techniques involved in this procedure range from imposing the sounds of the lower forms of language patterns produced by early brain levels, such as meaningful sound patterns. They culminate in the highest patterns of sound and language produced only by the exclusively human cortex, which include the various levels of uniquely human talking.

In each case of the auditory programming procedure, what is supplied to the child is the total auditory patterns which are prerequisite to the motor accomplishment of the appropriate level of speech. Without such auditory input, normal meaningful sounds or talking are impossible.

PROCEDURE FIFTEEN:
Supplying visual programming for various levels of total manual competence, culminating in human writing.

This procedure reinforces the program of sensory input at the highest level of manual competence attained by the child in order to be confident of his totality of function at that level. It also supplies total visual programming at the next higher anticipated level of manual competence that he has not yet attained.

The techniques employed within this visual programming procedure range from imposing the visual images of manual competence patterns produced by lower levels, prehensile grasp patterns, and cortical opposition patterns, to the highest patterns of manual competence produced only by the exclusively human cortex. They culminate in the various levels of uniquely human writing.

In each case of the visual patterning procedure, what is supplied to the child is the total visual patterns which are prerequisite to the motor accomplishment of the appropriate level of manual competence. Without such visual input, normal prehensile grasp, cortical opposition, or human writing are impossible. As an example, in order for a human being to write normally as the ultimate motor act of manual competence, he must have been capable of receiving the visual input of reading.

PROCEDURE SIXTEEN:
Creating intelligence through related information simultaneously given to the visual and auditory pathways.

This procedure provides sophisticated information simultaneously through the visual and auditory pathways. The information presented is not about the individual's immediate environment, but encompasses geography, science, history, art, math, music, or other such families of information. This procedure stimulates the combining and permutating of information that occurs exclusively in the cortex.

The techniques employed within this procedure are to passively provide the individual with visual and auditory information in a related manner. This is done frequently and for a shorter duration of time than the individual's interest will allow.

PROCEDURE SEVENTEEN:
Developing cortical hemispheric dominance.

This procedure accomplishes the attainment of the final ontogenetic development which is unique to man, cortical hemispheric dominance. It is this development that provides human beings with the ability to deal in symbolic language, i.e., in speaking and understanding spoken language and in writing and understanding written language.

The control of all skilled functions by a single cortical hemisphere results in unilaterality so that the individual consistently uses the right eye, right ear, right hand, and right foot, or vice versa, depending on which hemisphere is dominant. Hemi-spheric dominance is genetically determined but it is subject to influences such as physical trauma or cultural factors.

The techniques employed in creating unilaterality are superimposed on proper neurological organization of the preceding levels of brain function.

Dominant HANDEDNESS is established by the exclusive use of one hand for tactile identification of objects.

Dominant EYEDNESS is established by occlusion of the subdominant eye by means of color or polaroid filters and by opaque occluders.

Dominant EAREDNESS is established by occlusion of the subdominant ear. This encourages greater utilization and training of the dominant ear.

FOURTH PRINCIPLE:
PROCEDURES WHICH PERMIT THE BRAIN TO RESPOND TO PREVIOUS PROGRAMMING.

These procedures are sensory-motor in nature and provide an optimal opportunity for the brain to utilize in function the programs which are given to the brain in the procedures of the Third Principle.

Since the programs which were supplied to the brain were often repeated and were precisely coordinated, large amounts of related information, the responses which will now be elicited from the brain are holistic and precisely coordinated patterns of function.

They include patterns of mobility function which range from crawling through creeping to the highest levels of human walking.

They include patterns of speech function which range from meaningful sound to the highest levels of human speech.

They include patterns of human creativity emanating from a single dominant cortical hemisphere which include creative speech composition, creative writing, and creative manual accomplishments.

These patterns exclude the lowest level of brain and spinal cord, which are not responsive to programs but only to single bits of discrete information.

These procedures provide an opportune environment in which to retrieve the specific pattern that is desired. As an example, it is easiest for a human being to crawl on a smooth, flat surface. It is difficult to crawl on a textured uneven surface. Thus, a smooth flat surface is provided for a human being if the goal is to retrieve a pattern of human crawling that has been programmed into the brain.

PROCEDURE EIGHTEEN:
To provide an opportune environment in which to retrieve motor mobility patterns which have been programmed into the brain in sensory-tactile form.

PROCEDURE NINETEEN:
To provide an opportune environment in which to retrieve motor speech patterns which have been programmed into the brain in sensory-auditory form.

PROCEDURE TWENTY:
To provide an opportune environment in which to retrieve motor manual patterns which have been programmed into the brain in sensory-visual form.

PROCEDURE TWENTY-ONE:
To provide an opportune environment in which to retrieve creative motor movement patterns from a single cortical hemisphere of the brain which have been previously programmed into that hemisphere in sensory-tactile form.

PROCEDURE TWENTY-TWO:
To provide an opportune environment in which to retrieve creative motor speech patterns from a single cortical hemisphere of the brain which have been previously programmed into that hemisphere in sensory-auditory form.

PROCEDURE TWENTY-THREE:
To provide an opportune environment in which to retrieve creative motor writing patterns from a single cortical hemisphere of the brain which have been previously programmed into that hemisphere in sensory-visual form.

FIFTH PRINCIPLE:
THOSE PROCEDURES WHICH PROVIDE AN IMPROVED PHYSIOLOGICAL ENVIRONMENT IN WHICH THE BRAIN MAY FUNCTION.

All of these procedures are based on the physiological needs of the brain and the dynamic nature of neuroplasticity. The brain requires oxygen, carbon dioxide, glucose, water, and a host of nutrients vital to its function. As a result of brain injury, respiratory, circulatory, and digestive systems may be impaired, further impairing delivery of nutrients to the brain. Oxygen is the single most important and the most frequently threatened nutrient of the brain. Carbon dioxide is the primary regulator of cerebral blood flow. Water and electrolytes provide the liquid milieu in which all brain cells function. Glucose and other dietary nutrients are needed for cellular energy and function and for production of neurotransmitters and growth factors.

These procedures improve brain physiology, which helps to improve overall health, respiration, nutrient absorption and utilization, and to reduce the frequency, intensity, and duration of seizures.

PROCEDURE TWENTY-FOUR:
This procedure is of a reflex nature and increases the blood flow to the brain, thus supplying additional oxygen and other nutrients to the brain.

PROCEDURE TWENTY-FIVE:
This procedure ensures proper liquid balance for the brain and prevents over-accumulation of cerebrospinal fluid and cerebrovascular compression.

PROCEDURE TWENTY-SIX:
This procedure provides healthy natural foods and supplements essential for optimal brain function.

PROCEDURE TWENTY-SEVEN:
This procedure eliminates unhealthy foods and environmental substances that interfere with optimal brain physiology.

PROCEDURE TWENTY-EIGHT:
This procedure eliminates pharmacological substances that may interfere with normal brain development and function.