have been accumulated in the higher brain dysfunction support model project, which was commenced in fiscal 2001, it has been found that there is a group of persons having difficulty adapting themselves to daily life and social life mainly due to cognitive impairments, such as memory problem, attention problem, executive dysfunction and social behavioral disorders. An urgent requirement is to study methods for diagnosis, rehabilitation and living support which have not been established, for these disorders. Given these circumstances, it is appropriate to administratively name those cognitive impairments that this group have as "higher brain dysfunction" and those having the dysfunction as "persons with higher brain dysfunction" from the viewpoint of promoting measures to support these persons. The following are the diagnostic criteria for this dysfunction.

Diagnostic Criteria

I. Major symptoms
1. The fact that the person is affected by an injury caused by an accident or disorder leading to an organic lesion of the brain should be confirmed.
2. The person has difficulties in daily life or social life, and the major cause of the difficulties is a cognitive impairment, such as a memory problem, attention problem, executive dysfunction or social behavioral disorder.

II. Examination findings
The presence of an organic lesion of the brain regarded as the cause of a cognitive impairment should be confirmed through MRI, CT or electroencephalography, or it is confirmed in a medical certificate that there has been an organic lesion of the brain.

III. Excluded items
1. Persons having symptoms that can be classified as physical impairments by the law of Japan among cognitive impairments due to organic lesions of the brain, but having none of the major symptoms above (I-2) are excluded.
2. Symptoms and examination findings that the person already had before being affected by an injury or disorder are excluded at the stage of diagnosis.
3. Persons whose congenital disorder or perinatal brain damage, developmental impairment or progressive disorder is the cause are excluded.

IV. Diagnosis
1. If a case meets all the above criteria, I to III, it is diagnosed as higher brain dysfunction.
2. Diagnosis of higher brain dysfunction must be performed after the acute stage of the brain injury is passed.
3. The doctor may refer to findings of neuropsychological tests.

If a case meets diagnostic criteria I and III while the presence of an organic lesion of the brain is not confirmed in examination findings indicated in II, the patient may still be diagnosed as a person with higher brain dysfunction through careful evaluation.

It is appropriate to review these diagnostic criteria referring the new evidences of the corresponding fields on a timely basis given development of medicine and healthcare in I Descriptions of Major Symptoms

## I Descriptions of Major Symptoms

### 1. Memory problem

Anterograde and retrograde amnesia is observed. If the case does not show global intellectual dysfunction and attention problem, it is a typical amnestic syndrome.

① Anterograde amnesia: This is what is called a post-injury learning disability. The patient is unable to remember new information or a new episode after he/she is injured or develops a causative disorder, and memory of any event that occurs after the onset of amnesia is not retained. Measures to evaluate the memory problem include Wechsler memory scale, paired verbal association learning task (e.g., Miyake method), word list learning task (e.g., Rey auditory verbal learning test) and visual learning task (e.g., Rey-Osterrieth complex figure test, Benton visual retention test).

② Retrograde amnesia: Loss of memory before the patient is injured or develops a symptom. In particular, memory of episodes or experiences is strongly impaired. Evaluation is performed based on the reproduction of information on autobiographic memory. However, since the patient tends to confabulate, it is necessary to ask other relevant persons whether the patient can't remember the episodes or experiences before injury to conduct examination repeatedly. If the second response is the same as the first response, the doctor regards it as correct to assess the validity of the patient's responses.

Mild: Recent memory or complicated memory is partially retained. The patient shows impairment such may associate an item with a semantically irrelevant item in a highly difficult test.
Medium: Old memory and experimentally acquired knowledge are retained.
Recent new memory and memory of complicated events are lost.
Severe: Global amnesia, which includes anterograde and retrograde amnesia.
Most memory is lost.

In addition, confabulation and disorientation are observed. Confabulation is a phenomenon in which an event that the patient has not experienced is retrospected. In many cases, a confabulated scenario frequently changes. Embarrassment confabulations are confabulations that occur to infill a temporary loss of memory or the resultant embarrassment in spontaneous conversations. Embarrassment confabulations are induced through questions by the examiner, and their scenarios are based on fabricated events.

## 2. Attention problem

① Generalized attention impairment

Concentration difficulty/distraction: The patient has difficulty in concentrating on a certain stimulus, and is prone to diverting his/her attention to another stimulus. Useful evaluation measures include cancellation and detection test, Stroop test and mental control task.

Difficulty in retaining/maintaining attention: The patient of lighter attention problem has difficulty retaining attention for a long time. Task performance is lowered as time advances. When given a task, the patient is able to perform it in the beginning, but unable to sustain his/her concentration more than 15 minutes. Useful examination methods include continuous performance test and cancellation task.

② Unilateral spatial neglect

The patient shows unilateral neglect behaviors including overlooking a stimulus in the space opposite of the damaged part of the brain. This is not to be confused with homonymous hemianopsia. Neglect of the left space is often observed in patients with damage in the right hemisphere (parietal lobe damage in particular) of his/her brain. Measures evaluation tests to detect symptoms of unilateral spatial neglect include line bisection, line section cancellation and painting replication. Patients with left homonymous hemianopsia cannot see unilateral visual field of both eyes and cannot see an object present on one side unless they move their eyes. If the patient has only homonymous hemianopsia, he/she is able to see one side by turning his/her eyes toward the blind side, and does not show unilateral neglect.

Mild: Although the patient does not show consistent neglect in examination, neglect is observed in daily living behaviors as well as in brief presentation. When given concurrent stimulation on both sides, the patient overlooks the opposite side of the lesion, that is, shows extinction on one side.

Medium: Although the patient always shows neglect, he/she is able to see the neglect side if urged to pay attention to it.

Severe: The patient's body faces the lesion side, and he/she is unable to see the neglected side even if urged to pay attention to it.

## 3. Executive dysfunction

① Impairment in planning an action that meets the purpose: It is the impairment in setting a purpose for an action or planning an action. Since the patient has impairment in setting a purpose for an action or planning an action, the result of the

action is left to chance, or the action is impulsively due to autonomic on preservative manner of reaction to a stimulus. The patient starts an action before setting a goal. Because the patient is unable to set a clear goal, he/she may have difficulty starting an action, and it may lead to an action that is also regarded as lack of motivation or aspontaneity. Since the patient has the ability to execute the action, he/she is able to continue the activity if given an instruction in a stepwise manner.

② Impairment in executing an action that meets the purpose: It is the impairment in controlling his/her action by monitoring it. Since the patient has impairment in the process of formulating a basic policy for managing an activity, sustaining attention and objectively observing himself/herself and the surroundings, the patient immediately acts without analyzing options and makes a similar choice even if the action fails. To appropriately get involved with the surroundings, the patient needs to correct his/her action by himself/herself. As this ability is affected, the patient takes a socially inappropriate action. Assessment methods for executive dysfunction include BADS (behavioral assessment of dysexecutive syndrome).

**4. Social behavioral disorder**

① Decreased willingness/spontaneity: The patient does few spontaneous activities, and leads an idle life such as staying in bed all day not because of motor impairment.

② Personality disorder : As irritation starts, it gradually escalates to an excessively emotional reaction or aggressive action. Once it occurs, the patient is unable to control this action. The patient will not accept his/her disorder and obstinately refuses to receive training. He/she suddenly becomes excited and blusters in a loud voice. The patient shows anti-social behavior, such as violence or sexual activity to nurses.

③ Difficulty in interpersonal relationships: Social skills are considered to be a function of subordinate to cognitive ability and linguistic ability. Degradation of social skills in patients with higher brain dysfunction includes sudden diversion of conversational topics, excessively intimate and disinhibiting remarks and approaches, recitation of remarks by the other party, literalistic thinking, difficulty in recognizing subjects of cynical/satirical/abstract instructions, and difficulty in generating various conversational topics. The examiner evaluates the frequency, quality and achievement of social interaction through interviews.

④ Dependent behaviors: The patient shows degradation and regression of personality functioning after the brain is damaged. In many cases, the patient also

shows decreased spontaneity. As a result, the patient leads a dependent life.

⑤ Perseveration: In solving various daily living problems, the patient is unable to address new problems as a result of executive dysfunction although he/she can manage to solve problems as long as procedures are firmly established and he/she habitually behaves according to the procedures. In such cases, the patient with higher brain dysfunction develops impairment in recognition or in changing his/her behavior, and the past behavior reappears (is sustained) and the patient persists in such behaviors.

## II MRI Findings after Traumatic Brain Injury

### 1. MRI findings that are often observed as characteristic organic lesions in the chronic phase

i) Change after cerebral contusion or intracranial hematoma

Findings of local or diffuse necrosis or infarction, findings of cerebral atrophy, etc. that show T1 low signal or T2 high signal

Note: often observed on the tip or base of the frontal lobe or the temporal lobe

ii) Findings after diffuse (widespread) brain injury (including diffuse axonal injury)

Findings of ventricular expansion or diffuse cerebral atrophy, callosal atrophy, brain-stem damage, brain-stem atrophy, etc.

Note: Injury and gliding contusion of the deep white matter, corpus callosum, basal nucleus or dorsal upper brain stem are regarded as characteristic findings of diffuse (widespread) axonal injury. If hemorrhagic lesion occurs in these sites in the acute phase, it may remain in the form of T1 low signal or T2 high signal in the chronic phase. However, it may apply only to edematous lesion (T1 equal signal, T2 high signal) in the acute phase. In such a case, no anomaly is observed or only atrophy of the same site may remain in the chronic phase.

iii) Others

Findings of subdural hygroma or external hydrocephalus on one side or both sides may be observed.

### 2. MRI findings regarded as related to higher brain dysfunction

i) Deep white matter injury findings

ii) Ventricular expansion

Especially, expansion of the inferior horn of the lateral ventricle or of the third

ventricle

iii) Callosal atrophy

iv) Fornical atrophy, etc.

Note: Higher brain dysfunction may develop even if no pathological findings is observed in MRI.

(Appendix)

① Relationship between ventricular expansion or hippocampal atrophy and IQ has been reported.

- Findings of deep white matter injury or ventricular expansion and decreased performance IQ (PIQ)
- Increased volume of the inferior horn of the left lateral ventricle and decreased verbal IQ (VIQ)
- Increased volume of the inferior horn of the right lateral ventricle and decreased PIQ
- Decreased volume of the left hippocampus and decreased PIQ

② Findings that are characteristic to diffuse (widespread) axonal injuries such as brain-stem and callosal injuries observed in the acute phase *suggest* that the patient has higher brain dysfunction.

③ MRI findings regarded as related to higher brain dysfunction of infants

- Findings of deep white matter or brain-stem injury
- Findings of frontal lobe injury
- Findings of cerebellar atrophy

## III Higher Brain Dysfunction and ICD-10 (Mental and Behavioral Impairments of ICD 10: the International Statistical Classification of Diseases and Related Health Problems, 10th Revision [F00 - F99])

- The diagnostic criteria for higher brain dysfunction apply to persons having disorders that are included in F04, F06 and F07 as causative disorders.
- Although not all persons having the disorders included in these three items are eligible for support, those disorders included in other items are excluded.
  Ex. Alzheimer's disease (F00), Parkinson's disease (F02)
- Cases whose causative disorders include traumatic brain injury, cerebrovascular damage, hypoxic encephalopathy, encephalitis and brain tumors, and whose main pathological conditions are memory problem, are classified in F04 and eligible.

- Cases whose causative disorders include traumatic brain injury, cerebrovascular damage, hypoxic encephalopathy, encephalitis and brain tumors, and whose main pathological conditions are not amnesia, are classified in F06 and eligible. Cases only with attention problem or executive dysfunction are classified in F06.
- Posttraumatic stress disorder (PTSD) falls under F43 and is excluded.
- Functional amnesias represented by traumatic generalized amnesia fall under F40 and are excluded.

ICD 10: the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (1992)

Items included in the diagnostic criteria for HBD.

**F04 Organic amnestic syndrome, not induced by alcohol and other psychoactive substances**

**F06 Other mental disorders due to brain damage and dysfunction and to physical disease**

**F07 Personality and behavioural disorder due to brain disease, damage and dysfunction**

Items excluded from the criteria

**F40 Phobic anxiety disorders**

**F43 Reaction to severe stress, and adjustment disorders**

## Chapter 2.
## Standard Training Program for Persons with Higher Brain Dysfunction

### Overview
### 1.Condition of higher brain dysfunction

**Who are the persons with higher brain dysfunction (definition)?**

Those who comply with the diagnostic criteria of higher brain dysfunction in Chapter 1.

**What kinds of symptoms do persons with higher brain dysfunction have?**

(Glossary: http://www.rehab.go.jp/ri/brain/betten.html)

Persons with higher brain dysfunction have symptoms such as the following:

- Memory problem
- Attention problem
- Executive dysfunction
- Unilateral spatial neglect
- Lack of disease consciousness

Focal symptoms
- Aphasia
- Apraxia
- Agnosia

Physical dysfunctions
- Hemiplegia
- Ataxia

Social behavioral disorders
- Anaclisis, regression
- Decreased desire control
- Decreased emotional control
- Poor interpersonal skills
- Perseveration
- Decreased willingness/spontaneity
- Depression
- Affective incontinence

**How does higher brain dysfunction look?**

Higher brain dysfunction is apparently often difficult to identify. This is like the fact that each of us has a different personality, and in many cases you do not see a person's internal characteristics unless you associate with the person. As a result of organic lesion of the brain, persons with higher brain dysfunction are sometimes reminded of the following points in social life through persons around them. These points serve as important clues to recognizing persons with higher brain dysfunction.

- Late for an appointment
- Gives up any job halfway
- Writes in random places/pages of a notebook for supplementing memory problem
- Is absent-minded
- Repeats the same question many times
- Takes food from children and eats it
- Generously spends money

- Insists that the superior, instead of himself/herself, is to blame for failure.

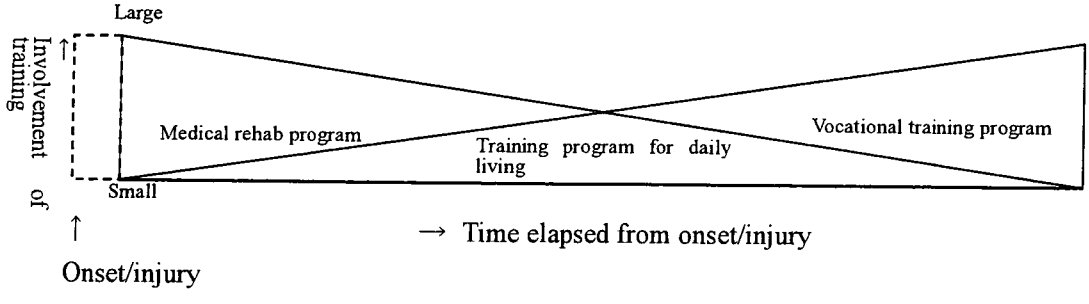
## 2.Training for higher brain dysfunction

### What kinds of trainings are available?

There are the following three types of training according to the relative period from the onset/injury and the goal:

- Medical rehabilitation program
- Training program for daily living
- Vocational training program

Medical rehabilitation programs (hereafter abbreviated "medical rehab programs") include psychological counseling, drug treatment and surgical treatment in addition to programs for coping with individual cognitive impairments (cognitive rehabilitation). In contrast, training for daily living and vocational training place a focus on acquisition of skills considered necessary for daily living or vocational skills, rather than on the cognitive impairment itself, even if the impairment is a serious problem.




### Implementation system of training

### Medical rehabilitation programs are conducted under instructions from doctors

Medical rehabilitation programs are conducted under instructions from doctors. In the higher brain dysfunction support model project, patients received training at hospitals or rehabilitation facilities for the physically disabled persons in most cases. In the remaining cases, local facilities and workshops were used. In training programs for daily living and occupational skill, non-doctor professionals may take the lead. However, since those programs are series of trainings, medical information and cooperation with doctors are important. In any case, it is important for all the staff members share the problem(s) of the user and stay focused on the objective when conducting training.

### Professions involved in training

Doctor: physiatrist, neurologist, neurosurgeon, psychiatrist, internist, etc.

Non-doctor: psychological personnel, occupational therapist, physical therapist,

speech therapist, nurse, rehabilitation sport specialist, medical social worker, etc. Instructors for daily living and vocational instructors conduct training for daily living and vocational skills.

**Training time**

Training time is adjusted according to the time from onset/injury and the circumstances (physical strength, concentration of the case).

**Training period**

- Medical rehabilitation programs are conducted for up to 6 months
- Training should preferably be conducted for one year in total by linking various services

A report on the model project indicates that of the patients with impairments who received training, 74% showed improvement in the impairment scale based on the data obtained in the model projects in 6 months and 97% showed the achievement in one year. Therefore, medical rehab programs focused on functional recovery should be conducted for up to 6 months from the start. Thereafter, continuous training added with training for daily living and vocational skills should be conducted as necessary. The preference is to conduct the whole training program for one year.

**Transition of training**

Concerning transition from a medical rehab program to training for daily living or vocational training, the rehab program should transition to training for daily living or vocational training if it is judged important for the patient to acquire skills considered necessary for daily living or vocational skills even if a cognitive impairment remains. Elements of training for daily living or vocational training should be added even during the medical rehab program, if necessary. In some cases, the client receives a medical rehab program again after receiving training for daily living. The flow of the whole training is not necessarily from a medical one to that for daily living and vocational skills.

**Continuation and completion of the training**

Whether to continue or complete the training should be determined through evaluation performed every month to every three months. After completion of the training, the doctor should proceed to the support stage as requested by the patient or his/her family while referring to alleviation of symptoms indicated for higher brain dysfunctions, physical functions, ADL, neuropsychological test, change in

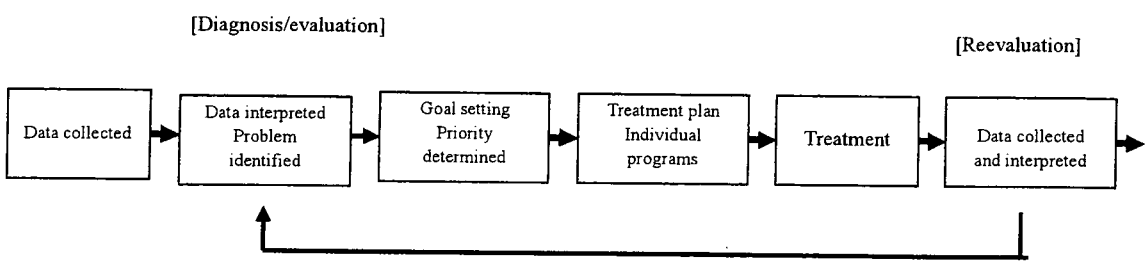
impairment scale, etc.

**Specific content of training by profession**

Training for persons with higher brain dysfunction involves various specialists. The training consists of highly specialized contents and those elements handled as common issues between different professions. For example, for attention problem of a patient with higher brain dysfunction, an occupational therapist, speech therapist, clinical psychotherapist (psychological staff) and nurse are involved from their respective standpoints.

**Procedure for conducting training for persons with higher brain dysfunction**

The procedure for the medical rehabilitation starts with the setting of a future goal while taking into account not only diagnosis and treatment of the disease but also the evaluation of impairment and functional limitation resulting from the disease as well as life history, socioeconomic environment and family background of the case, followed by formulation and implementation of a necessary plan and a specific program necessary to achieve the goal, evaluation of the progress after a certain period, modification of the goal and program as necessary, and then achievement of the goal.




Procedure for medical rehabilitation

**What is evaluation of higher brain dysfunction?**

We function within a certain range of behaviors, such as being on time, keeping commitments and not spending money wastefully, by learning through school and social life from childhood. However, if a person is late for an appointment, the reasons include forgetting a commitment, forgetting time, being absorbed in something, being distracted by something else and taking the wrong way, and as a result, there may be various possibilities behind such a failure. If the patient does not keep a commitment, you have to also consider the possibility that the patient used to fail to keep commitment regardless of the injury/onset of disease.

When considering what kind of problem lies in higher brain dysfunction, you should pay attention to the following points.

- Interview on life history, intelligence level and behavioral characteristics before injury/onset (whether the dysfunction results from organic lesion of the brain)

1. Evaluation through behavioral observation
    (a) With a fixed viewpoint
    (b) What in the higher brain dysfunction is the problem? → which test to use?
2. Evaluation using a neuropsychological test
    (a) Mean value and dispersion
    (b) Reaction unique to persons with higher brain dysfunction
3. Evaluation using a task
    (a) Make comprehensive evaluation
    (b) Consider the scene/situation

In making an evaluation, it is important to collect information on life and working place from the family, colleagues and teachers. In addition, information from the nurse and specialists concerning the place of conducting the training is needed. Based on these pieces of information, you should estimate what kind of cognitive impairment characteristics the patient has and which impairment concern the cause of difficulty in daily living. For example, if the patient cannot keep commitments as indicated above, you need to assess whether the memory impairment is the core problem.

Subsequently, conduct a neuropsychological test that corresponds to a specific function. Since the cognitive function of human beings is multifaceted, it is necessary to comprehensively make assessment through multiple tests. In addition, when conducting a test, it is necessary to fully consider the place of conducting the test, environment such as noise and difficulty of the task.

**Formulating a training plan**

Set a goal based on the result of evaluation on higher brain dysfunction. In general, the need of the subject person is considered. However, in the case of higher brain dysfunction, the judgment or understanding of the patient is not always appropriate. It is important to set a realistic goal that meets the level of impairment through sufficient talks with the patient, family and school or working place. Examples of goals include reinstatement to work or school. However, given the recovery process of higher brain dysfunction, the goal may not be achieved during the medical rehab program period. Therefore, the preference is to set a goal that the patient can easily imagine and can be achieved in a short period in medical rehab settings.

When conducting the training, it is important to unite the intensions of all staff.

**Specific goal setting is important**

The goal should preferably a realistic one that the patient can easily imagine. In many cases, the patient is not aware of his/her higher brain dysfunction, and therefore it is often difficult to gain the patient's understanding of conducting the training. It is important to identify the problem with daily living, working place and school based on the evaluation and have the patient understand the problem. It is necessary to unite the intensions of relevant professions through a conference in advance. Set a real-life goal that suits the ability of the patient, such as being able to make out a schedule and act according to the schedule, being able to manage cash by using a cashbook, being able to organize a cooking menu and being able to prepare necessary materials and being able to operate a personal computer, through consultation with the patient and his/her family or the like.

**Precautions on conducting the training**

1. Selection of a task

   Adopt a realistic task related to the patient's daily life or working place.

   Select a task that meets the patient's interest as much as possible.

   Adjust the level of difficulty of the task so that the patient can have a sense of accomplishment.

2. Procedure for the training

   Proceed with the training in a stepwise manner.

   Provide feedback on the training effect to the patient in an easy-to-understand manner so that his/her willingness to receive training is maintained.

3. Adjustment of the environment (establishment of an environment where the patient will not be confused is essential for efficiently conducting the training)

   Coordinate physical environment of the patient room and the training room.

   Structuring of the environment: presenting a clue, patterning behaviors, etc.

4. Generalization efforts (a measure to enable the patient to apply what he/she has acquired in the training to everyday life is necessary)

   Exercise in various places and situations in the hospital.

   Set the training environment so that it is similar to the home life or working environment.

   Gain cooperation of the family so that training can be also conducted in the home.

**Concept common to trainings**

Improvement of cognitive impairment is expected strongly. However, given that patients do not recover completely, it is necessary to take the following strategies for

any symptom.
①Improvement of cognitive impairment (cognitive rehabilitation in a narrow sense)
②Acquisition of a compensatory means
③Raising awareness of impairment
④Environmental adjustment (including approach to the family)

Strategy ① is a training method for specific cognitive impairments of persons with higher brain dysfunction, such as attention problem and memory problem. If this training is not effective, adopt compensatory means ②, which uses the remaining functions. For example, if the patient with memory impairment has more visual memory than linguistic memory, have him/her draw a picture and use a clue indicated in the picture. In contrast, if the impaired person is able to recognize his/her own dysfunction, it is easier to use various compensatory means (③). You should also take measures
④ designed to shape the surrounding environment in order to minimize inconvenience resulting from the impairment. Examples of this method include explaining the impairment to the family to gain their understanding and asking their assistance at the right time before the impaired person becomes confused, and asking the family to organize important belongings of the impaired person or have him/her carry them so that he/she can easily find them.

**When actually starting a standard training program**

For professionals at hospitals or facilities that have not conducted training for persons with higher brain dysfunction, there may be a number of uncertainties concerning specifically how to operate the team. The following are points that require your attention more than in daily rehabilitation.

1 The types of professionals at your hospital or facility

(a)Encourage as many types of professionals as possible to get involved. Although not all types of professionals need to be involved, you should form a team by sharing the evaluation/training operations (in particular, the medical rehab program requires a doctor's leadership).

(b)All the involved professionals should evaluate each case.

(c)Hold a conference to set a goal for each case.

There are several forms of team rehabilitation. Since you handle abstract matters with higher brain dysfunction in many cases, many in the field agree an interdisciplinary team approach is preferable in order to deepen understanding among the team.

(d)Conduct the training.

The conventionally practiced one-day training is insufficient. Utilize innovative ideas such as practicing training conducted at the training room in a ward,

reducing spare time by giving homework assignments and producing an easy-to-understand daily schedule.

It is necessary to increase the ability of the team through actual experience such as selection of realistic training exercises and addressing psychological problems that arise in the course of training.

(e)Assess the result.

It is necessary to repeat evaluation on a regular basis and review the validity of the training program and the system for conducting the training. It is also important to receive an evaluation from the case himself/herself or his/her family.

2. Cooperate with a facility that provides training for daily living or vocational skills.

Establish cooperation from an early stage of the training. Create conditions where the patient and his/her family can lead their life at ease. Facilities used for training include hospitals (general hospitals, rehabilitation hospitals), rehabilitation facilities for the physically disabled persons, sheltered workshop, local facilities and small-scale workshops.

To manage these processes, the effective measures that enable the professionals, the patient and his/her family to share the problems and the solutions is to utilize an evaluation sheet such as the one below, identify the basic information (e.g., age, medical history, social background) and the problems (e.g., dysfunction, functional limitation, psychological problems), set the training goal, check the specific content of the training, have professionals involved, and evaluate and analyze the training result.

## I Medical Rehabilitation Program

### 1. Memory problem

#### a. Symptoms

Suspect memory problem in the following cases:

- Cannot keep or forgets a commitment
- Does not remember where he/she has stored something important
- Insists that someone stole something
- Makes up a false story
- Repeats the same question many times
- Unable to remember new things

If there are any of the problems above and if memory problem is suspected, examine what aspect of memory is impaired and which function is relatively good. For future training, it is important to examine issues such as how long the case can remember an event, what types of memory (e.g., meaning of words, the case's experience and operations) it is about and whether there is a difference between word-based memory and vision-based memory. The following is a list of these factors.

Time related to memory

- Immediate memory or working memory (e.g., memory that lasts until making a phone call at a number he/she has found)
- Long-term memory (memory system for storing information until it is needed)
- Memory disturbance (e.g., recalling a phone number he/she called a while ago)
- Recent memory (e.g., about an activity on last Friday)
- Remote memory (e.g., an event from school days)
- Prospective memory (memory on a plan he/she is about to implement)

Types of memory

- Facts (semantic memory) (knowledge that he/she has remembered without noticing; e.g., the capital of the United States is Washington D.C.)
- Personal experience (episodic memory such as events that occurred to him/her)
- Skills and procedures (e.g., driving a car, word processing and printing)

Forms of memory

- Linguistic memory (information in the form of language such as written and spoken words)
- Visual memory (memory stored in visual form such as people's faces, patterns and layouts)

Stages of memory

- Coding (importing information and registering it)

- Storage (placing information in memory and keeping it until it is needed)
- Search (retrieving stored information when it is needed)

Ways of extracting memory

- Reproduction (act of recalling based on memory retention)
- Recognition (e.g., re-acknowledging whether he/she has seen the thing/person)

Time when an event is memorized

- Retrograde memory (memory of an event that occurred before an accident/illness)
- Anterograde memory (memory of an event that occurred after an accident/illness)

Establish what kinds of memory impairment characteristics the case has through evaluation concerning memory.

### b. Evaluation

Perform evaluation in the following tests:

- (Generalized memory test) WMS-R (Wechsler Memory Scale-Revised.)
- (Verbal memory test) Miyake Verbal Retention Test
- (Visual memory test) Benton Visual Retention Test, REY figure test
- (Everyday memory test) RBMT (Rivermead Behavioural Memory Test)

In conducting training, pay attention to the following points:

- Understand the severity of the memory impairment, the impaired area and the relatively sustained area.
- Test on presence of other cognitive impairment.
- Aim at unerring learning.

### c. Training

The following methods are available:

Repetitive training

Environmental adjustment

Internal memory strategy

- Visual imaging method
- Face-name association method
- Peg system
- Linguistic strategy
- PQRST method (Preview, Question, Read, State, Test)
- Verbal mediation method
- Initial letter memory method

- Rhyming method
- Story-making method

External auxiliary means

Each of us has the means to externally store information and clues to accessing information that is internally stored. If you have memory impairment, you forget these means themselves and cannot utilize them. To raise the case's awareness of these means and encourage him/her to actively utilize them, include them in the training and have the case acquire them.

Other methods

- Region-specific knowledge learning

This method focuses on the acquisition of information on everyday functions and is used in personal name learning, new vocabulary acquisition, etc.

- Clue reducing method

In this method, after presenting the definition of a term, add one letter after another and continue it until the case correctly reacts to it. Subsequently, remove the clue text one letter after another, and repeat it until the case can correctly react to the task without a clue.

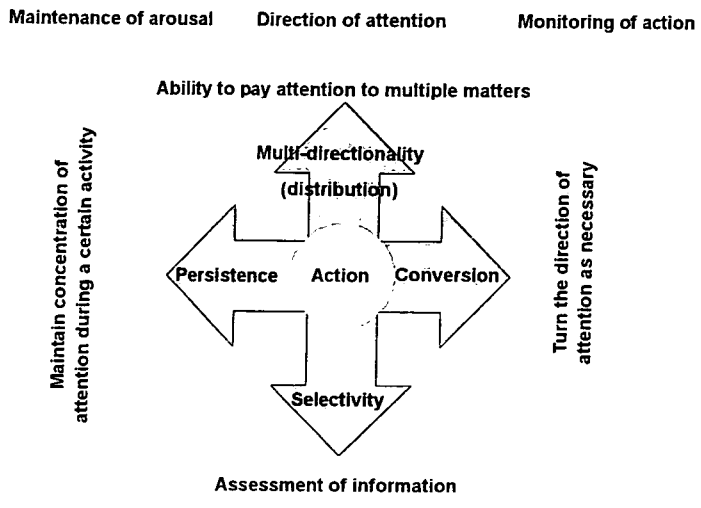
**2. Attention problem**

**a. Symptoms**

Presence of attention problem can be predicted from the following characteristics:

- Frequently sleeps in a chair or wheelchair
- Walks around on the ward and enters other rooms
- Interested in a person and sticks to the person
- Meddles in a task performed by a person next to him/her
- Tries to act without judging the surrounding conditions
- When an elevator door opens, immediately walks in
- Cannot continue a task for a long period
- Reacts to talk by a person and considers the talking as his/her own

These situations are not unique to attention problem and may include other elements of higher brain dysfunction. However, they will serve as clues to recognizing this impairment. Attention is the base for all cognitive functions, and it is included in all actions required for various persons to lead their social life and serves to integrate these actions. Attention is considered to consist of the following elements, and these elements need to be well balanced.




**b.Evaluation**

Evaluation of the presence and degree of attention impairment is performed.

In performing evaluation/training of cases with attention impairment, you need to take into account their tasks and environments. In the meantime, if the evaluation or training advances, you can examine whether the speed of task processing is reduced or attention can be sustained by intentionally changing the environment.

**c. Training**

In an early stage from injury/onset, it is likely that the case also has disturbance of consciousness. It may not be appropriate to start training suddenly in some cases.

**3. Executive dysfunction**

**a. Symptoms**

Symptoms of executive dysfunction have the following findings.

- Late for an appointment
- Unable to finish a job as promised
- Gives up any job halfway
- Writes in random places/pages of a notebook for supplementing memory problem
- Unable to perform a task he/she used to be able to perform, if asked differently

Since executive dysfunction involves various factors as shown below, it is important to evaluate what kind of mechanism is the cause. In addition, the cause may be attention impairment or memory impairment. Carefully observe the case operation, and find a specific mechanism based on how a failure or mistake occurs.

- Self-recognition
- Goal setting
- Planning
- Spontaneity
- Self-monitoring

**b. Evaluation**

Neuropsychological tests: BADS, WCST, frontal assessment battery at bedside (FAB), TMT, Stroop test, WAIS-R, Verbal fluency test, Tower of Hanoi, SPTA, GATB, KOHS block-design test, notebook diagnostic strap knotting test, box building test, four-frame cartoon explanation, reading test (speed-reading)

Behavioral evaluation: specific tasks through paper crafts, handicrafts and woodworking

Behavioral observation in daily life and workplace

If the judgment is that a specific mechanism is involved, examine the following as training.

- Study a treatment (e.g., drug) that supplements that area.
- Break down the operation process into sub-processes as routines.
- Conduct training using a series of routines.
- If the case fails in a certain process, provide assistance for that part.

**c. Training**

- Direct training (the case exercises necessary behaviors/actions or combination of them)
- Self-teaching, problem-solving training (the case and the trainer think about a solution and planning together)
- Manual utilization (the case performs a task by himself/herself according to the steps)
- Simplification of the environment (show the schedule in a big framework and pattern the behaviors)
- Behavioral therapy (contrive ways of providing guidance and instructions)
- Feedback of the performance result
- Acquisition of a compensatory means

Provide training by using these methods in the following.

- Desk task (e.g., workbook)
- Work activity task (e.g., assembly kit)
- Task of activity of daily living (e.g., changing clothes training, housework)