Visual Perceptual Retraining: A Functional Diagnostic and Treatment Process in Neurological Based Disorders.

By
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Visual Perceptual skills can be defined as **the brain’s ability to interpret and process incoming (sensory) information, specifically visual, and generate functional activity as an outcome.** Visual perceptual skills are the basic building blocks of all functional activity. The degree of deficit and how the basic visual perceptual performance components relate to and interact with frontal lobe brain functions (such as judgment, reasoning, decision making, lateral thinking, etc) and other sensory information determines the nature of functional output and its organisation or disorganisation. Utilising a process of functional diagnostics it is possible to identify specific performance component dysfunction and correct this within four to six weeks. Occupational Therapists are uniquely placed to identify visual perceptual performance components and specific function/dysfunction. It is now possible to differentiate between visual perceptual deficits and dementia on a functional evaluative and diagnostic level and correct many visual perceptual deficits. The relationship between the results observed in isolated task based evaluations can be related to functional performance deficits as indicators of outcomes in treatment. This satisfies the criteria of most outcome orientated healthcare systems.

Visual perceptual deficits have become a focus of many therapeutic interventions simply because in a large number of neurological conditions visual perceptual deficits are the reason for a decline in function. When I began to work in nursing homes in the USA I became very aware of residents who did not fit into the diagnostic category of dementia. The medical profession's tendency to diagnose dementia probably originates in the difficulty of diagnosing such conditions utilising clinical diagnostic tools. Frequently I have seen clients who present functionally with CVA who are not diagnosed because the CT scan was negative.

To therapists who have worked with the elderly it is easy to see how general terms of 'confused' or 'has memory problems' become the criteria for diagnoses such as dementia. On a functional basis the difference between dementia and visual perceptual deficit can be very clear with one example being that it is possible to hold a conversation with a person with visual perceptual deficits were as the person with dementia is locked into a very narrow field of reality and their conversation reflects this.

On a treatment basis the difference is also very clear. People with dementia are typically engrossed in a pattern of thought that is narrow, confined and obsessionial with the pattern of behaviour becoming more pronounced over time. Patterns of cognitive performance are such that a client with significant dementia quickly demonstrates an unwillingness or inability to perform even the simplest of tasks. This client group typically does not improve with visual perceptual retraining and the treatment is basically diversional. Clients with dementia also demonstrate an unwillingness to participate in the environment and the translation of any new learning becomes limited by this.

By comparison, the client with a visual perceptual deficit may demonstrate a reluctance to participate or a denial of the problem. It is however, possible to engage them in a wider interaction in their environment and the client typically responds to treatment with an increase in functional independence.
Parameters of Treatment

- Not all neurological conditions will respond to visual perceptual retraining, however, many will. I have successfully worked with clients following neurosurgery and with ABI, CVA and TIA. A sound clinical knowledge of neurological conditions is necessary with the degree of neurological damage and the residual affects of the neurological incident determining the outcome.

- Visual perceptual retraining is in many ways more demanding than any other type of therapy. In many instances half an hour of visual perceptual retraining can tire the client out for the rest of the day. There is little point in continuing with the therapy when the client's attention or concentration has lapsed to the point where there is significant fall off in task performance.

- Visual perceptual retraining occurs at a very basic performance level in human beings with trial and error being the predominant form of learning. Because of this, failure is a part of the retraining process. The clinician needs to keep this in mind, as it is necessary to keep the incidents of failure within the client's ability to deal with them. Modifying tasks, interrupting dysfunctional performance and redirecting client action to create functional outcomes are an important aspect of therapeutic intervention.

- It is not uncommon for clients to refer to themselves as "stupid" because of the simplicity of the task and the struggle they have to perform the task as easily as they once did.

- Because this technique utilises task performance found in early childhood development the clinician needs to be sensitive to the demands this places upon the client. The client frequently sees that their grandchildren can easily perform the tasks that they are now struggling with.

- The client group which presents with visual perceptual disorders will, if left untreated, typically over time develop compensatory strategies and behaviours that are mainly psychological in nature. Some clients present with denial that there is a problem and it is not uncommon to hear clients say that they cannot see the task and so therefore cannot complete it. Avoidance strategies may also be common where the client has learned which tasks or type of tasks they cannot complete and will be resistive to participating in them. Failure in task performance is frequent and, as a result, loss of self-esteem and confidence are generally very common. Visual perceptual deficit has such a high impact on functional performance that it prevents a significant number of clients from living independently.

- Clients who have been exposed to complex and/or multi-stage tasks, following a neurological incident with visual perceptual deficit, typically develop behaviours that make them resistant to visual perceptual therapy. For this reason I do not recommend these clients being treated using ADL’s (activities of daily living – bathing, dressing, grooming tasks, etc) as the main modality of treatment. Increased independence in performing ADL’s provides a means of qualifying outcomes achieved in visual perceptual retraining. However, using ADL’s as a treatment modality in visual perceptual disorders places significant demands upon the client without the dysfunctional performance components ever being identified. The client is left to do the best they can which is frequently not functional enough for them to regain their independence.

- The clinician needs to develop the ability to provide instruction in a way that enables the client to develop their independence in task performance. If this does not happen the client becomes reliant on the therapist (or others) to provide the means of accurately completing the task. This is along the lines of the family members who do not encourage the elderly person to remember but tell them the answers to everything and anticipate what they are trying to say. As in physical function, if the mind is not used it quickly deteriorates in its ability to function. In providing instruction the clinician may need to repeat the instruction in a variety of ways and a number of times before the client understands all aspects required of them in performing the task before them. This is the value of experiential learning and nothing will surpass it. If both client and therapist have the patience to persist in facilitating this process.
the natural tendency toward restoring functional abilities will occur. The client will naturally make the necessary links and progress will occur. However, the client requires reassurance and support and also needs to be reminded in tangible and meaningful terms, of the gains they are making.

- Clients who do not respond well to authority or being told what to do will generally have difficulty in coping with this therapy. Without the guidance and structure provided by the therapist the client's activity will descend into dysfunction. It is necessary for the clinician to provide verbal instruction, especially in the initial stages of therapy. The therapeutic approach required to elicit functional cognitive performance needs to be directive.

- The path of necessary action that we all take in order to produce functional activity occurs in a sequential, step-by-step order. For those of us who operate in a fully functional way, without visual perceptual deficits, the utilisation of visual perceptual skills occurs automatically. In our childhood we practiced them so frequently that it has become more routine than driving a car. This visual perceptual retraining technique has identified the inherent process involved in visual perceptual performance to produce functional activity.

- The main factor that results in dysfunctional activity in visual perceptual deficit is the client continuing to attempt to complete a task in the spontaneous or automatic way they always have. Because some of the necessary links in visual perceptual skills are dysfunctional the outcome of attempting to automatically complete the task is also dysfunctional. The purpose of visual perceptual retraining is to identify the dysfunctional performance components and, in a structured setting, assist the client to consciously work with these dysfunctional components and improve both their functionality and incorporation them back into the total skill set that makes up visual perceptual skills.

- Clients who have had a right sided CVA or who present clinically with left sided weakness, and functionally with visual perceptual deficits, generally tend to perform less well. It is common to see a blurring and blending of day-to-day events with dreams. Some clients develop insight into this and learn to inhibit it. For others the outcome is not so promising with the client becoming more and more confused. Medication may be helpful in managing such states.

**Visual Perceptual Evaluation**

The first indicators of visual perceptual deficit are frequently found in the sequence of events that have lead to the client coming to the clinician for therapy. Certain functional performance indicators indicate specific deficits, as does some of the information obtained from family and friends about the client's general presentation and level of function. We will explore these areas first and then move onto the visual perceptual retraining technique and its general application.

**The Client History**

Here is an example of how the client's history can be indicative of visual perceptual deficit.

The daughter of a 91-year-old woman described the sequence of events leading up to their mother's need for nursing home care. When asked what had happened to their mother they advised that she had fallen out of bed and fractured her neck of femur. Prior to this event she had lived at home independently. The functional indicator of deficit is this client's rolling out of bed and onto the floor. People do not generally do this unless there is something wrong. I asked the daughter what her mother's mental status was like and was advised that she had been having problems with memory for a short time prior to this event. On admission to the nursing home staff described the resident as very confused. Visual perceptual evaluation demonstrated that she did have a visual perceptual deficit and visual
Perceptual retraining was instigated. Prior to this intervention the resident was dependent in all ADL’s, confused between the use of her call light and her telephone, could not call her daughter by telephone even with the use of the speed dial and was making no progress in physiotherapy with her being unable to stand up safely from her wheelchair.

This resident progressed rapidly with visual perceptual retraining and was willing to participate. Within two weeks she was able to call her daughter on the telephone and was able to participate in physiotherapy. Treatment was continued to approximately 6 weeks with the resident being discharged from physiotherapy ambulating and toileting independently.

**Falls**

Falls are frequently the main indicator of possible cerebral event and subsequent visual perceptual deficit. When a client falls and suffers a fracture a cerebral event will almost always not be diagnosed unless it is a major event resulting in loss of speech and physical function. In some of these instances CT scan will be negative or will show minor areas of infarct. The client may be diagnosed with dementia without the parameters of visual perceptual function being explored.

If there is a decline in cognitive performance following a fall this is indicative of a cerebral event causing the fall. However, if the client has a history of many falls over a period of time that may span weeks or years, you may be able to pin point when the initial incident occurred by questioning the family. Typically the decline in cognition and falls will occur around the same time.

Typically the client will say that they do not know what happened when they fell. They can tell you that they did not black out. Typically falls occurs when the person is standing and turning which is a complex task in visual perceptual terms.

**The Client does not Progress in Ambulation or ADL’s**

Ambulation and ADL’s are multiple demand tasks and visual perceptual deficits are commonly noted secondary to the client’s inability to perform a task or perform it safely or completely without verbal prompting. Despite verbal prompting the client may still fail to perform the task safely or completely. Some indicators of visual perceptual deficits include:

- The client will consistently miss out vital pieces of a task such as
  - Putting the brakes on the wheelchair before standing up.
  - Forgetting to put toothpaste on the toothbrush.
  - Getting lost when moving about their environment.
  - Be unable to maintain balance in standing when required to perform another action such as opening a door, turning off a light or pulling up their pants, etc.

**Functional Performance**

Frequently there are indicators of visual perceptual deficits in the performance of general functional tasks, especially multiple demand tasks. These indicators may include:

- The client having to take time to think through what is being asked of them. (Indicative of the need for increased time for cognitive processing.)
- Inability to perform complex tasks - more than 3 stage commands or tasks. (The performance of three stage commands or tasks is the minimum requirement in order for a person to be functional.)
- Inability to go from sitting to lying and position themselves straight up and down in the bed. (Indicative of spatial deficits.)
- Client is fearful of transfers and can be desperate to hold onto something while transferring. (Indicative of spatial deficits.)
- Distractibility and inability to function in an environment where there is an acceptable level of noise and activity.
- Unsafe practices.

Recently there have been several items in the news about elderly drivers running off
the road and injuring others. This is highly indicative of visual perceptual deficit and the type of fall off in the client’s ability to demonstrate an acceptable level of functional performance in a multiple demand situation. It is probably enough reason for visual perceptual assessments become a requirement in obtaining a drivers license in the elderly population.

The Difference in Task Performance Between Sitting and Standing

We all have certain amount of cognitive or mental space at our disposal for the performing the multitude of our bodily functions some of which are under our direct control and some are not. It is interesting to note that there are some instances where a client may be able to perform a task in sitting but is unable to perform the same task in standing regardless of their proficiency while seated. This occurs frequently when visual perceptual deficits are present. There appear to be four factors that determine the ability to perform a task while standing.

1. Client safety and fear of falling. This is particularly true if spatial deficits are present where the client is attention is directed toward their fear of falling and maintaining an upright position.

2. Attention and concentration. Client's who have attention deficits are typically unable to widen their focus to include activities not directly involved in physically standing. When asked to perform a task while standing they may automatically sit down to perform it and resist any attempt to get them to stand and perform the task.

3. The client's co-ordination may have been interrupted by their cerebral event along with their ability to plan and sequence tasks. Multiple demand tasks frequently exceed the client's ability to perform at a functional level.

4. Performing a task such as standing is a multiple demand task. It requires a tremendous amount of resources in order to stand and when visual perceptual deficits are present the demand of cognitive resources may exceed those that are available at that time. When a client stands up there are frequently very little cognitive resource left for them to do anything else that may be functional, such as ambulating. This is why this client group does not perform very well in physiotherapy without having their visual perceptual deficits addressed.
Visual Perceptual Evaluation and Retraining

Visual perceptual retraining can be defined as the identification of the basic visual perceptual performance components, their function/dysfunction and the remediation of these skills.

Evaluation is carried out via the utilisation of a pegboard tasks and, later, a block tasks. Improvement in the functional performance of all ADL tasks provides the measure of outcomes achieved.

Evaluation

**Pegboard task**
Two pegboards being used - one large and one small. It is better to use two different pegboards that are two different colours but have the same coloured pegs as this immediately provides the opportunity for the client to generalise and transfer any learning from one environment to another. The therapist uses the smaller pegboard to create patterns that the client is then required to reproduce on the larger pegboard.

![Pegboard Example](image)

**Treatment**
Treatment also requires the use of the two pegboards with the tasks being structured in such a way that deficits identified are addressed through this modality. When the client has progressed to a level where the pegboard is not sufficiently challenging in all areas then a block task is introduced.

**Block task**
The blocks used are half green (or any other colour) and half white - through the diagonal so that two sides are green, two sides are white and two sides are half green and half white triangles.

![Block Example](image)

There is also a set of cards that accompany the blocks, which have patterns on them. One side of the card has a black grid that breaks the pattern up into squares and the other side does not. Theses block sets used to be available commercially and have cards that went up to 9 square patterns. The block sets are not readily available now but can be made with a minimum of effort and I recommend using cards that go up to a twenty-five square pattern, as higher functioning clients need to be operating at this level to regain their independence. Blocks need to be 2.5 – 3 cm cubed. The patterns on the cards need to be of the same size.
although it is extremely important that when using the blocks the client is not permitted to form that patterns on the cards as this practice eliminates the formulation of higher functioning abilities.

Visual Perceptual Performance Components

All visual perceptual performance components are inter-related. In performing any task functionally the interaction and integration of visual perceptual skills is automatic. When one part of the sequence of skill interaction is interrupted the whole of the task performance is interrupted and functional activity impaired. However, visual perceptual performance components can be readily identified and remedial tasks structured to target these deficits.

The following outlines the basic visual perceptual task performance components.

**Conceptualisation**

*Definition:* The ability to be aware of all the inherent component parts of a task and how they relate together in generating a functional outcome. This can be likened to a frame-by-frame account of a movie. This is our global view of our world and all that is in it. A combination of performance components enables us to develop this worldview, however, our demonstrated performance in conceptualisation accounts for our ability to be safe and to take appropriate action in the world.
**Dysfunction:** All tasks contain a central activity or task and other, peripheral tasks eg: putting toothpaste on the toothbrush before brushing our teeth or locking the brakes on a wheelchair before standing up. A failure to perform these peripheral tasks. No matter how many times the client is reminded they fail to perform the required activity.

**Evaluation:** Consists of the assessment of the client's ability to take into account all factors required of them in performing the task. In performing this evaluation it is important to see conceptualisation in the context outlined above and evaluate the other performance components as well. For example if an attention deficit interferes with conceptualisation abilities then the attention deficit is the performance component being assessed.

**Treatment:** As conceptualisation is a composite of other visual perceptual skills the clinician will find they are providing treatment for a conceptualisation deficit as other performance components are addressed. Fundamental to the treatment of visual perceptual deficits is the need to slow the client's task performance down and proceed step by conscious step through the inherent tasks. In order to demonstrate intact conceptualisation the client needs to become more aware of the steps involved in the task and move through them consciously. In doing so the automated function required is restored.

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**Planning and Sequencing**

**Definition:** The ability to perform a task sequentially and logically in a functional way. Individual differences in planning and carrying out a task need to be considered, as the objective of the treatment is to restore the client's level of function, which may be different from the way the clinician may perform the task.

**Dysfunction:** The client moves from one aspect of the task to another in seemingly random order. The client is not demonstrating an effective process in moving through task completion and this typically results in a breakdown of task performance.

**Evaluation:** the client attempts the pegboard task in a random order. The client may change approaches to the task several times without making progress.

**Treatment:** By their nature planning and sequencing is a step-by-step process where the client is encouraged to proceed slowly and deliberately through the task, thinking of the variables involved in the task. Much like a game of chess the client is required to strategise the simple pegboard tasks and become aware of the inherent requirements within the task.

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**Two fundamental and basic rules of visual perceptual retraining**

These rules provide a basic and constant structure for the client to operate under.

1.) Always begin in the corner
2.) Complete one pattern before moving on to the next. The pattern below is a complex inter-related pattern and unless these rules are followed breakdown in task performance will occur because sequencing and planning is not applied logically in a step-by-step process.
Corners are a constant on the peg board and do not change. Bottom left will always be bottom left. Completing one pattern before starting another requires the client to override perseveration and distractibility. Just about every client will require at least one experience of failing because they choose to ignore this second rule. Waiting until the client has had some success through following these rules means that their failure will have more meaning to them because they will see and understand that they have had success before they chose to ignore the rule. For some reason clients do not choose to ignore the first rule and start a task anywhere but in a corner.

**Orientation to task**

**Definition:** The ability to spontaneously look at a task and see what is required in order to complete it.

**Dysfunction:** Disorientation to task is typically not a common occurrence or resolves very quickly in therapy. The client does not know what is required of them when presented with a task and needs instruction in order to proceed. Sometimes repeated instruction is required.

**Evaluation:** In most instances if a person were given two pegboards, one with a pattern, and the means to reproduce that pattern they would naturally go ahead and perform the task. If the client is unsure about what is required of them and requires instruction in order to proceed then they should be considered dysfunctional in this area. Lack of confidence secondary to past failures in task performance may be an issue and needs to be considered.

**Treatment:** Orientation to task requires the client to once again become aware of the task. Decreased concentration and distractibility can impact negatively on orientation to task. The clinician needs to structure task performance in such a way that the client stops and thinks about what they are about to do. Providing direction or giving the client one peg at a time is usually sufficient. This creates a stepping off point from which strategies are defined and the task is then performed.

**Concept formation**

**Definition:** The ability to understand concepts such as under, over, through, above, below, etc.

**Dysfunction:** Generally the client just does not know what is meant when they are given an instruction with a concept in it such as "Put your shoes under the bed." Typically deficits in this area resolve quickly in therapy.

**Evaluation:** The client demonstrates lack of understanding of the meaning of concepts. Using the pegboard the client can be asked to position different pegs relative to each other.
on the board.

**Treatment:** Once again the client is required to stop and think and then apply themselves mentally to the task. Concept formation is a pre-requisite of task performance. Practice using the tasks outline in the evaluation phase can assist in the development of concept formation, however, the client then needs to apply this to task performance.

**Ability to Follow 3 Stage Commands and Demonstrate 3 stage Planning**

**Definition:** the ability to follow three stage commands and demonstrate 3-stage planning determines our ability to be functional. Three stage command tasks are termed multiple demand because they inherently involve three-stage planning. Each step builds on the one before and requires the utilisation of an increasing number of cognitive and perceptual skills in order to make the activity functional.

**Dysfunction:** When asked to perform a task that has three stages inherent in it the client is unable to. It is important to rule out the automatic tasks the client may perform and demonstrate this ability through something they are not so familiar with. I recommend that clients with visual perceptual deficits use a standard walker rather than a rolling walker. Using a standard walker requires a three-stage process: - pick up, put down and walk up. It can be seen that the task makes use of automatic motor function but introduces a cognitive and perceptual process.

**Evaluation:** Following three stage commands can be assessed in evaluating concept formation. Asking the client to pick up a red peg and put it to the right of the blue peg, for example, evaluates the client's visual perceptual performance on three stage commands. Evaluation of three stage planning is somewhat more complex and is better determined in functional tasks such as the ambulation example given above.

**Treatment:** Engaging the client in discussion regarding approaches that can be used in completing the task will frequently require three stage planning especially when the client translates the small steps they may take to the total completion of the task. Placing the client on a standard walker will naturally encourage the remediation of 3-stage planning.

**Left/Right Discrimination**

**Definition:** Left/right discrimination can be seen to be part of concept formation. However, there is an interesting difference with left/right discrimination in that we operate with an internal and external referencing in relation to left and right. Left/right discrimination means we simply know left from right.

**Dysfunction:** the client will either demonstrate deficits in ADL tasks and other situations such as those where the client is instructed to turn right at in a corridor or be required to place either left hand on a rail in toileting, etc.

**Internal referencing:** ask the client to raise their right or left hand. This is how we relate to ourselves internally.

**External referencing:** ask the client to turn right or left when walking down the corridor. This is how we relate to our environment.

**Evaluation:** in assessing concept formation the client will not be able to place pegs accurately to the left or right of other pegs.

**Treatment:** Once again structuring the task so that the client is required to consciously think about the terms used and how they apply. It is typical that when the client operates on "automatic pilot" that fall off in task performance is noted. Requiring the client to verbalise left and right is also crucial.
Colour discrimination

**Definition:** being able to discriminate between different colours.

**Dysfunction:** The client is unable to discriminate between colours.

**Evaluation:** In assessing concept formation the client will not be able to discriminate between different colours. It is necessary to take into account whether or not the client is colour blind to begin with.

In assessing concept formation, left/right discrimination and colour discrimination it is helpful to identify whether trends are noted generally or in isolation to one another. If the difficulty is noted in several areas it may be an issue of receptive aphasia where the person does not understand what is being said to them, rather than a visual perceptual disorder.

**Treatment:** Encourage the client to name colours and verbalise.

Spatial awareness

**Definition:** the ability to know where one's body is in space and relative to other objects in the environment.

**Dysfunction:** the client presents with fear in transfers or standing; the client is unable to position themselves in bed properly (cannot lie straight up and down in bed without tactile cuing); the client demonstrates left or right leaning and reports a decreased awareness of upright vertical positioning of the body. In clients who have spent some time in bed the clinician needs to rule out the tendency to lean back as a habitual positioning from a true spatial deficit.

**Evaluation:** in the pegboard task the client will discount the spaces between the pegs and typically put the pegs side by side as demonstrated below.

![Pegboard Diagram]

**Treatment:** Correction of spatial deficits requires the client to adjust and maintain an upright posture in therapy sessions. The use of therapy balls where the client sits on the ball is extremely useful.

In performing pegboard tasks the clinician asks the client if what they are doing is accurate. In the early stages of visual perceptual retraining it is crucial to do this before there are a lot of pegs on the board, as visual overload will impede the client's ability to identify errors.

As the client improves the clinician will increasingly postpone asking the client if their work is accurate. It is important that the client learn to automatically check their work, as this is an inherent part of task performance. Recognising that our work is accurate or has errors in it demonstrates that we have the ability to see the task via both the break down of its components as well as a 'big picture' view of the entire task. It is important that the client learn to perform these checks when their work is accurate or not. This removes any reliance the client has on the clinician to check their work for them and will naturally encourage independence and accuracy in task performance.

Stabilisation

**Definition:** the ability to use visual cues in identifying structures within the environment that
remain stable and provide us with anchor points upon which our activity is based.

**Dysfunction:** tasks are completed out of context and do not take into account their performance relative to the environment.

**Evaluation:** in the pegboard task the main stabilisers are the corners. The corners do not change and the right hand bottom corner on one board corresponds with and is relative to the right hand bottom corner on the other board. If stabilisers are not used the task will be performed on the board but out of context as shown below.

![Diagram of pegboard tasks](image)

**Treatment:** Use of stabilisers is an inherent part of task performance and is addressed simply by the client always beginning their work in a corner. The client will naturally learn to accommodate the lines and corners that do not lie adjacent to those on the board as an extension or elaboration of what is required of them in performing aspects of tasks that are more abstract.

**Perseveration**

**Definition:** The client continues to perform a task or a component of a task outside of its context to the whole task. The client demonstrates an inability to interrupt the task or an aspect of a task.

**Dysfunction:** The client may continually wander. In a social setting the client may eat all the food that is put even though it is apparent that it is to be shared. They may continue to clean their teeth beyond what is required.

**Evaluation:** The client continues to place pegs even through it is apparent that they are no longer following the pattern.

![Diagram of perseveration](image)

**Treatment:** Perseveration, by its nature is a habitual tendency to continue with a task beyond its usefulness. The clinician can interrupt the client's perseveration; however, in order

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for the inhibition of perseveration to become functional the client is required to do this. This essentially comes down to the client using their awareness to interrupt the behaviour. If the client is unwilling or unable to do this perseveration is likely to remain a feature of their presentation and dysfunctional task performance is the likely outcome. Allowing the client to fail at task performance can be one way of demonstrating to them that they are performing at a dysfunctional level. Most clients demonstrate a ready willingness to interrupt perseveration as they become more aware of its presence.

The clinician needs to be aware of the potential for complex partial seizures to exist following cerebral incident. Complex partial seizures have a strong functional element to them. For example I once observed a client buttering their bread roll and then putting their fingers into their mouth and biting on them without any awareness that they did not have the bread roll in their fingers. It is important to differentiate between perseveration and complex partial seizures as they both contain elements of functional activity and typically present with lack of awareness as a central feature in their presentation. The clinician may not be able to interrupt the behaviour pattern in either condition, however, with perseveration it is easier to distract the client away from the behaviour. In seizure conditions the behaviour will continue until the seizure is over.

**Attention/Distractibility**

**Definition:** the ability to stay present with a task. It is possible to perform a task without concentrating but impossible to perform any task without attending to it.

**Dysfunction:** Task performance fall-off is noted when the client is in noisy or 'busy' environments. It is particularly noticeable with those clients who walk with a walker as their gait pattern deteriorates and the distance between the client and the walker increases.

**Evaluation:** Typically it is noted that the client will look toward either visual or auditory stimuli while performing any task. In using the pegboard task as an evaluative tool the environment the evaluation is carried out it will provide information with regard to the client's distractibility.

**Treatment:** The exposure of the client to increasingly complex demands, as they are able, will assist in remediating this condition. Over exposure to stimuli is not in the client's best interest. Therefore the therapy session needs to be ended when the client's level of attention or concentration cannot be sustained. Initially with distractible clients it is better to provide therapy in a quiet and non-distractible environment. As the client is able to cope with increasing stimuli the therapy environment can be changed. The tasks can be structured in such a way that the client can succeed regardless of their attention span.

**Concentration**

**Definition:** the ability to remain focused on a task whilst working through the requirements of that task eg: reading a book whilst remaining aware of the context of what is being read to the purpose of the book.

**Dysfunction:** A fall-off in task performance is noted when the client becomes tired or has been concentrating on a task for a period of time.

**Evaluation:** It becomes noticeable that the client is no longer intensely focused on the task and there are long pauses during which time they do not act. The client may be repetitively checking their work but then lose track of where they are at in the task. It is important to note that once concentration has fallen off and the client has had a break, they will perform at an expected level again but the length of time they concentrate for will be less than in the initial period.

**Treatment:** the performance of visual perceptual pegboard tasks, by their nature, requires the client to attend and concentrate. Over time it can be expected that the length of time the client concentrates for should improve from minimal (ten minutes) up to an hour. This
improvement can occur within the space of 4 - 6 weeks. If the client has a variable concentration and attention span or they appear to 'zone out' seizure activity needs to be ruled out. It is exceedingly helpful to have the client repeat, out loud, any instruction given by the therapist. This will increase the type and quality of information the client receives to facilitate task performance. It also increases the client’s interpretative avenues from purely receptive to include expressive avenues as well.

If the client is able to stand and move about this also helps refocusing concentration. Normally we will move about and readjust our position several times in an hour. This may range from small and minor movements to bigger readjustments. Encouraging a client to exaggerate this adjustment of position is effective in assisting them to re-establish their level of concentration.

**Visual Overload (or tolerance for visual stimuli)**

**Definition:** the ability to receive and process visual information/stimuli without adverse affect.

**Dysfunction:** the client demonstrates agitation and withdrawal after concentrating on a visual task for a period of time.

**Evaluation:** in the pegboard a similar task fall off in performance is noted to what is seen in loss of concentration but it is also noted that the client has an ‘owl eyed’ appearance with the eyes being noticeably wider. Visual overload is a cause of loss of concentration, however, loss of concentration may not be the issue in terms of treatment. This ‘owl eyed’ appearance may be noticeable in other situations and is always an indicator that the person is over stimulated. Over stimulation can result in a person failing to eat it can be that devastating.

**Treatment:** The nature of this visual perceptual retraining is such that it requires the client to tolerate increasing levels of visual stimuli. Some conditions such as brain stem CVA's may not progress as well in this area as other conditions do. As the client's ability to accurately, sequentially and logically complete these tasks increases so too does their tolerance for visual stimuli increase. Progression in overall task performance can be limited by the inability to cope with increasing levels of visual stimuli.

The clinician may find it necessary to limit the visual stimuli in the task. Only putting out the pegs the client requires in a number they can cope with is one way of doing this.

**Visual Neglect**

**Definition:** the absence of visual neglect can be defined as the awareness of all stimuli within the total visual field, including peripheries.

**Dysfunction:** the client is seen to be unaware of stimuli within the visual field. This is different from a hemianopia, which can be considered to be denser than a neglect and also present with loss of awareness of one side of the body.

**Evaluation:** If a visual neglect is suspected the pegboard task can be structured so that the smaller board containing the pattern to be copied can be placed on one side of the client or the other. The client will either not see part of the pattern or the entire pattern or will produce an incomplete pattern in the bigger board. The pegs can also be placed in such a way that they are outside the client's visual field awareness, to determine if a visual neglect is present of not.

**Treatment:** Structuring the task so that the client is required to operate in all visual fields is relatively simple to do in visual perceptual retraining. The clinician may put out only the pegs required to complete the task on the table and in such a position that the client needs to work in the visual filed they are inclined to neglect. The clinician may require the client to reproduce the pegboard task in the visual field they avoid.
Memory

Definition:

Short term memory: is the memory that is used to remember things such as a telephone number. Short-term memory decays after approximately 60 seconds.

Recent memory: Short-term memory needs to be converted into recent memory in order to remember anything beyond 60 seconds. Recent memory is the memory for events up to 5 days after they occurred.

Long term memory: memory for events beyond 5 days.

Retrieval: the ability to find information in memory. There are two types of retrieval.

Recognition: where we are presented with something - do we recognise it. Multiple choice examination questions use recognition.

Recall: where we are asked to generate something from our memory. Essay examination questions make use of recall ability.

Dysfunction: the client demonstrates an inability to remember events.

Evaluation: evaluated through the client's ability to return to successive therapy sessions and perform the pegboard tasks without being reminded of what is required of them to do this. Memory as a deficit needs to be identified relative to other performance components as planning and sequencing, attention, concentration, and orientation to task can all influence memory. This definition's required as memory may not be the issue. Memory dysfunction is not as common as it is typically thought because it is typically not assessed properly.

Treatment: visual perceptual retraining is structured to require the client to relearn skills in task performance and build on them. Memory is an inherent part of task performance and is linked to the emotive states the client experiences in therapy. Therefore if the therapy is unpleasant to the client they will remember who you are that they do not enjoy their time with you. In much the same way the success and progress the client experiences in visual perceptual retraining facilitates memory for the inherent steps and requirements for successful tasks performance. If there is no benefit to the client in performing this therapy, successful outcomes will be limited. It then becomes very important to remind the client of how they are improving in performing tasks that really are important to them. In this way the therapy is linked to the functional outcomes and the client's willing participation is more likely. Improvement in memory will also be noted.

Problem Solving

Definition: the ability to combine various visual perceptual skills to reach a functional solution to a problem that, when applied, produces the desired result.

Dysfunction: the client either implements solutions that have a poor outcome or are reluctant to become involved in problem solving because they have had previous successive failures in it.

Evaluation: in the pegboard task the client demonstrates difficulty in deciding which solutions to implement to reach the desired outcome. Once the specific visual perceptual deficits have been identified the task can then be structured to facilitate successful problem solving.

Treatment: Problem solving is an inherent requirement of this treatment. The structure required to facilitate the remediation of all other skills is also required to remediate problem solving.

Decision Making

Definition: The ability to quickly make accurate decisions on the basis of the information
available.

**Dysfunction:** The client is hesitant and avoids making decisions or becomes anxious at the thought of making a decision. Because accurate and effective decision-making is typically impaired in visual perceptual dysfunction it is common to see a loss of confidence and avoidance of making decisions because of negative consequence of poor decision-making.

**Evaluation:** Observation of the client and the degree of independence or lack of in the pegboard task determines the level of the client’s decision making. As the client progresses in treatment and regains function, confidence will be restored and improved decision-making will be demonstrated.

**Treatment:** decision-making is an inherent requirement of this treatment. The structure required to facilitate the remediation of all other skills is also required to remediate decision-making.

**Summary**

Visual perceptual retraining is a treatment modality that occupational therapists can effectively use to rapidly restore client function and independence. Without specific retraining client’s will typically not achieve the levels of function and independence they may otherwise gain and are frequently seen to develop compensatory techniques in task performance that inhibit functional gains. If the occupational therapist is able to work with speech language pathologists and physiotherapists where tasks are broken down into step-by-step performance components clients will typically regain functional independence in a wider sphere of activities.

Visual perceptual skills are so fundamental to our ability to perform functionally that functional gains and independence will be extremely limited in many instances of cerebral conditions if retraining is not provided. Visual perceptual retraining also proves to be a cost effective form of treatment that enables the client to perform in other therapies, such as physiotherapy, whereas without this intervention the client may spend weeks in therapy and not make any gains at all. The cost of long-term care is also decreased, as a significant number of clients require less care than they would of otherwise.