



NEURO  
INSTITUTE

Continuing Education for Rehabilitation Professionals



# Neurological Rehabilitation: Remediation vs. Compensation

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In this course, participants will be able to ...

1. Define remediation of deficits following neurological injury.
2. Define compensation of deficits following neurological injury.
3. Define how to switch from remediation to compensation for improved outcomes.

The presentation is to discuss a concept rather than providing a review literature only.

## Perspective....

Lets define the whole problem by first understanding the conditions...



The goal is improved functioning for the individual.

## What is Neurological Rehabilitation?

Let's define...Johns Hopkins Medicine, 2016  
[hopkinsmedicine.org/conditions](https://hopkinsmedicine.org/conditions)



***Neurological rehabilitation is a program designed for people with diseases, trauma, or disorders of the nervous system.***

***Neurological rehabilitation can often improve function, reduce symptoms, and improve the well-being of the patient.***

## Neurological Rehabilitation continued

### *What Conditions can benefit from neurological rehabilitation?*

Injuries, infections, degenerative diseases, structural defects, tumors, and disorders in the circulatory system can impair the nervous system.

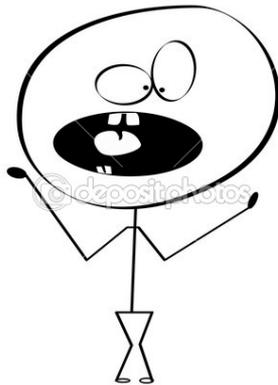
Conditions may include, but are not limited to, the following (Johns Hopkins Medicine, 2016, [hopkinsmedicine.org](https://www.hopkinsmedicine.org)):

- **Vascular disorders** such as strokes, hemorrhages, abnormalities
- **Infections** such as meningitis, encephalitis, polio, and brain abscesses
- **Trauma** such as brain and spinal cord injury
- **Structural or neuromuscular disorders** such as Bell palsy, cervical spondylosis, carpal tunnel syndrome, brain or spinal cord tumors, peripheral neuropathy, muscular dystrophy, myasthenia gravis, and Guillain-Barre syndrome
- **Functional disorders** such as headache, seizure disorder, dizziness, and neuralgia
- **Degenerative disorders** such as Parkinson disease, multiple sclerosis, amyotrophic lateral sclerosis (ALS), Alzheimer disease, and Huntington chorea

## Neurological Rehabilitation continued

A neurological rehabilitation program is designed to meet the needs of the individual based on the specific problem or disease ([hopkinsmedicine.org](http://hopkinsmedicine.org))

The goal of neurological rehabilitation is to help the patient return to the highest level of function and independence as possible, while improving the overall quality of life within the following domains —



Physical  
Cognitive  
Emotional  
Social

## Remediation vs. Compensation



**Defining the differences and similarities**



## Remediation vs. Compensation

Treatment should encompass attempts at **restoration** of lost function at the same time as teaching compensatory strategies to minimize the cognitive impairment(s).

The aim is to maximize or optimize [these] skills, while learning new ways of doing things to minimize the problems (**e.g., compensation**).

... Society for Cognitive Rehabilitation (2004)

## Remediation

- Remediation is the process of restoring a lost function. This may be completed at the time of a person learning compensatory strategies or not.
- **Example of Remediation or restoration of function:**
  - A person presents with left hemiplegia (upper extremity more impaired than lower extremity on exam).
  - **Initially**, the patient a 55 year old female, was given exercises to strengthen, and focused on specific movements.
  - **In rehabilitation**, E-stim was used to stimulate the muscle patterns for movement. The patient uses the E-stim each therapy day provided by OT. PT provided continued gait training with balance, strengthening, and stretching exercises.
  - **Outcome** included improved balance, coordination, and movement of the lower right extremity. The patient progressed from wheelchair to a quad cane, and by the end of rehabilitation was able to ambulate independently. Therapy capitalized on the spontaneous recovery process. Therapy services continued beyond the hospital at the outpatient level. Compensatory strategies were not the focus since independent ambulation occurred within 3 months of recovery.



## Compensation



- Compensation is the process of learning how to develop “work arounds” for a task, function, or process.
- An individual is taught to change the environment, change their approach, or learn to adapt their lifestyle to the difference.
- **Example of compensation only:**
  - **Initially**, a 40-year-old woman had a stroke leaving her visual field compromised by 90%. She had 10% vision within the center portion of the visual field, while the eyes were functioning normally (e.g., turning toward stimuli and when addressing someone, looking directly at the individual). The 10% vision was clear (no diplopia, blurriness).
  - **In rehabilitation**, she was taught to use the 10% vision by scanning the area she was occupying at the time. She was taught to follow a pattern of scanning to make sure to fill her visual knowledge of the environment.
  - **Outcome** revealed she took a 6 month course with blind services, learning to use a walking stick, and learned to adapt with hearing and touch. She later was able to have a guide dog. She returned to her job with Wal-Mart and they provided blind accommodations for her to remain employed. Her vision did not improve, but following a year of therapy, was able to manage complex visual challenges with her techniques.

## Remediation & Compensation

- According to the Society for Cognitive Rehabilitation (2004)...

### “Either / Or” Phenomenon

The reality of rehabilitation is that remediation or compensation should not be considered an either/or approach. Meaning, the patient should have both available so that they are able to regain as much as possible. With persistent impairments, the goal is continued work toward the highest level of functioning under these new conditions.

In the examples provided so far, there is overlap because neither approach is a pure approach.



## Remediation & Compensation Strategies

- Remediation and Compensation is the combined process of restoring and learning adaptive techniques for improved functioning.
- **Example of use with remediation and compensatory strategy development:**
  - A person has cortical blindness at the beginning of the traumatic brain injury rehabilitation approach.
  - Case review: A 20 year old was at the beach “riding the waves” when he was pulled under during body surfing. He was curled under and when the wave crashed down, so did the patient hitting his bilateral occipital lobes. As a result, he developed cortical blindness.
  - **Initially**, he was provided education on how this happened (etiology) and then he was told that there was no treatment or cure for the problem.
  - **In rehabilitation**, he was provided a method of compensating by voice recognition when identifying his care providers, and he would ask anyone entering his room to identify by name. He was taught compensatory blind strategies.
  - **Outcome** included adequate use of compensatory strategies, and he regained a portion of his vision before returning home where he could see light/dark, blurred colors, and facial/body outlines of persons. He was beginning to see larger letters as well and continued with vision therapy at the outpatient level.

## Cognitive remediation and compensation

- Aside from physical examples, there are many cognitive examples as well.
- In traumatic brain injury, the following example highlights the difference based on the element of time of recovery. In prior research (Lewis & Horn, 2013) that time is only a factor in recovery within the first 6-8 months. Following this period, more time does not mean the added days-weeks-months is sufficient to provide more improvement. Rather, activities and therapy completed tends to be more critical than time.
- Example:
  - Person is brought into the trauma center with a GCS of 5. Upon the evaluation, the person is medically stabilized and sent to NICU for observation.
  - 2 days later, the individual is GCS of 12 and rapidly recovers to 15/15 before transfer.
  - In the rehabilitation center, the patient is now Rancho Level IV with agitation and confusion and post-traumatic amnesia as measured by the Galveston Orientation and Amnesia Test (GOAT)

**Do you teach compensatory strategies or remediation, and if remediation, then how?**



## Use of Remediation and Compensation

- In the prior example, the use of both techniques is essential to the outcomes trying to be achieved.
  - When the person is emerging in the acute center, the goal is medical stability so rehabilitation remediation and compensation are not a consideration at that time.
  - Once in the rehabilitation center, the goal is to use both skills. At first, remediation of attention and disorientation may be the focus given the Rancho Level IV status. At this level, behavior control and reduction of global cognitive dysfunction is imperative and this is accomplished with routine and familiarity.
  - Once the person progresses to Rancho Level VI, then the focus is on continued remediation of deficits with compensatory strategy use.
    - **Remediation** – work on confusion and disorientation with current events and repetitive skill building for activities of daily living. Attention is improved by length of simple tasks being completed (e.g., therapy is initially 15 minutes and increased to 30-60 minute increments in 1 sitting).
    - **Compensation** – provide the use of a memory notebook, watching the news each day for reduce confusion, and seeing pictures of family on the wall or in the room to remind them of their loved ones until memory begins to carry over.

# Ideas and Innovations ...



## Influences on use of techniques

- It seems that influences separate from rehabilitation goals have an impact on not only recovery, but also what is expected.
- Controversy, for example, has been around cognitive rehabilitation for years. Early on, this treatment was focused on the individual outcome without studies showing group-wide effects.
- **ACRM** – has published the cognitive rehabilitation manual for the past few years showing the theoretical and applied approach to cognitive rehabilitation that provides the use of remediation and compensation skills (ACRM, 2015 and 2014).
- Studies published in Brain Injury have shown group wide effects of cognitive rehabilitation approaching both techniques use.
- D'Esposito & Gazzaley, 2015 focused on executive dysfunction and reported limited studies, but showed that there was an effect with medication and treatment.
- **Thought >>** Is the use of medication considered remediation or compensatory?



## How does payment impact technique used?

- **Insurance carriers determine whether cognitive rehabilitation therapy is an acceptable standard of care following neurological injury.**
- Example
  - Aetna
    - Provide “coverage” for cognitive rehabilitation by Physical Therapy, Occupational Therapy, Speech Therapy, Neuropsychology, or Physician.
    - One of the basic requirements is that the person is expected to make significant cognitive improvement.
    - They define the use of this therapy as time limited..(“experts” provided the time parameter for consideration)
      - Visual-spatial deficits = 20 1-hour sessions delivered in 4 weeks
      - Language and communication = 8 hours of weekly therapy beginning at 4 weeks post-onset and continuing up to 48 weeks post-onset.
      - If the duration of cognitive rehabilitation is longer, than it is subject to a review for “medical necessity”
      - Conclusion from 1999 data is that there is limited data on the effectiveness... but what about data today that shows the opposite?

## Additional financial considerations

- Medicare, also a significant payer, allows for cognitive rehabilitation for a time limited period.
  - Medicare will typically allow for this intervention (remediation and compensation) for up to a year from the onset of problem, injury or illness.
  - In psychology, Medicare will allow for behavioral intervention and “psychotherapy” to occur essentially indefinitely as long as services are not over-utilized within a given week (e.g., no more than once per week).
  - As one approaches a year, Medicare requires either no treatment or requires one to provide services using long-term treatment codes.

A common element is time!

How much is necessary?



## How long should one take to remediate or compensate?

- One of the problems of remediation or compensation is the length of time that it takes.
- There are no established guidelines to determine when is enough, how much therapy is enough.
- There are no established guidelines as to which deficits can benefit from remediation or compensation.
- When should one focus on remediation over compensation?
- When can one say that deficits are now “static” and therefore treatment no longer remains necessary?

**It can be quite confusing...**

- Lewis & Horn, 2013; Horn & Lewis, 2014; and Lewis & Horn, 2015
  - Recovery continues well after 6 months from the time since injury.
  - Individuals injured longer than 20 years shows continued stability, and gradual improvement with disability with supportive services



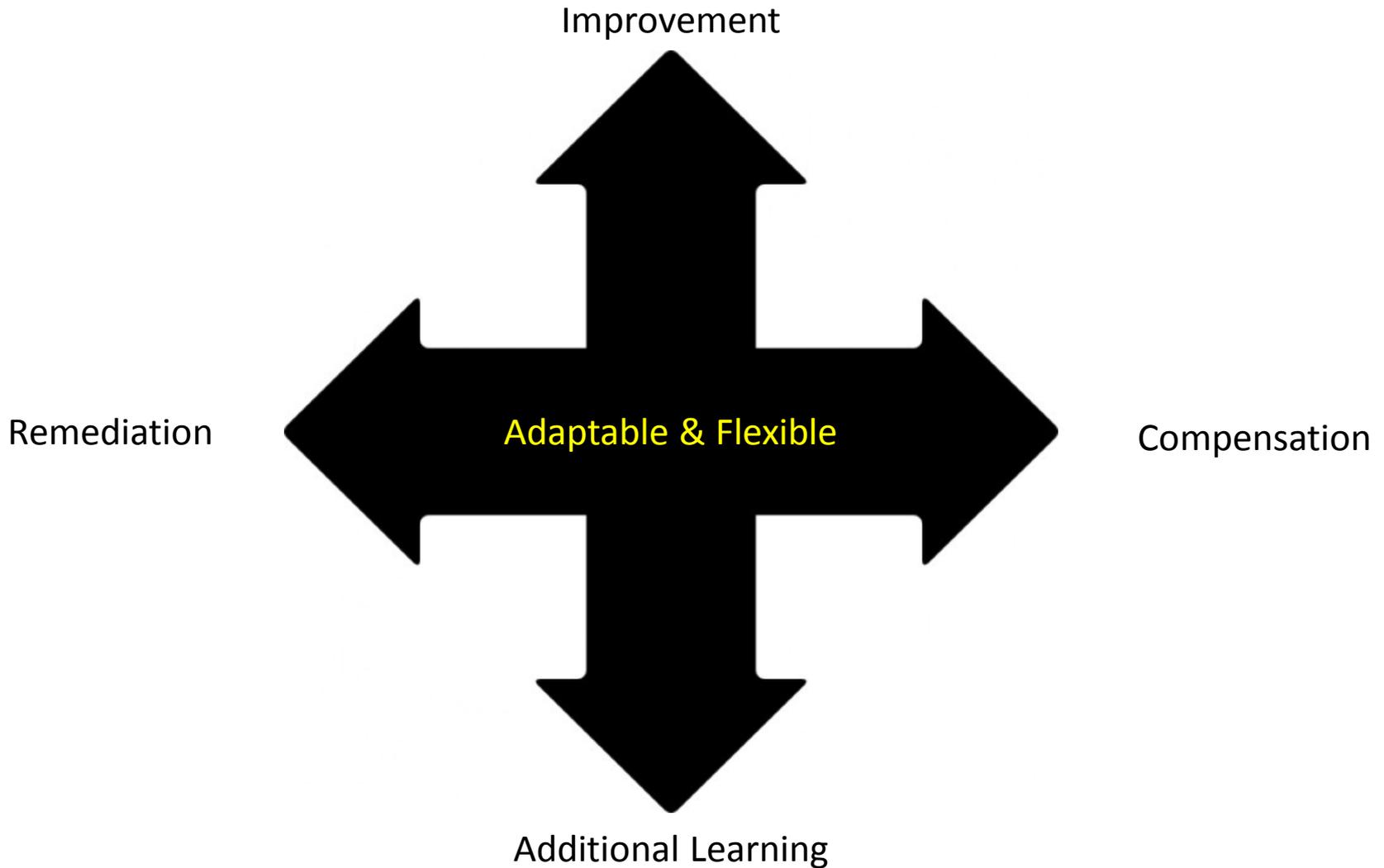
## Is there one approach?

- There is no one established approach to remediation or compensation.
- Most professionals would agree that the approach is based on the goal of the patient, and the type of deficit. It may also be based on the training of the provider – one provider may be of the opinion that recovery is a year long and then stops, while another provider may see recovery as a process of stimulation and structure that should be ongoing.
- Maybe ... we should focus on a flexible and adaptable model that is evidenced-based to provide guidance.
  - A model such as this would have to be sensitive and specific.
  - A model such as this may actually take out the element of time, and instead focus on function.

Is there one approach?



Let's tease the brain... consider this option



## A model of recovery – Rasch approach

- Adaptable and Flexible Model of care – **The Switch**
- Consider using remediation or restoration of function as a goal, with episodic compensatory strategy use to build foundational skills to achieve (side to side model)
- Consider high impact – low probability problems (evidenced-based model)
- Consider levels that a patient can move up or down (flexibility of care – up & down)
- Consider application of skills (ecological validity)
- Consider time as a function of showing learned behavioral compensation rather than time being a finite outcome
  - Instead of saying a skill must be learned in 20 sessions or less, otherwise it is not an achievable skill
  - Rather, time is provided as a guide – lets say that effective learning can be achieved if a person is able to show use of compensation or restoration within 90 days – if so, then move to the next impairing skill(s). If not, then remain at the level of learning and use both compensation and remediation as the guide
- Consider measuring functional outcomes as a process of recovery not an achievement of recovery (this is like learning – you don't stop learning because you graduated high school)

Remediation and Compensation are a push-pull dynamic



## Comments/Questions

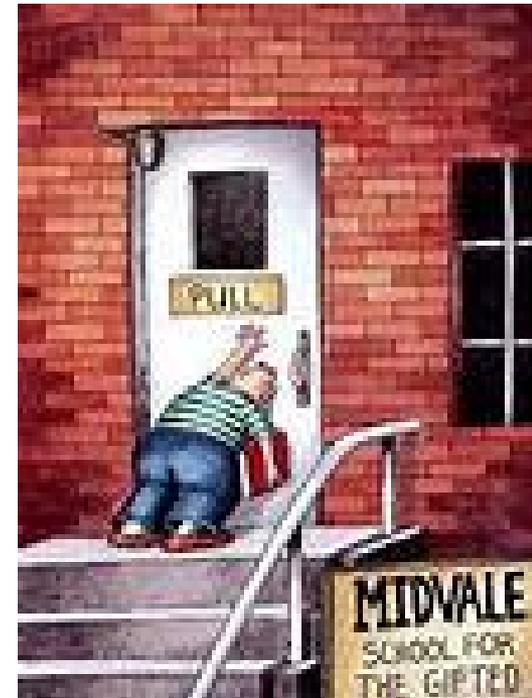


In the end, we can either back away from the challenges because it seems overwhelming ...

Or we can continue trying until we get it right...

That is life, that is rehabilitation.

**Conclusion:** use both remediation and compensation.





[hopkinsmedicine.org/conditions](http://hopkinsmedicine.org/conditions)

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