

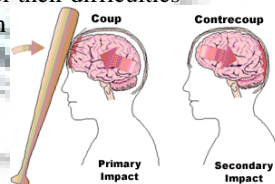
## Acquired Brain Injury (ABI)

- is an injury to the brain, which is **NOT** hereditary, congenital, degenerative, or induced by birth trauma
- is an injury to the brain that has **occurred after birth**
- commonly results in a **change in neuronal activity**, which effects the physical integrity, the metabolic activity, or the functional ability of the cell
- may result in **mild, moderate, or severe impairments in one or more areas**, including cognition, speech-language communication; memory; attention and concentration; reasoning; abstract thinking; physical functions; psychosocial behavior; and information processing

*Brain Injury Association Board of Directors, March 14, 1997*

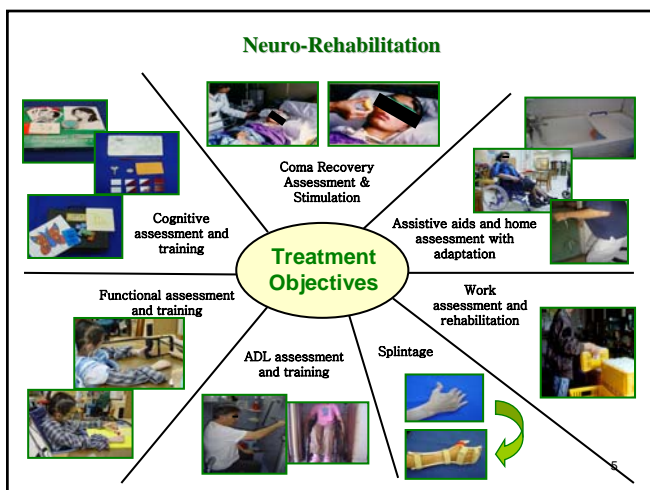
## ABI Rehabilitation

- **Rehabilitation goals** should be individualized, clinically relevant, achievable and related to everyday life (Wilson, 2002)
- **Aims:**
  - ✓ to restore lost functioning
  - ✓ to encourage anatomical reorganization
  - ✓ to help people to compensate for their difficulties
  - ✓ to ~~by-pass~~ the problems through environmental modifications, or use a combination of these methods.



## Role of Occupational Therapist

- Use **purposeful activities** including **physical** and **mental** activities as well as **environmental intervention** as means of preventing, reducing, or overcoming physical and emotional challenges for all clients with disabilities to ensure the **highest level of independent functioning in meaningful occupations**.
- Occupations can include activities in **self-maintenance** (i.e. personal care, mobility), **leisure** (i.e. social activities, sports) and **productivity** (play, school, employment, home-making), or **roles of clients in the community**. Occupations must be meaningful tasks to the clients in the stream of time and in the contexts of one's physical and social world (Kielhofner, 1995).



## Rancho Scale

- a **commonly used measure of cognitive function** that evaluates **level of awareness, interaction with the environment, cognition and behaviour**
- a **categoric scale** with high interrater reliability
- helpful in **preparing for rehabilitation and future life care planning**
- has proven **more valuable for predicting later outcomes** including function in **ADL** and degree of **independent living**

More detailed assessment by OT needed

**At later stages of brain injury, neuropsychological testing is best method of providing detailed and comprehensive information on cognitive capabilities**

### Rancho Scale

Level I : No Response to Stimulation: Total Assistance  
 Level II : Generalized Response to Stimulation: Total Assistance  
 Level III : Localized Response to Stimulation: Total Assistance  
 Level IV : Confused, Agitated Behavior: Maximal Assistance  
 Level V : Confused, Inappropriate, Non-agitated Behavior: Maximal Assistance  
 Level VI : Confused, Appropriate Behavior: Moderate Assistance  
 Level VII : Automatic, Appropriate Behavior: Minimal Assistance for Daily Living Skills  
 Level VIII : Purposeful, Appropriate: Stand-by assistance  
 Level IX : Purposeful, Appropriate: Stand-by on request  
 Level X : Purposeful, Appropriate: Modified Independent

... an originally eight-level scale (Hagen, 1979) and later developed into a ten-level scale in 2000 ...

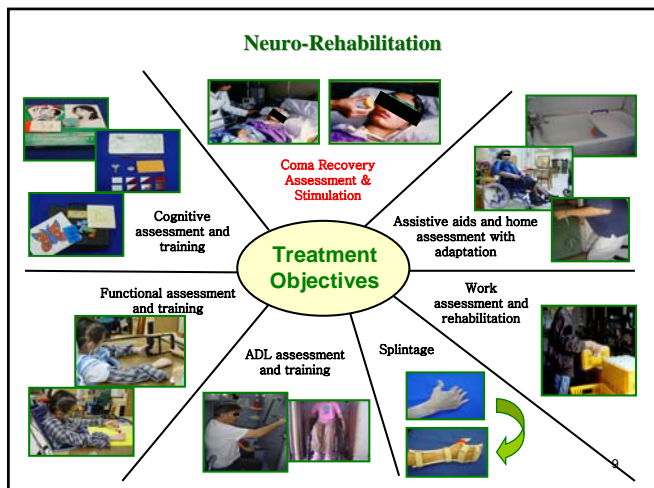
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... adopt 8-level Scale ...

Majority of patient is in early, inpatient phase of recovery

No published research on the tool (validity/reliability data)



### JFK Coma Recovery Scale

- A **standardized instrument** for grading level of neurobehavioral responsiveness following severe brain injury
- Developed to monitor the recovery of **minimally responsive** brain-injured patients  
*(i.e. unable to follow commands)*
- Corresponds to patient functioning at **Rancho level II through IV**

### JFK Coma Recovery Scale

Rancho Level	Response
I	None
II	<b>Generalized</b>
III	<b>localized</b>
IV	<b>confused, agitated</b>
V	confused, inappropriate, non-agitated
VI	confused, appropriate
VII	automatic, appropriate
VIII	purposeful, appropriate (stand by assistance)
IX	purposeful, appropriate (stand by assistance on request)
X	purposeful, appropriate (modified independent)

### JFK Coma Recovery Scale

- 6 subscale score & total CRS score
- Lowest items within each subscale assess reflexive response while highest items represent cortically-based abilities
- **0-14 : minimally responsive (coma, vegetative state)**
- **15-25: emergent awareness (post coma, non-vegetative state)**
- Shown to be an effective instrument for predicting outcome during acute rehab  
*(Giacino, et al 1991)*

## JFK Coma Recovery Scale

- Tested item is designed to evaluate responses in area of :
  - **Arousal / attention**
  - **Auditory function**
  - **Visual function**
  - **Motor function**
  - **Oromotor / verbal ability**
  - **Communication**
- Concurrent validity:
  - $r = -0.93$  with DRS &  $r = 0.90$  with GCS
- Inter-rater reliability: Kappa = 0.83

**25 items**

## JFK Coma Recovery Scale - Revised

**6 Subscales**

- Arousal / attention
- Auditory function
- Visual function
- Motor function
- Oromotor / verbal ability
- Communication

**JFK CRS 1991**  
**25 items**

➔

**JFK CRS-R 2004**  
**23 items**

## Patient Progress

	Week Post Injury	JFKCRS	GCS Score	JFKCRS-R
Before MNS stimulation	4	5	8	3
MNS	6	6	7	4
	8	7	7	5
MNS stopped	10	11	7	12
	13	20	11	17
	14	23	12	21
	18	24	12	23
	22	25	12	23

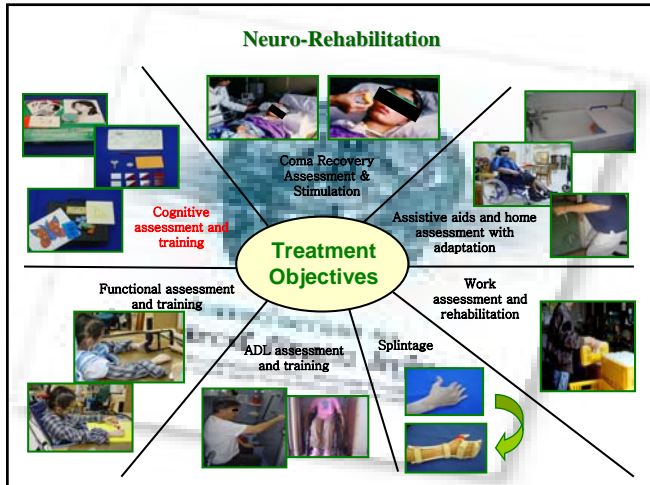
Denotes MCS

## JFK Coma Recovery Scale – Revised

- **Easy, fast & standardized** administration (< 25 mins)
- A **functional approach outcome scale** to measure meaningful & purposeful behavior (correlates with FIM ADL scale)
- A **relatively sensitive** coma measurement in assessing **subtle neurobehavioral changes** of patients with **severe brain injury** in coma & vegetative state

## JFK Coma Recovery Scale – Revised

- Emerging MCS scores indicate **early 'intensive & aggressive' rehabilitation** to minimal conscious patient with severe brain injury
- **Enhance future studies** on various **coma recovery stimulation modalities** with its sensitive scoring nature



## Cognitive Assessment

- First step in cognitive rehabilitation
- Significance of cognitive assessment
  - **Baseline data** of cognitive deficits area
  - **Monitoring progress** of cognitive rehabilitation program
  - **Outcome measures** of neurorehabilitation program
- Content
  - Arousal, orientation, attention span, visual processing, language, memory, reasoning, problem solving, executive functions

## Cognitive Assessment

- Provide data / results in the form of profile or sum of scores
- **Profile type of scoring allows**
  - Quick reference to progress of each specific area included in the cognitive assessment
  - However, **NO** total sum of scoring to show overall progress
- **Sum of scores scoring system allows**
  - Total scoring of overall progress
  - However, **UNABLE** to highlight specific tested area which may significantly alter the total scoring result

## Cognitive Assessment

### Sum of scoring Profile scoring Questionnaire

- MMSE
- NCSE
- EMQ
- RBMT
- LOTCA
- PCSQ

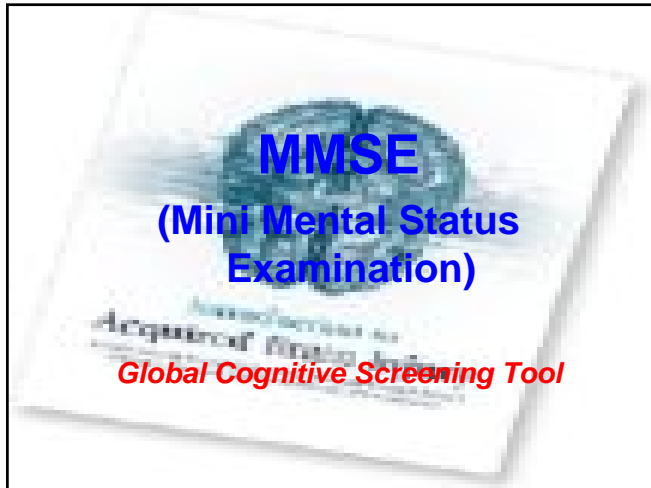
MMSE-Mini Mental State Examination  
 RBMT-Rivermead Behavioral Memory Test  
 EMQ - Everyday Memory Questionnaire  
 NCSE-Neurobehavioral Cognitive Status Examination  
 LOTCA-Loewenstein Occupational Therapy Cognitive Assessment  
 PCSQ - Post Concussion Syndrome Questionnaire

## Cognitive Assessment

- Common standardized cognitive assessment widely used in HA hospitals by OT
  - **MMSE (Mini Mental Status Examination)**
  - **NCSE (Neurobehavioral Cognitive Status Examination)**
  - **RBMT (Rivermead Behavioral Memory Test)**
  - **LOTCA (Loewenstein Occupational Therapy Cognitive Assessment)**

## Cognitive Assessment

- **Advantages** of unifying the use of cognitive assessments
  - Enhance **communication** of patients' progress among disciplines in every hospital
  - Provide **better documentation** in progress monitoring (standardization)
  - Enable **outcome evaluation**



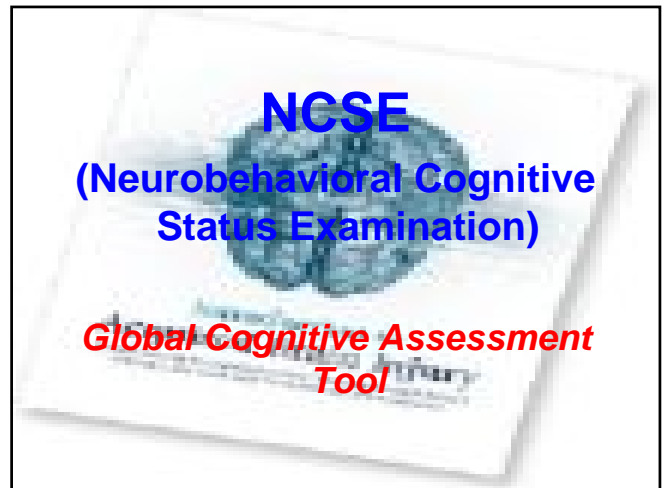
### MMSE

- Originally established in 1975
- A quick and effective screening test for elderly
- 5-10 mins for administration
- **Chinese version** validated in **1994**
- Aim: to develop **cognitive screening test** for clinical & service planning process with increasing aging population

### MMSE

- A cut-off score 19-20/30 indicate further evaluation for cognitive impairment
- **24-30/30: normal**
- **19-23/30: mild impairment**
- **10-18/30: moderate impairment**
- **0-9/30: severe impairment**

Independent in ADL  
Mild to moderate assistance in ADL  
Dependent in ADL



### NCSE

- Designed to determine the degree of disability **BUT** not to measure the full range of cognitive performance
- A **thorough screening examination** for patient with short attention span
- A **more sensitive test** than MMSE, especially on geriatric patients (Suzanne D. Fields et al 1993)
- Validity and reliability are stated **good**

### NCSE

- Require 15-25 mins for administration
- 5 major ability area tested:
  - **Language**
  - **Construction**
  - **Memory**
  - **Calculation**
  - **Verbal reasoning**

## NCSE

- Has been translated and validated into **Chinese version**
- Widely used in HK settings (100%) for neurological patients.
- Has collected different profiles for elderly, stroke patients and brain damaged patients

## LOTCA (Loewenstein Occupational Therapy Cognitive Assessment)

- To assess higher mental functions:  
perception, sequential ability, logical thinking  
Suitable for aphasic patients*

## LOTCA

- Designed to assess brain damaged patients (children 6-12 y.o and adults)
- Administration time: 30-45 mins
- Provides **profile scoring** system
- Internal consistency reliability is high:
  - Perception alpha coefficient: 0.87
  - Visuomotor organization: 0.95
  - Thinking operation: 0.85
- Validity: not clearly mentioned but claim is high

## LOTCA

- 26 subtests in 6 main areas:
  - **Orientation**
  - **Visual perception**
  - **Spatial perception**
  - **Motor praxis**
  - **Visuo-motor organization**
  - **Thinking operations**

## RBMT

- About 20-30 mins for administration
- Translated into **Chinese version in 1998** (86 BD vs 84 NC with age range 16-69)
- With discriminant analysis, a **cut off score of 15/24** of HK RBMT score indicates having memory dysfunction

## RBMT

- Internal consistency  
Cronbach's alpha: 0.859
- Concurrent validity  
Correlates with CMMSE,  
rho: 0.86 ( $p < 0.001$ )
- Predictive validity  
Rho: 0.86 ( $p < 0.012$ )



### Precaution of cognitive assessment

- Test performance may be interfered by **environmental distraction**; assessment should be conducted in a **quiet room**
- **Educational level** is necessary to consider before interpreting patient's result
- Patients may fail in some tests **NOT** because of errors but **slow processing speed**; attention should be paid in interpreting tests that require time limit

### Precaution of cognitive assessment

- **Aware of training/knowledge** requirement before using assessment batteries
- Results evaluated must be used with cautions and consider the **"age" factor**
- Assessment in **acute phase** may be compounded by **extraneous variable** e.g. GC, medication; therapist must understand patient's consciousness before evaluation
- Ability to complete most of standardized tests rely on **intact language ability**; therefore, it's better to assess language ability first.

### Treatment

- **Goal**: enhance patient's capacity in processing and interpreting information
- **Approach**: **restorative** and **compensatory**
- **Restorative training** focus on improving specific cognitive function
- **Compensatory training** focus on adapting to cognitive deficits

### Treatment Approaches

- **Cognitive Remediation**
- **Adaptive Approach**
- **Environmental Modification**

Treatment Approach	Cognitive Remediation	Adaptive Approach	Environmental Modification
<b>Rationale</b>	Owing to plasticity of the brain and anatomical reorganization take place inside the brain	Previous skills cannot be used, i.e. need compensation	Reduce the external environmental demand for cognitive ability, i.e. complexity, or loading, i.e. amount
<b>Intervention</b>	Restore lost functioning Make use of implicit learning: over-learning or procedural learning	Direct training of functional skills	Environment compensation
<b>Strategy</b>	Facilitation of spontaneous return  Direct retraining of cognitive abilities or functional integrative skills	Use of external devices in functional skills performance	Adapt the environments to suit the needs of clients  Simplify working routine

### Treatment precaution

- Training environment should be **safe and quiet**
- Treatment provided should **meet the level of patient**
- Treatment task should be **structural** and content of treatment session should be **gradable**
- **One cognitive performance component** should be focussed in each session
- Appropriate **use of training cues** is essential for success of training
- **Process** itself is more important than the **Result** of training

**Introduction**  
 Cognitive Disorders  
 Recommended Training Techniques  
 Training in PC Level  
 Attention  
 Orientation  
 Memory  
 Perception  
 Calculation  
 Executive Function  
 Training in OP Level  
 Shopping & Grocery  
 Community Living Skills  
 Money Management  
 Meal Preparation  
 Handling Telephone  
 Reference  
 Glossary of Terms

**Guidebook on Cognitive Training For Occupational Therapists**

Occupational Therapy Central Co-ordinating Committee  
 Hong Kong Hospital Authority  
 Hong Kong Occupational Therapy Association

**時間概念 (Orientation to Festival) 節日**  
 請用線把相對的節日與日期相連

**Orientation**

聖誕節 ·	農曆正月初一
中秋節 ·	農曆五月初五
端午節 ·	新曆十二月廿五日
元旦 ·	新曆一月一日
農曆新年 ·	農曆九月初九
重陽節 ·	新曆七月一日
大除夕 ·	新曆十二月卅一日
香港回歸紀念日 ·	農曆八月十五日



職業治療部 **Money Management**

金錢處理習作 : (Money Handling)

1. 把購買下列玩具應付的硬幣數目填在橫線上:

模型船 \$8.3

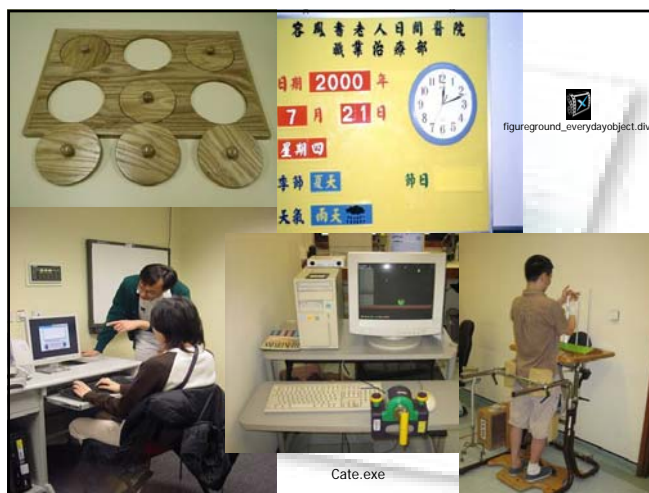
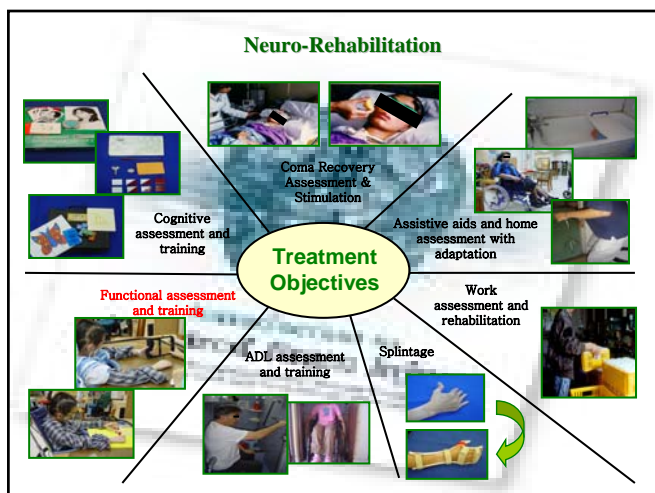
\$5    \$2    \$1    20¢    10¢

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模型飛機 \$35.5

\$5    \$2    \$1    20¢    10¢

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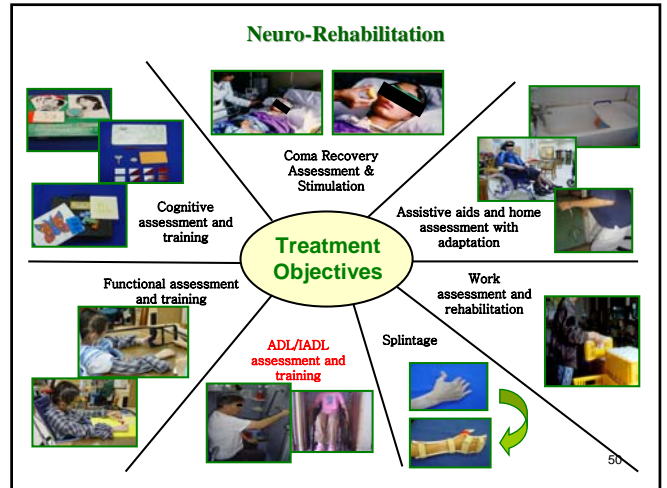


**二、物及器樂輔助工作治療**

**幻彩水柱**  
Aquatic Bubble Tube with Interactive Switches

**活動簡介:**  
此器材主要用於訓練腦內傷患者...  
**活動目標:**  
1. 提高患者對顏色之辨識力...  
**活動程序:**  
1. 先向患者介紹器材之用途...  
2. 將器材放入水中...  
3. 讓患者觸摸器材...  
**活動紀錄:**  
1. 患者能辨識顏色...  
2. 患者能觸摸器材...  
3. 患者能說出器材之名稱...

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### ADL Assessment – Barthel Index

- is a scale used to **quantify recovery from stroke**
- uses **ten variables** describing **activities of daily living (ADL) and mobility**
- was introduced in **1965**, and yielded a score of **0-20**
- modified by Granger *et al* in **1979**, when it came to include 0-10 points for every variable (maximum = **100**)
- further refinements** were introduced in **1989** (**Modified Barthel Index - MBI**) (Shah, Vanclay and Cooper)

Items	Unable to perform task	Attempts task but unsafe	Moderate help required	Minimal help required	Fully independent
Personal Hygiene	0	1	3	4	5
Bathing Self	0	1	3	4	5
Feeding	0	2	5	8	10
Toilet	0	2	5	8	10
Stair Climbing	0	2	5	8	10
Dressing	0	2	5	8	10
Bowel Control	0	2	5	8	10
Bladder Control	0	2	5	8	10
Ambulation (wheelchair)	0 (0)	3 (1)	8 (3)	12 (4)	15 (5)
Chair-Red Transfers	0	3	8	12	15

**Modified Barthel Score<sup>2</sup>**  
This modification further increases the sensitivity of the score (maximum 100), without increasing difficulty undertaking test or time involved

Adapted Chopboard

ADL - dressing

### IADL Assessment – Lawton's Scale

- is designed to **capture more complex life activities** (Rodgers and Miller 1997)
- includes** light housework, laundry, meal preparation, transportation, grocery shopping, using the telephone, medication management, and money management
- has been **translated in Chinese** and **cross-cultural validation done** (Tong & Man, 2002)

Activity	Need No Help (2 pts. each)	Need Some Help (1 pt. each)	Unable to Do At All (0 pts. each)
1. Using the Telephone	___	___	___
2. Getting to Places Beyond Walking Distance	___	___	___
3. Grocery Shopping	___	___	___
4. Preparing Meals	___	___	___
5. Doing Housework or Handyman Work	___	___	___
6. Doing Laundry	___	___	___
7. Taking Medications	___	___	___
8. Managing Money	___	___	___
Total Score: ___ = ___ x 2 + ___ x 1 = ___			0

From Lawton, M.P., and Brody, E.M. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist*, 9, 179-186.  
Copyright (c) by The Gerontological Society of America. Used by permission of the Publisher.

### IADL training – Use of Community Resources

### IADL training – Easy Street

- to relearn daily living skills in order to regain their independence and confidence in everyday tasks
- to encourage patients to achieve functional goals

**SUPERMARKET/SHOPPING**

### IADL training – Community Living Skill Training

**Virtual Reality**

