

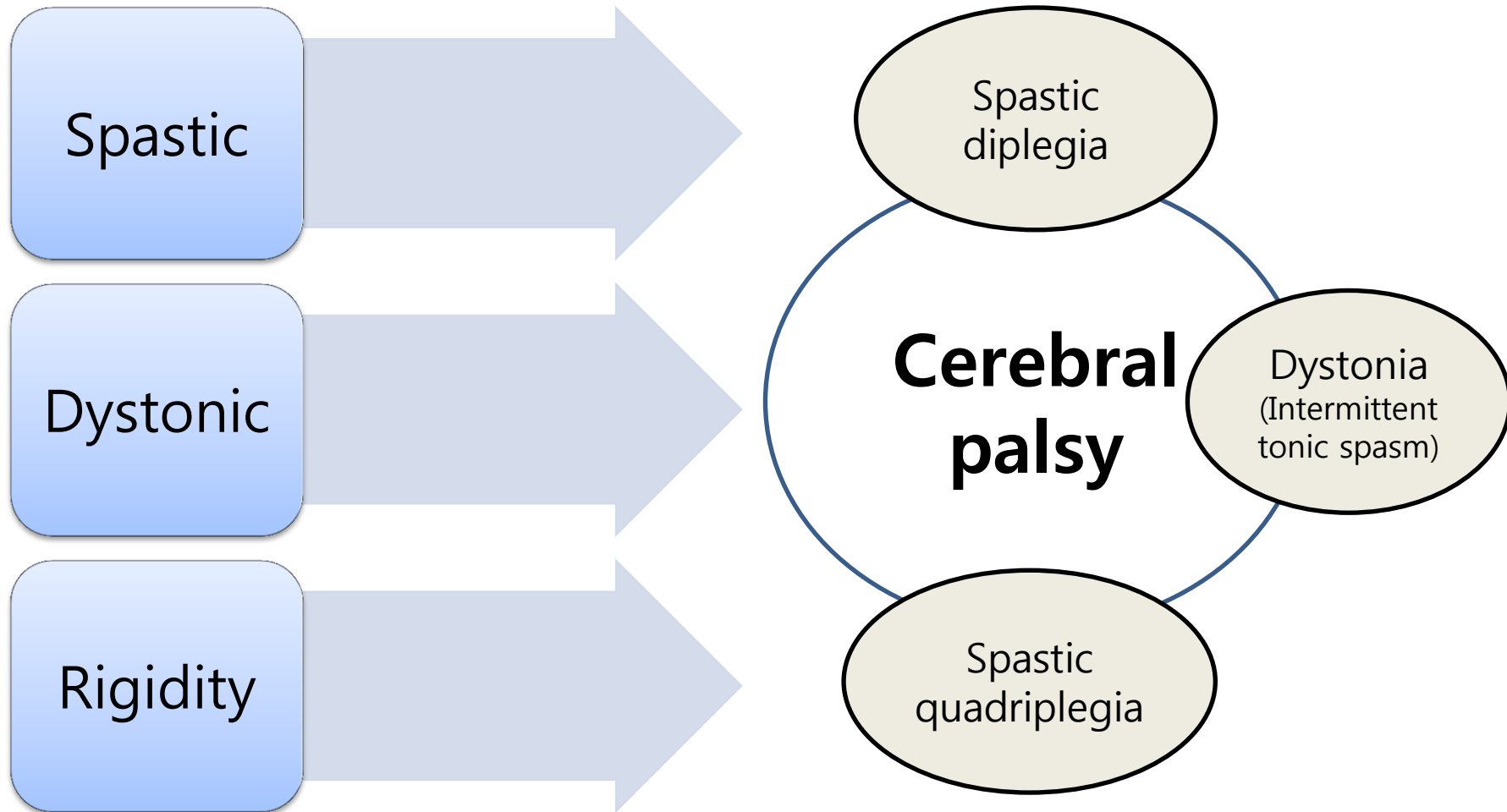
# **Occupational therapy for total body involved hypertonic children: Focusing on arm and hand function**

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# Contents

- Overview of hypertonia
  - ✓ Arm and Hand function
- Assessment
- Intervention
- Case

# Classification of hypertonia

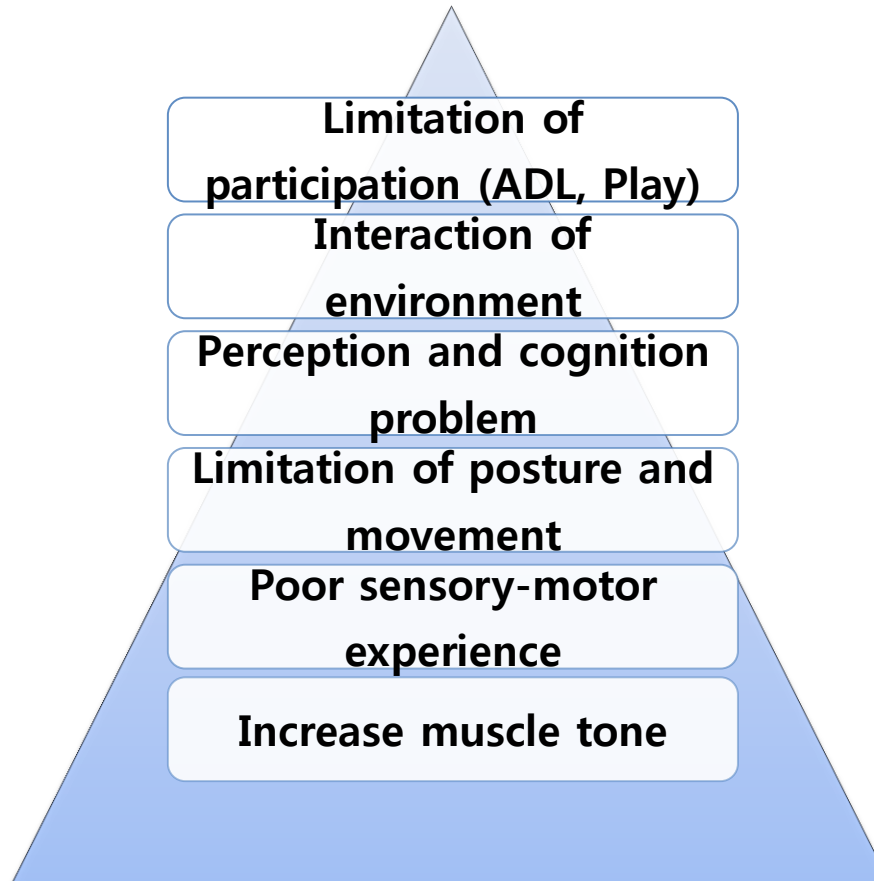


# Characteristics of CP and Associated hand function

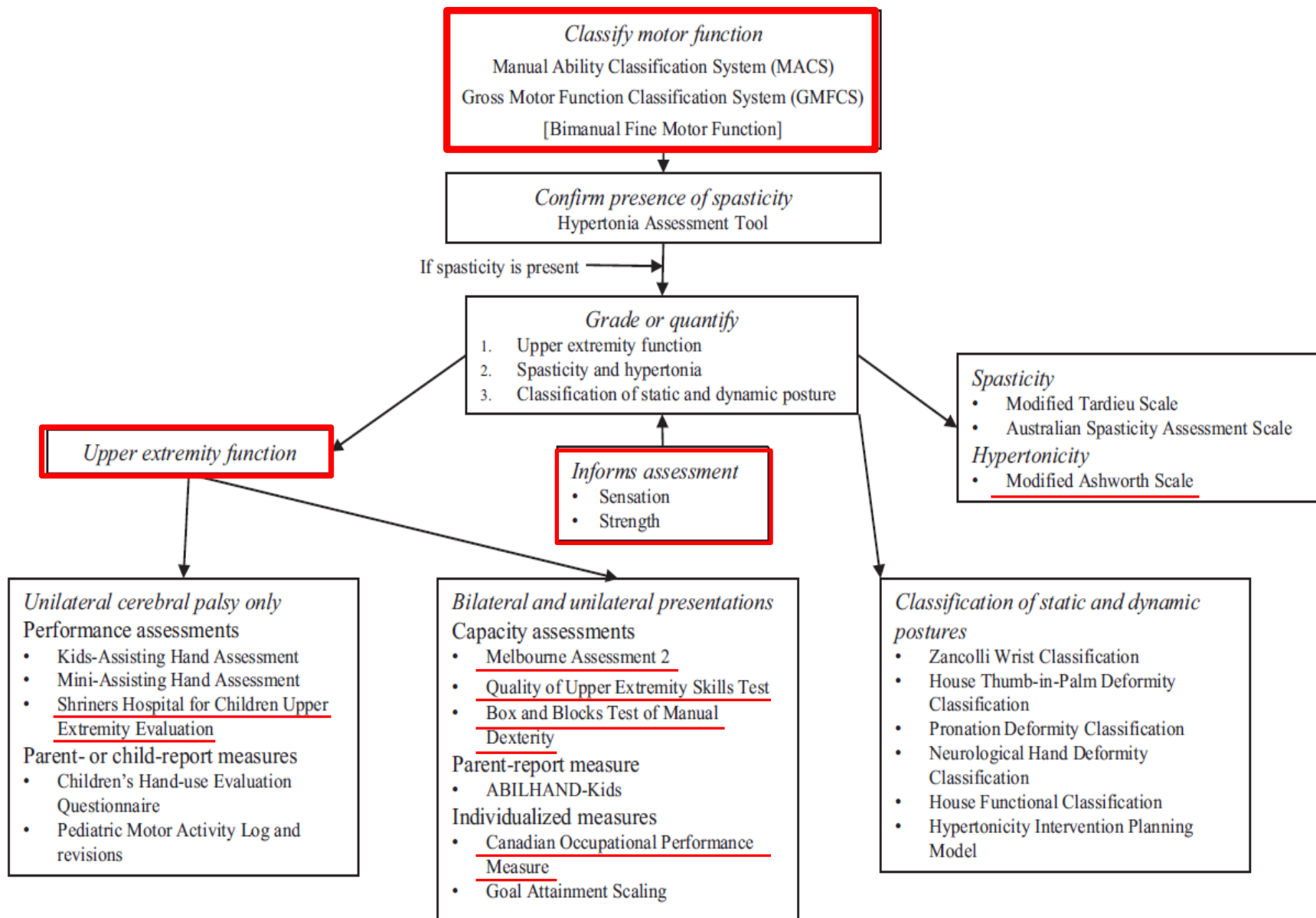
Characteristics of CP	Associated Hand function limitation
<b>Muscle tone</b> characterized by <b>hyper</b> or hypo	Limited ROM at wrist, forearm, and fingers. In <b>hypertonicity</b> finger flexor tight
Excessive co-contraction at Joints	Wrist, forearm and metacarpals are stiff,(with spasticity)
Muscle synergies are inefficient and stereotypical	Flexor synergy dominate U/E movement Shoulder int. rotation, elbow flexion, forearm pronation, wrist flexion
<b>Muscle weakness</b>	Hand may not generate appropriate forces to hold and use
<b>Limited dissociated movement</b>	Fingers move in full extension and flexion Difficulty moving isolated arm and hand
<b>Impaired sensory feedback</b>	Sensory feedback is not available to guide precise hand and finger movement

# Clinical feature of hypertonia

## Arm and hand function



# Assessment



**Fig. 1** Measures for grading and quantifying upper extremity function in children with spasticity.

Wallen, M., & Stewart, K. (2016, February). Grading and quantification of upper extremity function in children with spasticity. In *Seminars in plastic surgery* (Vol. 30, No. 1, p. 5). Thieme Medical Publishers.

# OT Assessment

## Upper extremity function

- Melbourne 2
- Quest(Quality upper extremity skill test)
- Jebsen Taylor hand function test, Box and block test
- Shuee(Shriners hospital for children upper extremity evaluation)
- [수지기능 관찰평가](#)

## Functional ability

- **PEDI(Pediatric Evaluation of Disability Index)**
- KPPS(Knox preschool play skill test)-ex.Material management
- DDST II( ex. Fine motor adaptive)

## Strength

## Sensation

- Grip and pinch power
- Two point discrimination, stereognosis, tactile perception)  
→ **Observation, Parent interview**

## Association problem

- Medical chart review
- **Clinical observation**

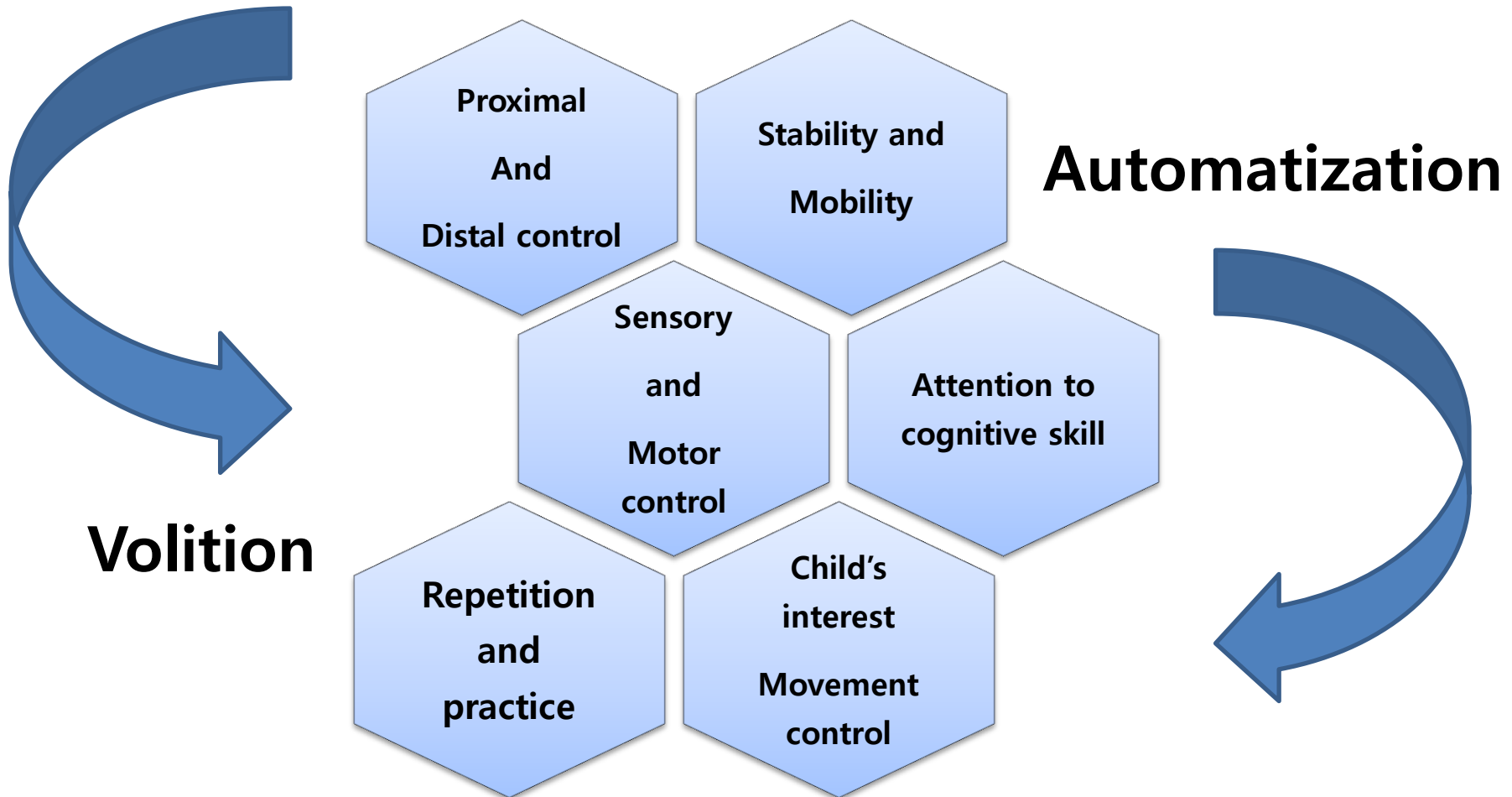


# 수지기능 관찰평가

수지기능 관찰평가		Rt.	Lt.
Reach	Extending a arm	▾	
	Reaching for objects		
	With crossing midline		
Grasp	Grasping objects		
	Holding objects		
Pinch	Pincer grasp		
Release	Open a hand		
	Voluntary release		
Coordination	Hand to mouth		
	Finger feeding		
	Hand to hand		
	Grasping both hands together		
	Transfer objects		
	Clap hands		
Sensory factor	Tactile sensitivity on the palm		
Reflex	Palmar grasp reflex		

# **Occupational therapy Intervention**

# Factors to Intervention planning

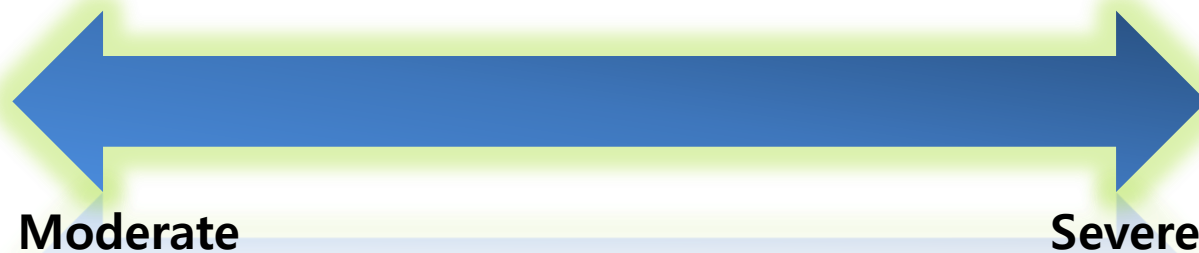


# Focus on Intervention session

- Positioning of the child and the therapist
- Tone and postural/ proximal control
- Tactile/sensory awareness/discrimination
- Isolated arm(reaching) and hand movement
- Grasp
- Voluntary release
- In-hand manipulation
- Bilateral hand skill
- Integration of skill into occupational performance

# Intervention focus

## Hypertonia with Motor Involvement



# Strategy for Intervention

**Function**  
(GMFCS, MACS **IV~V**)

- Limited or absent active U/E and hand movement
- Minimal no active grasp or thumb movement
- Passive function
- Sensory and perceptual deficit (ex. CVI)
- Lack of Interaction with environment

**Severe**



**Occupational Goal**

- Reduce of muscle tone
- Improving positioning for comfort and care
- Prevention of Contracture and deformity (U/E, hand)
- **Sensory information with experience**  
-> **Interaction with environment**

# Strategy for Intervention

## Function (GMFCS, MACS I~III)

- Active movement U/E to place arm/ hand in space
- Limited of isolation movement
- Inefficient, unreliable grasp with pattern  
-> clumsy, weak grasp, may flex wrist to grip
- Some active movement
- Incomplete of U/E coordination

Moderate



## Occupational Goal

- Reduce of muscle tone
- Improving positioning for Function
- Improving active reaching, grasp and release
- Improving bilateral function
- **Improving arm and hand function**  
-> **Improving Occupational performance**

**CASE**



# CASE I

GMFM V, MACS(mini) V

# Subjective Information

- Name/Gender: 전 O O(여)/ Age 1세 2개월
- DX.) Quadriplegia d/t HIE (onset : 17.4.14)
- BD) 2017년 1월 11일
  
- BHx) IUP 38+4wks, Bw 3.3kg, C-sec  
perinatal asphyxia (-) : ventilator (-) incubator care (-)  
neonatal hyper-bilirubinemia (-) : phototherapy (-) transfusion (-)  
neonatal seizure (-) associated anomaly (-)
  
- PI) 17.4.14 PPV 시술 중 RV rupture 로 cardiac arrest 후 CPR 40min후 ROSC  
emergency op s/p Exploratory median sternotomy, Repair of cardiac rupture,  
pulmonary valve annulus 시행함. Intubation 후 ventilator apply.  
18.2.27 포괄적 재활 치료 위해 본원 나동욱 교수님께 1st adm.  
18.3.12 재활의학과로 TI되어 치료 시작함.
  
- Brain MRI : (+) 17.5.4  
Diffuse hypoxic injury in almost entire brain
- Brain MRI (17.12.7)  
Large amount of chronic SDH in both cerebral convexity.  
Extensive encephalomalacia with atrophy of cerebral hemisphere and cerebellum.

# Objective Information

## 1. COPM(Canadian Occupational Performance measure)

작업 수행 과제	중요도	수행도	만족도
1. 감각 자극에 대한 반응 능력 증진	10	1	1
2. 자세변화 활동 시 긴장도 이완	10	3	3
3. 고개 조절 능력 증진	10	1	1

## 2. K-Denver Development Screening Test

[개인-사회성 발달]: 전 항목 수행 불가

[미세운동 및 적응발달]: 전 항목 수행 불가

[언어 발달]: 1~2개월 추정('중소리에 반응한다', '소리를 낸다')

[운동 발달]: 전 항목 수행 불가

# Objective Information

## 3. KPPS(Knox Preschool Play Scale)

: 전 항목 수행 불가

## 4. PEDI(Pediatric Evaluation of Disability Inventory)

: 전 항목 수행 불가

## 5. 수지기능 관찰평가

: tactile sensitivity on the palm(+), holding object(+)

# Feature



# Assessment

## Problem

- **Poor awareness of sensory stimulation**
- **Incomplete control of postural tone and movement**



## Goal

- **Improvement of U/E body awareness**
- **Reduce of hypertonicity**
- **Improvement of positioning for care**

# Intervention strategy for OT



- 안정된 환경
- 엄마의 'touch'
- 상지의 sensitivity 감소
- 상지로의 체중지지  
-> U/E body awareness  
증진



- 상지에 대한 인식
- 상지와 object, person의 관계
- 상지 움직임의 경험
- 적절한 position 유지



# **CASE II**

**GMFM , MACS(mini) III**

# Subjective Information

- Name : 홍OO (여) Age(2세3개월) BD : 15.12.18
- 
- Dx.) Cerebral palsy Spastic diplegia
  
- BHx) NSVD at IUP 28+5wks, B.wt=1.77kg d/t 자궁근무력증  
perinatal asphyxia (-) : ventilator (-) incubator care (+)  
neonatal hyperbilirubinemia (+) : phototherapy (+), transfusion (-)  
neonatal seizure (-) associated anomaly (-)
  
- PI) 16.6.8 환자의 발달평가 및 관련 상담위해 박은숙 교수님 1st opd visit  
16.6.29 intensive rehab 위해 박은숙 선생님께 1st adm.  
17.3.16 intensive rehab 위해 박은숙 선생님께 6th adm.
  
- Brain MRI: Both PVL

# Objective Information

## 1. COPM(Canadian Occupational Performance measure)

작업수행 과제	중요도	수행도	만족도
1. 공간에서의 자세조절 능력 증진	10	5	3
2. 식사 활동 시 도구 사용 능력 증진 (손가락, 포크)	10	5	3

## 2. K-DDST II(K-Denver Development Screening Test II)

[개인-사회성 발달]: 14~15개월 추정

[미세운동 및 적응발달]: 12~13개월 추정

'컵안에 적목넣기', '적목을 다른 손으로 옮겨잡기'

[언어 발달]: 27~30개월 추정

[운동 발달]: 7~8개월 추정

# Objective Information

## 3. KPPS(Knox Preschool Play Scale)

[공간 운용]: 13개월 추정    **[놀이감 운용]: 18개월 추정**

[가장/상징]: 21개월 추정    [참여]: 13개월 추정

놀이감 운용 (    개월)				
조작 (    개월)		구성 (    개월)		
12-18 개월	던지기	+	관련된 물건 모으기	+
	집어넣기	+	통 안에 물건 넣기	+
	밀기	+		
	당기기	+		
	옮기기	+		
	돌리기	+		
	열기(예: 문 열기)	+		
	닫기(예: 문 닫기)	+		
18-24 개월	작동 장난감 조작하기	+		
	구슬 끼우기	-		

# Objective Information

## 4. 수지기능 관찰평가

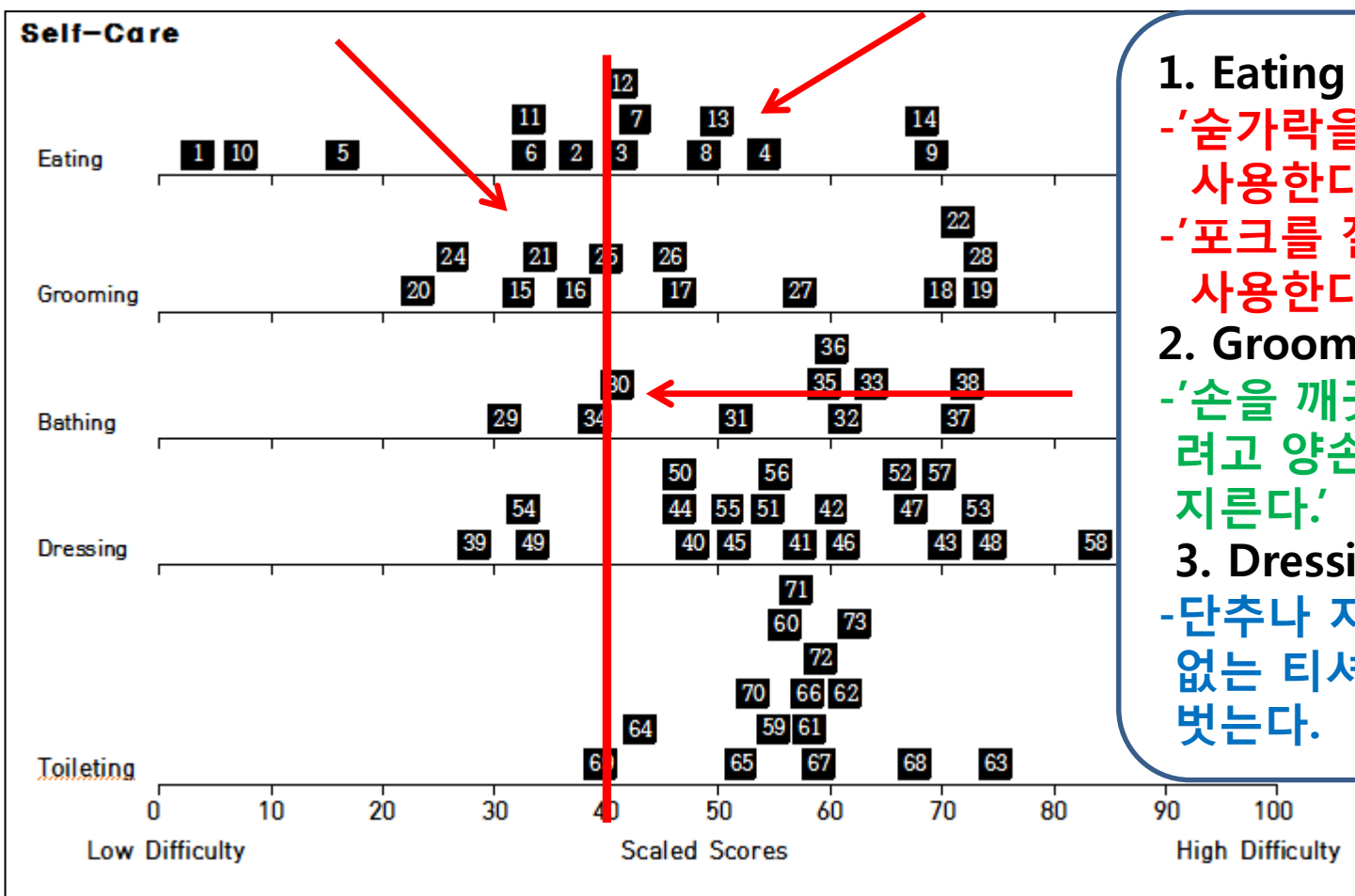
수지기능 관찰평가

수지기능 관찰평가		Rt.	Lt.
Reach	Extending a arm	+	+
	Reaching for objects	+	+
	With crossing midline	+	+
Grasp	Grasping objects	+	+
	Holding objects	+	+
Pinch	Pincer grasp	±	±
Release	Open a hand	+	+
	Voluntary release	+	+
Coordination	Hand to mouth	+	+
	Finger feeding	+	+
	Hand to hand	+	+
	Grasping both hands together	±	±
	Transfer objects	+	+
	Clap hands	±	±
Sensory factor	Tactile sensitivity on the palm	-	-
Reflex	Palmar grasp reflex	-	-

- **Bilateral hand use 의 어려움**

- **다양한 grasp pattern 경험 부족**

## 4. PEDI(Pediatric Evaluation of Disability Inventory)



# Assessment

## Problem

- Incomplete of positioning for function
- Incomplete of U/E coordination



## Goal

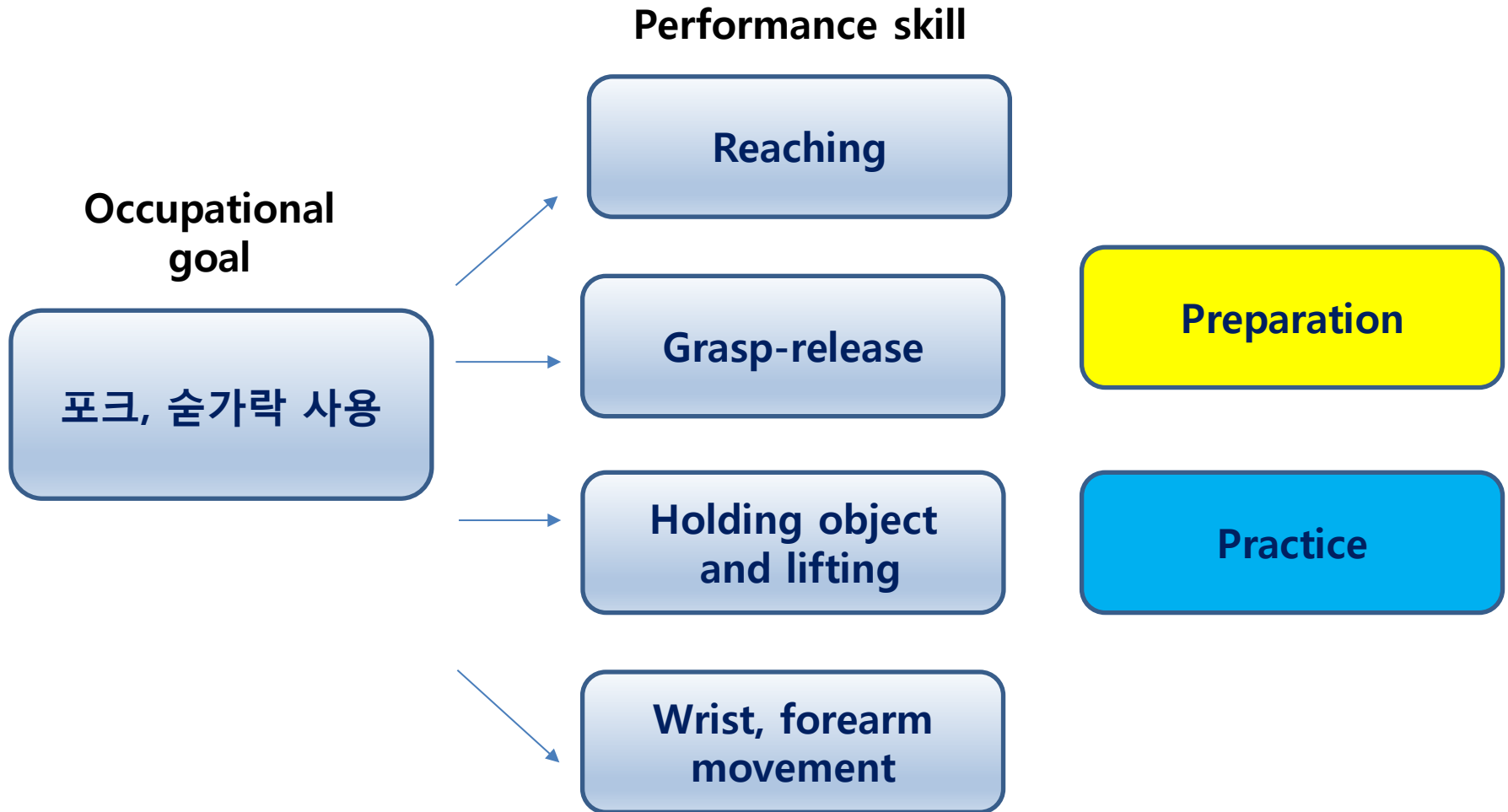
- Improvement of positioning for function
- Improvement of U/E coordination  
-for ADL participation

# Feature





# Intervention strategy for OT



# Preparation



# Practice



# Practice





치료 초기



치료 장면



치료 후기

**Thank you**

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