

Introduction of a Children's Hand Skills Framework and the corresponding assessment



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Hand Skills

- Definition:** The skills of the hand needed to attain functional needs or manipulate objects in relations to goal-directed activities in everyday environments
- How important is it for children?**
 - Participation in daily life activities
"31% to 60 % school time engaged in hand skill activities"
 - Children's general development




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Hand Skills Difficulties OT Assessment → Intervention

1: Direct measure of hands structure

Limited to:

- specific activities
- specific population
- specific test settings
- not explain what & how the hands can be used



2: Use of hand skills assessments

- Purdue Pegboard Test
- Box & Block Test
- Movement ABC
- BOTMP or BOT-2
- Peabody Developmental Motor Scales
- In-Hand Manipulation Test
- Erhardt Developmental Prehension Assessment
- Pediatric Assessment of Hand Skills
- Quality of Upper Extremity Skills Test
- Assisting Hand Assessment
- Melbourne Assessment of Upper Limb Function

..... more than 100 tests ³

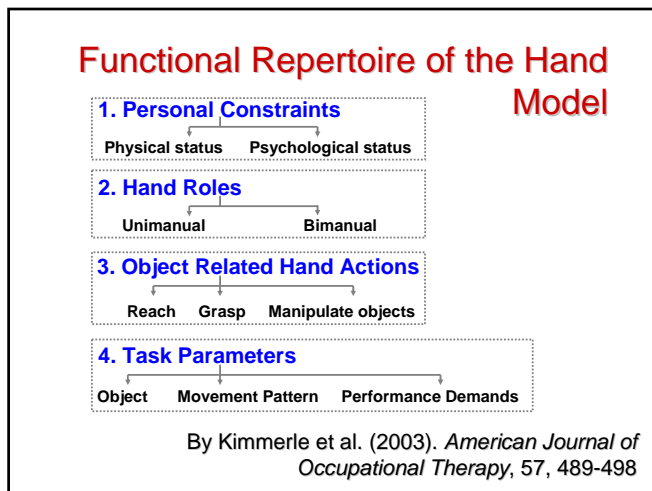
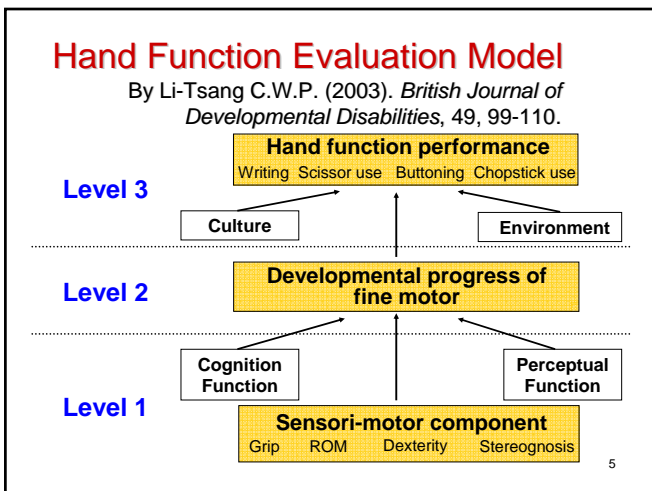
Hand Skills Difficulties OT Assessment → Intervention

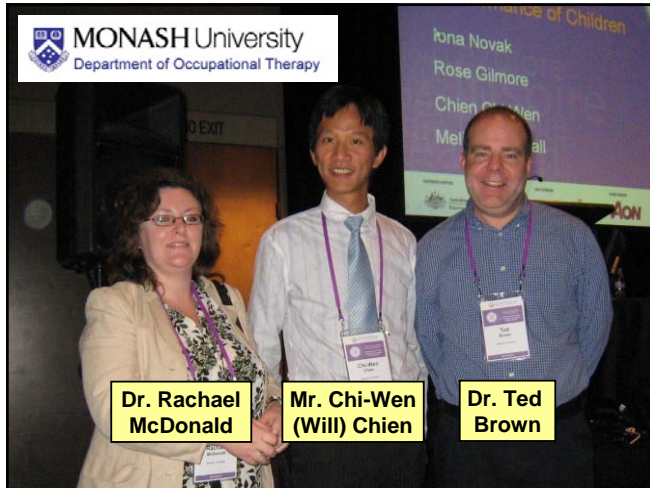
3: Following a hand skills model or framework

Advantages

- Guide organising factors affecting hand skills
- Describe & analyse the complexity of hand skills
- Provide for selecting proper assessment & intervention
- Serve a common language for communication

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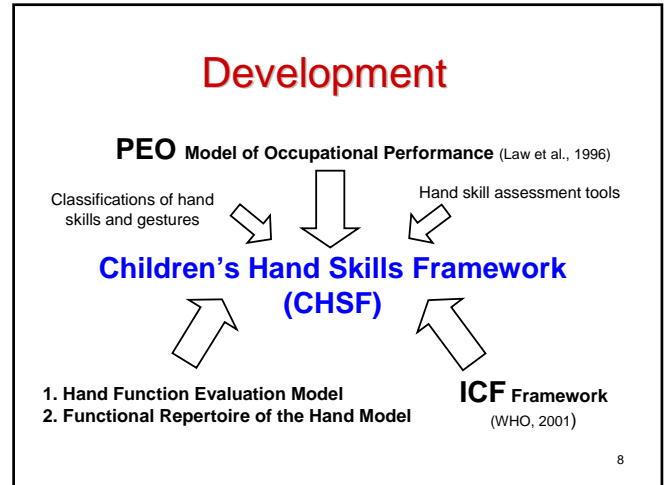




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Validation & Revision

- Questionnaire (using 5-point rating scale)
 - 10 international experts
 - 4 from Australia
 - 2 from Taiwan
 - 1 each from US, UK, Canada, Hong Kong
 - Overall structure (mean=4)
 - Sub-categories (mean=3.9~4.6)
 - 82 written comments
 - Revision and refinement of definitions
 - Reduction of several sub-categories
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Structure of the CHSF

Hand skills use that does NOT contact specific OBJECTS

Category 1. Manual gesture as a means of communication

Category 2. Body contact hand skills to touch, scratch, rub, poke, support or meet functional needs

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Structure of the CHSF

Hand skills use that CONTACT specific OBJECTS

Object-related hand skills involving

Category 3. Adaptive skilled hand use

- 1: Grasping
 - Grasp without thumb opposition
 - Grasp with thumb opposition
- 2: Holding/sustained grasp
- 3: In-hand manipulating
 - Finger-to-palm or palm-to-finger translation
 - Simple or complex rotation
 - Simple or complex shift
- 4: Releasing
- 5: **Isolated finger movements** (e.g., keyboarding)

Structure of the CHSF

Hand skills use that CONTACT specific OBJECTS

Object-related hand skills involving

Category 4. Arm-hand use

- 1: Reaching
 - 2: **Turning** (e.g., turning a doorknob)
 - 3: Carrying (e.g., lifting/putting down a glass)
 - 4: Throwing
 - 5: Catching
 - 6: Moving (e.g., pulling/pushing a door open)
 - 7: **Stabilising**
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Structure of the CHSF

Hand skills use that CONTACT specific OBJECTS

Object-related hand skills involving

Category 5. Bimanual use

- 1: Transferring
- 2: Using both hands together simultaneously (e.g., lifting a heavy pots with 2 hands)
- 3: Using both hands cooperatively (e.g., completing a handwriting task while stabilising the paper or zipping up a jacket)

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Structure of the CHSF

Category 6. General quality of hand skills

- 1: Accuracy
using arm/hand movement without deviation of target and movement direction
- 2: Pace
using appropriate rate, tempo and sequence of arm/hand movement
- 3: Movement quality
arm/hand movements with sufficient force exerted; movement should be smooth

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Applications of the CHSF

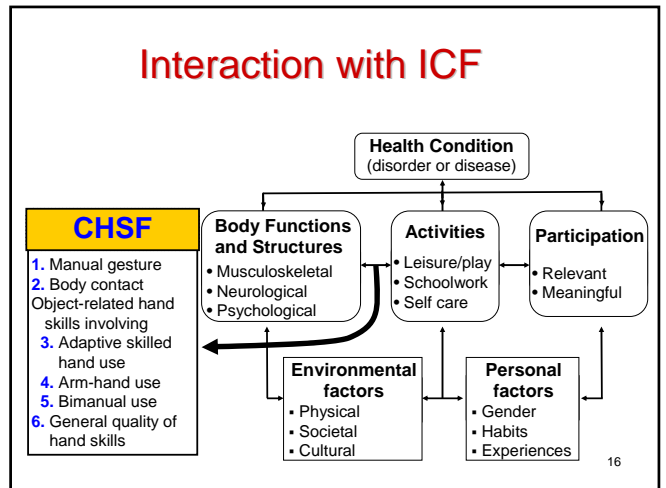
- **Establish a complete profile of functional hand skills**

1. Manual gesture
2. Body contact hand skills

Object-related hand skills involving

3. Adaptive skilled hand use:
 - 1) Grasping, 2) Holding/Sustained grasp, 3) In-hand manipulating, 4) Releasing, 5) Isolated finger movements
4. Arm-hand use:
 - 1) Reaching, 2) Turning, 3) Carrying, 4) Moving, 5) Throwing, 6) Catching, 7) Stabilising
5. Bilateral arm-hand use: 1) Transferring, 2) Using both hands together simultaneously, 3) Using both hands cooperatively
6. Quality: 1) Accuracy, 2) Pace, 3) Movement quality

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1. Manual gesture	Arm-hand use	Bimanual use
2. Body contact hand skills	8. Reaching	15. Transferring
Adaptive skilled hand use	9. Turning	16. Using both hands simultaneously
3. Grasping	10. Carrying	17. Using both hands cooperatively
4. Holding	11. Moving	Quality of hand skills
5. In-hand manipulation	12. Catching	18. Accuracy
6. Releasing	13. Throwing	19. Pace
7. Isolated finger movement	14. Stabilising	20. Movement quality

Assessment of Children's Hand Skills (ACHS)

Leisure and Play (8 activities)	School-related Work (8 activities)	Activities of Daily Living (6 activities)
1: Construction (blocks)	1: Reading book	1: Drinking
2: Puzzle	2: Drawing and/or colouring	2: Eating
3: Stringing beads	3: Writing & copying	3: Putting on/ taking off socks and shoes
4: Catching, throwing, & hitting/balting	4: Cutting	4: Dressing upper body
5: Card game	5: Pasting	5: Washing hands
6: Playdough/clay	6: Using computer	6: Brushing teeth
7: Folding paper	7: School tool use (ruler)	
8: Handling money	8: Putting on backpack	

Research plans for ACHS

- Inter-rater & test-retest reliability (*Completed*)
 - 54 Australian children
- Construct & concurrent validity (*Ongoing*)
 - 150 Australian children
 - 150 Taiwanese children
- Cultural comparison (*Planning*)

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Any comments or questions?
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