

# Instructions

## Timed Test of In-Hand Manipulation (Timed-TIHM)

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### NEEDED FOR ASSESSMENT

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- Instructions
- Scoreform
- Pegboard of Nine-Hole-Peg test
- Stopwatch
- Chair and table adjustable to the child's body dimensions

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### SITTING POSTURE

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During the administration of the Timed-TIHM, the child sits on a chair at a table with an adequate sitting posture (hips, knees and ankles are at a 90° angle and the height of the table is 2-4 cm higher than the bottom of the 90° curved elbow).

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### MANIPULATION IN ONE HAND

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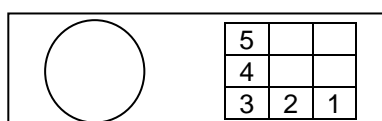
1. **Finger-to-palm translation**
2. **Palm-to-finger translation**

Aim: Observing dissociated thumb-and-finger movements in complex manipulation tasks; finger-to-palm translation and palm-to-finger translation.

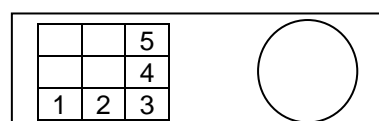
Place the pegboard of the 9-hole peg test in the center of the table in front of the child, 10 cm from the edge of the table, with the holes in the pegboard on the side of the child's preferred hand. Then place two pins in the pegboard in the row closest to the child and on the side of the child's preferred hand. Demonstrate the skill while giving the instruction:

- **“Pick up the pins one by one and hide them in your hand.”** (finger-to-palm translation).  
When both pins are hidden in your hand, say:
- **“Now let the pins come out of your hand again and put them back one by one in the holes of the pegboard.”** (palm-to-finger translation).  
Ask the child to do the same:
- **“Now you take the pins one by one and hide them in your hand. The other hand is not allowed to help with this, it holds the board.”**  
When the two pins are hidden in your hand, say:
- **“Let the pegs come out one by one and put them back in the pegboard, it's up to you where you put them.”**

If the child succeeds with this task with two pins, repeat this procedure with consecutively three, four and five pins while placing them in this order in the pegboard:



For right-handed children



For left-handed children

- **“Let’s try this with three pins.”**
- **“Now with four pins.”**
- **“And now with five pins.”**  
If the child uses the other hand to help, encourage the child to continue performing the task with one hand.  
When the child is finished practicing with five pins, continue the task with five pins for scoring the time twice. Use the stopwatch and say to the child:
- **“Now we do it two more times as quickly as possible while I record the time. When I say: ‘Go’, you can start!”**  
Start the stopwatch when the child picks up the first pin and stop the stopwatch when the child has picked up the last pin with his or her fingertips.  
Then ask the child to hide all the pins in his hand and stop for a moment:
- **“Stop for a moment and hide all the pins well in your hand, then I will write down the time... Can you now put all the pins one by one back in the pegboard as quickly as possible? I will record the time again. When I say: ‘Go’ you can start!”**  
You start the stopwatch when the child starts the translation and stop when the last peg has been placed in the pegboard. When a pin falls out of the hand on the table, let the child pick it up again to continue the task. When the pin falls to the ground, ask the child to do the task from the beginning.  
The finger-to-palm translation and the palm-to-finger translation tasks are scored separately. The number of dropped pins, the use of the other hand or external surface and the time scores are noted at the score form.

### 3. **Complex rotation**

Aim: Observing dissociated thumb-and-finger movements in complex manipulation tasks; complex rotation

Place the pegboard of the 9-hole peg test in the center of the table in front of the child, 10 cm from the edge of the table, with the holes in the pegboard on the side of the child's preferred hand. For this item, place 1 peg in the pegboard in the row closest to the child and on the side of the child's preferred hand. Demonstrate the skill while giving the instruction:

- **“Pick up a pin and spin it between my thumb and fingers.”**  
Ask the child to do the same:
- **“Can you also pick up a pin and spin it all the way around five times?”**  
The peg is picked up from the pegboard and rotated 360 degrees from the lengthwise direction 5 times, counting out loud with each complete turn. After practising it one time, this task is also scored twice. Use the stopwatch and say to the child:
- **“Now we do it two more times; you pick up the pin and turn it five times as quickly as possible. I record the time with the stopwatch. When I say ‘go’, you can start.”**  
You start the stopwatch when the child picks up the pin and you stop when the pin has rotated 360 degrees 5 times.

Of the two attempts for all three subtests, the fastest time is used for comparison with the reference data.

- De Vries L, Van Hartingsveldt M, Cup E, Nijhuis-van der Sanden M, Groot I. Evaluating fine motor coordination in children who are not ready for handwriting: which test should we take? *Occupational therapy international*. 2015;22(2):61-70.
- Haberfehlner, H., L. de Vries, E.H.C. Cup, I.J.M. de Groot, and M.W.G. Nijhuis-van der Sanden, and M.J. van Hartingsveldt. 2023. "Ready for handwriting? A reference data study on handwriting readiness assessments." *Plos ONE* 18(3): e0282497.

# Scoreform

## Timed Test of In-Hand Manipulation (Timed-TIHM)

Name: \_\_\_\_\_

	Year	Month	Day
Date	_____	_____	_____
Birth date	_____	_____	_____
Chronological age	_____	_____	_____
Left/ right handed	_____	_____	_____

1. Finger-to-palm translation with 5 pins			
	First trial	Second trial	
Number of dropped pins	..... times	..... times	
Other hand/ external surface	..... times	..... times	
	<b>Time score 1</b>	<input type="text"/>	<b>Time score 2</b> <input type="text"/>

2. Palm-to-finger translation with 5 pins			
	First trial	Second trial	
Number of dropped pins	..... times	..... times	
Other hand/ external surface	..... times	..... times	
	<b>Time score 1</b>	<input type="text"/>	<b>Time score 2</b> <input type="text"/>

3. Complex rotation			
	First trial	Second trial	
Number of dropped pins	..... times	..... times	
Other hand/ external surface	..... times	..... times	
	<b>Time score 1</b>	<input type="text"/>	<b>Time score 2</b> <input type="text"/>

Fastest time score (sec.)	
Finger-to-palm translation	=
Palm-to-finger translation	=
Complex rotation	=
<b>Total</b>	=
<b>Percentile score</b>	=

<b>Remarks:</b>