



## **T-GAP**

# **Administration and Scoring Manual for the Thumb Grasp and Pinch Assessment**

**Wendy A. Tomhave, OTR/L<sup>a</sup>**  
**Kathleen M. Kollitz, MD<sup>c</sup>**  
**Ann E. Van Heest, MD<sup>b,a</sup>**  
**Steven L. Moran, MD<sup>c,a</sup>**

**Shriners Children's Twin Cities<sup>a</sup>**  
215 Radio Drive  
Woodbury, Minnesota, 55125  
612-596-6100

**University of Minnesota<sup>b</sup>**  
2450 Riverside Avenue South  
Minneapolis, Minnesota 55454  
612-884-0600

**Mayo Clinic<sup>c</sup>**  
200 First Street SW  
Rochester, MN 55905  
507-284-2736

### **Correspondence:**

Wendy Tomhave, OTR/L  
[wendytomhave@gmail.com](mailto:wendytomhave@gmail.com)

Steven Moran, MD  
[Moran.steven@mayo.edu](mailto:Moran.steven@mayo.edu)



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## **T-GAP Test Description**

The thumb grasp and pinch assessment (T-GAP) is a participation measure developed to rate the hands ability to formulate grasp and pinch during nine object manipulation routines. The T-GAP provides a new perspective that grades hand dexterity based on the skill level of grasp and stabilization rather than measuring timed speed, which is the focus of timed dexterity assessments. The T-GAP was standardized in 2018 for construct and concurrent validity as well as inter and intra rater reliability in children following index pollicization surgery. In 2023, additional validation studies were completed at University's in Norway and Finland in children who underwent thumb reconstruction.

The T-GAP was developed to understand how the hand formulates grasp in children with congenital thumb hypoplasia who have absent or weak thumb musculature. The T-GAP includes nine tasks based on developmental stages of hand function for three different age groups: 18 months to 4 years, 5 to 7 years and 8 to 18 years. The tasks were selected using activity analysis for nine specific object manipulation routines to elicit large grasp, medium grasp, small grasp, lateral pinch, tip pinch, tripod pinch, manipulation, resistance, school activities and ADLs. The tasks may be video recorded during a 5-10-minute semi structured play session and scored during a subsequent viewing. Experienced raters can easily score the T-GAP during the assessment.

Each of the nine tasks are scored using an eight-point hierarchical scale ranging from the most primitive grasp styles which do not include the thumb (0-3 points) to more sophisticated patterns that engage the thumb in distal patterns of radial digital opposition (4-7 points). Scoring involves the use of the two page grasp pattern hierarchy which shows photo examples and written descriptions of each grasp style and variations. The T-GAP total score is calculated as the sum of 9 task scores and has a theoretical range of 0-63 with a higher score indicating a greater skill level when formulating grasp and pinch. In addition, the T-GAP includes a thumb use score which can be converted to a percentage and records the number of grasp styles the hand formulates.

## **Background**

Children with mild radial longitudinal deficiency may have functional deficits in the thumb's ability to reach across the palm or oppose the fingers. The most severe form is absence of the radius and thumb, which requires grasp and pinch adaptations by scissoring or flexing the fingers to hold and stabilize objects. Often the goal of hand therapy and hand surgery in children with radial sided hand involvement is to provide a child with a strong, opposable thumb that can be used in multiple grasp and pinch activities. Evaluating the effectiveness of therapy and surgery for thumb absence or weakness are not fully understood, as previously there were no validated outcome measures to grade dexterity based on the skillfulness of hand grasp and thumb use.

## **Purpose and Development**

In 2005, a surgeon-therapist team at Mayo Clinic, Rochester, Shriners Children's - Twin Cities and the University of Minnesota, developed an assessment protocol to evaluate hand function in children with congenital radial longitudinal deficiency with thumb hypoplasia. The most commonly reported assessments to study outcomes in this population include hand strength, range of motion and dexterity. The dexterity assessments we included in our protocol include the Box and Blocks Test, the Nine Hole Peg Test, and the Functional Dexterity Test. These assessments measure the amount of time it takes the hand to quickly and repetitively manipulate blocks or pegs. Use of several dexterity assessments can challenge the hand in different ways but they do not determine whether or how the thumb is used. To address this need, we developed the T-GAP as part of our thumb assessment protocol, which has become our standard of care to measure functional hand dexterity.

The T-GAP was developed and modeled after the Unilateral Below Elbow Test (UBET) by one of the lead developers. The T-GAP includes half of the original UBET tasks selected by an expert panel of 10 pediatric occupational therapists in 2000 for the evaluation of congenital upper limb transverse deficiency. The T-GAP's scoring hierarchy was developed to rate the hands ability to formulate grasp and pinch in children with congenital thumb hypoplasia. The hierarchy is based on developmental principles of hand skills and includes grasp style nomenclature that excludes the thumb which was previously under defined in the literature.

## **Hand Development**

The T-GAP scoring hierarchy is designed to reflect the developmental progression of hand grasp which includes compensatory patterns seen in children with an absent or poorly functioning thumb who as infants use palmar grips without use of the thumb. As motor control develops, objects are held at the fingers beginning with ulnar sided scissoring and later, radial scissoring. Normal hand skills develop similarly from the palm out to the fingers and from the ulnar side of the hand to the radial side. Thumb opposition begins with a full hand grasp followed by increased radial isolation with lateral pinch to the side of the index. This is followed by thumb to index tip pinch and for objects requiring manipulation and precision, radial digital opposition. T-GAP scoring reflects this hand development hierarchy with patterns which do not include the thumb receiving fewer points (0-3). Grasp and pinch patterns that engage the thumb distally and radially score the most points (4-7).

## T-GAP Nomenclature and Grasp Pattern Hierarchy

Grasp/Pinch Type	Point Value
<b>No Use of Thumb</b>	
<b>No Grasp or Pinch:</b> passive stabilization with hand	<b>0</b>
<b>Palmar Grasp:</b> fingers to palm	<b>1</b>
<b>Ulnar Scissor Grasp:</b> between small/ring fingers	<b>2</b>
<b>Radial Scissor Grasp:</b> between index/long or long/ring fingers	<b>3</b>
<b>Use of Thumb</b>	
<b>Cylindrical Grasp:</b> opposed thumb to all fingers	<b>4</b>
<b>Lateral Key Pinch:</b> thumb to side of index	<b>5</b>
<b>Tip Pinch:</b> thumb to index finger tip	<b>6</b>
<b>Tripod Pinch:</b> thumb to distal index/long	<b>7</b>

### Nomenclature and Scoring Descriptions:

- **No Grasp:** Passive stabilization of any part of the hand (**0 points**)
- **Palmar Grasp:** All fingers flexed to palm, no thumb use (**1 point**)
- **Ulnar Scissor Grasp:** Finger stabilization between the small/ring fingers. Also, when 4 web spaces are present (5 fingered hand), stabilization between the ring/long fingers (**2 points**)
- **Radial Scissor Grasp:** Finger stabilization between the index/long or long/ring fingers (**3 points**)
- **Cylindrical Grasp:** Large grasp of all fingers to opposed thumb (**4 points**)
- **Lateral Key Pinch:** Thumb is opposed to the lateral aspect of the index finger; or the index finger opposed to the side of the thumb (i.e. Index Pollicization) (**5points**)
- **Tip pinch:** Thumb is opposed to the tip of the index finger in a static, non-manipulative grasp (**6 points**)
- **Tripod pinch:** Thumb is opposed to the index and long fingers in a manipulative dynamic grasp (**7 points**)

Photo examples of each grasp style and variation patterns can be found in the grasp pattern hierarchy. It is recommended that the two page hierarchy document be printed in color, placed back to back in a plastic sleeve and used a reference during scoring. Grasp patterns on the front page exclude the thumb and receive the fewest points (0-3) while patterns that include the thumb receive the most (4-7) and are shown on the back. The most commonly observed patterns include two picture examples on the left side of the page. Variation patterns are shown on the right side and occur less often where objects may be held more distal or proximal. Variation patterns with similar level of hand skill, which do not alter the score, include: distal flexion of the fingers, scissors multiple fingers, scissors fingers distally and lateral encircling. Three variation patterns, which require a higher or lower level of hand skill are given a point score adjustment and include: distal cylindrical, tip to non-index and proximal radial grasp.

## **T-GAP Activities and Administration**

The size and shape of an object are important factors in promoting various grasp and pinch strategies. The T-GAP activities are designed to elicit a variety of specific grasp and pinch styles including; large grasp, medium grasp, small grasp, lateral pinch, tip pinch, manipulation, resistance, school activities and ADLs. Objects and tasks were carefully selected which maintain a child's interest in the younger groups, are safe, and are developmentally appropriate. This is reflected in the 3 sets of administration and test kit item forms for toddlers, primary school and older children. Each of these groups has separate administration guides which should also be printed in color and placed together back to back in a plastic sleeve. These are used as a guide when administering the assessment and the included photos by age group are used when identifying the supplies prior to testing. Note: some test items are shared. The full list of all T-GAP tasks by age, quality and portion of task scored are found on page 11 of this manual.

Each task in the administration pages is described in simple terms and includes the portion of the task you are scoring. For tasks you feel may be less familiar to the child, provide a demonstration such as turning the key in the padlock, making a paper tube or forming a bowl from Play-Doh. If a child does not have the skill set to complete the task following the demonstration, such as a young child tying shoelaces, observe their attempt and move on. Note: You are not scoring whether they can tie the shoe successfully rather how they grasp the shoelaces. Administration time should take approximately 5-10 minutes. When introducing the T-GAP to the child, explain that the assessment includes nine different activities and to please use their hands how they naturally would. Do not coach or encourage them to use their hands or thumbs in a particular pattern of use. You want to rate their preferred method of use when grasping and stabilizing objects. We recommend testing both hands for comparison even if only one hand is involved.

## **T-GAP Scoring**

The specific component of each activity to be rated is identified in the administration pages and score forms. Defining a specific aspect of each task lessens the variety of grasp styles employed throughout the task and improves scoring consistency among raters. For example, in the ADL task placing a sock on foot over toes, the grasp style rated is defined by the method used when holding the sock open to place over the toes. In the case of two grasp styles used equally during the specific aspect of the task, the higher score is awarded.

The T-GAP includes three different scores to aide in understanding a child's hand dexterity. The first is the T-GAP score which is calculated by adding all nine scores together. This score has a theoretical range of 0 - 63 points with a higher score indicating more skill level of grasp and pinch function. A dexterous hand would have a T-GAP score of 50-55 and incorporate the thumb for all tasks during multiple grasp patterns. A

theoretical maximum score of 63 is unattainable as the object manipulation routines are not designed to promote a tripod pinch for all nine tasks rather a variety of grasp styles.

The second score recorded is the number of different grasp styles used. This is obtained by totaling the number of each different grasp styles which have different point values from 0 through 7. A normal hand would most commonly include 4 different grasp styles that include use of the thumb. A less dexterous hand may not incorporate the thumb as often and use fewer different grasp styles.

The third and final score tabulated when reporting the T-GAP results is the thumb use score. This score is the total number of tasks involving the thumb which have been awarded 4, 5, 6 or 7 points. The thumb use score can also be converted and reported as a percentage of thumb use using the chart below. The normal dexterous hand would involve the thumb in nine of nine activities with a 100% thumb use score. Scores that do not include use of the thumb would receive fewer thumb use points and percentages indicating more immature, less efficient grasp and pinch functions.

### **Thumb Use Score Percentage Conversion**

<b>Thumb was used</b>	<b>Percentage</b>
1 task of 9	11%
2 tasks of 9	22%
3 tasks of 9	33%
4 tasks of 9	44%
5 tasks of 9	56%
6 tasks of 9	67%
7 tasks of 9	78%
8 tasks of 9	89%
9 tasks of 9	100%

## **Validation**

Validation of the T-GAP was originated by a team of Hand Surgeons and Occupational Therapists following IRB approval for a retrospective study of children who underwent index finger pollicization that completed a thumb function assessment from 2005 to 2014. Validity testing for construct and concurrent validity of the T-GAP was completed and published in the Journal of Hand Surgery in 2018. This study found significant correlations between the children's T-GAP score and standardized dexterity measures including the Nine Hole Peg Test, the Box and Blocks Test and the Functional Dexterity Test, supporting concurrent validity. In addition, significant correlation was found between strength and range of motion of the thumb and the T-GAP score with P values for each < .05 supporting construct validity. To complete standardization of the T-GAP, a second study was conducted for inter rater and intra rater reliability and published in the Journal of Hand Surgery in 2018. A team of four Occupational Therapists scored 11 videotaped T-GAP assessments twice separated by at least two weeks. Interclass correlation coefficients (ICCs) for the inter-rater reliability trials were 0.887 and 0.901, which suggest raters can classify and score children's hand function consistently. Intra-rater ICCs in all cases were above 0.88 which is considered excellent. These results strongly suggest that results from T-GAP assessments are reliable.

## **T-GAP Training**

Training in use of the T-GAP is a self-study format and involves a variety of learning materials. This includes reviewing this manual, the combined Part 1 and 2 administration and grasp style photo training module and Part 3 video training examples. Reviewing these materials can be accomplished in 60-90 minutes. The grasp pattern hierarchy forms should be used in conjunction when scoring the photo and video training examples to understand the grasp style options and differences. Some video examples will require repeat reviews and use of slow motion to determine the primary grasp style score.

## **Video Recording**

When video recording the T-GAP, we recommend use of a tablet, hand held camera or smart phone. Hand held devices allow the ability to easily change the camera angle for the best views of the hands and thumbs when filming between the left and right hands. Recording from over the child's head or opposite shoulder is an effective method to obtain the child's point of view of their hands when manipulating objects. This position provides fewer distractions and less uneasiness from the child from being filmed. If you have a second person filming, make sure they understand the importance of close up views that captures the activity of the fingers and thumb. If you do not have assistance, a tripod raised to its tallest setting can be positioned over the child's head or shoulder.

Record each of the tasks in the same order as the administration and test kit pages to make subsequent scoring easier and to ensure each of the nine activities are included. Pay attention to the part of the task scored (italicized on the score form) to ensure the involved hand is used. When testing both hands, the portion of the task being scored will need to be shown with the dominant then contralateral hand (i.e. threading a bead on the zip tie). Once you clearly see the action performed (how the bead is held) at least twice, move to the next item. Don't allow too much time for the child to explore the test kit items beyond what's requested. Most young children do fine with this structure and welcome the next activity.

Testing materials should be readily available and out of view from distracting the child's attention. The length of the recording should be 5 - 10 minutes. When using the T-GAP for research purposes, begin the recording by having the child hold up a piece of paper that includes name, date, age, pre-op, or length of time post-op. These details are useful to aide in future treatment planning particularly when videos are stored in the child's medical record. Experienced raters can score the T-GAP directly without the video recording.

The child should be seated in a chair with their hips and knees flexed to 90 degrees and feet supported on the floor. Children in the youngest age grouping do well seated in a trip trap chair which is made for smaller children and improves their ability to use their arms and hands when seated at a table. An adjustable table or working surface should be positioned slightly above the elbow when the arm is at their side to allow the best view of their arms and hands. If a child is wearing a long sleeved shirt, roll their sleeves up past their elbows.

Scoring the video soon afterwards is recommended to make sure the recording includes good views of the hands and that all nine tasks were included. Past studies have shown the thumb can be difficult to capture because of its size and sometimes downward position. Recording, viewing and scoring the T-GAP will help you develop expertise in how the hand formulates grasp and pinch. Understanding functional hand dexterity and compensations can aide in decision making when recommending treatment including use of orthotics, taping, therapeutic home exercise programs and surgery.

## Assembling the T-GAP Test Kit

Standardized and appropriately sized equipment to promote a variety of grasp styles is necessary for valid evaluation. This test was developed to incorporate common tasks and can be purchased with the specifications listed in the pictured administration pages. Some countries have had difficulties finding specific name brand test kit items in which the size and quality of the items should be matched as close as possible to the size and shape of those pictured and described.

We recommend storing the test kits in three medium sized bags and placing the kits in a backpack labeled T-GAP. Pages 9-11 have descriptions and sizing of the test kit items as well as amazon visual examples. The padlock, shoe, peanut butter jar and sling shot are shared test kit items between the three different age groups. The three lists below can be printed, laminated and attached with a zip tie to each of the three test kits to keep the items accessible and organized.

Ages 18 Months - 4 Years	Ages 5-7 Years	Ages 8-18 Years
<p>Film container and Cheerios Zippered pencil pouch Two large diameter markers Five blocks (like Duplos) stacked together 4-oz. bottle of bubbles Play Doh or similar moldable clay Drawstring fabric bag Box of eight crayons, standard size One child size sock</p>	<p>Piggy bank and pennies Padlock and key Two small diameter colored markers Medium sized kaleidoscope Peanut butter jar Play Doh Sling shot Drawing pad and a crayon Child sized lace up shoe</p>	<p>Plastic beads and a zip tie Padlock and key Ball point pen Drawing pad and a rubber band Peanut butter jar Pencil sharpener and unsharpened pencil Sling shot Drawing paper and a sharpened pencil Child size lace up shoe</p>

### T-GAP Amazon Supply List and Specification Examples

*Below are test kit items that meet the measurement and style parameters as shown in the test kit administration pages. These can be used as examples when selecting your test kit supplies.*

#### Backpack (to hold all test kit items) and Iron on Lettering to Label it T-GAP:

[https://www.amazon.com/dp/B07XCB51BP/ref=twister\\_B07THKLTCL](https://www.amazon.com/dp/B07XCB51BP/ref=twister_B07THKLTCL)

[https://www.amazon.com/gp/product/B076CPQSGM/ref=ox\\_sc\\_act\\_title\\_13?smid=A1WLYBY5QB5LR7&psc=1](https://www.amazon.com/gp/product/B076CPQSGM/ref=ox_sc_act_title_13?smid=A1WLYBY5QB5LR7&psc=1)

#### Three (3) Drawstring Bags (to separate each test kit by age group):

[https://www.amazon.com/gp/product/B0BCW6PSF5/ref=ox\\_sc\\_act\\_title\\_2?smid=A2MML96N7JP81G&psc=1](https://www.amazon.com/gp/product/B0BCW6PSF5/ref=ox_sc_act_title_2?smid=A2MML96N7JP81G&psc=1)

## **Ages 18 months - 4 years**

Three Cheerios and a standard sized film container:

[https://www.amazon.com/gp/product/B07YYYYF7C6/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o01\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B07YYYYF7C6/ref=ppx_yo_dt_b_asin_title_o01_s00?ie=UTF8&psc=1)

[https://www.amazon.com/gp/product/B0C1PF7TLW/ref=ox\\_sc\\_act\\_title\\_1?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B0C1PF7TLW/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER&psc=1)

Pencil pouch (8 ½" x 4") with solid metal tab zipper (1' x 3/8"):

[https://www.amazon.com/gp/product/B082H6DVR8/ref=ox\\_sc\\_act\\_title\\_1?smid=AOYYCF558IMLT&psc=1](https://www.amazon.com/gp/product/B082H6DVR8/ref=ox_sc_act_title_1?smid=AOYYCF558IMLT&psc=1)

Two large diameter markers (1/2" wide):

[https://www.amazon.com/gp/product/B00004UBH1/ref=ox\\_sc\\_act\\_title\\_1?smid=A2LQFYAPGHDQIN&psc=1](https://www.amazon.com/gp/product/B00004UBH1/ref=ox_sc_act_title_1?smid=A2LQFYAPGHDQIN&psc=1)

Five blocks (like Duplos) stacked together as shown in the test kit supply picture:

[https://www.amazon.com/gp/product/B07QD1FBZC/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B07QD1FBZC/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

4-oz. bottle of bubbles (4 ¼" tall x 1 3/4" wide):

[https://www.amazon.com/gp/product/B071KD7WKP/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B071KD7WKP/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

Play Doh or similar moldable clay:

[https://www.amazon.com/gp/product/B07BC1NR52/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B07BC1NR52/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

Drawstring fabric bag (approximately 8" x 10") with 3/8" inch wide string:

[https://www.amazon.com/gp/product/B09Y1CRBKP/ref=ox\\_sc\\_act\\_title\\_1?smid=ARIG5D5IH6ELB&psc=1](https://www.amazon.com/gp/product/B09Y1CRBKP/ref=ox_sc_act_title_1?smid=ARIG5D5IH6ELB&psc=1)

Box of eight crayons, standard size:

[https://www.amazon.com/gp/product/B00UXU3JIM/ref=ox\\_sc\\_act\\_title\\_1?smid=AY2ANYVC1YIBT&psc=1](https://www.amazon.com/gp/product/B00UXU3JIM/ref=ox_sc_act_title_1?smid=AY2ANYVC1YIBT&psc=1)

One child size sock:

[https://www.amazon.com/gp/product/B00S4GMSOI/ref=ox\\_sc\\_act\\_title\\_1?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B00S4GMSOI/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER&psc=1)

## **Ages 5-7 years**

Three pennies and a sturdy medium size plastic piggy bank (6" x 10"):

[https://www.amazon.com/gp/product/B0B4P4WPY9/ref=ppx\\_od\\_dt\\_b\\_asin\\_title\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B0B4P4WPY9/ref=ppx_od_dt_b_asin_title_s00?ie=UTF8&psc=1)

Padlock and a sturdy vinyl coated key (padlock 2 1/2" tall x 1 3/4" without the key):

[https://www.amazon.com/gp/product/B00004Y8C7/ref=ppx\\_od\\_dt\\_b\\_asin\\_title\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B00004Y8C7/ref=ppx_od_dt_b_asin_title_s01?ie=UTF8&psc=1)

Two small diameter colored markers (3/8-inch wide):

[https://www.amazon.com/gp/product/B000K9DKIA/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B000K9DKIA/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

Medium sized kaleidoscope (9" long x 2 ½" wide):

[https://www.amazon.com/gp/product/B000ELSZW0/ref=ox\\_sc\\_act\\_title\\_1?smid=A3BZNO80UDMT5Y&psc=1](https://www.amazon.com/gp/product/B000ELSZW0/ref=ox_sc_act_title_1?smid=A3BZNO80UDMT5Y&psc=1)

1-1.5 pound peanut butter jar (5" tall by 3" wide); keep the aluminum top seal in place:

[https://www.amazon.com/gp/product/B00MHVEBY6/ref=ox\\_sc\\_act\\_title\\_1?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B00MHVEBY6/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER&psc=1)

Play Doh or similar moldable clay: *(Duplicate item to ages 18 months – 4)*

[https://www.amazon.com/gp/product/B07BC1NR52/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B07BC1NR52/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

Sling shot with foam pull (pull size is 2" long and 1 1/4" wide): see photo for bulb pull style:  
[https://www.amazon.com/dp/B07WKP9QFC?psc=1&ref=cm\\_sw\\_r\\_cp\\_ud\\_ct\\_X0CZK96XA5HG7CNX6YVV](https://www.amazon.com/dp/B07WKP9QFC?psc=1&ref=cm_sw_r_cp_ud_ct_X0CZK96XA5HG7CNX6YVV)

6" x 9" sturdy heavy weight white sketch paper and a crayon:  
[https://www.amazon.com/gp/product/B07T4RNLTN/ref=ox\\_sc\\_act\\_title\\_5?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B07T4RNLTN/ref=ox_sc_act_title_5?smid=ATVPDKIKX0DER&psc=1)

Child sized lace up shoe with long flat laces:  
[https://www.amazon.com/gp/product/B08KXXFCMR/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B08KXXFCMR/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

## **Ages 8-18 years**

Five small plastic beads and a 5-inch zip tie:  
[https://www.amazon.com/gp/product/B09C1YL7RQ/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o01\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B09C1YL7RQ/ref=ppx_yo_dt_b_asin_title_o01_s00?ie=UTF8&psc=1)  
[https://www.amazon.com/gp/product/B08TVLYB3Q/ref=ox\\_sc\\_act\\_title\\_1?smid=A3QR7MJ9FCPSP7&psc=1](https://www.amazon.com/gp/product/B08TVLYB3Q/ref=ox_sc_act_title_1?smid=A3QR7MJ9FCPSP7&psc=1)

Padlock and a sturdy vinyl coated key (padlock 2 3/8" tall x 1 3/4" without the key):  
[https://www.amazon.com/gp/product/B00004Y8C7/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B00004Y8C7/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

Ball point pen with a pull-off cap:  
[https://www.amazon.com/gp/product/B0012YVR1O/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B0012YVR1O/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

6" x 9" sturdy heavy weight white sketch paper and a rubber band; *(duplicate item to ages 5-7)*  
[https://www.amazon.com/gp/product/B07T4RNLTN/ref=ox\\_sc\\_act\\_title\\_5?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B07T4RNLTN/ref=ox_sc_act_title_5?smid=ATVPDKIKX0DER&psc=1)  
[https://www.amazon.com/gp/product/B003VQ9RVS/ref=ox\\_sc\\_act\\_title\\_1?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B003VQ9RVS/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER&psc=1)

1 – 1.5 pound peanut butter jar (5" tall by 3" wide); keep the aluminum top seal in place:  
*(Duplicate item ages 5-7)*  
[https://www.amazon.com/gp/product/B00MHVEBY6/ref=ox\\_sc\\_act\\_title\\_1?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B00MHVEBY6/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER&psc=1)

Handheld pencil sharpener and a no. 2 unsharpened pencil:  
[https://www.amazon.com/gp/product/B0B8VQZRHL/ref=ox\\_sc\\_act\\_title\\_1?smid=A6Q1QPB2660W9&psc=1](https://www.amazon.com/gp/product/B0B8VQZRHL/ref=ox_sc_act_title_1?smid=A6Q1QPB2660W9&psc=1)  
[https://www.amazon.com/gp/product/B006K0OEFQ/ref=ox\\_sc\\_act\\_title\\_1?smid=A2T5AW4PWVLAND&psc=1](https://www.amazon.com/gp/product/B006K0OEFQ/ref=ox_sc_act_title_1?smid=A2T5AW4PWVLAND&psc=1)

Sling shot with bulb style foam pull (pull size is 2" long and 1 1/4" wide): *(Duplicate item ages 5-7)*  
[https://www.amazon.com/dp/B07WKP9QFC?psc=1&ref=cm\\_sw\\_r\\_cp\\_ud\\_ct\\_X0CZK96XA5HG7CNX6YVV](https://www.amazon.com/dp/B07WKP9QFC?psc=1&ref=cm_sw_r_cp_ud_ct_X0CZK96XA5HG7CNX6YVV)

6" x 9" sturdy heavy weight white sketch paper and a no. 2 sharpened pencil: *(Duplicate item ages 5-7)*  
[https://www.amazon.com/gp/product/B07T4RNLTN/ref=ox\\_sc\\_act\\_title\\_5?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B07T4RNLTN/ref=ox_sc_act_title_5?smid=ATVPDKIKX0DER&psc=1)  
[https://www.amazon.com/gp/product/B005FPT78G/ref=ox\\_sc\\_act\\_title\\_1?smid=ATVPDKIKX0DER&psc=1](https://www.amazon.com/gp/product/B005FPT78G/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER&psc=1)

Child sized lace up shoe with long flat laces: *(Duplicate item ages 5-7)*  
[https://www.amazon.com/gp/product/B08KXXFCMR/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s01?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B08KXXFCMR/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1)

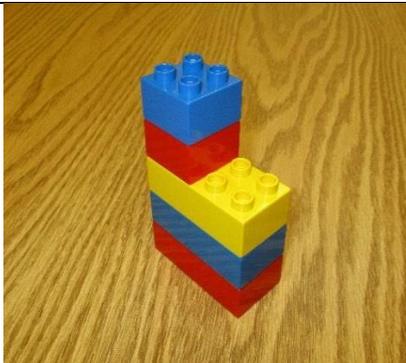
## Thumb Grasp and Pinch Assessment (T-GAP) by Age, Task, Quality and Portion of Task Scored

	T-GAP Activity Ages 18 months – 4 years	T-GAP Activity Ages 5 – 7 years	T-GAP Activity Ages 8 – 18 years
<b>Tip Pinch</b>	Pick up 3 Cheerios one at a time and release into a film container <i>Score how the Cheerio is held</i>	Pick up 3 pennies one at a time and release into a piggy bank <i>Score how the penny is held</i>	Thread 5 plastic beads onto a zip tie  <i>Score how the bead is held</i>
<b>Lateral Key Pinch</b>	Open a zippered pencil case and remove 2 markers <i>Score how the zipper tab is held</i>	Turn a vinyl coated key to open a Padlock <i>Score how the key is held</i>	Turn a vinyl coated key to open a Padlock <i>Score how the key is held</i>
<b>Small Grasp</b>	Pull cap off a large diameter marker <i>Score how the marker is held</i>	Pull cap off a small diameter marker <i>Score how the marker is held</i>	Remove cap from ballpoint pen <i>Score how the pen is held</i>
<b>Medium Grasp</b>	Separate 5 Duplo style blocks that are stacked together <i>Score how the duplos are stabilized</i>	Turn end of kaleidoscope 3 times <i>Score how the kaleidoscope is held</i>	Make a telescope with a 6" x 9" sheet of paper and place rubber band over <i>Score how the paper tube is held</i>
<b>Large Grasp</b>	Open a 4 oz. container of bubbles <i>Score how the container is stabilized</i>	Twist cap from a 1# peanut butter jar <i>Score how the jar is held</i>	Twist cap off from a 1# peanut butter jar <i>Score how the jar is held</i>
<b>Manipulation</b>	Form moldable clay into a bowl <i>Score how the moldable clay is held</i>	Form moldable clay into a bowl <i>Score how the moldable clay is held</i>	Rotate a pencil 3 times in a handheld pencil sharpener <i>Score how the pencil is held</i>
<b>Resistance</b>	Open a drawstring bag <i>Score how the bag is held when opened</i>	Pull back foam pull on slingshot <i>Score how the foam pull is held</i>	Pull back foam pull on slingshot <i>Score how the foam pull is held</i>
<b>School</b>	Open a box of 8 crayons and remove one <i>Score how the crayon is held</i>	Color inside a circle with a crayon <i>Score how the crayon is held</i>	Write name with a no. 2 pencil <i>Score how pencil is held</i>
<b>ADL</b>	Put sock on over toes <i>Score how the sock is held open</i>	Tie shoelaces into a knot <i>Score how the laces are held</i>	Tie shoelaces into a bow <i>Score how the laces are held</i>

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## T-GAP Administration and Test Kit Items    Ages 18 Months - 4 Years

	<p><b><u>Film container and cereal</u></b></p> <p>Place the container and three cheerios in front of the child. Ask the child to pick up each cheerio and put it in the container.</p> <p><b>Score:</b> How the cheerio is held</p>
	<p><b><u>Metal tab zippered pencil pouch and two markers</u></b></p> <p>Place two markers in the zippered pencil pouch. Ask the child to unzip the pouch and remove the markers.</p> <p><b>Score:</b> How the zippered tab is held</p>
	<p><b><u>Large diameter marker</u></b></p> <p>Ask the child to remove the cap from the marker then put the cap back on tightly and then remove the cap again.</p> <p><b>Score:</b> How the marker is held</p>
	<p><b><u>Five duplo style blocks stacked together</u></b></p> <p>Ask the child to pull the blocks apart and put them back together again.</p> <p><b>Score:</b> How the blocks are held</p>
	<p><b><u>4-oz. bottle of bubbles with twist-off lid</u></b></p> <p>Ask the child to remove the lid and put the lid back on.</p> <p><b>Score:</b> How the bottle is held</p>

**T-GAP Administration and Test Kit Items    Ages 18 Months - 4 Years**



**Full-size container of Moldable Clay**

Demonstrate how to form the clay into a bowl and help to start the shape. Ask the child to make a bowl using their hands to shape it.

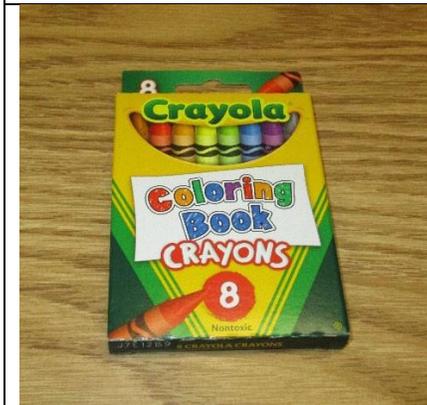
**Score:** How the clay is held



**Medium-size fabric drawstring bag with rope laces**

Put blocks inside the bag and pull the drawstring to close the bag. Demonstrate how to use your hands to fully open the drawstring bag. Close the bag and ask the child to open the bag to see what is inside.

**Score:** How the bag is held



**Box of 8 crayons**

Place the box of crayons in front of the child. Ask the child to open the box and pull out his / her favorite color crayon. If you do not observe the grasp pattern, ask the child to pull out his second favorite color crayon.

**Score:** How the crayon is held



**Child size sock**

Have the child sit in a chair or on the floor. Ask the child to remove one shoe and put the sock on.

**Score:** How the sock is held open



**Sturdy medium size piggy bank and 3 pennies**

Place the bank and three pennies in front of the child. Ask the child to pick up and put each penny into the piggy bank

**Score:** How the penny is held



**Padlock (2 3/8" tall) with vinyl-coated key**

Demonstrate how to insert the key and turn it to open the padlock then demonstrate how to relock the padlock. Ask the child to unlock and lock the padlock two times.

**Score:** How the key is held



**Small circumference marker (3/8" wide)**

Place a marker in front of the child. Ask the child to pull off the cap then put the cap on tightly then pull the cap off again.

**Score:** How the marker is held



**Kaleidoscope (9 " long and 2 1/2" wide)**

Demonstrate how to use the kaleidoscope by holding it horizontally and looking through it while rotating the end. Ask the child to look through the kaleidoscope and turn the end three times.

**Score:** How the kaleidoscope is held



**1 pound peanut butter jar (3" wide and 5" tall)**

Place the peanut butter jar in front of the child and ask the child to take the cover off and put the cover back on.

**Score:** How the jar is held

**Full-size container of moldable clay**

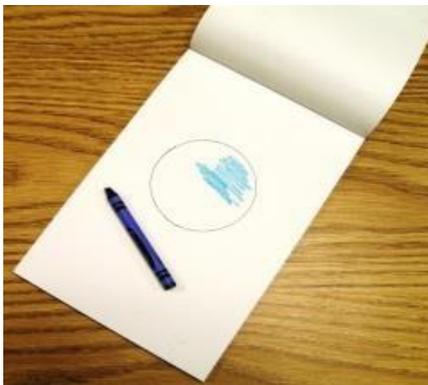
Demonstrate how to form moldable clay into a bowl then form into a ball and place on the table. Ask the child to make a bowl. You can help start the shape if needed.

**Score:** How the clay is held

**Slingshot with foam pull**

Demonstrate how to hold the slingshot, grasp the round end of the pull and pull back with moderate force then release. Ask the child to do this sequence twice

**Score:** How the foam pull is held

**6" x 9" white drawing pad and a crayon**

Place a peanut butter jar on the paper and draw a circle around it with the crayon. Ask the child to color in the circle with the crayon.

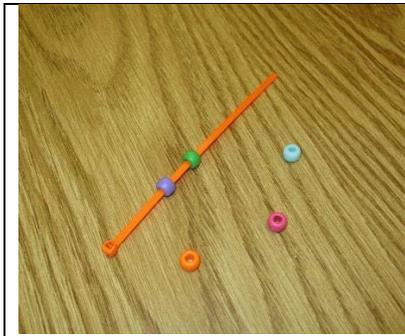
**Score:** How the crayon is held

**Child-size lace-up shoe with long, flat laces**

Place the shoe in front of the child and ask the child to tie a knot with the laces. You can show how to make a knot if needed.

**Score:** How the laces are held

**T-GAP Administration and Test Kit Items      Ages 8-18 Years**



**Plastic zip tie and 5 plastic beads**

Ask the child to thread the plastic beads onto the zip tie one at a time.

**Score:** How the bead is held



**Padlock and vinyl-coated key**

Demonstrate how to insert the key and turn it to open the padlock, then relock the padlock. Ask the child to unlock and lock the padlock two times.

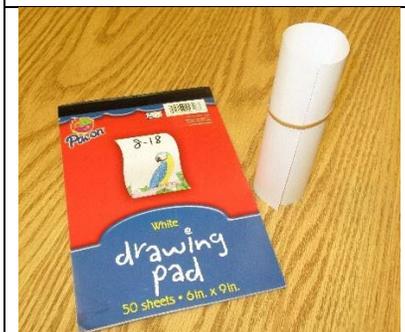
**Score:** How the key is held



**Ballpoint pen with a pull off cap**

Ask the child to pull off the cap and put the cap back on tightly then pull the cap off again.

**Score:** How the pen is held



**6" x 9" sheet of drawing paper and a rubber band**

Demonstrate and ask the child to make a large tube by rolling up the piece of paper and placing the rubber band around the middle. Ask the child to hold the tube and look through the end.

**Score:** How the paper tube is held

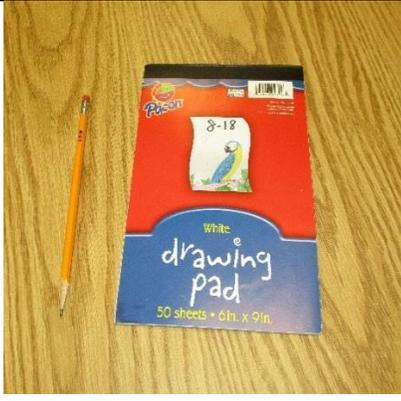


**Unopened 1-lb. peanut butter jar**

Ask the child to take the cover off and put the cover back on. Leave the metal seal on top of the jar in place.

**Score:** How the jar is held

**T-GAP Administration and Test Kit Items      Ages 8-18 Years**

	<p><b><u>Handheld pencil sharpener and new no. 2 pencil</u></b> Ask child to sharpen the pencil. You must observe at least three rotations of the pencil in the sharpener.</p> <p><b>Score:</b> How the pencil is held</p>
	<p><b><u>Slingshot with foam pull</u></b> Demonstrate how to hold the slingshot upright, grasp the foam pull by the round / bulb end and pull back with moderate force, then release. Ask the child to demonstrate this sequence twice.</p> <p><b>Score:</b> How the foam pull is held</p>
	<p><b><u>6" x 9" drawing pad with a no. 2 sharpened pencil</u></b> Provide the child with an open drawing pad and sharpened no. 2 pencil. Ask the child to write his name on a piece of paper.</p> <p><b>Score:</b> How the pencil is held</p>
	<p><b><u>Child's size lace-up shoe with long, flat laces</u></b> Place the shoe in front of the child and ask the child to tie the shoelaces into a bow. If needed, you can demonstrate how to tie the bow.</p> <p><b>Score:</b> How the laces are held, not the ability to tie the laces</p>

# Grasp Pattern Hierarchy: No Use of Thumb

## T-GAP Scoring: 0 - 3 Points

### Standard Grasp Patterns

#### No Grasp, Passive Stabilization (0 points)

Passive stabilization using fingertips or side of hand



#### Palmar Grasp, Finger Flexion (1 point)

Finger flexion, all fingers to palm



#### Ulnar Scissor Grasp (2 points)

Finger stabilization between small/ring fingers

If four web spaces are present; also between ring/long fingers



#### Radial Scissor Grasp (3 points)

Finger stabilization between the index/long fingers



### Variation Grasp Patterns

#### None

No variation for No Grasp, Passive Stabilization

#### Distal Flexion of Fingers (1 point)

Finger flexion without use of palm



#### Scissors Multiple Fingers (2 Points)

Weaves objects between multiple fingers



#### Distal Finger Scissoring (3 points)

Distal pinch between non-adjacent finger tips



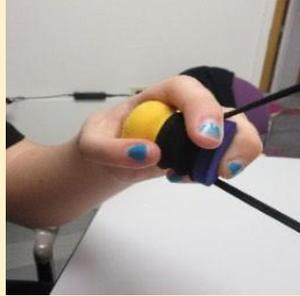
# Grasp Pattern Hierarchy: Use of Thumb

## T-GAP Scoring: 4 - 7 Points

### Standard Grasp Patterns

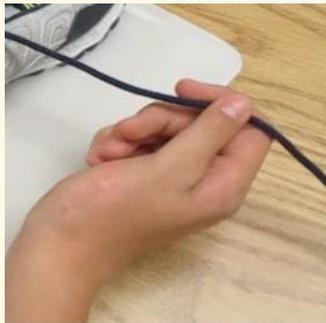
#### Cylindrical Grasp (4 points)

Thumb opposition with proximal grasp of all fingers



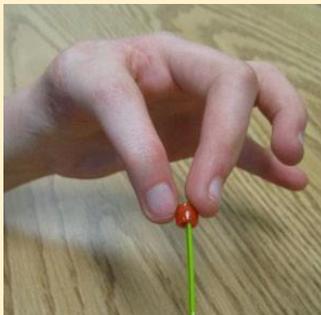
#### Lateral Key Pinch (5 points)

Thumb opposition to side of index finger or index to side of thumb



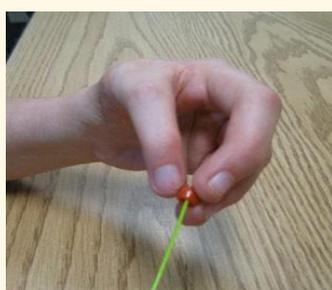
#### Tip Pinch (6 points)

Thumb opposition to tip of index finger



#### Tripod Pinch (7 points)

Thumb opposition to index and long fingers



### Variation Grasp Patterns

#### Distal Cylindrical (5 points)

Thumb opposition with distal grasp of all fingers



#### Lateral Cylindrical (5 points)

Encircling grasp of thumb and index finger



#### Tip to Non-Index Finger (5 points)

Thumb opposition to tip of ring, long or small finger



#### Tripod Pinch (6 points)

Thumb opposition with proximal index/long fingers



**The Thumb Grasp and Pinch Assessment**  
**T-GAP Score form**  
**18 months – 4 years**



T-GAP Activity	LEFT (Score 0-7)	RIGHT (Score 0-7)
Pick up 3 Cheerios one at a time and release into a film container <b>(tip pinch)</b> <i>Score how Cheerio is held</i>		
Open a zippered pencil case and remove 2 markers <b>(lateral key pinch)</b> <i>Score how zipper tab is held</i>		
Pull cap off a large diameter marker <b>(small grasp)</b> <i>Score how marker is held</i>		
Separate 5 Duplo style blocks that are stacked together <b>(medium grasp)</b> <i>Score how blocks are stabilized</i>		
Open a container of bubbles <b>(large grasp)</b> <i>Score how container is stabilized</i>		
Form moldable clay into a bowl <b>(manipulation)</b> <i>Score how moldable clay is held</i>		
Open a drawstring bag <b>(resistance)</b> <i>Score how bag is held when opened</i>		
Open a box of 8 crayons and remove one <b>(school)</b> <i>Score how crayon is held</i>		
Put sock on over toes <b>(ADL)</b> <i>Score how sock is held open</i>		

**Grasp and Pinch Style Scoring**

- 0 No Grasp, Passive Stabilization
- 1 Palmar Grasp, Finger Flexion; No Thumb Use
- 2 Ulnar Scissor Grasp; No Thumb Use
- 3 Radial Scissor Grasp; No thumb Use
  
- 4 Cylindrical Grasp; Thumb to Fingers
- 5 Lateral Key Pinch; Thumb to Index
- 6 Tip Pinch; Thumb to Finger Tip
- 7 Tripod Pinch; Thumb to Distal Index/Long

**T-GAP Total Score**

Left Hand \_\_\_\_\_/63  
 Right Hand \_\_\_\_\_/63

**Number of Grasp Styles: Points 1-7**

Left Hand \_\_\_\_\_  
 Right Hand \_\_\_\_\_

**Thumb Use: Points 4-7**

Left Hand \_\_\_\_\_/9  
 Right Hand \_\_\_\_\_/9

**The Thumb Grasp and Pinch Assessment**  
**T-GAP Score form**  
**5 years – 7 years**



T-GAP Activity	LEFT (Score 0-7)	RIGHT (Score 0-7)
Pick up 3 pennies one at a time and release into a piggy bank <b>(tip pinch)</b> <i>Score how penny is held</i>		
Turn a key to open a padlock <b>(lateral key pinch)</b> <i>Score how key is held</i>		
Pull cap off a small diameter marker <b>(small grasp)</b> <i>Score how marker is held</i>		
Turn end of kaleidoscope 3 times <b>(medium grasp)</b> <i>Score how kaleidoscope is held</i>		
Remove cap from a peanut butter jar <b>(large grasp)</b> <i>Score how jar is held</i>		
Form Play-Doh into a bowl <b>(manipulation)</b> <i>Score how Play-Doh is held</i>		
Pull back foam pull on slingshot <b>(resistance)</b> <i>Score how foam pull is held</i>		
Color inside a circle with a crayon <b>(school)</b> <i>Score how crayon is held</i>		
Tie shoelaces into a knot <b>(ADL)</b> <i>Score how laces are held</i>		

**Grasp and Pinch Style Scoring**

- 0 No Grasp, Passive Stabilization
- 1 Palmar Grasp, Finger Flexion; No Thumb Use
- 2 Ulnar Scissor Grasp; No Thumb Use
- 3 Radial Scissor Grasp; No thumb Use
  
- 4 Cylindrical Grasp; Thumb to Fingers
- 5 Lateral Key Pinch; Thumb to Index
- 6 Tip Pinch; Thumb to Finger Tip
- 7 Tripod Pinch; Thumb to Distal Index/Long

**T-GAP Total Score**

Left Hand \_\_\_\_\_/63  
 Right Hand \_\_\_\_\_/63

**Number of Grasp Styles: Points 1-7**

Left Hand \_\_\_\_\_  
 Right Hand \_\_\_\_\_

**Thumb Usage: Points 4-7**

Left Hand \_\_\_\_\_/9  
 Right Hand \_\_\_\_\_/9

**The Thumb Grasp and Pinch Assessment**  
**T-GAP Score form**  
**8 years – 18 years**



T-GAP Activity	LEFT (Score 0-7)	RIGHT (Score 0-7)
Thread 5 plastic beads onto a zip tie <b>(tip pinch)</b> <i>Score how bead is held</i>		
Turn a key to open a padlock <b>(lateral key pinch)</b> <i>Score how key is held</i>		
Remove cap from a ballpoint pen <b>(small grasp)</b> <i>Score how pen is held</i>		
Make a telescope from a sheet of paper and place a rubber band around it <b>(medium grasp)</b> <i>Score how paper telescope is held</i>		
Remove cap from a peanut butter jar <b>(large grasp)</b> <i>Score how jar is held</i>		
Rotate a pencil 3 times in a handheld pencil sharpener <b>(manipulation)</b> <i>Score how pencil is held</i>		
Pull back foam pull on a slingshot <b>(resistance)</b> <i>Score how foam pull is held</i>		
Write name with a pencil <b>(school)</b> <i>Score how pencil is held</i>		
Tie shoelaces into a bow <b>(ADL)</b> <i>Score how laces are held</i>		

**Grasp and Pinch Style Scoring**

- 0 No Grasp, Passive Stabilization
- 1 Palmar Grasp, Finger Flexion; No Thumb Use
- 2 Ulnar Scissor Grasp; No Thumb Use
- 3 Radial Scissor Grasp; No thumb Use
  
- 4 Cylindrical Grasp; Thumb to Fingers
- 5 Lateral Key Pinch; Thumb to Index
- 6 Tip Pinch; Thumb to Finger Tip
- 7 Tripod Pinch; Thumb to Distal Index/Long

**T-GAP Total Score**

Left Hand \_\_\_\_\_/63  
 Right Hand \_\_\_\_\_/63

**Number of Grasp Styles: Points 1-7**

Left Hand \_\_\_\_\_  
 Right Hand \_\_\_\_\_

**Thumb Usage: Points 4-7**

Left Hand \_\_\_\_\_/9  
 Right Hand \_\_\_\_\_/9