early hand asymmetry therapy

Acknowledgements:

This website was made possible through the collaborative efforts of healthcare practitioners and researchers across Canada. The work was funded in part through Kids Brain Health Network, CHILD-BRIGHT Network, and the Interplay Project Team.

- Sophie Lam-Damji, Liz Cambridge, Bisman Mangat, Darcy Fehlings, Lauren Switzer (Holland Bloorview Kids Rehabilitation Hospital)
- Christine Marchessault, Scott Thieu (IWK Health)
- Catherine Scott (Janeway Children's Rehabilitation Centre)
- Melissa Myers (Queen Elizabeth Hospital)
- Giannoula Mentakis (Montreal Children's Hospital)
- Melanie Gagnon (CHU Sainte-Justine)
- Paige Kirby (Rehabilitation Centre for Children)
- Charlotte Henderson (Saskatchewan Health Authority)
- Kathleen O'Grady (Glenrose Rehabilitation Hospital)
- Keith O'Connor (BC Children's Hospital)

A special thank you to the families that provided photos for this project.

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What is Early Hand Asymmetry Therapy for infants?

Early hand asymmetry therapy consists of two motor-based treatments, baby constraint induced movement therapy (Baby-CIMT), and bimanual therapy (BIM) or a hybrid combination of both, delivered in early infancy. Baby-CIMT focuses on developing unimanual function whereas BIM focuses on improving bimanual function. Early hand therapy (both Baby-CIMT and BIM) is a parent/caregiver mediated play program supported by coaching from therapists, for infants 3 months to 2 years of age. These treatments have been shown to be safe and effective in improving hand function in infants with upper extremity asymmetry - specifically, those who have one arm that functions and is used less than the other hand/arm. This hand/arm is often referred to as the "helper hand".

While these motor therapies are commonly used with infants diagnosed with hemiplegic (unilateral) cerebral palsy (HCP) or those with high probability of developing HCP, they can also be applied to infants with triplegia (involvement in both legs and one arm) or quadriplegia (involvement in all four limbs with asymmetric hand usage).

Early Hand Asymmetry Therapy focuses on coaching parents/caregivers on how to implement daily play sessions to encourage use of the helper hand. Short periods of daily goal directed play over many weeks has been effective in developing helper hand skills (Taylor et al., 2025). To support building capacity and use of the helper hand, consistent implementation of these programs are an essential component. Each of these therapies are equally effective on their own or paired together (Palomo-Carrión, R., Pinero-Pinto, E., Lirio-Romero, C., et al. 2025). Deciding on which therapy to use will depend on the parent/caregiver goals and the infant's clinical presentation along with other factors ("How Do I Choose Which Therapy to Use").For example, if the infant is not using the helper hand, the initial goal is to develop spontaneous hand use and awareness of hand, and Baby-CIMT would be a feasible option to start with. Depending on the goals, and helper hand skills, Baby-CIMT is often followed with a hybrid approach or BIM to help improve use of two hands together. Overall, the goal of early hand therapies is to provoke early use of the helper hand. These motor therapies are not used to normalize movements or to "make the helper hand work like the dominant hand". We all have a dominant hand and a helper hand, and each hand has different roles. While the role differences are more visible in infants with upper extremity asymmetry the goal of these therapies is to optimize functional helper hand skills.

Why do Early Hand Asymmetry Therapy?

Early Hand Asymmetry Therapy harnesses the neuroplasticity of the infant brain. Neuroplasticity is a sensitive period when the infant brain is flexible, and most adaptable to reorganization of motor pathways. Starting these motor-based treatments early can help to optimize hand/arm function. There is evidence from a randomized trial that Baby-CIMT, BIM or hybrid approaches are more effective in improving hand/arm function in children with HCP or asymmetric hand usage compared to usual care (Palomo-Carrión, R., Pinero-Pinto, E., Lirio-Romero, C., et al. 2025).

When to do Early Hand Asymmetry Therapy?

The parent mediated program is done at home. Parents are coached on how to play with their infants to encourage the use of the helper hand for short periods of time during the day over several weeks in the infant's daily environment(s) (e.g., home, daycare). Evidence from clinical trials has shown that Baby-CIMT and BIM provided before six months of age improves arm/hand function (Boyd RN, Greaves S, Ziviani, 2025).

Who can do Early Hand Asymmetry Therapy?

Early hand therapy is typically done by parents/caregivers in the infant's natural environments, such as at home. The clinical team (e.g., OT, PT, and/or early interventionists) coaches the caregivers/parents on how to implement Early Hand Asymmetry Therapy to suit their infant's developing needs.

What is Baby-CIMT?

Baby-CIMT programs involve blocking the infant's dominant hand for short periods during the day and coaching parents on how to use toys and play situations to provide repetitive, systematic, progressive, variable, and self-initiated movement practice with the helper hand (see **Appendix A- Example of a Baby-CIMT Program**).

How do I do Baby-CIMT?

Baby-CIMT is a motor-based, early intervention using toys and play to repeatedly encourage infants to use their helper hand. The clinical team educates caregivers/parents, for example, on how to play with their infant to encourage use of the helper hand, considerations for the toy features, and how to present toys to best encourage helper hand skills. Depending on the infants' needs and parent/caregiver goals, Baby-CIMT programs will differ between infants. The best Baby-CIMT program is one that is "just right" for the infant. This means a program that is customized to the infant's needs and goals and optimally encourages repeated use of the helper hand. As such, the implementation, the frequency, and the duration of Baby-CIMT programs will vary. The clinical team (e.g., OT/PT/ early interventionists) will coach the parent/caregiver periodically to graduate the play activities as the baby uses their helper hand more.
See **Appendix A – Example of a Baby-CIMT Program**

What do I need to do Baby-CIMT?

For Baby-CIMT, you will need:

- A way to gently block the dominant arm/hand (see Suggestions for Blocking the Dominant Hand for Baby-CIMT below)
- Safe, age-appropriate toys that will motivate the infant to use the helper hand to work on helper hand skills and goals (see Suggestions to Work on Helper Hand Skills below)
- A device to position and support the infant in a safe, seated position. Sitting is the preferred position for Baby-CIMT. If your infant is unable to sit, see Tips for Positioning.

How do I know if I am doing Baby-CIMT correctly?

Baby-CIMT programs should be supported by the clinical team. The clinical team will provide ongoing coaching and education to caregivers/parents on how to provoke self-initiated use of the helper hand when playing with the infant. In addition, the clinical team will use feedback from caregivers/parents to modify programs as the infant uses the helper hand more.

If parents are actively implementing the program at home and they report the infant is using their helper hand more, this suggests that the program is a "just right" fit and well matched to the infant.

What is Bimanual Therapy?

Bimanual therapy (BIM) is a safe proven effective early motor-based intervention that focuses on helping infants to use both hands together BIM uses carefully chosen toys for goal directed, two handed activities that provoke specific bimanual actions and behaviours (Hoare, B. & Greaves, S. 2017).

How do I do Bimanual Therapy?

BIM involves coaching parents on how to provide progressive, variable, and active repeated movement practice using carefully selected toys to provoke using both hands together for specific two-handed skills. The clinical team educates caregivers/parents, for example, on how to play with their infant to encourage use of the helper hand together with the dominant hand. Coaching and education are provided on how to choose toys/activities with an emphasis on how to use the properties and features of toys, and how to present toys to help infants learn how to use their hands together. It is the properties of the toys and how the toys are used that help drive potential for action movement to develop functional hand use. Depending on the infants' needs and parent/caregiver goals, bimanual therapy programs will differ between infants. The best program is one that is specific to the infant's goals and "just right" and well matched for the infant.

What do I need for Bimanual Therapy?

For BIM you will need:

- Safe, age-appropriate toys that will motivate the infant to use the helper hand together with the preferred dominant hand to work on specific two-handed skills and goals (see Suggestions to Work on Helper Hand Skills below)
- A device to position and support the infant in a safe, seated position. Sitting is the preferred position for BIM. If your infant is unable to sit, see Tips for Positioning.

How do I know if I am doing Bimanual Therapy correctly?

BIM programs should be supported by the clinical team. The clinical team provides feedback on how to use the toys for purposeful and intentional play to practice self-generated movements for specific two-handed skills. Incorporating feedback from caregivers/ parents, the clinician uses this feedback to modify programs as the infant uses the helper hand together more with the dominant hand. Overall, if parents are actively implementing the program at home and they report the infant is using their helper hand together more with the dominant hand demonstrating more efficient functional hand skills this suggests that the program is a "just right" fit.

What is a Combined/Hybrid Baby-CIMT and Bimanual Therapy

A hybrid program combines both Baby-CIMT and BIM together in a parent mediated play program. The program includes doing Baby-CIMT with BIM either in the same play session or doing BIM following a period of doing Baby-CIMT. The two approaches are often considered complementary to each other.

How do I do a Hybrid Program?

In this approach Baby-CIMT and BIM are given in roughly equal amounts. The hybrid program is done in the infant's natural environments and uses toys and/or play activities to provoke the use of the helper hand independently and together with the dominant preferred hand. The clinical team educates caregivers/parents, for example, on how to play with their infant to encourage use of the helper hand on its own and together with the dominant hand, and how to set up play situations in the home to provoke this intentional play. Parents are coached on the features and properties of toys, and how to present toys to best encourage self-generated active helper hand skills. Depending on the infants' needs and parent/caregiver goals, the hybrid programs will differ between infants. The best program is one that is "just right" for the infant. This means a program that is customized to the infant's needs and optimally encourages repeated specific use of the helper hand to meet goals.

What do I need for a hybrid program?

- A way to gently block the dominant arm/hand (see Suggestions for Blocking Techniques)
- Safe, age-appropriate toys that will motivate the infant to use the helper hand on its own and together with the dominant hand to work on specific helper hand skills, two handed skills, and goals (see Suggestions to Work on Helper Hand Skills)
- A device to position and support the infant in a safe, seated position. Sitting is the preferred position for early arm and hand therapy. If your infant is unable to sit, see Tips for Positioning.

How do I know if I am doing hybrid program correctly?

Hybrid therapy programs should be supported by the clinical team. The clinical team will provide ongoing coaching and education to caregivers/parents as the infant uses their helper hand more and together with the dominant hand.

Overall, if parents are actively implementing the program at home and they report the infant is using their helper hand more functionally for both unilateral and bimanual tasks and meeting the specific goals this suggests that the program is a "just right" fit.

How do I choose which therapy to do?

Baby-CIMT, BIM, and /or hybrid programs are proven safe and effective in improving arm and hand function in early infancy. Some factors to consider when choosing which therapy to do:

- Is the infant showing spontaneous use of the helper hand? If so, what can the helper hand do?

- Is the infant showing arm/hand movements but is unable to use the two hands effectively i.e. can hold two objects but cannot push the objects together?
- The family's goals (i.e. are the goals unimanual or bimanual?)
- The family's philosophy and/or preferences for Early Hand Asymmetry Therapy
- The infant's tolerance for blocking
- The infant's developmental profile as this influences hand skills and play interests
- The infants current assessed hand skills, what skills are missing, are these skills unimanual or bimanual?

Depending on the infant's skill progression, feedback from caregivers/ parents, and the infant's tolerance for the selected therapy, the clinician may recommend starting with one therapy, or starting with one therapy followed by the other, or pairing both therapies together, or discontinuing one therapy in preference of another. Overall, the main goal is to encourage the infant to use their helper hand as much as possible.

How to use Assessments (Standardized and Non-Standardized) to Develop a Successful Parent Mediated Early Hand Asymmetry Therapy Program

The clinical team may use a variety of methods for assessing infants to inform the development of a customized, "just right" Early Hand Asymmetry Therapy program. While there are standardized hand assessments available, being trained in these assessments is **not** a requirement to recommend or start Early Hand Asymmetry Therapy. Assessments to inform Early Hand Asymmetry Therapy may include standardized assessments, clinical observations, review of the medical history, caregiver/parent report, and/or collaborative goal setting. The aim is to identify the infant's helper hand skills, family context and goals enabling the clinician to match the best therapy to the infant to support the development of the helper hand for efficient functional hand skills.

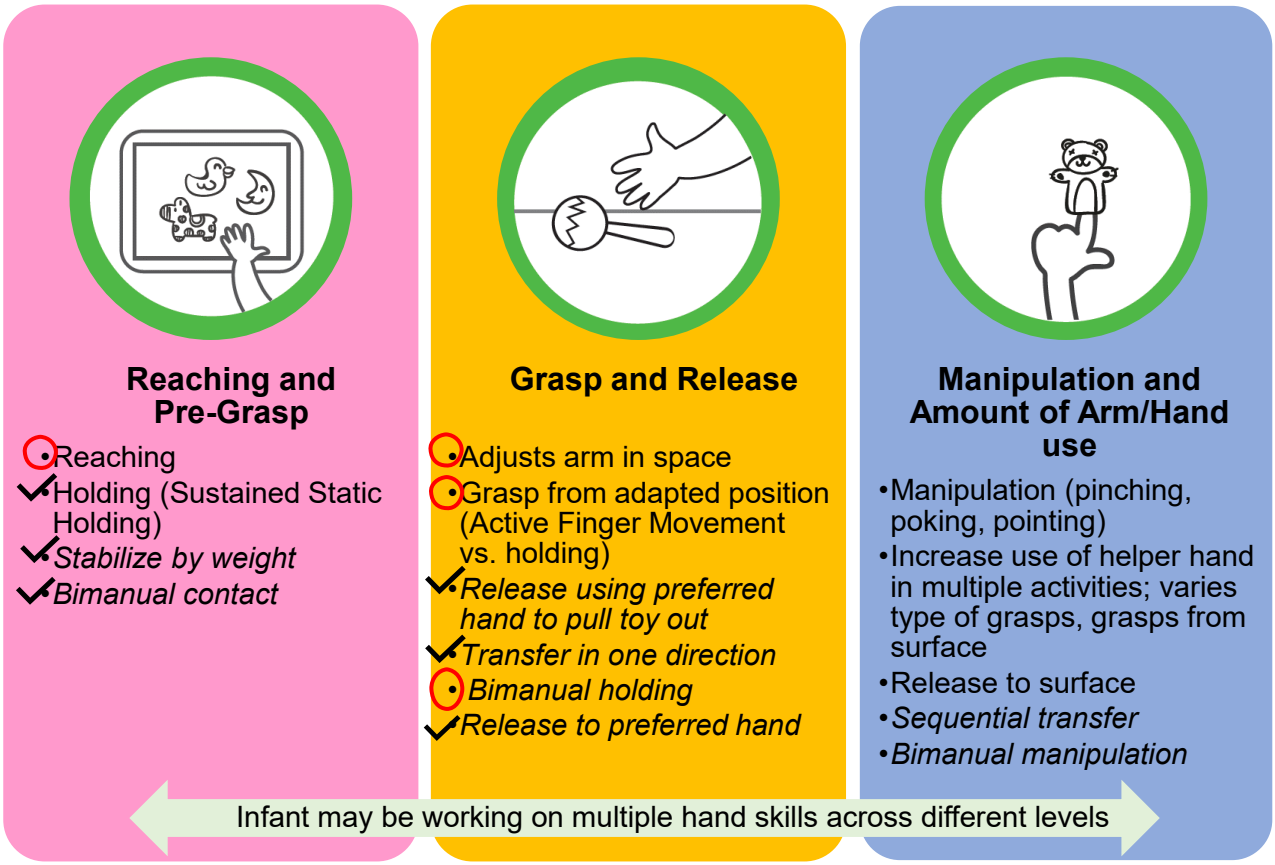
If you are interested in learning about standardized assessments, these are available:

1. **Hand Assessment for Infants (HAI)**, ages 3-12 months, (Krumlinde-Sundholm et al., (2017)
2. **Screening Hand Assessment for Infant (s-HAI),** ages 3.5 -12 months (Ulrike C. Ryll, et al. (2024)
3. **Mini Assisting Hand Assessment (Mini AHA)**, ages 8-18 months, (Greaves S, et al. (2013)

If you are NOT using standardized hand assessments:

If you are not trained on the standardized hand assessments, use the figure below along with parent/ caregiver goals to help develop an Early Hand Asymmetry Therapy program. Observe a short play session using 7-10 toys that will enable you to see the use of the helper hand on its own and together with the dominant hand to assess how the infant integrates the helper hand in play. When observing the infant playing, check off skills the infant is consistently demonstrating. Circle skills that are emerging, these could be ones that you see about ≤ 50% of the time or only

when the preferred hand is blocked. These skills would be a good starting point for developing an Early Hand Asymmetry Therapy program. See Figure 1 for an example. Refer to Appendix D for a usable blank template.



*adapted position = from caregiver/ parent hand or infant dominant hand

Figure 1: How to use the Arm and Hand Function Overview diagram to identify an infant's hand skills for therapy planning. Bimanual skills are italicized.

During the play observation the infant most often reaches for toys placed on the helper hand side with the preferred/ dominant hand and only on a few occasions uses the helper hand to contact the toy. The infant only reaches to shoulder height. Using the helper hand, the infant can grasp toys from your hand but not from a surface. The grasp is awkward and slow. They are not adjusting the arm in space (ie. rotating the forearm prior to grasp.) Release is seen with the infant pulling out the toy with the preferred hand and demonstrates moving a toy from the helper hand to the preferred hand. When given a toy requring both hands to play with the infant will bring both hands together to contact the toy. Using two hands to hold the toy you notice the helper hand comes in after marked delay.

Check marks were given to those skills consistently seen i.e. bimanual contact, transfer in one direction and relase to preferred hand. Stablize by weight was checked as the infant shows the higher skill of being able to grasp. The skills, reaching, grasping and adjusts arm in space and bimanual holding were circled as they are emering and seen less than 50% of the time or there is a marked delay with integration of the helper hand. Visually you can now see what skills to

start working on as you develop a program. The diagram also shows what skills are mising to work towards.

NOTE: Depending on the goals, infant's developmental readiness, and motor skills, infants may work on skills across coloured sections (outlined in Figure 1) at the same time. For example, an infant who can manipulate and grasp toys nearby but is unable to reach for toys placed far away could be working on easy tasks within the "pre-grasp and reaching" section and simultaneously working on "refining manipulation". You can also use these standardized assessments to help inform the development of an Early Hand Asymmetry Program.

Canadian Occupational Performance Measure (COPM)- to establish, assess, and reassess goals. (Law et al., 1990)

Goal Attainment Scale – to establish, assess, and reassess goals (Steenbeek et al., 2007)

It is important to consider the infant's developmental readiness and motor skills to match the toy(s) to the infant. You will know you have found the "just right" Early Hand Asymmetry Therapy program for the infant if the infant plays with the toy(s) repeatedly using their helper arm/hand. If the toy is too easy or too hard, the infant may not want to play with the toy and not use their helper hand.

Example (Developmental Level > Arm/Hand Function): An infant whose developmental level is more advanced than arm/hand function.

Tips:

- Choose a toy that is cognitively motivating but requires less motor skill to play with (e.g., sorting animal/color/shapes by reaching to move similar shapes together in a pile).

Example (Arm/Hand Function > Developmental Level): An infant whose arm/hand function is more advanced than developmental level.

The infant may be able to grasp and release, but not yet manipulate toys; difficulty with self-regulation and attending to play and use of helper hand:

Tips:

- Use cause and effect and/or sensory toys (e.g., toys that light-up, vibrate, have textures, have brighter targets) to promote pinching and poking. Sensory toys may be more motivating.
- Limit distraction by removing noise and doing the play session in a less-distracting room to help with focus and attention.
- Show infant how to play with the toy and/or give consistent, simple instructions on how to play with the toy.
- Shorten play session time to match infant's self-regulation.

An example of how to use standardized assessments to develop a Baby-CIMT program:

If you are using standardized hand assessments, below is a general guide on how to use the findings from the assessments to develop a customized Baby-CIMT program using the ***Baby-***

***CIMT - Arm and Hand Adventure: A Tool to Customize Play Activities*.** This tool helps to generate a list of play activities that match and progress an infant's hand skills. Using the tool, you will be able to select the helper hand skill(s) you would like the infant to work on, the level of difficulty for activities, and the type of toys (commonly found in the home and/or commercially available).

It is important to consider the infant's developmental readiness and motor skills to match the toy(s) to the infant. You will know you have found the "just right" Baby-CIMT program for the infant if the infant plays with the toy(s) repeatedly using their helper arm/hand. If the toy is too easy or too hard, the infant may not want to play with the toy and not use their helper hand.

HAND ASSESSMENT FOR INFANTS (HAI)

- If the infant *always* or *almost always* demonstrates the helper hand skill, select medium to hard activities in the ***Baby-CIMT - Arm and Hand Adventure tool***.
- If the infant *sometimes, seldomly, or demonstrates slowness or delay* in the helper hand skill, select medium activities in the ***Baby-CIMT - Arm and Hand Adventure tool***.
- If the infant *does not demonstrate* the helper hand skill, select easy activities in the ***Baby-CIMT - Arm and Hand Adventure tool***.

MINI ASSISTING HAND ASSESSMENT (MINI-AHA):

- If the infant is *somewhat effective* (i.e., almost good but somewhat awkward with mild asymmetry) in the helper hand skill, select medium to hard activities in the ***Baby-CIMT - Arm and Hand Adventure tool***.
- If the infant is *ineffective* (i.e., clumsy and with clear asymmetry between the two hands) in the helper hand skill, select easy to medium activities in the ***Baby-CIMT - Arm and Hand Adventure tool***.
- If the infant *does not* or *is unable* to use the helper hand skill, select easy activities in the ***Baby-CIMT - Arm and Hand Adventure tool***.

Reasons why a Baby-CIMT may be the primary approach?

- Parental goals are unimanual e.g., reach more with the helper hand, holding and grasping with the helper hand
- Infant is not using the helper hand spontaneously or is missing helper hand skills
- Parents /infants accept the blocking of the dominant hand.

If the infant is not yet demonstrating any helper hand skills develop a Baby-CIMT program start with easy items in the pre-grasp and reaching section (see Figure 1: Pink Section). When the infant successfully performs a helper hand skill approximately 70-75% of the time, consider progressing to the next difficulty level within the helper hand skill.

Please refer to **Appendix D** for case studies for early arm and hand therapy.

An example of how to use standardized assessments to develop a bimanual therapy program:

It is important to consider the infant's developmental readiness and have knowledge of motor learning in infants so the clinician knows what skills to provoke and when. For example, transfer between hands in a sequence or bimanual manipulation typically develops around 8-10 months and working on these skills when the infant is younger may be unsuccessful. The standardized assessments measure skills in a hierarchy i.e. skills are ordered to reflect the difficulty from "more able/ easy" to "less able/ hard". The assessments can help inform which skills to start with. BIM programs use toys and the environment to provoke purposeful structured practice for bimanual skills. Repeated opportunities for purposeful meaningful play to learn the action capabilities for using two hands together, establishing specific bimanual goals, and coaching parents /caregivers on the purpose of the play are factors in developing a successful BIM program. Parents/ caregivers are coached to carefully select toys that require both hands to play with. The toys selected should be in keeping with infant's developmental age and the goals.

If the infant demonstrates marked asymmetry between hands when playing you may see the infant does not or is unable to use the helper hand compared to the dominant hand. Such infants may not be able to contact or hold toys and, a reasonable first skill to first work on is to establish holding. To do this the parent/caregiver can place an "easy to hold" toy in the infants' helper hand. While this skill can be considered one handed, holding toys will help with developing bimanual hand use.

If the infant is able to hold toys placed in the helper hand move towards provoking stabilization by weight or support to grasping from an "easy position" i.e. from the dominant hand and/or caregiver's hand. An infant who can demonstrate these skills may present with moderate asymmetry between hands.

If the infant demonstrates somewhat ineffective skills with minimal asymmetry between hands consider developing a program that works on grasping toys from different surfaces i.e tray and/or table, and progressing to adjusting arm in space for grasping and regrasping to develop skills needed to rotate, twist, turn the toy when playing.

You will know you have found the "just right" bimanual therapy program for the infant if the infant plays with the toy(s) repeatedly using both their hands. If the toy is too easy or too hard, the infant may not want to play with the toy and will not get the repeated skills practice.

Please refer to Appendix **D** for case studies for early arm and hand therapy.

Getting started: Practical tips to implementing early intensive hand therapy

Tips for the Parents to Play with their Infant

- Play with the toy yourself before offering it to the infant so you are familiar with what helper hand skills are needed.
- Present the toy in front of the infant, and on the helper hand side.

- Show the infant how you want them to play with the toy. Sit in front of the infant so the infant can see and understand what actions are needed to play with the toy.
- Provide minimal assistance, if needed, for infant to initially learn how to play with the toy. Withdraw the assistance as soon as the infant demonstrates the ability to play with the toy.
- Give one toy at a time, remove each toy before introducing another toy.
- Wait for the infant to use the helper hand to play with the toy.
- Give positive feedback immediately to encourage the infant to repeat the play (smile, clap, praise).
- If the infant does not play with the toy, change how you present the toy (e.g., give the toy in an easy position) or give a different toy.
- To keep the infant engaged with fresh and novel toys, put together a bin of toys that is only brought out when doing the Early Hand Asymmetry Therapy program(s).
- If the infant is mouthing toys, consider using a pacifier.

Tips for When to do Early Hand Asymmetry Therapy at Home:

Choose a time when the infant can play uninterrupted, such as when the infant is fed, alert, and there are minimal distractions.

Tips for Positioning

Ideally, the infant should be positioned such that the infant is able to see the caregiver/parent's reaction. This can help to support engagement and repeated play. While the infant can be positioned in different positions, sitting is the preferred position. If you are implementing a bimanual therapy program you will not need to block the dominant hand. The following photos show blocking of the dominant hand for Baby-CIMT; however, the positions can be applied for BIM as well.

Sitting:

Sitting - When placing an infant in sitting, ensure that the infant is stable and in midline. - If infant is unstable, consider using rolled towels in highchair or infant carrier seat.	 

- Sitting in adult's lap with helper hand in front. - If doing BIM, sit the infant on the adult's lap with both arms accessible to the toy to be presented in midline.	 
Side Lying - When positioning the infant in side lying, position with the helper hand on top so the infant will be able to use the helper hand to reach and play.	
Supine (infant lying on their back) - In supine, use blocking techniques to encourage reaching with the helper hand. An example is holding the infant's dominant hand gently or using some of the suggested ways in this handbook to block the dominant hand. - If doing BIM, present the toy in midline.	 

Standing • Depending on the infant's stability, encourage weight bearing through the dominant hand at a support surface such as wall or coffee table to promote reaching and playing with the helper hand. If stable on feet, use blocking techniques to gently block the infant's dominant hand when standing at a bench/child table with close adult stand-by supervision. Infants may have difficulty getting the helper hand out to protect themselves if the infant falls.	

Equipment options for supportive sitting

Special Tomato	
Baby bouncer chair	

Highchair	
Floor sitter	

Suggestions for Blocking the Dominant Hand for Baby-CIMT

What to Use:

Snug sock -use a longer sock that extends up over the elbow to the shoulder to minimize infant pulling sock off	

Infant winter mitten with buckle	
Munch mitt	
Sleep sack with dominant arm to body	

Scarf/ Coban Wrap securing dominant arm to body	
Chip clip at end of the onesie sleeve / tie knot in end of sleeve or sew closed the opening of the sleeve.	
Hand splint	

Helper Hand Skills

When playing with the infant, use toys to encourage the following helper hand skills. The clinical team should coach and educate caregivers/parents on, how to do the Early Hand Asymmetry Therapy program, what skills parents are working on, how to provoke these skills , and if they are on the right “track”, and how to progress the program as the infant’s helper hand skills develop.

While the infant may have multiple hand skills they can work on, not all hand skills need to be targeted in each play session. Choosing a few skills to work on e.g. reaching and grasp can help the play session to feel less overwhelming for parents to implement. Remember the quality of the play session is more important than the duration. Play sessions can be spread throughout the day to accommodate the infant and parents/caregivers schedule and needs.

This handbook lists toys and play activities from “easy” to “hard” and contains tips to guide clinicians on how to progress the Early Hand Asymmetry Therapy program. Remember to always work at the infant’s developmental level and motor abilities informed by knowledge of infant upper extremity motor skill development, your assessment findings, clinical observations, caregiver/parental reports, and/or caregiver/parental goals when developing and progressing the program. Early hand programs should be tailored, specific to goals, meaningful, and fun for the infant to optimize repeated intentional play to practice hand skills.

Toy and Activity Suggestions

The following play activities can be used to work on multiple helper hand skills. The play activities are progressively graded from "easy" to "hard". Depending on the approach you are using, clinicians need to use clinical judgement on how to present the toy, what toy to use, and how you want the infant to play with the toy to encourage the desired helper hand skill(s).

The activities can be modified for unilateral play or bimanual play. In unilateral play, the adult will hold or stabilize the toy as needed while in bimanual play the adult presents the toy(s) to the infant and the infant uses both hands to play with the toy(s). E.g.: Pull apart animal connecting toys. If you are using Baby-CIMT, the adult holds part of the toy while the infant uses their helper hand to grasp to pull apart the animal while in bimanual therapy the infant holds the toy in both hands and pull apart the animal pieces.

When doing the following activities, adult supervision is required at all times for safety. Parents/caregivers should regularly check toys for safety (e.g., broken pieces) before each play session and avoid toys with small parts that may be a choking hazard.

Initiates Use of Helper Hand: Reach and Pre-Grasp

Reach: Movement of upper arm

Unimanual: Lifts arm to interact with a toy held above the surface/ to the side

Bimanual: Lifts the helper arm to interact with toy held above the surface

Why work on this skill:

- This skill will help with playing with toys and doing tasks at home and in school.

Tips to progress skill:

- Present toys to infant below shoulder level, initially close to infant on the helper hand side, then in midline, then on the dominant hand side
- Progress to presenting toys further away at shoulder level on the helper hand side, then present in midline, then on the dominant hand side
- Present toys above shoulder level and overhead in front of infant and to the side of the helper arm, then to the dominant side

From easier to harder:

- Roll a ball back and forth to tempt infant to reach and push the ball back to you.
- Place a “toy clean-up box” on the helper hand side and have the infant push toys into the box using their helper hand/ place a box in front of the infant and have the infant use both hands to push the toys from a tray/table into the box
- Blow bubbles and catch the bubbles on a wand to encourage the infant to reach to pop the bubbles.
- Tempt the infant to play peek-a-boo by reaching to move your hand/facecloth from hiding your face
- Stick suction cups on the mirror to encourage the infant to grasp or bat at them if grasp is too difficult. Gradually move the suction cups away from the infant (higher, or to the side) to encourage reaching overhead.
- Play with yogurt on a mirror.

- Pull magnets off a sheet pan. Can start on the floor and then place magnets on a wall/fridge.
- Play “Simon Says” game, encourage arm movements overhead.
- Stack and knock-over a block tower.
- Push a ball up a wall using helper hand / both hands.
- Play tug of war with a towel or blanket.
- Pull pop tube apart with adult holding one side and the infant holding the other.
- Place blanket or hat on the infant’s head, encourage infant to take the object off their head.

Reach: Movement of upper arm and elbow

Unimanual: Moves upper arm and elbow to interact with a toy far away

Bimanual: Moves both arms and elbow to interact with a toy far away

Why work on this skill:

- This skill will help with playing with toys and doing tasks at home and in school.

Tips to progress skill:

- Present toys to infant below shoulder level, initially close to infant on helper hand side, then in midline, then on the dominant side.
- Progress to presenting toys further away and at shoulder level on helper hand side, then in midline.
- Present toys above shoulder level and overhead in front of infant and to the side of the helper arm and then in midline

From easier to harder:

- Place toys on the floor in the midline to encourage batting at / touch toys.
- Play with a toy positioned close to the body on a tray/table top.

- Place pudding on a cookie tray in front of the infant on a surface far enough away to encourage reaching in front.
- Have the infant push a ball, rolling it on a table with a straight elbow.
- Fill a water bottle with toys and food colouring. Have the infant roll the bottle on a flat surface in front of their body.
- Knock down block towers/bowling pins with straight elbow. Place the tower on either side, in midline in front of infant.
- Swipe ribbons and necklaces placed on an upright surface. Position near each arm and in front in midline.
- Give high-5's (elbow straight), play hand games (e.g., pat a cake) far enough away to have a straight elbow.
- Push down toys with low resistance progressing to higher resistance placed away to encourage reaching
- Put magnets on a vertical surface.
- Pull suction toys off from a wall placed overhead.
- Grasp and throw various size balls to an adult.
- Reach above shoulder to retrieve balls using either hand to place balls inside paper towel/ toilet paper rolls taped to the wall.

Holds: Toys are stabilized when placed in the helper hand or by weight for play

Unimanual: Toys are held when placed in the helper hand

Bimanual: placing and pushing toys into the helper hand using dominant hand, bimanual holding, the helper hand stabilizes the toy by weight while the dominant hand manipulates toy

Why work on this skill:

- This skill will help the infant to use their hand to stabilize toys/objects for the dominant hand to do the task.

Tips to progress skill:

- Give toys that are easy to stabilize by weight, and do not move progressing to giving toys that are less stable.
- Give toys that require holding to play with.
- Progress to holding large soft toys to narrower thin toys placed in the hand.
- Consider adding resistance when playing (e.g., tug of war)
-

From easier to harder:

- Give toys that do not move. Consider cause and effect toys (e.g., toy that lights up, makes sound, vibrates) to encourage the infant to stabilize the toy on a surface by using their hand (hand can be fisted).
- Give toys that are less stable and requires the infant to use their hand to stabilize the toy to play with i.e. toys with a wobble, consider removing the base on a stable toy.
- Place the toy in the helper hand to encourage holding; choose a toy that will easily fit in the helper hand. If working on bimanual skills, teach using dominant hand to place and push the toy into the helper hand to hold.
- Place toys with textures, sound/light in infants hand to encourage sustained holding. Give a consistent command, “hold”, “squeeze”.
- Place easy to hold item close to infant's hand, physically prompt baby to hold by touching the hand if needed
- Give larger, lightweight toys for holding (e.g., soft stuffie) .
- Place narrow / thin toys for holding into infant's hand. Teach the infant to use the dominant hand to place and push into assisting hand if working on bimanual skills.
- Place toys that change shape, bend, are softer (e.g., small stuffie) in infant's hand. Teach the infant to use the dominant hand to place and push into assisting hand if working on bimanual skills
- Place toys that do not change shape or bend (e.g., block) in infant's hand.
- Give toothbrush holder with toy stuck hiding inside. Infant holds toothbrush holder and adult pulls toy out.
- Give toys that encourage holding and moving of the arm (e.g., rattle, maraca) for shaking.
- Provide resistance while the infant holds and pulls the toy (e.g., tug of war).
- Squeeze squishy toy that makes sounds or lights up. Give a verbal cue “squeeze”.
- Place stamps with larger cylindrical/knob handles in infant's hand and encourage stamping on vertical surface.

Grasp and Release

Grasp: Rotating arm to grasp toys of different shapes

Unimanual: Adjusts position of forearm to grasp toys

Bimanual: Grasp objects from the dominant hand

Why work on this skill:

- This skill will help with the ease of moving your forearm which helps with using two hands together later in daily tasks (e.g., feeding yourself, carrying large objects).

Tips to progress skills:

- Start with presenting the toy close to infant with arms resting on surface (e.g., tray of highchair) with elbow bent to make the task easier.
- Gradually move the toy further away to encourage moving the arm with elbow straight.
- Start by grasping toys with palm down and then progress to having the infant grasp toys while moving the arm with thumb pointing to the ceiling.
- Present toys in a horizontal position progressing to presenting toys in a vertical position and then presenting toys in a diagonal position to encourage arm rotation with grasp.
- Progress to having the infant hold objects that are heavier or harder to hold (palmer vs. pincer grip).
- Encourage the infant to play with toys rotating the arm.

From easier to harder:

- Pat stuffie placed on opposite shoulder.
- Tickle the palm/forearm with a feather/toy/towel to encourage infant to rotate forearm to look for source.
- Place a large bright sticker in infant's palm or on the inner forearm, cue infant to turn palm upwards to see the sticker.
- Hold a rattle and encourage rotating forearm to make sound. Position the rattle initially horizontally then progress to giving rattle vertically. Give two rattles simultaneously or

one to the dominant hand and present another rattle to the dominant hand to provoke grasping of the first rattle using helper hand for bimanual program

- Place a board book in front of infant, show infant how to flip each page with their helper hand. Lift the page slightly to help infant get started. You could create a small book with cardboard or diaper wipe containers fastened to cardboard.
- Hold toothbrush holder and adult drops safe snacks into tube and infant can pour the snacks. Hold toothbrush holder in helper hand for dominant hand to pull out safe snacks.
- Give a toy, such as a rain stick, in a vertical position. Show infant how to flip it over with helper hand to create the sound. Can make your own by putting rice/lentils into an empty spice container or toilet paper roll and taping the ends. Model how to play with a rainstick using both hands for bimanual program.
- Present hand clapper in a vertical position, have infant hold hand clapper and encourage rotating forearm to clap. Give two clappers or use the same method as per the rattle example. Model moving the clapper between hands.
- Drumming - have infant hold drumstick and hold a hand drum to the back/knuckle side of the r helper hand Encourage infant to rotate forearm with palm up to hit drum. Can use household items (e.g., spoon, pot). Give two objects for drumming or have infant hold a drum/ tambourine when drumming.
- Using a box of tissues or ribbons in an empty tissue box, hold the box upside down and encourage infant to pull out tissues/ribbons with palm facing infant.
- Turn wooden knobbed puzzle pieces, cubes, or baby toy cups over to look at sticker underneath (easier = large knobs using palmer grasp; harder = use pincer grasp).
- Phone toy - have infant grasp phone in horizontal position, then encourage rotating forearm to bring phone to ear. Present a flip phone to encourage using both hands to play with phone for bimanual programs.
- Bingo dabber - tape paper onto tray. You can print out a fun design as well.
- Scoop up sand or water and pour it into another container; place the container on the back/ knuckle side of the helper hand side.
- Turn a key in lock - have infant insert a key in a toy lock, then turn the key to open the lock (promoting forearm supination). Encourage holding with helper hand and doing with the dominant hand for bimanual programs.

Grasp: Lifting hand to encourage a stronger grasp

Unimanual: Adjusts helper hand position for grasping

Bimanual: Lifts wrist up when grasping toy to place in an open container held by dominant hand

Why work on this skill:

- Adjusting the hand position will help with grasping toys from different positions/surfaces and develops strength to grasp.

Tips to progress skill:

- Present toys from an “easy to grasp” position to “harder to grasp” position. Easy to grasp position is grasping toys from parent/caregiver’s hand then progressing to grasping from infant’s dominant hand; some infants may be able to progress to grasping from a surface.
- Gradually increase the surface angle from flat surface to vertical surface (e.g., on a wall).
- Give safe, small toys for playing and gradually increase the size of toys (e.g., give a smaller ball and then a medium sized ball).
- Choose “easy to play with/activate” toys using arm and whole hand progressing to toys that require more strength, and combined arm/hand and finger movements.

From easier to harder:

- Fill a Ziplock bag with paint, small toys, glitter and seal tight, have infant smear the paint and play with the toys.
- Place toys on a flat surface, encourage lifting the wrist to activate the toy; such as, tapping a toy piano, playing with a tambourine.
- Fill a water bottle with toys and food colouring, have infant roll the bottle on a flat surface using arm/hand.
- Push a big exercise ball with your hand(s) (hand can be fisted or with an open hand).
- Swipe and/or tap ribbons and necklaces placed on an upright/vertical surface.
- Hit/flick toys on vertical surface using the back of your hand or your fingers.

- Hit a lightweight toy (e.g., balloon, feather) using wrist movement.
- Give high 5's, play hand games (e.g., pat a cake).
- Pull out ribbons, scarves, small toys hidden inside a tissue box (tissue box can be taped to wall).
- Handprints on paper taped to a wall.
- Give push down toys.
- Wipe window dry using a face cloth.
- Put/ pull magnets from a vertical surface.
- Grasp and throw various size balls

Grasp & Release: Coordination of opening and closing hand

Unimanual: Varies type of grasp and releases toys to adult hand or surface

Bimanual: Grasps and regrasps toys, transfers toys between hands

Why work on this skill:

- This skill will help the infant to transfer toys between hands and later use hands together (e.g., grasping and regrasping a piece of paper for cutting).

Tips to progress skill:

- Progress from “easier to grasp” toys to “harder to grasp” toys.
- Give toys closer to infant to grasp and progress to giving toys further away.
- Give toys that encourage give and take games; grasp a toy then give to adult or drop into a basket/bin with larger opening.
- Give toys that need to be inserted into an opening to work on accurate release.

From easier to harder :

- Give toys with sensory features (e.g., spiky ball) to encourage feeling, touching, pinching, opening of hand.

- Give toys that have slots for ease of grasp and release (e.g., oball, slinky). Hide scarves, foil wrapping paper, ribbons etc inside Oball to provoke using two hands to play with hidden objects.
- Grasp large, lightweight, easy to grasp toys from adult's hand and release them into a box (e.g., bumpy sensory balls that are child size).
- Gift ribbon either held by parent or stuck to surface and infant grasps and regrasps.
- Pull out handkerchiefs from a box with a slot or from a whisk and drop into the basket/box.
- Grasp pegs presented in a horizontal position and release to caregiver's hand, infants' dominant hand, or onto table.
- Crumple towel/tissue paper placed on a tray/table by grasping and regrasping.
- Pick up wet sponge from a pail/cookie sheet, squeeze water out and drop the sponge and repeat.
- Grasp cubes from adult's hand, then from dominant hand, and release them to caregiver's hand, to dominant hand, and then to the o table or basket.
- Grasp irregular shape toys from dominant hand, or table and drop them into adult's hand or table
- Grasp shapes from dominant hand, or table, and place them in a shape sorter.
- Grab magnetic toys off of magnetic board and drop into a container.
- Pick up the peg and place them in the hole.
- Grab coins and place them in coin slot/ slot opening of a home made container.
- Grab pom-poms and place them in an ice tray or egg carton.
- Grab toys floating in a water bin.

Manipulation

Manipulation: Coordination and/or isolation of small movements of the hand

Unimanual: Varies type of grasps to suit different sizes of toys

Bimanual: Pointing/poking buttons on toy held by dominant hand, pulling small parts of stretchy toy

Why work on this skill:

- This skill will help the infant play with various toys of various sizes in different ways. Additionally, this skill will help with turning keys, fastening buttons, holding onto zippers, and holding a pencil.

** Close supervision required as this skill uses small objects**

** These activities are more challenging; be mindful to whether infant is having fun and is engaged.

Tips to progress skill:

- Give larger toys (e.g., 1" block) that can be held using the pointer finger, middle finger, and thumb. Then, give smaller toys (e.g., 1cm block) to encourage the infant to hold with the pointer finger, and thumb.
- Mealtimes/snack times are great opportunities to explore safer small items that the infant can pick up and transfer to their mouth.
- Encourage the infant to actively point and pinch using thumb, index, and middle fingers.

From easier to harder:

- Sensory exploration of toys (e.g., fuzzy/furry blankets, mats on tabletop/floor/wall). Encourage infant to pull at strings/tags.
- Board puzzles with nobs for picking up or toys with small handles with adult stabilizing toys.
- Infant points to pictures in books or pokes at toys.
- Play on a musical keyboard, encourage use of index finger.
- Press buttons on a toy to activate toy with forearm on table.

- Bubbles: point and try to pop with index finger.
- Finger puppets.
- Finger feeding: Place small pieces of food on the food tray and get infant to use thumb and index finger (without middle finger) to self-feed.
- Story books with windows and pulling items, finger isolation to point to certain things or items on the page.
- Push or poke items into an egg carton/towel roll cardboard holder; pulling out pipe cleaners inserted in colander holes (e.g., push and pull straws through holes)
- Squeeze out small sponges with water, play by pinching.
- Small toy syringes, get infant to squeeze out water.
- Pick up cotton balls and paint with them.
- Peel stickers half stuck on tray/table.
- Animal rescue: Use masking tape to secure toys to a surface (flat is easier than vertical). Encourage the infant to use a pinching grasp to peel the tape off and rescue the animal.
- Velcro board: add velcro to smaller items and have the infant pull them off.
- Connecting toys such as rotating animal parts (i.e. head, legs, body) and pushing connecting toy pieces together first with minimal precision then progressing to toys requiring pushing together with high precision.

Appendices

Appendix A – Example of Baby-CIMT Program

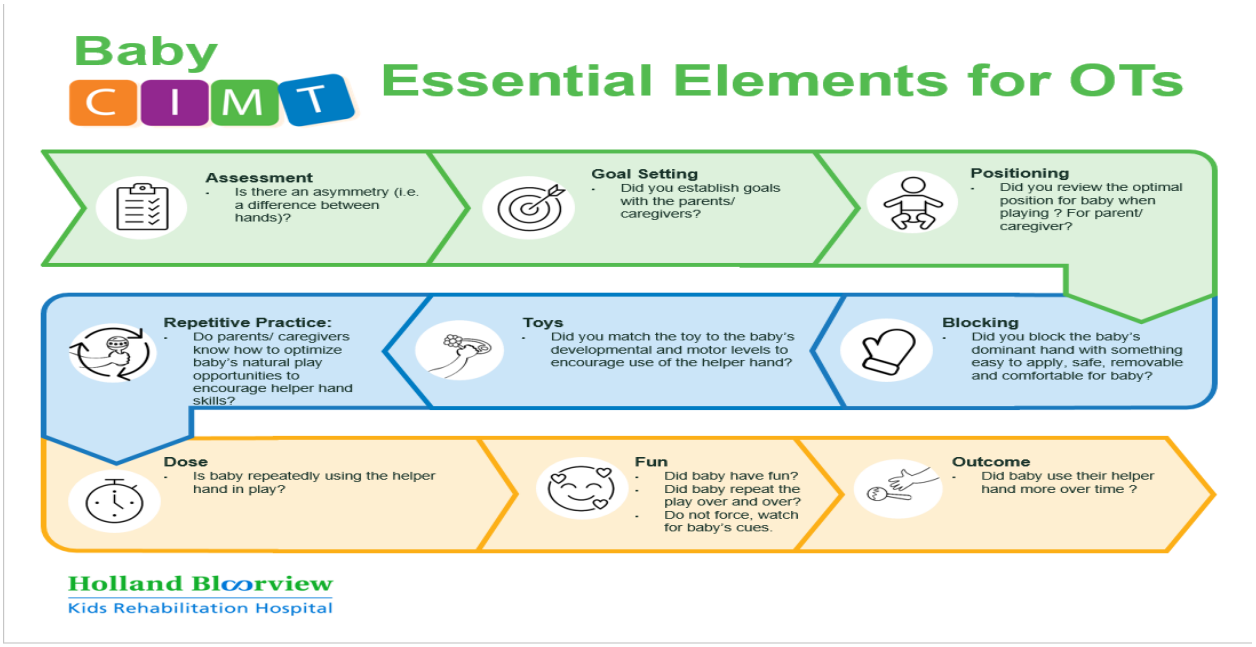
To date, one evidence-based parent mediated Baby-CIMT home program is divided into three 6-week blocks (Reference to: **National Library of Medicine website**).

In this program, Baby-CIMT is carried out for 30 minutes/day for 7 days per week, for 6-weeks, followed by a 6-week break, then repeating Baby-CIMT for another 6-weeks. The 30-minute session can be broken up into shorter sessions if the infant is not yet tolerating 30 minutes. During the 6-week break, the infant is given toys that require two hands to play with for the purpose of practicing the helper hand skills learned in the first 6 weeks.

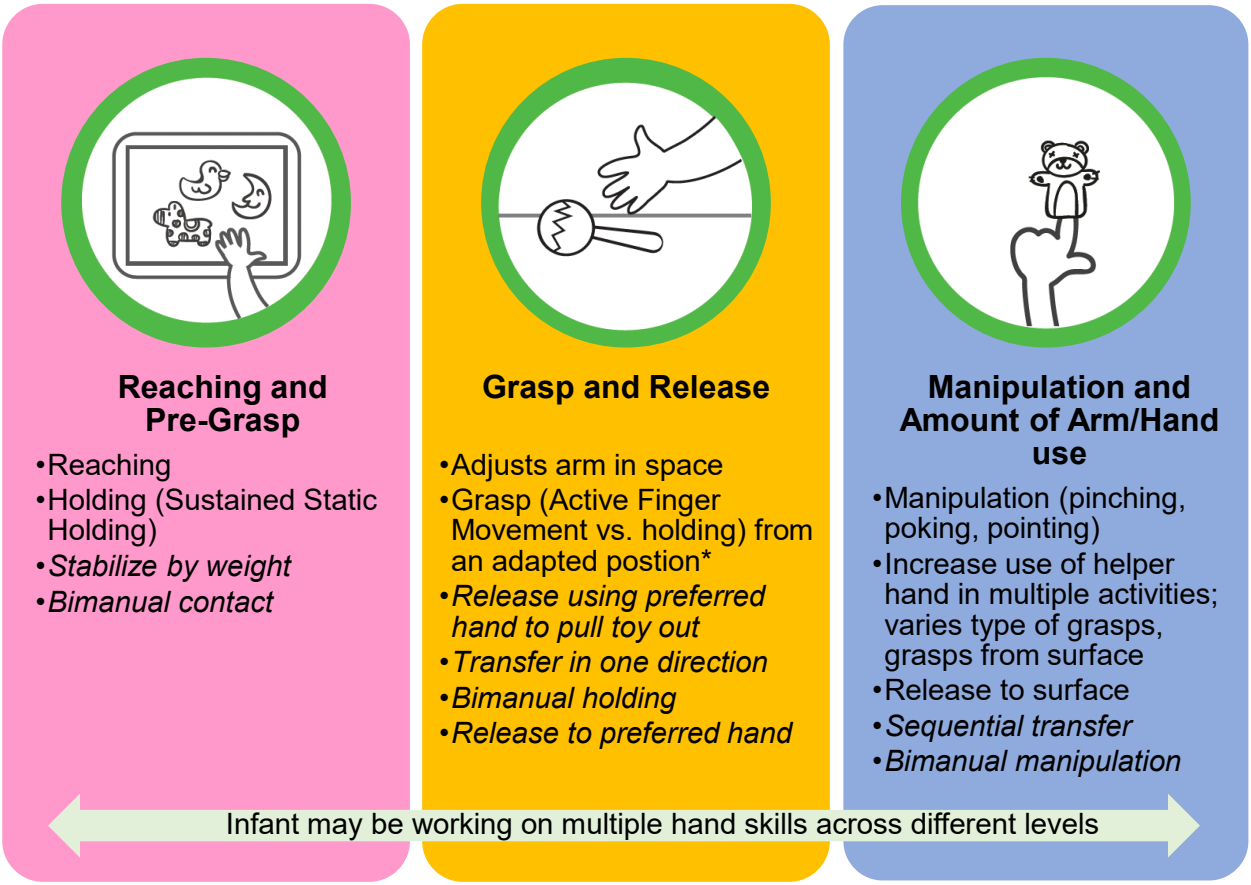
This is only one example of a Baby-CIMT program. The clinical team may recommend a different program frequency from the one above. For example, some infants may tolerate more Baby-CIMT and/or benefit from a greater intensity, others may benefit from a more distributed intensity (e.g., shorter sessions over more weeks), and others may need less intensity but more frequent blocks. At the time of print, evidence shows an effective Baby-CIMT program requires at least 42-hours (Eliasson, A.-C, et al. (2018)).

Overall, we want to develop a "just right" Baby-CIMT parent mediated home program that encourages the infant to use their helper hand more overtime.

Appendix B – Baby-CIMT Essential Elements



Appendix C: Arm and Hand Function Overview



Appendix D: Case Studies

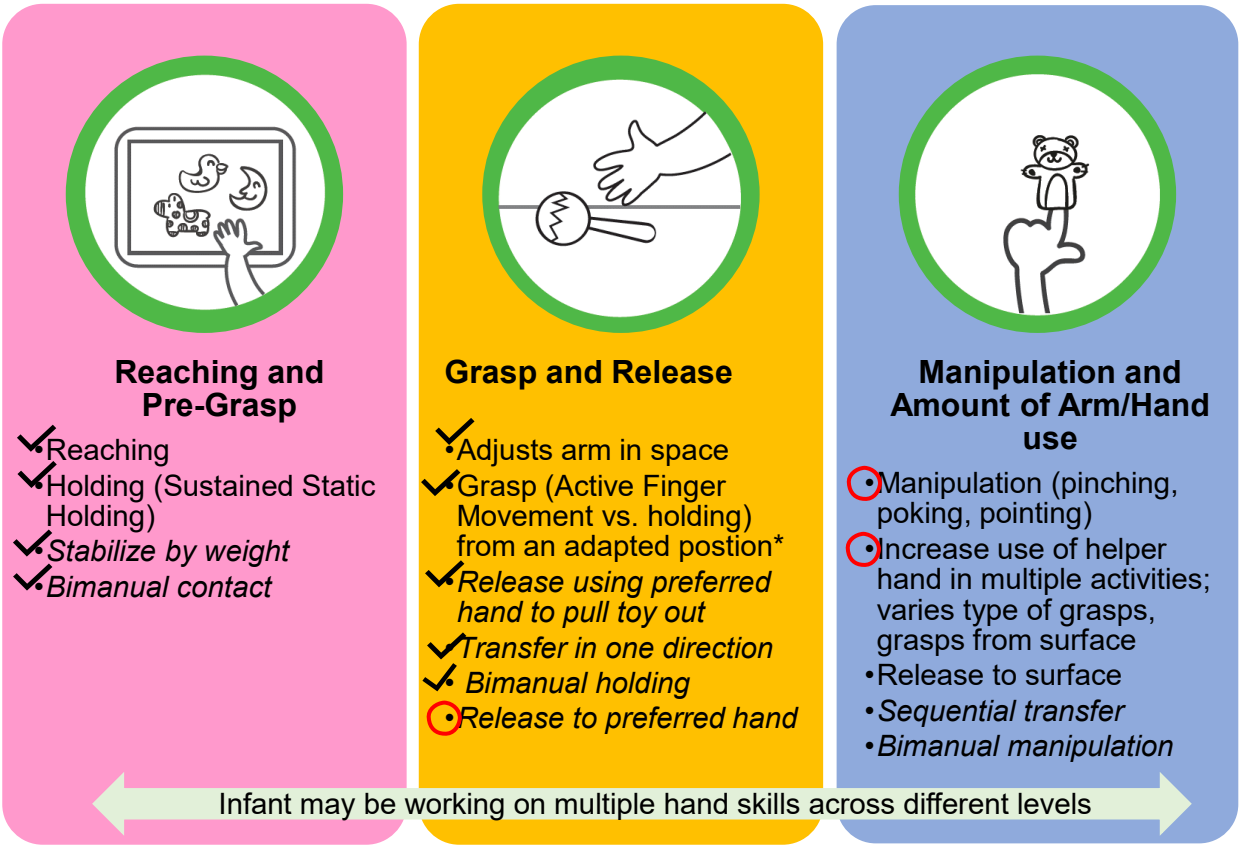
Case Study 1:

You see a 15-month-old toddler who presents with a moderate preference to use the right hand with a diagnosis of left hemiplegic cerebral palsy.

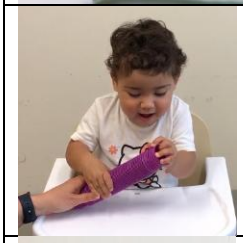
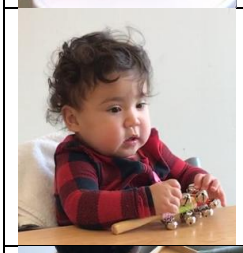
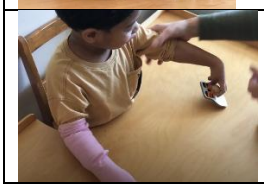
Parents report the toddler uses the preferred dominant right hand to grasp toys from the table and transfer toys to the left helper hand. While the left helper hand can hold toys well the toddler picks up toys awkwardly and has difficulty with releasing toys from the helper hand.

On observation, the infant can spontaneously use either hand for reaching and holding when motivating toys are presented. When reaching, the toddler adjusts arm in space to grasp objects from your hand or from the toddler's dominant hand. Depending on the toy properties you notice the toddler will bring both hands together to hold, grasp, and play with a toy. They are inconsistently isolating their left index finger for poking and rarely pinch, when they do it is weak. Grasp from the table using the left hand is emerging and is slightly awkward and slow compared to grasping from the table with the right hand. When releasing toys the infant uses the dominant hand to pull the toy out but on occasion is starting to release to the preferred hand. Overall, the asymmetry between the hands is mild.

Parent goals: To increase ease of release and using the left hand to play with the toy (press buttons, moving the toys between hands).



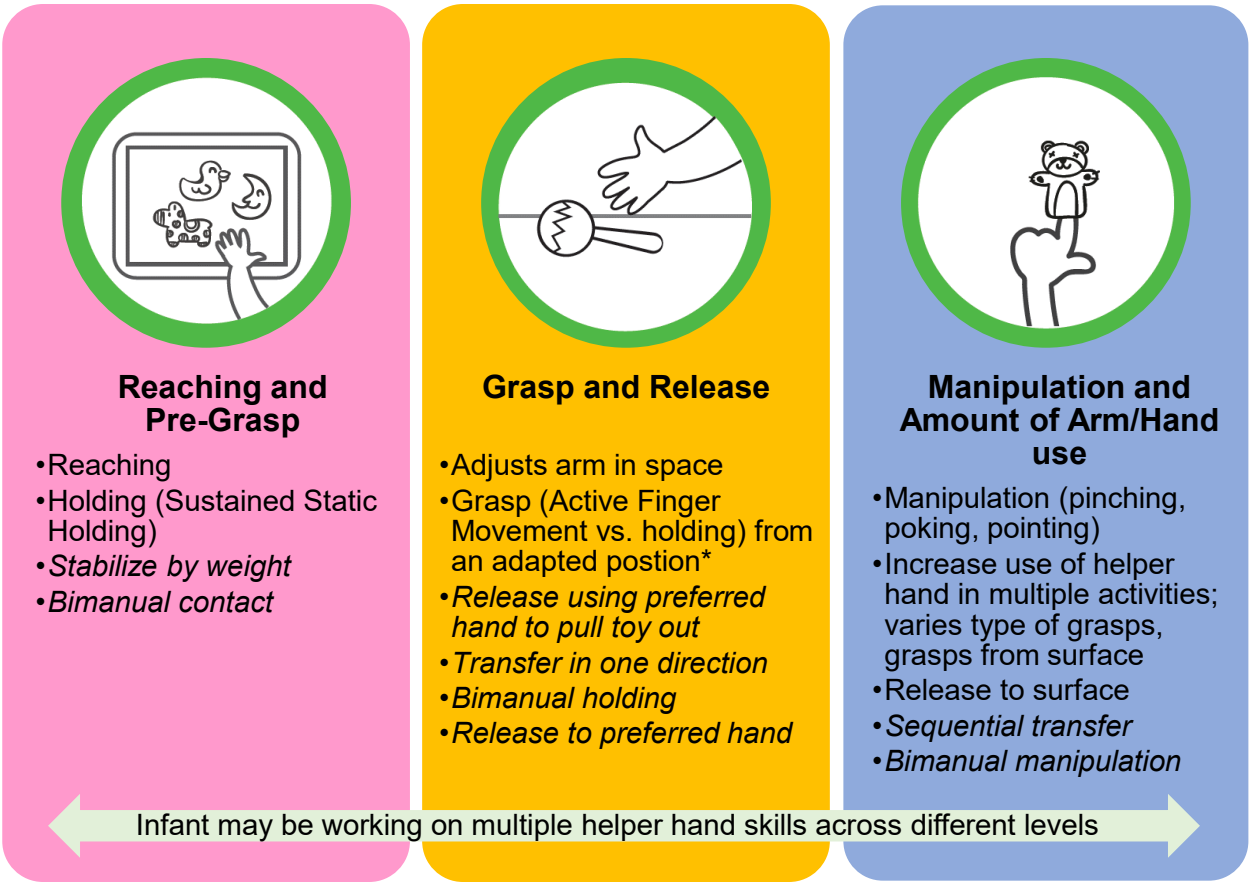
Early Hand Therapy Program recommendation: Based on the parental goals, the infant's motor presentation and current hand skills/ abilities, the following approach would be reasonable. A hybrid approach is a reasonable approach to present to the family to provide some gentle blocking of the dominant hand to provoke targeted helper hand skills that may not be easily elicited in bimanual play due to infants' preference of using the dominant hand such as poking, pinching, and grasping from the table. Of note, some infants/ toddler / children will not grasp from the table or release to the table if it is more efficient for them to grasp from dominant hand and release to the dominant hand. There should be dedicated and repeated practice on optimizing bimanual skills as the toddler will need to learn the action-oriented goals for using two hands. Working on bimanual skills such as readjusts grasps/varies grasps and releasing to the table by setting up the environment to provoke these skills will help develop helper hand skills together with the preferred hand during bimanual play. Early hand therapies are used to optimize functional hand skills. If grasp from dominant hand is efficient and release to the dominant hand is efficient and does not impact bimanual skills the infant/ toddler/child working on other helper hand skills may be a reasonable approach.

Some play suggestions may include:	
	Toys that have smaller parts/ features encourage manipulation (pinching and poking). When using in bimanual play, encourage the infant to poke and pull while the preferred hand holds the toy stable. Toys with multiple features or textures and moving parts encourage varying grasps and regrasping to explore the toy.
	Toys with different sized pieces encourage adjustment for grasping and refining grasp. Giving toys with parts / bits and pieces inside provoke poking, pinching and using two hands together, grasping and regrasping, transferring toy between hands, and bimanual manipulation.
	Books or toys with textures and high sensory input can be motivating. Smaller areas provoke more finger isolation. Positioning the book close to the body may make finger control easier. For bimanual use, the helper hand can hold/ turn the page or explore the page depending on skills.
	Set-up the environment to encourage releasing to the table or another surface if practicing release to the table/surface.
	Toys with small features/ buttons encourage one hand to hold and the other to engage with the parts, two hands doing different actions. Larger or heavier toys encourage both hands to work together to interact with the toy.
	If working on grasp from table toys with large knobs and stable toys (e.g. blocks) are easier to grasp from the table compared to flat toys (e.g. coins) or rolling toys. Placing toys close to the body reduces the coordination to reach and grasp, as grasping from the table becomes more frequent, move the toy further away.

Case study 2:

You see a 5-month-old infant, corrected age, with a diagnosis of right hemiplegic cerebral palsy. Parents report the infant most often does not use the right arm and hand. The right hand is frequently fisted, and any toys placed in the right hand are either quickly dropped or pulled out using the dominant (left) hand. During the assessment, gentle blocking of the left (dominant) hand was attempted; however, the infant became fussy intermittently with the blocking. Overall, there is a marked asymmetry in upper limb use.

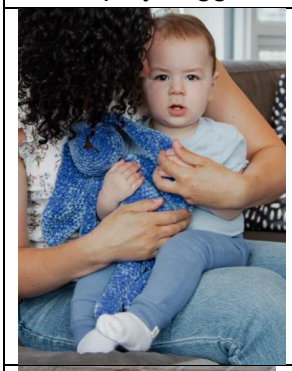
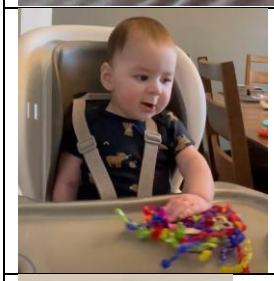
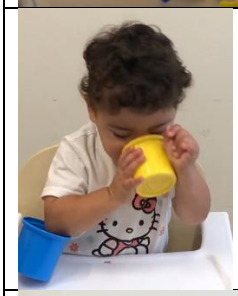
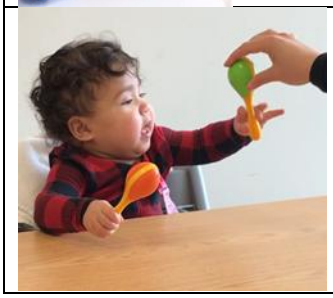
Parent goals: to increase use of the right hand for reaching for toys, holding toys, and grasping toys to bring toys to mouth for exploring.



Early Hand Asymmetry Therapy Program recommendation: Based on the parental goals, the infant's motor presentation and current hand skills/abilities, and the infant is not tolerating blocking well, the following approach would be reasonable.

Since the infant is not yet spontaneously using the helper hand and is not tolerating blocking a Baby-CIMT program may be challenging at this stage; however, if the parents are open to trying it, very short intervals of distributed blocking throughout the day could be introduced to gradually build tolerance such as a few minutes at a time. Softer, more natural approaches—such as intentional positioning on the parent's lap—may be better tolerated and more successful initially versus using a sock/mitt to contact or hold "easy to hold toys". As the infant demonstrates more spontaneous use of the hand i.e. unimanual capacity and awareness of arm and hand, it is important to provide bimanual opportunities to allow the infant to work on coordinating both hands together to bring toys to mouth for exploration.

If the parents are unable to implement blocking at all, starting with a bimanual therapy approach is another option. You would educate parents on how to implement intentional repeated play using toys to impact goals such as initiates use of the helper hand for bimanual reaching and bimanual holding of larger objects to bring toys to mouth for exploring, and progressing to grasping objects from the dominant hand to develop the bimanual skills. As the infant begins to show progress it is important to review goals together with the parents to progress the program.

Some play suggestions may include:	
	Start with a comfortable position, preferred toy, and if needed physically helping the infant to bring both hands together to contact and hold the toy. Remove your assistance as soon as possible. Only help as needed to model/show the infant what you want the infant to do.
	Toys that are narrow/thin, or have “easy to hold” that fits well in the infant’s hand are easier to maintain holding (rain sticks, maraca etc). Toys that match the infant’s interests will be a source of motivation for holding.
	High sensory motivating toys that are easy to activate or interact with encourage reaching to touch or bat.
	Presenting larger items can encourage bimanual holding, the infant’s hand can be fisted as the goal at this stage is to encourage integration of both hands together.
	Engaging the dominant hand will help the infant to use the helper hand. Giving “easy to hold” toys with a sensory component can be highly motivating for holding and playing.

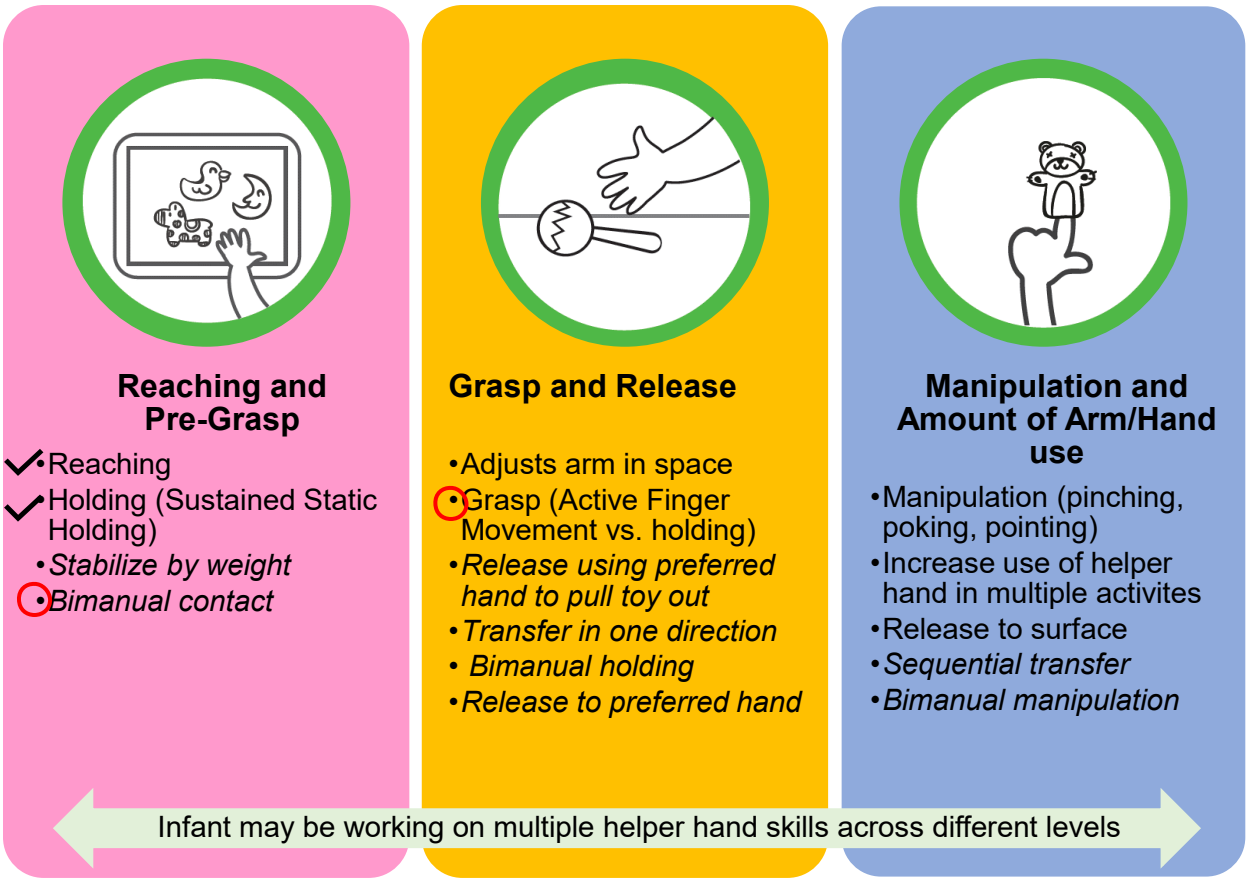
	Giving easy to reach for and easy to hold toys near the helper hand. Consider toy features to help infant visually attend to the toy and that will motivate the infant to play with the toy.

Case study 3:

You see an 11-month-old, corrected age infant who is has a high probability for left hemiplegic cerebral palsy.

Parents report that the infant is beginning to reach for toys more consistently and is more able to grasp with the left hand; however, grasp with the left hand is awkward and inconsistent with items frequently falling from the hand. When a toy is placed in the left (helper) hand, the infant is able to hold the toy i.e. holds a maraca placed in the left hand and shakes it. You observe when the infant is playing the infant typically initiates with the dominant (right) hand and then brings in the left hand after a moderate delay and the helper hand is used to support or prop the object but is not actively holding or grasping the object. The infant tolerated short periods of right-hand blocking. During these periods, the infant demonstrated spontaneous use of the left arm and hand to reach for, touch, hold, and grossly grasp a toy. Overall, there is moderate asymmetry in upper extremity use.

Parents identified the following goals: Increase frequency and spontaneous use of the helper (left) hand for holding and grasping of toys for bimanual hand use such as pulling apart toys.



Early Hand Asymmetry Therapy program recommendation: Based on the parental goals, the infant's motor presentation and current hand skills/abilities, and the infant is tolerating blocking the following approach would be reasonable.

Since the infant is tolerating right-hand blocking and is beginning to integrate the left hand—albeit with a delay—a hybrid therapy approach is reasonable, provided the parents are comfortable with blocking the right hand. It may be reasonable to incorporate short, distributed periods of right-hand blocking throughout the day during play to encourage reaching with the helper (left) hand, stabilizing by weight, and to support refinement of holding and grasping skills. Pairing this with a bimanual program to work towards moving objects / transfer in one direction between hands, releasing objects to preferred hand, transfer objects between hands, and twisting, turning and rotating objects.. Reviewing the program as the infant progresses in hand skills and the goals with the parents will help determine next action skill focused goals.

This combined approach can support improved spontaneous use and skill development of the helper hand while respecting the infant's current tolerance and developmental stage.

Some play suggestions may include:	
	Play activities that encourage moving an item between spaces promotes holding for longer periods, reaching, and targeted release. Using different size and/or textures encourages adjusting grasping and refining grasp.
 	Toys that have an unstable component (ball, round base, pages of a book etc) or items with resistance that need force to pull apart encourage one hand to stabilize and the other to manipulate. Pull apart items promote strength, grasp and regrasp, and adjusting hand in space. Give toys that are easy to hold and grasp with low resistance to pull apart first then progress to toys with higher resistance. Toys that need to be put together and pulled apart naturally provoke turning , twisting of toys .
	Once they can statically hold an item, to work on release, teach how to use their dominant hand to pull the toy from the helper hand. This works on coordinating both hands together for transfers.

Frequently Asked Questions

1. I am seeing an infant who is not tolerating blocking of the preferred dominant hand what can I do?
   I am seeing an infant who initially tolerated blocking of the dominant hand but is no longer accepting blocking of the dominant hand what can I do?

   Are there any suggestions to block the dominant hand?

   Consider trying some of the following to block the dominant hand:
   - Intentionally positioning the infant so the helper hand is more accessible to the toy, for example, holding the infant so the preferred dominant hand is behind your back and the helper hand is free to play with toys.
   - Giving a toy to the preferred dominant hand to occupy the hand while at the same time provoking use of the helper hand.
   - You can also try blocking with "softer" methods such as tucking the preferred hand into the onesie, sewing the sleeve of the onesie shut, using a chip clip at the end of the sleeve, using a longer sock that goes past the elbow above up to the shoulder if the infant is pulling the sock off.

   You could try shorter periods of distributed blocking i.e. 5 mins vs 10 vs 15 mins etc. and gradually increase the time as tolerated. Remember you do not need to eliminate all movement in the dominant hand, you just want to make the dominant hand clumsier if the infant uses the hand. Consider the goals, the family context, and if blocking is necessary to achieve the goals.

   If trying other methods to block the dominant preferred hand is unsuccessful consider if the goals are achievable using bimanual therapy. You could also try a hybrid approach that includes bimanual and blocking of the preferred hand.

2. What are some guidelines for how frequently or how long to do Early Hand Asymmetry Therapy?

   The existing literatures suggests the following guidelines: Greaves, S., & Hoare, B. (2024) For Baby CIMT for infants under 18 months – 30 mins per day, 7 days per week x 6 weeks and for infants > 18 months, 2 hours per day, 7 days per week x 6 weeks.

   For bimanual therapy for infants 12-18 months, 30 minutes per day, 7 days per weeks x 6-8 weeks. For preschoolers and school aged children with task specific goals you would be working on goal directed therapy i.e. dressing.

   These are guidelines and the infants progress should be monitored to determine when the activities need to be graded to promote the “just right” challenge. Early arm and hand

therapy for some children may continue to be appropriate given their developmental profile thus continuing beyond the recommended period of time if the infant would continue to benefit from intentional play to promote helper hand skills development. The type of arm and hand therapy can be modified to match the goals and infant's development.

3. How do I know how many "rounds" of bimanual or Baby Constraint Induced Movement Therapy (Baby-CIMT) should I be doing?

   This would depend on a number of factors, some of which to consider include:
   a. What are the goals and are the goals met?
   b. Is the infant making progress, and are there still missing skills?
   c. What is your model of service delivery and/or capacity for seeing this client? If needed in addition to parent coaching, can you leverage other persons in the infant's environment (i.e. daycare? Preschool) to help with implementing the program?
   d. Does the family require a break from early manual therapy?
   e. Does the infant require a break to consolidate current skills i.e. more practice to generalize existing learned skills?

4. My infant is not interested in playing with toys what can I do?

   When playing with the infant and choosing toys you should consider the infants developmental profile, motor, skills, and abilities. For example, using your knowledge of motor skill development in infants, consider do we expect infants to be able to play with this toy at this time? Consider the features and properties of toys, are these well matched to the goals, the infant's developmental profile, and motor skills and abilities. Did you model / show the infant how to play with the toy? If the toys are too hard to play with or to easy you will not get the repeated motor practice to impact hand skills. You want to scaffold the play activity so the infant experiences some success and some effort playing with the toy to learn the actions and functional hand skills needed. For some infants, toys with sensory features such as toys that light up, vibrate/move/jiggle etc. will be more motivating.

5. How do I know when to stop an Early Hand Asymmetry Therapy program?

   Some factors to consider include:
   a. Did you achieve the goals?
   b. Do parents have other action skill focused goals? Or are the goals task focused or participation focused i.e. dressing, if yes, move towards goal directed therapy.
   c. Are there missing skills to work towards based on your reassessment?
   d. Are parents feeling more confident and empowered when playing with their infant enabling you to take on a less coaching role?

6. How early can I start a hand therapy program?

   There is evidence to show starting a hand therapy program as early as 3 to 5 months is feasible. Starting a hand therapy program when there is observable and/or reported asymmetry between the hands is reasonable.

7. With ongoing early arm and hand therapy, will the infant be able to achieve all levels of hand skills?

   Starting arm and hand therapy as early as possible maximizes potential neuroplasticity and increases the potential arm and hand skills. However, the prognosis is also dependent on factors including location and extent of brain lesion(s), cognitive development, and any co-occurring medical complexities. Not all children will be able to achieve all hand skills. It is important to maximize the skills that they do have to support function. If a child is unable to grasp but can stabilize by weight with their helper hand, teaching them how to use this strategy for bimanual tasks (opening containers, carrying items) would optimize their helper hand skills and function. The goal of early arm and hand therapy is to optimize function and what is functional differs for each infant/child.

8. Do I need to buy specific toys, and do I need a lot of toys for Early Hand Asymmetry Therapy?

   No, you do not need to buy specific toys to do Early Hand Asymmetry Therapy. Reserving toys specifically for therapy can support excitement and motivation (ie. bringing out these toys only during this intentional play time). Coaching parents/caregivers on how to choose and /or use commonly found objects and/or toys in the infant's home, and/or make toys from common objects to work on specific goals helps to minimize barriers and empowers parents. Depending on the goals, while having a variety of objects/ toys that can be used with unimanual play and/or bimanual play may be helpful, you can coach parents/caregivers on how to use a few toys well to work on multiple helper hand skills i.e. how to position the infant, how to present or adapt the same toy in different ways to work on different goals, show the parents/caregivers how you want the infant to play with the toy to achieve the goals, develop a different story/narrative to make the playing fun to work on different goals. See play activities and case studies for ideas on how to use a wide range of toys.

9. Can early arm and hand therapy be implemented virtually/remotely?

   Yes, early arm and hand therapy can be provided virtually. If timing of appointments, internet resources etc. are a barrier to monitoring therapy plans, parents/caregivers can record videos to review with the clinician. Since the program is based on a coaching model it is feasible to be supported by telehealth/ virtual appointments.

10. Where can I learn how to implement the coaching model?

Publication: Development of the Applied Coaching Tool for Pediatric Rehabilitation Therapists: A Practice Support Tool for Therapists Coaching Parents of Young Children. (https://pubmed.ncbi.nlm.nih.gov/40226902/)

Online resource: https://cumming.ucalgary.ca/early-hand-therapy-4-cp/coaching-caregivers/applied-coaching-tool

References

Boyd, Roslyn N et al. “Randomized Comparison Trial of Rehabilitation Very Early for Infants with Congenital Hemiplegia.” The Journal of pediatrics vol. 277 (2025): 114381. doi:10.1016/j.jpeds.2024.114381

Eliasson, A.-C., Nordstrand, L., Ek, L., Lennartsson, F., Sjöstrand, L., Tedroff, K., & Krumlinde-Sundholm, L. (2018). The effectiveness of Baby-CIMT in infants younger than 12 months with clinical signs of unilateral-cerebral palsy; an explorative study with randomized design. Research in Developmental Disabilities, 72, 191–201. https://doi.org/10.1016/j.ridd.2017.11.006

Fehlings, D., Novak, I. & Eliasson, A.C. Hands down, early wins: the case for active, play and training based therapies in unilateral cerebral palsy. Pediatr Res (2025). https://doi.org/10.1038/s41390-025-04398-y

Figueiredo, P. R. P., Mancini, M. C., Feitosa, A. M., Teixeira, C. M. M. F., Guerzoni, V. P. D., Elvrum, A.-K. G., Ferre, C. L., Gordon, A. M., & Brandão, M. B. (2020). Hand–arm bimanual intensive therapy and daily functioning of children with bilateral cerebral palsy: A randomized controlled trial. Developmental Medicine & Child Neurology, 62(11), 1274–1282. https://doi.org/10.1111/dmcn.1463

Greaves, S., & Hoare, B. (2024). Upper Limb Therapy for Infants and Young Children with Unilateral Cerebral Palsy: A Clinical Framework. Journal of clinical medicine, 13(22), 6873. https://doi.org/10.3390/jcm13226873

Greaves S, Imms C, Dodd K, Krumlinde-Sundholm L. (2013) Development of the Mini-Assisting Hand Assessment: evidence for content and internal scale validity. Developmental Medicine & Child Neurology 55;11 1030-1037).

Hoare B, Greaves S. Unimanual versus bimanual therapy in children with unilateral cerebral palsy: Same, same, but different. *Journal of Pediatric Rehabilitation Medicine*. 2017;10(1):47-59. doi:10.3233/PRM-170410

Jackman, M., Lannin, N. A., Galea, C., Sakzewski, L., Miller, L., & Novak, I. (2020). What is the threshold dose of upper limb training for children with cerebral palsy to improve function? A systematic review. Australian Occupational Therapy Journal, 67(3), 269–280. https://doi.org/10.1111/1440-1630.12666

Krumlinde-Sundholm, L; Ek, L; Sicola, E; Sjöstrand, L; Guzzetta, A; Sgandurra, G; Cioni, G; Eliasson, AC (2017) Development of the Hand Assessment for Infants: evidence of internal scale validity. Developmental Medicine and Child Neurology. 2017. 59: 1276-1283.
Law, M., Baptiste, S., McColl, M. A., Opzoomer, A., Polatajko, H. J., & Pollock, N. (1990). *The Canadian Occupational Performance Measure: An outcome measure for occupational therapy. Canadian Journal of Occupational Therapy, 57*(2), 82–87. https://doi.org/10.1177/000841749005700207

Merino-Andrés J, López-Muñoz P, Carrión RP, Martín-Casas P, Ruiz-Becerro I, Hidalgo-Robles Á. Is more always better? Effectiveness of constraint-induced movement therapy in children with high-risk or unilateral cerebral palsy (0–6 years): Systematic review and meta-analysis. Child Care Health Dev. 2024;50(3):e13262. doi:10.1111/cch.13262

Moore HG, Ayala A, Aravamuthan BR, Smith AE, Ramey SL, Hoyt CR. Caregiver determinants and capacity for participation in constraint-induced movement therapy. Front Pediatr. 2025;13:1487781. doi:10.3389/fped.2025.1487781

Morgan, C., Fetters, L., Adde, L., Badawi, N., Bancale, A., Boyd, R. N., Chorna, O., Cioni, G., Damiano, D. L., Darrah, J., de Vries, L. S., Dusing, S., Einspieler, C., Eliasson, A.-C., Ferriero, D., Fehlings, D., Forssberg, H., Gordon, A. M., Greaves, S., … Novak, I. (2021). Early intervention for children aged 0 to 2 years with or at high risk of cerebral palsy: International clinical practice guideline based on systematic reviews. JAMA Pediatrics, 175(8), 846–858. https://doi.org/10.1001/jamapediatrics.2021.087

Novak, I., & Honan, I. (2019). Effectiveness of paediatric occupational therapy for children with disabilities: A systematic review. Australian Occupational Therapy Journal, 66(3), 258–273. https://doi.org/10.1111/1440-1630.12573

Sköld, A., Norling Hermansson, L., Krumlinde-Sundholm, L., & Eliasson, A.-C. (2011). Development and evidence of validity for the Children's Hand-use Experience Questionnaire (CHEQ). Developmental Medicine & Child Neurology, 53(5), 436–442. https://doi.org/10.1111/j.1469-8749.2010.03896.x

Steenbeek, D., Ketelaar, M., Galama, K., & Gorter, J. W. (2007). Goal attainment scaling in paediatric rehabilitation: A critical review of the literature. Developmental Medicine & Child Neurology, 49(7), 550–556. https://doi.org/10.1111/j.1469-8749.2007.00550.x

Susan Greaves, Christine Imms, Lena Krumlinde-Sundholm, Karen Dodd, Ann-Christin Eliasson,Bimanual behaviours in children aged 8–18 months: A literature review to select toys that elicit the use of two hands,Research in Developmental Disabilities, Volume 33, Issue 1, https://doi.org/10.1016/j.ridd.2011.09.012

Sutcliffe TL, Logan WJ, Fehlings DL. Pediatric Constraint-Induced Movement Therapy Is Associated With Increased Contralateral Cortical Activity on Functional Magnetic Resonance Imaging. Journal of Child Neurology. 2009;24(10):1230-1235. doi:10.1177/0883073809341268

Svensson K, Eliasson AC, Sundelin H, Holmqvist KL. Parents in the Driver's Seat-Experiences of Parent-Delivered Baby-mCIMT Coached Remotely. J Clin Med. 2024;13(16):4864. doi:10.3390/jcm13164864

Taylor, E., Greaves, S., & Hoare, B. (2025). Barriers, Facilitators, and a Proposed Model of Care for Implementation of Upper Limb Distributed Practice Approaches for Children with Unilateral Cerebral Palsy. Journal of clinical medicine, 14(3), 924. https://doi.org/10.3390/jcm14030924

Ulrike C. Ryll, Johanna Kembe, Cornelia H. Verhage, Giuseppina Sgandurra, Lena Krumlinde-Sundholm,) (2024) The Screening Hand Assessment for Infants for detecting the risk of unilateral cerebral palsy: Item selection and development. Developmental Medicine & Child Neurology 66;12 1644-1652.

Verhaegh APM, Teerenstra S, Nijhuis-van der Sanden MWG, Aarts PBM, Willemsen MAAP, Groen BE. Upper limb training for young children with unilateral cerebral palsy using video coaching: An explorative retrospective clinical study. Aust Occup Ther J. 2025;72(2):e70008. doi:10.1111/1440-1630.70008

Vurrabindi, D., Hilderley, A.J., Kirton, A. et al. Facilitators and barriers to implementation of early intensive manual therapies for young children with cerebral palsy across Canada. BMC Health Serv Res 25, 503 (2025). https://doi.org/10.1186/s12913-025-12621-z