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# Expanding Practice in Trinidad and Tobago: Training Therapists to Implement Pediatric Constraint-Induced Movement Therapy

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## Abstract

While the World Federation of Occupational Therapy (WFOT) recommends that occupational therapists (OTs) competently respond to changing environments and new clinical practice and research demands (WFOT, 2012), there are many challenges for therapists to engage in professional development in countries where resources and specialized expertise are limited. The purpose of this article is to describe a successful educational collaboration between therapists in Trinidad and the United States to further training of Trinidad and Tobago therapists on evidence-based pediatric intensive therapy models, with a focus on pediatric constraint-induced movement therapy (CIMT). The authors applied a translational framework to build capacity for pediatric CIMT in Trinidad which included in-country didactic education and hands-on experience with pediatric patients. This collaboration led to the development of a locally feasible and contextually relevant form of pediatric CIMT which was successfully piloted in Trinidad and Tobago. Intentional efforts must be made to build a competent OT workforce in countries with workforce challenges to ensure that children and adults seeking high quality care can receive an excellent standard of care.



## Keywords

International, training models, intensive therapy, cerebral palsy





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# Expanding Practice in Trinidad: Training Therapists to Implement Pediatric Constraint-Induced Movement Therapy

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## ABSTRACT

While the World Federation of Occupational Therapy (WFOT) recommends that occupational therapists (OTs) competently respond to changing environments and new clinical practice and research demands (WFOT, 2012), there are many challenges for therapists to engage in professional development in countries where resources and specialized expertise are limited. The purpose of this article is to describe a successful educational collaboration between therapists in Trinidad and the United States to further training of Trinidad and Tobago therapists on evidence-based pediatric intensive therapy models, with a focus on pediatric constraint-induced movement therapy (CIMT). The authors applied a translational framework to build capacity for pediatric CIMT in Trinidad which included in-country didactic education and hands-on experience with pediatric patients. This collaboration led to the development of a locally feasible and contextually relevant form of pediatric CIMT which was successfully piloted in Trinidad and Tobago. Intentional efforts must be made to build a competent OT workforce in countries with workforce challenges to ensure that children and adults seeking high quality care can receive an excellent standard of care.

## Introduction

Occupational therapy (OT) practice is complex, requiring therapists to make decisions based on sound clinical reasoning (da Silva et al., 2022). The World Federation of Occupational Therapy (WFOT) recommends that OTs competently respond to changing environments and new clinical practice and research demands by engaging in continuing education and professional development (WFOT, 2012). The WFOT *Code of Ethics* states that OTs have the responsibility to participate in professional development through life-long learning and apply their knowledge and skills in their professional work which is based on best available evidence (WFOT, 2016). This principle facilitates competent OT practice and ensures that children and adults seeking high quality care in all societies are entitled to a standard of excellence. To this end, the purpose of this article is to describe a collaboration between therapists in Trinidad and the United States to further education and training of Trinidad and Tobago therapists on evidence-based pediatric intensive therapy models, with a focus on pediatric constraint-induced movement therapy (CIMT). The authors applied a translational framework to build capacity for pediatric CIMT in Trinidad and Tobago, which included in-country didactic education and hands-on experiences with pediatric patients. This collaboration led to the development of a locally feasible and culturally relevant form of pediatric CIMT which was successfully piloted in Trinidad.

## Background

Pediatric CIMT is a leading, evidence-based rehabilitation approach that has demonstrated efficacy in improving functional skills and abilities in children with hemiparetic cerebral palsy (CP; Coker-Bolt et al., 2015; DeLuca et al., 2017; Novak et al., 2020). Implementation of CIMT into practice remains a challenge, despite the robust evidence supporting its use. Anecdotal evidence suggests that clinicians are interested in CIMT but hesitant to use it (Walker & Pink, 2009). Several studies have investigated barriers to CIMT implementation including a lack of confidence and knowledge and a lack of training in evidence-based CIMT protocols (Fleet et al., 2014; Pedlow et al., 2014). Patient related barriers include cognitive and physical impairments limiting a person's ability to engage in CIMT (Fleet et al., 2014) and clinicians' concerns about patient compliance and safety (Daniel et. al., 2012; Pedlow et al., 2014). Resource-related barriers include a lack of staff, time, and equipment (Daniel et al., 2012; Page et al., 2005; Pedlow et al., 2014).

A recent study by Christie et al. (2019) surveyed clinicians from 17 countries including the United Kingdom, Australia, Denmark, Singapore, Norway and Canada to determine their proficiency in using CIMT. Results indicated a majority of clinicians felt comfortable delivering CIMT, yet less than half of the sample reported attending a CIMT training course. Most respondents reported learning about (or becoming aware of) CIMT from journal articles and/or clinical guidelines. In addition, the fidelity of CIMT programs appeared to be low based on respondents' self-reports, perhaps due to limited formal training. Clinicians who delivered individual CIMT programs reported great variation in


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terms of dosage and outcome measurements. Finally, there was a lower frequency of using CIMT as an intervention in practice, implying that many adults and children who were stroke and brain injury survivors were missing out on this effective upper limb intervention.

The current research on CIMT has described barriers and challenges to implementing this intensive intervention in countries where it is not currently provided, yet few studies have focused on successful implementation in clinical practice settings. In addition, few studies have addressed how CIMT can be delivered in countries where models of healthcare delivery vary, and the number of trained OT providers may be limited. The aim of this project was to successfully train and develop a contextually relevant model of pediatric CIMT in Trinidad and Tobago. We framed our partnership in terms of an implementation science model to support evidence-based OT practice in Trinidad and Tobago (National Institutes of Health, 2021). In this paper, we describe the training activities and indicators of impact, including subjective evaluations and anecdotal and reflective perspectives from practitioners who participated in the training. We include data collected from a pilot program which used the newly developed Trinidad and Tobago pediatric CIMT model.

**Occupational Therapy Practice in Trinidad**

Disability estimates highlight a need for a minimum of 250 OTs to meet the needs of adult and pediatric clients in Trinidad and Tobago but in 2016 only 16 therapists were registered to practice locally (Garcia et al., 2016). In the past, foreign-trained occupational therapists have been recruited to compensate for the lack of locally trained practitioners, however, this method is not sustainable due to the high costs of recruitment and the difficulty in developing cultural competence among foreign-trained OTs (Garcia et al., 2016). Trinidad and Tobago have since made strides to grow the number of highly trained therapy providers and to increase access to rehabilitation services through the development of an entry-level Master of Science in Occupational Therapy (MSOT) education program at the University of the Southern Caribbean (USC; Garcia et al., 2016). With the development and implementation of this program, the USC has since graduated a total of 21 therapists, which has more than doubled the number of working therapists in the country. While the increased number of therapists can be attributed mainly to the implementation of this WFOT-approved educational program, it also highlights the value of the OT profession in Trinidad and Tobago.

The development of the MSOT program has led to collaborations with other Caribbean and international OT schools, more diverse learning activities for students, and additional avenues for continuing education for therapists practicing in Trinidad and Tobago. It has also allowed for advocacy of both the profession and the various populations that need OT in Trinidad and Tobago. As such, OTs can now be found in mental health hospitals, schools, pediatric clinics, physical rehabilitation centers, elderly care facilities, and academia. As the profession of OT continues to grow in Trinidad and Tobago, there is a need to assure new entry-level therapists access to advanced training and mentorship.

**CIMT Education and Training Program for Trinidad Practitioners**

In 2019, Christie et al. concluded that "CIMT is being used globally but not always with fidelity to the original trials. A range of strategies are needed for improving clinicians' knowledge and skills to increase the frequency of program delivery and enhance program delivery with (increased) fidelity" (p. 407)**.** As with almost all good teaching processes, the foundation of training efforts must be a collaborative exchange of information built on a foundational relationship between teachers and learners. With this in mind, a CIMT educational course comprising didactic and hands-on learning activities was designed for and implemented with Trinidad and Tobago practitioners.

**Didactic Education**

The CIMT educational sessions were delivered via didactic, synchronous presentations via a virtual (Zoom) platform to 16 practitioners. In addition, participants were provided targeted reading material and video case examples. The topics of the educational sessions are included in Table 1.

**Table 1**

*Topics of Didactic Educational Sessions*

- Overview of pediatric CIMT and core elements
- Current research on the effectiveness of pediatric CIMT
- Dosage for intensive therapies such as CIMT
- Fidelity measures for CIMT
- Assessment measures commonly used for pediatric CIMT
- The MR3 Cycle: Movement, Reinforcement, Repetition, and Refinement (Ramey et al., 2013)
- Goal setting for pediatric CIMT
- Toy essentials – selecting toys to match the child's abilities and progress goals
- Developing a transition package (discharge program)
- Engaging parents in home-based CIMT programs
- Intensive bimanual therapy
- Neuroimaging findings following participation in pediatric CIMT
- The use of adjunctive therapies with pediatric CIMT
- "Spillover" effects of intensive therapy

**Hands-On Training**

Direct hands-on training was provided for two days and children with hemiparesis and their families volunteered to participate in these sessions. These in-person sessions allowed participant therapists to use information provided in the didactic coursework including selecting assessment measures and appropriate treatment activities and toys and implementing principles of operant conditioning and positive reinforcement to progress a child's motor skills and abilities. At the end of each hands-on session, we had a debriefing with participants to listen to their questions and welcome discussion about the training. Questions were posed to participants such as, *"What other available*


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*resources do you need to deliver high quality CIMT?"* and *"How could clinicians build models of CIMT for clinical settings in Trinidad and Tobago?"* In many countries, the delivery of intensive therapies is based on very different models of care than those that are commonplace in Western healthcare systems. Most importantly, the hands-on training sessions provided a process to allow participants to consider pediatric models of CIMT which may fit in the context and healthcare system of Trinidad and Tobago (see Table 2).

**Table 2**

*Model of CIMT Programs Developed by Practitioners in Trinidad and Tobago*

| "Signature" CIMT<br>***investigated in most studies* | Trinidad and Tobago Model |
|---|---|
| Constraint of less involved extremity with univalved cast | Constraint of less involved extremity with orthotic + mitt |
| High dosage (beyond typical therapy schedule)<br>Dosage = 60 to 120 hours | High dosage (beyond typical therapy schedule)<br>Dosage = 40 hours |
| Use of shaping techniques with repetitive practice with task variation | Use of shaping techniques with repetitive practice with task variation |
| Sessions take place in the natural environment | Sessions provided in a camp setting which was held at a Trinidad pediatric outpatient clinic.<br><br>Parents were given home activities to complete for 1 hour per day to achieve maximal dosage and to involve and empower parents/caregivers to carry out the intervention. |
| Transition or discharge package was provided at end of CIMT program | Follow up sessions with parents and participants took place after the end of the CIMT program. |

**Trinbagonian Practitioners' Perceptions of Training**

Seven therapists (44%, n=7**)** completed a post-training survey. Questions used a 5-point Likert scale from Strongly Agree (5) to Strongly Disagree (1). When asked about their overall satisfaction with training, the majority of therapists strongly agreed (42.9%, n=3) or agreed (42.9%, n=3) that the training was beneficial, and the remainder had a neutral response (14.3%, n=1). The most relevant sessions were face to face training and interactions with clients, (43.8%, n=3) and many found only the training relevant (29.4%, n=2). The majority of participants (71.4%, n=5) found the training content of good quality, while the remainder found the training to be excellent (29.4, n=2%). The training was found to be very relevant to the practitioners' jobs (57.1%, n=4), while the remainder found the training mostly relevant (43.8, n=3%). Respondents provided additional feedback to open ended questions about benefits of training and recommendations for future training (see Table 3).

**Table 3**

*Perceptions of Trinbagonian Practitioners about CIMT Training Program and Future Training Initiatives*

| | | | |
|---|---|---|---|
| Benefits of training | *"Practicing with real clients."* | *"[Learning that] scientific evidence shows that high repetition unilaterally creates neural pathways that improve bilateral use of the UE. CIMT can be used for pts with hemiparesis (CP, stroke, brachial plexus injury)."*<br><br>*"It is important to know the hierarchy of movement and meet your client where they are to present the just right challenge."* | *"How to become creative with choosing targeted interventions and to create the splints."* |
| Recommendations for future training | *"Not enough practical days." (more hands-on days)* | *"Would've like for the course to include adults as well."* | *"Too little time to practice the assessment."* |
| Additional feedback on logistics | *"Was well planned out."* | *"Ensure recordings cover the entire session. Some of the recordings did not show videos mentioned* | |


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| | | | |
|---|---|---|---|
| | | *in the presentation to which the live audience were privy to."* | |
| Has training been used in practise | *"Not as yet as I have no CP clients."* | *"Currently have on my caseload an infant with brachial plexus injury."* | *"The techniques, Yes, I have however, it is not as intensed, given costing and time availability. (Adapted version of it without splints)"* |
| Additional resources needed | *"Mentorship and or coaching."* | *"More information on baby CIMT."* | *"Splinting course"* |
| Overall feedback on training | *"It was a well delivered program and planned."* | *"It was great, thoroughly enjoyed and understood clearly. Looking forward for more in the future."* | *"Well delivered by Dr. Bolt. Great training opportunity created by university."* |

**Piloting the Trinidad and Tobago CIMT Model**

The Trinidad and Tobago model was piloted during one camp-based intervention; the first CIMT intensive program to be delivered in Trinidad. This was a quality improvement project intended to educate practitioners and improve therapy practices within a Trinidad pediatric clinic which regularly used therapy-based camp programs. The primary intent of this project was not to conduct a systematic investigation designed to contribute to generalizable knowledge about CIMT. The goals of the camp were twofold: 1) to explore the use of a camp-based CIMT model to provide high-quality, affordable, intensive evidence-based treatment for children with hemiparesis in Trinidad, and 2) to mentor Trinidad and Tobago therapists on how to deliver the newly developed Trinbagonian CIMT model.

***Participants***

Participants in this CIMT program were a convenience sample of four children ages 1 year and 9 months to 6 years and 4 months with either hemiplegia or tetraplegia. Table 4 provides further demographic information about the participants.

**Table 4**

*Participant Information*

| Child | Affected Side | Gender | Age; Yr:Mo | MACS |
|---|---|---|---|---|
| 1 | R | Male | 1:9 | III |
| 2 | R | Male | 3:7 | III |
| 3 | R | Male | 6:4 | II |
| 4 | L | Male | 6:4 | III |

**MACS – Manual Ability Classification Scale (Eliasson et al., 2006)*

### *Trinidad and Tobago CIMT Program*

The group based CIMT intervention took place at a private OT clinic in Trinidad. Participants engaged in group intervention for four hours per day, four days per week for two consecutive weeks, with an 8-hour home program for a total dosage of 40 hours of CIMT treatment. During intervention participants donned a constraint mitt on the unaffected upper extremity consisting of a custom-fabricated thermoplastic resting hand splint covered by a child-friendly cloth hand puppet. A rigorous camp schedule was developed to ensure maximum usage of the child's affected limb while engaged in play-based therapeutic tasks and daily living activities (see Figure 1). Camp activities centered around four themes (animals, space, pirates and cooking), each spanning two days. Themes were age appropriate and contextually situated to motivate participants to engage in intensive therapy sessions. Each day, participants engaged in circle time, individual and group centers and mealtime, which addressed tactile and proprioceptive awareness, motor abilities, and functional use of the arm and hand. The group-based format allowed for peer support and modeling and children frequently motivated each other. The OT who provided the CIMT training course led each session alongside Trinidad therapists. These Trinidad therapists previously completed the CIMT education and training program, and this pilot camp-based program allowed practitioners an opportunity to apply their newly acquired skills in a real-world clinical setting.


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**Figure 1**

*Children Engaged in Group Activities During Camp-Based CIMT Program*

***Parent Perceptions of the CIMT Camp***

Parents of the children who participated in the camp program were asked to provide feedback to determine their perception of the Trinbagonian CIMT model. A thematic analysis of responses from parents indicated three salient themes: 1) parents valued play-based therapy. Parents commented on the child-friendly activities and the joy that children experienced at the camp, 2) parents expressed a desire for future intensive treatment programs, which can help their kids meet their goals in a cost-effective way, and 3) parents felt the CIMT program helped boost their child's confidence and spontaneous use of the affected arm and hand (see Table 5). While the primary goal of the CIMT camp was to increase participants' use of the affected limb, parents commented on improvements outside of gains in motor abilities.

**Table 5**

*Caregivers Perceptions of CIMT Camp-Based Program*

| Respondent | Comments |
|---|---|
| Caregiver A | *"The camp gave X a boost in confidence, and I think it was instrumental in giving him the extra push to start walking."* (confidence)<br><br>*"Since participating, X uses his right hand a lot more when he's playing. I would definitely be interested if you have another."* (future camps) |
| Caregiver B | *"X enjoyed it to the fullest. Every day he would come home and tell me everything he did. It was awesome*." (increased confidence) |
| Caregiver C | *"CIMT did an amazing job with getting X to use both his hands. This wasn't possible prior to CIMT camp."* (spontaneous of hands)<br><br>*"The environment was perfect for kids, which made him interested. I'm hoping you can have more camps in the future. My concern with [usual] therapy is the cost per session. It's expensive for kids like X, who need repetition. Camp was affordable to the hours achieved."* (intensive or group therapy) |
| Caregiver D | *"We really appreciate the love, effort and consistency that you have shown him. We have seen such an improvement with X's fine motor skills and confidence, and we give all thanks to you and your team"*. (increased confidence) |


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Caregivers reported improvements in their child's motor skills and confidence after participation in the camp based CIMT program intervention (dosage = 40 hours). Parents valued the play-based nature of the program, which increased children's motivation to engage. Motivation is particularly important to achieve high dose treatment, and the active participation needed to achieve motor outcomes (Roberts et al., 2022). All participants' parents expressed a desire to have future camp programs like this in Trinidad, which reveals the desirability of the camp-based therapy model. The demand for future camps implies that an appropriate format of pediatric group-based CIMT intervention in Trinidad and Tobago may include planned repeated doses of high-intensity intervention therapy, perhaps during school vacations. Repeat doses of CIMT camp have been found effective in previous studies (Thompson et al., 2015).

## Discussion

This paper highlights a successful collaboration to train and implement the first CIMT program in Trinidad and Tobago for children with hemiparesis. This collaborative model between the United States and Trinidad and Tobago practitioners allowed almost half of the currently registered therapists in Trinidad and Tobago to receive training on an evidence-based intervention, which otherwise may not have been accessible if therapists had to travel abroad for additional education. This CIMT educational program employed a train-the-trainer model which empowered practitioners to learn a new evidence-based intervention and implement it during a mentored, hands-on training experience, and pilot program. Guided practice was intended to increase therapists' confidence in administering CIMT, preparing them to train future practitioners. The use of in-person or virtual training programs has been shown to expand therapists' knowledge of specialized therapy interventions and support evidence-based practice in counties where resources are limited (Coker-Bolt et al., 2015; Glegg, 2016). Although this training can be provided by specialists from other countries, models should focus on supporting in-country, or regional experts and local providers who have an inherent understanding of the resources and cultural practices within their country and local communities.

The twin islands of Trinidad and Tobago are facing the challenge to support advanced training for new entry-level therapists, an issue that is not unique to this country. In places with underdeveloped rehabilitation structures where therapy providers may have limited specialty training, there remains tremendous barriers to implementing current recommended evidence-based interventions. Countries where OT educational programs exist should consider ways to facilitate continuing and advanced specialty training for alumni and new graduates. This will assure new therapists an opportunity to advance their knowledge and use of evidence-based interventions while remaining committed to the profession and patients within the context and setting of their country. The WHO Rehabilitation 2030 initiative (Gimigliano & Negrin, 2017) suggested several strategies to address the challenges faced by the inability of the current rehabilitation workforce to efficiently meet population needs in countries with limited resources. Emphasis should be placed on building comprehensive rehabilitation service delivery models to progressively achieve equitable access to quality therapy services, especially for children and families living in rural and geographically remote areas (Magnusson et

al., 2017). It is critical to develop a strong interprofessional rehabilitation workforce to meet the unique needs of clients by exploring both in-person and virtual rehabilitation workforce education initiatives. Training models should emphasize the use of formal and in-formal mentorship and coaching where specially trained providers work along-side and support practitioners in countries where resources and the workforce are limited.

The therapists and parents who participated in new CIMT programs felt that intensive models of pediatric rehabilitation were a good fit within the existing rehabilitation structure of Trinidad and Tobago. Since there was a limited number of therapy providers in Trinidad and Tobago, small groups and camp-based models were already commonly used to allow practitioners to provide services to a larger number of clients. A camp-based model was successfully used to deliver a pediatric CIMT program, but could also be used to support feeding skills, handwriting, or social-skills interventions. In addition, in Trinidad and Tobago, individual and small-group models are many times supplemented with parent education and training. Parent-mediated intervention has been shown to be a successful strategy to support in-person therapy sessions after appropriate education is provided to caregivers (Adams et al., 2012; Jackman et al., 2022). Future training sessions in Trinidad and Tobago should consider how to incorporate training of family and caregivers to determine if this approach could be part of a successful intervention model.

Although this training was specific to only one type of evidence-based intensive therapy model for children, the format and delivery method can serve as a model for future training sessions in Trinidad and Tobago and in countries with a limited number of registered therapists. The practitioners who participated in this training contributed to a model of CIMT which was successfully delivered within the context of Trinidad and Tobago during a first-of-its-kind pilot program. Although the pilot program only served a small number of children, it highlights that the CIMT model collaboratively developed with Trinidad and Tobago therapists could be feasibly and successfully delivered and received positive feedback from families. Future studies should investigate additional impacts of the program on children with hemiparesis by using culturally relevant assessment measures to determine specific outcomes of this new Trinidad and Tobago model of CIMT.

## Implications for Occupational Therapy Education

This educational innovation highlights the use of a translational and implementation framework to build capacity for pediatric CIMT in Trinidad and Tobago where healthcare systems and resources are different from the United States where this intervention has been more widely accepted and delivered. The education and training program met the goals to create a locally feasible, culturally relevant form of CIMT which was successfully piloted in that country by therapists trained to deliver the intervention. Evidence-based interventions can be implemented in international settings with different resources, personnel, and healthcare delivery models by using a carefully developed and iterative processes to educate practitioners on the key elements of an intervention and research which support modified or adapted delivery models.


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In-person or virtual training programs have been used to expand therapists' knowledge of specialized therapy interventions and support evidence-based practice in countries with limited resources (Coker-Bolt et al., 2015; Sogbossi et al., 2021). Although this training can be provided by specialists from other countries, these educational models should focus on providing a framework to build experts within a country by training in-country practitioners, who have an inherent understanding of the resources and cultural practices within their country and local communities. In-person training sessions should provide focused education using active collaboration with international therapists, who, in turn, can become the lead or master educators who train others in their country about specialized interventions.

## Conclusion

While the WFOT recommends that OTs competently respond to changing environments and new clinical practice and research demands (WFOT, 2012), there are many challenges for therapists to engage in continuing education and professional development in countries where resources and specialized expertise are limited. Carefully planned and implemented advanced training workshops can support professional development and help practitioners apply knowledge and skills within the context of their own country (WFOT, 2016). These efforts can build a competent OT workforce and ensure that children and adults in all countries receive an excellent standard of care. Future studies should continue to measure the impact of these hands-on training experiences and elucidate how formal and informal mentorship models can be used to increase practitioners' confidence in implementing evidence-based interventions.

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