

CLIMBING FOR ALL ABILITIES: AN OCCUPATIONAL THERAPY-BASED
TRAINING FOR INDOOR ROCK CLIMBING GYM STAFF TO INCREASE
KNOWLEDGE AND SELF-EFFICACY WHEN WORKING WITH INDIVIDUALS
WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITIES

A thesis submitted to the faculty at Stanbridge University in partial fulfillment of the
requirements for the degree of Master of Science in Occupational Therapy

by


Lauren Chetwood, Andrew Hahn, Kianna Ugalde, and Jamie Wilson

Thesis advisor: Kaitlin O'Hara, OTD, OTR/L

October 2023

Certification of Approval

I certify that I have read *Climbing for All Abilities: An Occupational Therapy Based Training for Indoor Rock Climbing Gym Staff to Increase Knowledge and Self-Efficacy When Working with Individuals with Intellectual and Developmental Disabilities* by Lauren Chetwood, Andrew Hahn, Kianna Ugalde, and Jamie Wilson, and in my opinion this work meets the criteria for approving a thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Occupational Therapy at Stanbridge University.



Kaitlin O'Hara, OTD, OTR/L

Instructor of Occupational Therapy



Myka Persson
boxSIGN 1R6JV6ZX-1923QQL3

Myka Persson, OTD, OTR/L

Program Director, Master of Science in Occupational Therapy

Abstract

Indoor rock climbing has demonstrated substantial benefits for both individuals with and without disabilities through extensive research. However, a noticeable gap exists in knowledge and advocacy for populations with intellectual and developmental disabilities (IDD) concerning their access to indoor rock climbing facilities. Indoor rock climbing gyms predominantly lack inclusivity for individuals with IDD despite evidence showcasing considerable advantages such as improved social, motor, and cognitive skills. This study emphasizes the importance of implementing appropriate education staff programs aimed at highlighting adaptive techniques and effective communication strategies to promote a stronger sense of self-efficacy amongst climbing staff. The results of the study support the hypothesis that an occupational therapy-based training program improves self-efficacy and knowledge among climbing gym staff working with participants with IDD. The data revealed an increase in self-efficacy scores of staff who underwent the training program, with a statistically significant z-score value above -2.0. These findings suggest that the occupational therapy-based training program has a positive impact on both self-efficacy and knowledge of climbing gym staff, which is crucial for effectively working with individuals with IDD. Utilizing an occupational therapy based training program for Sender One staff will foster accessibility and integration within the IDD community, ultimately contributing to their quality of life.

Table of Contents

Introduction.....	1
Statement of Problem.....	2
Literature Review.....	3
Improvements in Motor and Cognitive Skills.....	4
Improvements in Self-Efficacy.....	5
Improvements in Social Interaction Skills.....	5
Remaining Gaps.....	6
Clinical Significance of the Evidence.....	7
Methodology.....	8
Design.....	9
Data Analysis.....	10
Ethical and Legal Considerations.....	10
Results.....	11
Discussion.....	12
Limitations.....	13
Conclusion.....	14
References.....	16
Table 1: Wilcoxon Signed Rank Tests Comparing Pre and Post Program Results.....	19
Appendix A: Institutional Review Board Approval.....	20
Appendix B: Site Approval Forms.....	21
Appendix C: Pre- and Post- Test	24
Appendix D: Staff Training Presentation.....	26

Appendix E: Recruitment Flier29

Climbing for All Abilities: An Occupational Therapy Based Training for Indoor Rock Climbing Gym Staff to Increase Knowledge and Self-Efficacy When Working with Individuals With Intellectual and Developmental Disabilities

Indoor rock climbing provides many positive benefits to individuals with and without disabilities, which has been supported by numerous research studies (Bibro & Żarów, 2021; Vreuls et al., 2022; Christensen et al., 2017; Kaplan-Reimer et al., 2010; Darcy & Dowse, 2013; Kokaridas et al., 2018). Some of the most significant benefits include improvements in the domains of social, cognitive, and motor skills. Climbing promotes a sense of social belonging, self-efficacy, and achievement among climbers, which can be seen through positive interactions and rapport building that occurs among peers (Mazzoni et al., 2009). Improvements in cognitive skills can be seen through the climbers' ability to sequence, which requires them to anticipate which holds to use, where to place their feet, and how to shift their weight between holds (Kokaridas et al., 2018). The exercise of upper and lower body strength in climbing activities leads to the development of gross and fine motor skills (Bibro & Żarów, 2021).

Studies have shown that sports activities generally lack accessibility for individuals with disabilities, especially for those with intellectual and developmental disabilities (IDD; Darcy & Dowse, 2013). An intellectual disability is defined as limitations to a person's ability to learn at an expected level and function in daily life (Centers for Disease Control and Prevention, 2022). A developmental delay is when a child's progression through predictable developmental phases slows, stops, or reverses (Centers for Disease Control and Prevention, 2022). Individuals with IDD are less inclined to participate in sports activities than individuals with other disabilities, despite

having a strong desire to participate amongst typically developing peers. This can be attributed to a lack of resources and support from sports communities (Darcy & Dowse, 2013). One study found that there are significantly low physical fitness levels across populations of children with IDD, with above average reports of obesity (Wouters et al., 2020). This further indicates that physical activities are generally less accessible to this population, and that an activity as physically demanding as indoor rock climbing has the potential to improve the fitness levels across populations with IDD.

Implementing educational staff training for climbing gyms would therefore be an appropriate approach to take in promoting accessibility and advocacy for the IDD community. This is necessary to highlight the various adaptive techniques, communication styles, and benefits of climbing for this population. Occupational therapists have various approaches for communicating with and teaching individuals with IDD, which places them in a unique position for collaborating with instructors at indoor climbing gyms. Occupational therapists can introduce indoor rock climbing to individuals with IDD in a manner that is both safe and enjoyable, while also making it accessible and easy to understand.

Statement of Problem

Individuals with IDD often face difficulties in receiving necessary accommodations to participate in physical activities like rock climbing due to insufficient resources (Darcy & Dowse, 2013; Wouters et al., 2020). Accessibility issues can be linked to a general lack of awareness and understanding of IDD diagnosis within diverse sporting environments, including the rock climbing community. There is a high demand within these communities for enhancing the accessibility of sports activities, including

climbing, for individuals with IDD (Bibro & Żarów, 2023; Wouters et al., 2020). To promote inclusivity, climbing gyms would benefit from incorporating training sessions that teach staff how to assist participants with IDD to ensure the safety of all climbers (Kokaridas et al., 2018; Bibro & Żarów, 2021). Our research question was if occupational therapy-based training for indoor rock climbing gym staff increases their knowledge and self-efficacy when working with individuals with IDD. We hypothesized that the implementation of this training program would increase their knowledge and self-efficacy working with this population. Therefore, the aim of our study was to improve climbing gym staff's knowledge and ability to provide strategies that cultivate an accessible environment for climbers with IDD through an educational training session. This aligns with the Stanbridge University Master of Science Occupational Therapy mission statement of meeting the needs of diverse populations through relevant training and instruction (Stanbridge University, 2023, p. 303). Occupational therapy (OT) practitioners are uniquely qualified to provide this training due to their skills to "identify the demands of occupations and activities" and grade activities to a person's abilities (American Occupational Therapy Association [AOTA], 2020, p. 16). Implementing a training program through an OT lens will enhance the gym staff's ability to accommodate the needs of their climbers.

Literature Review

Indoor rock climbing has become a popular sport, with a growing number of climbing gyms accessible to the public. Evidence demonstrates that there are numerous health benefits to indoor climbing, such as increased muscle strength in gross and fine motor activities, cognitive skills, and social engagement with peers and climbing

instructors (Bibro & Żarów, 2021). Sensory modulation and proprioception have also shown improvement in climbing participants (Christensen et al., 2017; Kaplan-Reimer et al., 2010). One study examined the personal experiences of individuals with IDD who participated in sports through an online self-reported survey that identified benefits, constraints and demographic profiles with disability specific questions. The study reports a sense of achievement/belonging amongst their typically developing peers and identified benefits of participation in sport across a range of functional skills (Darcy & Dowse, 2013). The benefits of sports and indoor rock climbing can be applied to any population, including those with disabilities. This occupation allows individuals to acquire new skills and find new ways to excel in their physical and mental abilities through organized sports.

Improvements in Motor and Cognitive Skills

Several studies have found that indoor rock climbing can lead to improvements in motor and cognitive skills in those with disabilities. Bibro & Żarów (2021) evaluated the increase in physical performance, specifically fine motor skills and balance/coordination among climbers with IDD. Kaplan-Reimer et al. (2010) examined improvement in cognitive abilities between two children with autism spectrum disorder (ASD). The children exhibited their problem-solving skills by following color coordinated climbing routes in the first phase of the trial. In the final phase, the colored routes and cues given through words or gestures were taken away, and the children were able to complete the route without any issues. In addition, the studies by Christensen et al. (2017) and Kokaridas et al. (2018) describe how climbing is a growing attraction among the ASD community. These studies emphasize how climbing promotes motor and cognitive skills,

enhances coordination, sequencing, and problem-solving strategies that support self-efficacy development.

Improvements in Self-Efficacy

Vreuls et al. (2022) evaluated how indoor rock climbing affects the rates of employability and self-efficacy in individuals with IDD. This study found that after an indoor rock climbing program, individuals with IDD reported increased self-efficacy; this finding is valuable in promoting workplace competencies and employability rates.

Mazzoni et al. (2009) utilized an indoor climbing intervention to investigate athletic competency, social acceptance, and climbing efficacy in individuals with IDD. The study examined children with physical/developmental challenges that are already receiving health care services; this included belayers' perceptions of children's climbing efficacy. Children's perceptions were measured through the Self-Perception Profile for Children that evaluates athletic/social competence and global self-worth; each was completed after the first and sixth climbing sessions. The study concluded that children are successful through an indoor climbing experience. There is evidence to suggest that appraisal of basic task completion facilitates the feeling of competency (Mazzoni et al., 2009). An environment shared with typically developing peers can ultimately improve the children's quality of life through processing and acquiring new skills. Incorporating indoor rock climbing into rehabilitation therapy programs shows potential for positive outcomes for children with IDD and other disabilities as evidenced by increased self-efficacy and motivation in climbers.

Improvements in Social Interaction Skills

Multiple studies demonstrated that social interaction skills among those with disabilities were improved when they participated in indoor climbing. Kokaridas et al., (2018) evaluated climbing effects in children with ASD, while Christensen et al., (2017) evaluated the effects in children with cerebral palsy. The study design intentionally prepared the intervention space to promote social interaction among peers. Both studies demonstrated improvement of social skills and peer engagement by implementing fun warm-up games and activities, like passing a ball, to promote a welcoming and lively atmosphere. Another study by Kaplan-Reimer et al. (2010), focused on an intervention to help children with ASD engage in rock climbing, the social aspects of the sport, and addressing the effects of peer modeling. Christensen et al. (2017) describe how climbers of different levels may interact and provide feedback, in turn creating therapeutic bonds and friendships. Positive feedback in the form of verbal praise, reinforcements, and a lively environment have shown a positive correlation with successful climbing.

Remaining Gaps

First, effective staff training needs to be established to promote accessible climbing to the IDD population. Appropriate gym staff training would facilitate appropriate communication techniques in order to ensure safety for all participants (Christensen et al., 2017; Kaplan-Reimer et al., 2010). Secondly, to promote accessibility, climbing gyms and staff should be able to adapt to the needs of those with IDD (Kokaridas et al., 2018; Bibro & Żarów, 2021). This may include having specific climbing gear, utilizing easier route levels, and allotting more time for task completion in order to promote adequate participation.

Mašťalíř (2019) evaluated the effectiveness of active teaching methods for students with IDD in practical schools. This study found that communication techniques such as visual aids, providing specific examples, and using body language (gestures, role-play) are effective in teaching those with IDD. Training climbing staff to instruct those with IDD can be improved by using OT evidence-based communication techniques. Complex concepts and language should be avoided by keeping instructions short and simple, followed by sufficient time for individuals to comprehend and reply. These communication techniques can be translated to staff training programs at climbing gyms so they are equipped to work with those with IDD. This promotes a more accessible and safe climbing experience and environment for people with different learning abilities.

Clinical Significance of the Evidence

Based on the studies by Kaplan-Reimer et al. (2010), Kokaridas et al. (2018), Bibro & Źarów (2021), and Christensen et al. (2017), there is strong evidence for implementing indoor rock climbing activities into OT sessions. The literature supports the idea that typically developing individuals and individuals with IDD benefit from indoor rock climbing. OT practitioners have learned and created different methods to communicate with those with IDD, which is a skill deficit among many staff members at public climbing gyms (Cahill, 2019, p. 195). OT practitioners have the opportunity to introduce climbing to those with IDD in a way that is safe, fun, engaging, and comprehensible.

The studies by Kaplan-Reimer et al. (2010), Kokaridas et al. (2018), Bibro & Źarów (2021), and Christensen et al. (2017) found strong evidence to support the assertion that children who are diagnosed with ASD or cerebral palsy can engage in a

climbing program that aims to improve climbing abilities through a few weeks of intense training. General function test scores were enhanced after the climbing intervention (Christensen et al., 2017). Evaluations of hand grip strength and traverse speed show there is a positive physiological impact on both upper and lower limbs (Kokaridas et al., 2018). Studies vary on the effectiveness of cognitive aspects that are related to performance anxiety, fear, and planning due to a small sample size and short duration of intervention. Overall, the literature provides sufficient evidence for OT practitioners to implement an educational climbing program designed to assist children with IDD.

These common themes address the importance of the indoor rock climbing community and its expansion as an environment for individuals with IDD to further develop motor, cognitive, and social skills alongside their peers. When there is a space where climbers of all levels can climb, it provides the opportunity for positive feedback and encouragement to transpire. There are nevertheless remaining gaps in evidence, as there are only a few studies that are also considerably short in intervention length. Although physiological improvements are significant throughout the studies, there is still a need for an effective method of educating staff. The application of an OT-based training for staff members will provide techniques that are unique to the needs of climbers with IDD, while prioritizing appropriate adaptations.

Methodology

The occupational adaptation frame of reference was the foundation for the development of the training session at Sender One, an indoor rock climbing gym located in Santa Ana, California. According to the AOTA (2017), occupations are seen as a means to good health and well-being, which acknowledges that each person has unique

abilities and needs that influence their capacity to adapt to and engage in their desired occupations (AOTA, 2017). Prior to presenting at the general staff meeting, we met with the managers of Sender One to discuss the benefits of our educational program. Once the managers approved our study, we implemented their feedback into our presentation for the general staff meeting. Educating the gym staff with effective environmental accommodations and communication skills promotes accessibility for individuals with IDD to participate in climbing activities and enhance their overall occupational performance.

Design

The training session educated the gym staff on IDD and addressed common characteristics, implications, and associated challenges that may arise when working with this population. We educated the staff on evidence-based strategies, accommodations, and communication techniques to support individuals with IDD. Effective evidence-based strategies that we explained to the staff included the use of visual aids, visual demonstration, and behavioral supports like providing climbers with feedback. Accommodations we suggested to the staff included providing climbers with guided structured activities through the gym and sensory supports such as ear plugs to cancel out excessive noise. Finally, we emphasized the importance of communicating at the climbers' eye levels with simple and clear language. The goal was to improve the staff's self-efficacy and competency in providing services to meet the needs of climbers with IDD. This was assessed by the staff identifying their comfort levels and ability to apply skills learned in the training. We used pre- and post-test surveys to assess the staff's self-efficacy and perceived understanding of IDD.

The pre- and post-tests were adapted from the standardized test called Teaching Students with Disabilities Efficacy Scale (Dawson & Scott, 2013). In efforts to maintain the integrity of this scale, some of the language was methodically changed so the verbiage is appropriate to the climbing gym environment, with permission from LaRon A. Scott. The following words were changed: “student” to “climber,” “classroom” to “gym,” “disabilities” to “intellectual or developmental disability,” “his/her” to “their,” “lessons” to “sessions,” and “your” to “the.” The pre- and post-tests provided an efficient means to measure the effectiveness of the training session and evaluate changes in the staff’s comfort levels and ability to meet the needs of climbers.

Data Analysis

The statistical test utilized was the Wilcoxon signed rank test. This test was beneficial for the small sample sizes and organizing ordinal data. The pre- and post-test groups were compared to determine if any differences were statistically significant (Scheff, 2016). The pairs of data were dependent, meaning the pairs are the same group throughout the duration of the study (climbing staff pre- and post- training). The data was collected through an online generated test through Google Forms that was later transferred to a spreadsheet to compare results to identify any statistically significant data collected. The data was organized and analyzed through scales of comfortability, competency, and improvement of the pre-test baseline.

Ethical and Legal Considerations

Prior to the staff training at Sender One, informed consent was obtained from the participants (e.g., gym staff member). Informed consent included the written description of the purpose behind the research, what the research process would look like, and how

anonymity is maintained. The training was fair and inclusive, with no discrimination on the basis of race, gender, or ability. The student researchers worked directly with the staff and not with individuals with IDD, meaning no vulnerable populations participated in this study. Student researchers corresponded with Sender One about the research topic and obtained permission from the manager to conduct the training session with their staff members and in the Sender One facility. Student researchers provided pre- and post-tests and all responses remained anonymous. All data that was obtained electronically required two-factor authentication passwords in order to protect data, and there was no paper data that required storing. To protect participant's privacy, all identifying information, such as names of participants, was removed to anonymized data. Only the student researchers and thesis advisor have access to the collected data. Communication pertaining to the study done over email, was done through a secure platform or using email with encryption.

Results

A series of Wilcoxon Signed Rank Tests were conducted to determine if there is statistical difference from the pre- to post-test survey through an occupational therapy-based indoor rock climbing education program. These initial values were evaluated through the Likert scale ratings of gym staff's comfort working with individuals diagnosed with IDD in 12 different areas (Appendix A). As shown in Table 1, there was a significant increase in gym staff's comfort working with individuals diagnosed with IDD from pre- to post-test in Likert scale ratings in these four areas:

1. *Manage a climbing gym when your climbers range from learning disabled to gifted*: On average, ratings increased from pre (Mdn = 4.00) to post (Mdn = 4.00).

The Wilcoxon Test indicated this improvement was statistically significant, $z = -2.0$, $p = .047$.

2. *De-escalate a situation involving a climber with intellectual or developmental disabilities who is getting out of control in the gym:* On average, ratings increased from pre (Mdn = 3.00) to post (Mdn = 4.00). The Wilcoxon Test indicated this improvement was statistically significant, $z = -2.4$, $p = .018$.

3. *Motivate a climber in the gym who has an intellectual or developmental disability, regardless of how uncomfortable you may be:* On average, ratings increased from pre (Mdn = 4.00) to post (Mdn = 4.00). The Wilcoxon Test indicated this improvement was statistically significant, $z = -2.2$, $p = .029$.

4. *Utilize different teaching strategies when your teaching isn't as effective as you had hoped:* On average, ratings increased from pre (Mdn = 3.50) to post (Mdn = 5.00). The Wilcoxon Test indicated this improvement was statistically significant, $z = -2.0$, $p = .043$.

However, the remaining items failed to yield significant differences from the pre to post survey. Z-score values greater than -2.0 were not considered as statistically significant.

Discussion

The outcomes of this research support the positive benefits of implementing an indoor rock climbing training program for gym staff in working with individuals with IDD. The most prominent benefits include utilizing different teaching strategies, motivating climbers with IDD, de-escalating a situation, and managing a climbing gym with a wide range of climbers. Occupational justice emphasizes access and participation to meaningful and enriching occupations for all persons in society regardless of age,

gender, or social class (AOTA, 2020). The training program shared the same focus of inclusion, accessibility, and understanding of individuals with IDD to ensure safe participation of all. OT practitioners are put in a unique position due to their expertise in promoting engagement and participation in meaningful activities. The training program guides staff through an OT lens on how to effectively communicate and motivate climbers with IDD through de-escalation techniques and positive reinforcement, which directly aligns with the AOTA value of effective communication and behavior management. AOTA advocates for the significance of OT in improving the quality of life and active engagement of people with disabilities (AOTA, 2020). The increased knowledge the gym staff have on climbers with IDD, as shown through the statistically significant improvements in results, may show further development through a focus on enhancing climbers' occupational performance, which is a core principle of AOTA. Additionally, client-centered care is a cornerstone of AOTA that is strongly emphasized. Using an OT lens to train gym staff about client-centered care improves staff's self-efficacy when effectively managing a climbing gym that aims at prioritizing the needs, preferences, and goals among climbers of various levels.

Limitations

The first limitation to this study was that there was a small sample size of 26 gym staff participants. The second limitation involved a minor discrepancy between the pre- and post-tests. There were 27 completed consent forms and pre-tests, but only 26 completed post-tests, resulting in one participant being lost to follow-up. This discrepancy may have had an influence on the results. The third limitation was the absence of number identifiers for participants, which made it challenging to track the

changes in competency and self-efficacy for each individual from the pre- to post-tests. As a result, the overall mean scores for each question were assessed. The fourth limitation was that there was varying experience and comfort levels among the staff prior to the training session. This may have led to higher pre-test scores due to increased knowledge and awareness. The final limitation was that the research team had limited knowledge of the culture in climbing gyms and how these factors are connected to disabilities.

Conclusion

The goal of this study was to educate and equip rock climbing staff members with skills to create an indoor rock climbing community that is supportive and accessible for populations with IDD. Indoor rock climbing has shown to improve self-confidence, motor skills, and social skills in those with IDD. However, the sport is not widely accessible to populations with IDD and there is a lack of effective training tools for gym staff to learn about climbers with IDD. Therefore, this study aimed to educate the gym staff at Sender One through a training program that provided background information on IDD and addressed different evidence-based strategies, communication techniques, and appropriate adaptations to promote an accessible climbing environment. The pre- and post- tests demonstrated that the training was effective in increasing the staff's comfort levels in effectively carrying out instruction and meeting the needs of climbers with IDD. Future research is warranted to build on the findings of this study and evaluate the efficacy of this training at other climbing gyms. The pre- and post-tests show that the presentation was statistically significant for four out of the 12 items. Revising and building the current training to present at other climbing facilities is warranted in efforts

to improve the staff's self-efficacy outcomes on all 12 post-test items. OT is envisioned to be globally connected and to enhance the "quality of life for all people, populations, and communities through effective solutions" (AOTA, 2017). With the growing popularity of rock climbing in communities, OT practitioners hold the evidence-based knowledge and power to spearhead training programs for gym staff to create accessible climbing communities.

References

- American Occupational Therapy Association. (2017) Vision 2025. *American Journal of Occupational Therapy*. 71(3), 7103420010p1.
<https://doi.org/10.5014/ajot.2017.713002>
- American Occupational Therapy Association. (2020). Occupational therapy practice framework: Domain and process—Fourth edition. *The American Journal of Occupational Therapy*, 74(2) 1-87. <https://doi.org/10.5014/ajot.2020.74s2001>
- Bibro, M. A., & Żarów, R. (2021). The influence of climbing activities on physical fitness of people with intellectual disabilities. *International Journal of Disability, Development and Education*. 70(4), 530-539.
<https://doi.org/10.1080/1034912X.2021.1895085>
- Cahill S. M. (2019). Evaluation, interpretation, and goal writing. In H. M. Kuhaneck & J. O'Brien (Eds.), *Case-Smith's occupational therapy for children and adolescents* (8th ed., pp. 181-197). Elsevier Inc.
- Centers for Disease Control and Prevention. (2022). *Facts about intellectual disability*.
<https://www.cdc.gov/ncbddd/developmentaldisabilities/facts-about-intellectual-disability.html>
- Christensen, M. S., Jensen, T., Voigt, C. B., Nielsen, J. B., & Lorentzen, J. (2017). To be active through indoor-climbing: An exploratory feasibility study in a group of children with cerebral palsy and typically developing children. *BMC Neurology*, 17(1), Article 112. <https://doi.org/10.1186/s12883-017-0889-z>

- Darcy, S., & Dowse, L. (2013). In search of a level playing field—The constraints and benefits of sport participation for people with intellectual disability. *Disability & Society, 28*(3), 393–407. <https://doi.org/10.1080/09687599.2012.714258>
- Dawson, H., & Scott, L. (2013). Teaching students with disabilities efficacy scale: Development and validation. *Inclusion, 1*(3), 181–196. <https://doi.org/10.1352/2326-6988-1.3.181>
- Kaplan-Reimer, H., Sidener, T. M., Reeve, K. F., & Sidener, D. W. (2010). Using stimulus control procedures to teach indoor rock climbing to children with autism. *Behavioral Interventions, 26*(1), 1–23. <https://doi.org/10.1002/bin.315>
- Kokaridas, D., Demerouti, I., Margariti, P., & Krommidas, C. (2018). The effect of an indoor climbing program on improving handgrip strength and traverse speed of children with and without autism spectrum disorder. *Palaestra, 32*(3), 39–44.
- Mašťalír, J. (2019). The use of active teaching methods among pupils with learning disabilities in practical schools. *SWS International Multidisciplinary Scientific Conference on Social Sciences & Arts SGEM, 6*, 629-636. <https://doi.org/10.5593/sws.iscss.2019.4/S13.081>
- Mazzoni, E. R., Purves, P. L., Southward, J., Rhodes, R. E., & Temple, V. A. (2009). Effect of indoor wall climbing on self-efficacy and self-perceptions of children with special needs. *Adapted Physical Activity Quarterly: APAQ, 26*(3), 259–273. <https://doi.org/10.1123/apaq.26.3.259>
- Scheff, S.W. (2016). *Fundamental Statistical Principles for the Neurobiologist a Survival Guide*. Academic Press. <https://doi.org/10.1016/B978-0-12-804753-8.00008-7>

Stanbridge University. (2023). *Stanbridge university student catalog*.

<https://api.stanbridge.edu/catalog/Stanbridge-University-Catalog.pdf>

Vreuls, R. J. A., Mockenhaupt, J., Tillmann, V., & Anneken, V. (2022). Effect of indoor climbing on occupational self-efficacy and employability: Results of a 10-month randomized controlled study of persons with intellectual disability. *International Journal of Environmental Research and Public Health*, *19*(20), 13399.

<https://doi.org/10.3390/ijerph192013399>

Wouters, M., Evenhuis, H. M., & Hilgenkamp, T. I. M. (2020). Physical fitness of children and adolescents with moderate to severe intellectual disabilities. *Disability and Rehabilitation*, *42*(18), 2542–2552.

<https://doi.org/10.1080/09638288.2019.1573932>

Table 1*Wilcoxon Signed Rank Tests Comparing Pre and Post Program Results*

Pair	Item	Time	<i>N</i>	<i>Mdn</i>	<i>z</i>	<i>p</i>
1	Adjust activities to meet the needs of all climbers in the gym, regardless of ability level.	Pre	27	4.00	-1.1	.252
		Post	26	4.50		
2	Create an environment that is open and welcoming for every climber, including those with intellectual or developmental disabilities.	Pre	27	4.00	-1.3	.190
		Post	25	5.00		
3	Encourage all climbers to accept those with intellectual or developmental disabilities in the gym.	Pre	27	4.00	-0.5	.591
		Post	26	4.00		
4	Manage a climbing gym when your climbers range from learning disabled to gifted.	Pre	27	4.00	-2.0	.047
		Post	26	4.00		
5	Change society's view of individuals with intellectual or developmental disabilities.	Pre	27	3.00	-1.9	.059
		Post	26	4.00		
6	Establish meaningful relationships with your climbers with intellectual or developmental disabilities.	Pre	27	4.00	-1.4	.174
		Post	26	5.00		
7	De-escalate a situation involving a climber with intellectual or developmental disabilities who is getting out of control in the gym.	Pre	27	3.00	-2.4	.018
		Post	26	4.00		
8	Motivate a climber in the gym who has an intellectual or developmental disability, regardless of how uncomfortable you may be.	Pre	27	4.00	-2.2	.029
		Post	26	4.00		
9	Control a situation in which a climber with an intellectual or developmental disability is displaying disruptive behaviors in the gym.	Pre	27	3.00	-1.7	.089
		Post	26	4.00		
10	Promote acceptance of climbers with intellectual or developmental disabilities in the community.	Pre	27	4.00	-0.6	.520
		Post	26	4.50		
11	Teach a climber who is motivated to learn but struggles because of their disability.	Pre	26	4.00	-1.8	.074
		Post	26	5.00		
12	Utilize different teaching strategies when your teaching isn't as effective as you had hoped.	Pre	26	3.50	-2.0	.043
		Post	26	5.00		


Note. *N*, sample size. *Mdn*, median. *z*, z-score. *p*, p-value.

Appendix A

Institutional Review Board Approval

Dear Dr. Kaitlin O'Hara and Students,

The Stanbridge University Institutional Review Board has completed the review of your application entitled, "An Occupational Therapy-based Training for Indoor Climbing Gym Staff Working with Intellectual Disabilities." Your application (#13MSOT012) is approved and categorized as Expedited.

IRB Application Number	#13MSOT012
Date	08/25/2023
Level of Review	Expedited
Application Approved	X
Conditional Approval	
Disapproved	
Comments	The requested Minor changes have been reviewed and confirmed as completed by the IRB. (08/25/2023)
Signature of IRB Chair	

Please note that any anticipated changes to this approved protocol requires submission of an IRB Modification application with IRB approval confirmed prior to their implementation.

Sincerely,

Julie Grace, M.S., M.A.

IRB Chair

Appendix B

Site Approval Forms

Research Site Agreement Form Stanbridge University

AGREEMENT

Research Site: Sender One - Santa Ana

Research Site Address: 1441 S. Village Way Santa Ana, CA 92705

Title of Proposed Research: An Occupational Therapy Evidence-Based Training for Indoor Climbing Gym Staff W

RESEARCH STUDY INFORMATION

Student Investigator(s) Name(s):

1. Lauren Chetwood
2. Andrew Hahn
3. Kianna Ugalde
4. Jamie Wilson

Principle Student Investigator Name: Kianna Ugalde

Email address: Kianna.ugalde@my.stanbridge.edu Phone Number: (949)468-6418

Duration of the study: Session time: one hour; Study conclusion by 9/30/2023

Authorization Effective Date: _____ Authorization Expiration Date: _____

Allowed Number of Contact Hours: _____ The study will be completed by (date): _____

Description of Research:

Indoor rock climbing is proven to be effective in promoting motor, cognitive, and social skills in individuals with intellectual and developmental disabilities (IDD). Children experience a sense of accomplishment/autonomy when climbing that increases self-confidence, promotes peer socialization and improves motor/cognitive skills. We believe that climbing gyms can improve accessibility to populations with IDD to create an inclusive environment explore climbing. There is a lack of education on individuals with disabilities for gym staff and the general public, so our training aims to advocate for these underrepresented populations and promote accessible climbing to everyone. Students will provide an evidence-based presentation that will educate climbing staff on working with climbers who have IDD. A pre and post-survey will be used to assess staff self-efficacy and perceived understanding of IDD.



Research Site Agreement Form Stanbridge University

Intellectual Property Statement:

Stanbridge University reserves the right to use, publish, and disseminate the results of the research findings. The University shall provide the research site with a copy of the final research product at the earliest practicable time.

Thesis Advisor Contact Information:

Name: Kaitlin O'Hara

Email address: kohara@stanbridge.edu Phone Number: (949)794-9090 Ext. 5046

RECRUITMENT PLAN

Means by which the researcher(s) will contact and/or recruit participants:

Researchers will recruit participants through coordinated with management of Sender One, Santa Ana. We will agree to present during one meeting with a pilot group. The manager will select based on who is available that specific day. Contact with management is primarily made via email with thesis advisor. Participants must be employed at Sender One, Santa Ana and over the age of 18.

SITE REPRESENTATIVE AGREEMENT

I agree to the recruitment and data collection methods to be used in this study, and I authorize the investigator to conduct research at:

Facility Name/Research Site Name: Sender One Santa Ana

Representative authorizing agreement: Art Garcia

Title: Gym Manager

Arturo Garcia Alwear
Signature

7/11/2023
Date



Research Site Agreement Form
Stanbridge University

STANBRIDGE UNIVERSITY AGREEMENT SIGNATURES

I/We accept the terms of this agreement.

Student Investigator 1: Lauren Chetwood Title: Student investigator

Lauren Chetwood

Signature

07/07/2023

Date

Student Investigator 2: Kianna Ugalde Title: Student investigator

Kianna Ugalde

Signature

07/07/2023

Date

Student Investigator 3: Andrew Hahn Title: Student investigator

Andrew Hahn

Signature

07/07/2023

Date

Student Investigator 3: Jamie Wilson Title: Student investigator

Jamie Wilson

Signature

07/07/2023

Date

Faculty Thesis Advisor: Kaitlin O'Hara Title: Thesis Advisor

Kaitlin O'Hara

Signature

07/10/2023

Date

Program Director: _____ Title: _____

Signature

Date

Dr. Kelly Hamilton
Vice President of Instruction, Stanbridge University

Signature

Date



Appendix C

Pre- and Post- Test

Adjust activities to meet the needs of all climbers in the gym, regardless of ability level.	(0) (1) (2) (3) (4) (5)
Create an environment that is open and welcoming for every climber, including those with intellectual or developmental disabilities.	(0) (1) (2) (3) (4) (5)
Encourage all climbers to accept those with intellectual or developmental disabilities in the gym.	(0) (1) (2) (3) (4) (5)
Manage a climbing gym when your climbers range from learning disabled to gifted.	(0) (1) (2) (3) (4) (5)
Change society's view of individuals with intellectual or developmental disabilities.	(0) (1) (2) (3) (4) (5)
Establish meaningful relationships with your climbers with intellectual or developmental disabilities.	(0) (1) (2) (3) (4) (5)
De-escalate a situation involving a climber with intellectual or developmental disabilities who is getting out of control in the gym.	(0) (1) (2) (3) (4) (5)
Motivate a climber in the gym who has an intellectual or developmental disability, regardless of how uncomfortable you may be.	(0) (1) (2) (3) (4) (5)


Control a situation in which a climber with an intellectual or developmental disability is displaying disruptive behaviors in the gym.	(0) (1) (2) (3) (4) (5)
Promote acceptance of climbers with intellectual or developmental disabilities in the community.	(0) (1) (2) (3) (4) (5)
Teach a climber who is motivated to learn but struggles because of their disability.	(0) (1) (2) (3) (4) (5)
Utilize different teaching strategies when your teaching isn't as effective as you had hoped.	(0) (1) (2) (3) (4) (5)

*Adapted from Dawson, H., & Scott, L. (2013). Teaching students with disabilities efficacy scale: development and validation. *Inclusion, 1*(3), 181–196.

<https://doi.org/10.1352/2326-6988-1.3.181> with permission from Dr. LaRon A. Scott

Appendix D

Staff Training Presentation

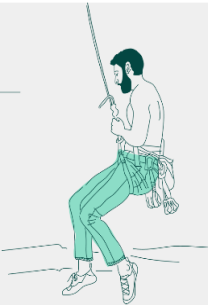


Climbing for All Abilities

Presentation by:
Lauren Chetwood, Andrew Hahn, Kianna Ugalde, and Jamie Wilson
Principal Investigator: Kaitlin O'Hara, OTD, OTR/L

Why We Are Here

Improve Sender One staff's understanding of how to assist climbers with intellectual and developmental disabilities (IDD) to make climbing more accessible



What is an intellectual disability?

Limitations to a person's ability to learn at an expected level and function in daily life.

What is a developmental delay?

When a child's progression through predictable developmental phases slows, stops, or reverses.

Prevalence


- 1 in 10 families in the U.S. are affected
- 7-8 million people in the U.S. are diagnosed with an intellectual disability

Average number of Sender City sessions on a weekend day	10
Average number of participants per session	20
Total number of climbers seen in Sender City	200
Potential number of climbers with IDD in a given day (10%)	20

Research Based Benefits of Climbing for the IDD Population

Benefits	Improvements in...
Cognitive	Problem-solving Task completion Sequencing
Social	Self-confidence Sense of belonging Positive peer interactions
Motor	Strength Balance Coordination

Observable Signs of IDD in the Climbing Gym



Difficulties with Speaking & Communicating

- Stuttering
- Speaking slowly
- Using sign language or gesturing
- Limited eye contact



Struggling with Solving Problems & Completing Tasks

- Look lost or hesitant
- Quick to become upset, frustrated, or give up easily
- Difficulty sequencing steps
- Easily distracted



Poor Understanding of Social Norms



- Not wanting to wait their turn
- Poor perception of personal space

Limited Insight into Consequences



- Decreased adherence to gym rules
- Impulsivity

Strategies You Can Use!



Simplify Instructions

- Communicate at their level
- Provide step-by-step instructions
- Demonstrate what you mean (ex. gestures)
- Avoid complex language
- Ask simple “yes/no” questions



Utilize Cue Cards

- For individuals that have little to no language or difficulty expressing their needs, cue cards come in handy!
- Pictures with short phrases to help an individual express what they want



Provide Feedback

- Constructive feedback:
 - Direct
 - Concise
 - Timely
- Positive feedback:
 - Verbal reinforcement
 - Gestures



Offer Structured Activities

- Individuals may feel lost during free play, so providing structured activities or games are a great way to promote their enjoyment and engagement in the gym!
- Examples: obstacle course, Simon Says, red light green light



Have Fun :)



Case Study

Sarah is an 8-year-old girl with Autism Spectrum Disorder (ASD) who is interested in climbing anything and everything (bookshelves at school, cabinets in the kitchen, etc.). Sarah's parents heard about Sender One from a friend, and her teachers and therapists believe that this activity could be an excellent opportunity for her to develop physical skills, build confidence, and improve social interactions.

When observing Sarah during the pre-session safety video and her initial interaction in the Sender City environment, you notice she:

- Is sensitive to loud noise
- Does not like touching certain textures
- Appears to be non-verbal
- Stays with familiar individuals
- Is shy with peers and staff

Post-Test QR CODE



Thank you!

References

- J&C Sites. Adaptive Climbing Group 'Anybody Can Climb'. (2019, March 18). <https://abc7chicago.com/adaptive-climbing-group-rock-climbs-with-disabilities-accessible-for-all/5718415/>
- Chittaranon, M. E. et al. (2017). To be active through indoor-climbing: An exploratory feasibility study in a group of children with cerebral palsy and typically developing children. *BMC Neurology*, 17(1). <https://doi.org/10.1186/s12883-017-0889-4>
- Dawson, H., & Scott, L. (2015). Teaching students with disabilities efficacy scale: development and validation. *Acadison*, 1(3), 181-196. <https://doi.org/10.1352/2326-6988.1.3.181>
- Gejala, L. et al. (2018). Occupational Adaptation as a Construct: A Scoping Review of Literature. *The Open Journal of Occupational Therapy*, 8(1). <https://doi.org/10.15452/106-6408.1800>
- Kaplan-Balaban, H. et al. (2010). Using stimulus control procedures to teach indoor rock climbing to children with autism. *Behavioral Interventions*, 26(1), 1-23. <https://doi.org/10.1080/13611361003611361>
- Kohrt, D., et al. (2018). The effect of an indoor climbing program on improving handgrip strength and inverse opoal of children with and without autism spectrum disorder. *Palastre*, 32(2), 39-44. <https://doi.org/10.1080/10401229.2017.1409491>
- Maria, A. B., & Ryan, J. (2021). The influence of climbing activities on physical fitness of people with intellectual disabilities. *International Journal of Disability, Development and Education*. <https://doi.org/10.1080/10401229.2021.1909491>
- Mahdiz, J. (2019). The use of active teaching methods among pupils with learning disabilities in practical schools. *IMP International Multidisciplinary Scientific Conference on Social Sciences & Arts (IJSSM)*. <https://doi.org/10.55933/issjssm.2019.4>
- Mason, E. R. et al. (2009). Effect of indoor wall climbing on self-efficacy and self-perceptions of children with special needs. *Adapted physical activity quarterly: APAQ*, 26(3), 229-273. <https://doi.org/10.1123/apaq.26.3.229>
- Scheff, S.W.(2014). Chapter 8 - nonparametric statistics. *Academic Press*. 157-182. <https://doi.org/10.1016/B978-0-12-404753-8.00008-7>
- Rea-Kewswell, J. & Brer, M. (2014). Developmental disabilities series: Understanding and managing behavior. *Rutgers - New Jersey Agricultural Experiment Station*. Retrieved from <https://opennj.org/ebooks/1280>
- Ross, H. (2019, May 7). Occupational therapy research agenda. AOTIP. <https://www.aotip.org/Research-Resources/Resources-for-Occupational-Therapy-Research/occupational-therapy-research-agenda>
- Vinik, R.J.A., Mockaitis, J., Tillmann, V., Amthor, V. (2022). Effect of indoor climbing on occupational self-efficacy and employability: Results of a 19-month randomized controlled study of persons with intellectual disability. *International Journal of Environmental Research Public Health*, 19, 13199. <https://doi.org/10.3390/ijerph192013199>

Appendix E
Recruitment Flier



STANBRIDGE
OCCUPATIONAL THERAPY

RESEARCH STUDY

SENDER ONE

**SUNDAY
OCT. 1ST,
2023**

**PARTICIPANTS
NEEDED**



**CONTACT KIANNA
FOR MORE INFO**

**STANBRIDGECLIMBING
@GMAIL.COM**

**PRESENTATION DURING
QUARTERLY STAFF
MEETING**

SENDERONE.COM