

Goal Attainment Scaling for Evaluation

Child Name: DOB:

Staff Member:

Frequency of your service:

Date written:

Date of reevaluation (6months):

Developmental Area	-2 baseline or a little better	-1 progress	0- goal	+1 more than expected	+2 much more than expected
Score after 6 months:					
Score after 6 months:					
Score after 6 months:					



Ocean of Change

Aquatic Developmental Play Program for
Children with Disabilities

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Learning Objectives

By the end of this presentation, attendees will be able to

- Describe a community-based aquatic developmental play program promoting sensory integration and motor development and its impact on parental isolation and satisfaction with services.
- Understand how program effectiveness was measured in a single-subject research design using standardized and non-standardized assessments, including Goal Attainment Scaling.
- Apply Goal Attainment Scaling methods to specific case studies by writing measurable goals and scaling them appropriately.



Key Terms

- Sensory processing
 - Ability of the body to register and regulate sensory information (Frahman & Mullinek, 2015)
- Sensory integration
 - A person's ability to register sensory information as well as organize and respond to that information in an appropriate and functional manner (Frahman & Mullinek, 2015)
- Social validity
 - Perceived value of a program or intervention based on satisfaction and perceived benefit by the consumers (Rudman, 2017)
- Reliability
 - Accuracy of information (Taylor, 2017)
- Validity
 - Whether an instrument measures what it is supposed to measure (Taylor, 2017)



Aquatic

Programming

Literature Search and Needs Assessment

Community Participation



- Provides unique opportunity to integrate young children with disabilities and their families into their community
 - Promotes inclusion
 - Increases acceptance
 - Decreases stigma or discrimination
- Strives to combat parental feelings of social isolation reported in this population (Lalshamman et al., 2017; Melissen et al., 2010)
- Ocean of Change NOT considered aquatic therapy
 - Aquatic developmental play program
 - Maintains value of skilled services from licensed professional

Ocean of Change



Program Overview



Background



- Ocean of Change was a community-based aquatic developmental play program for children with disabilities under 3 years old and their families
- Aimed to engage infants and toddlers in the therapeutic process by using aquatic play
 - Addressing individual developmental needs
 - Provide parent education
 - Opportunities for parent-child bonding, increased social interactions, and community involvement

Theory



- Utilizing principles of sensory integration to aim for adaptive response to various stimuli within aquatic environment to improve overall performance in and out of the water (Furman & Mallonee, 2015)
- Focus on motor learning with developmental approach by facilitating repetition of meaningful tasks through play and social interactions to achieve age-appropriate developmental milestones (Case-Smith, 2015; O'Brien, 2015)
- Person Environment Occupation Performance of family unit brings awareness to parental needs for social interaction and feelings of self-efficacy when handling child in and out of aquatic environment (Brown, 2014)

Program Description

- 9-week program
- 11 participants, age range 8 months to 2 years 11 months
 - Autism spectrum disorder, Down syndrome, developmental delay, cerebral palsy
- 30-minute sessions, 2x/week
 - 1 individual session
 - With OTD-S
 - 1 group session
 - Groups of 3-4 children
 - Activities led by OTD-S but handling done by parents
- 1 parent in the water with child for each session
- Pool Specifications
 - Constant 92 degrees
 - 3 ½ to 4 ½ feet deep

Program Goals

- Ocean of Change aimed to
- Encourage sensory integration and motor development of young children with disabilities under three years old in a community-based setting.
 - Enhance social participation of parents/caregivers of infants and children with disabilities under three years old.
 - Support community integration of children with disabilities under three years old and their families.

Individual Goals

- Initial evaluation process
 - Parent interview
 - Administration of standardized and non-standardized assessments
 - In-water assessment/clinical observations
- Goals written according to child's needs and parental concerns
 - Gross Motor
 - Fine Motor
 - Oral Motor
 - Sensory Integration
 - Social Skills
 - Water Safety

DOMMAN	SUPPLIES/EQUIPMENT
Lower Extremity Strength/Endg/Coordination/Motor Planning <ul style="list-style-type: none"> - Climbing up/down pool stairs - Safe water exit - Kicking laps 	<ul style="list-style-type: none"> - Pool stairs with handrail - Edge of pool, floating surface mat - Bar float
Upper Body/Lower Body Separation of Movement <ul style="list-style-type: none"> - Kicking laps - Safe water exit 	<ul style="list-style-type: none"> - Bar float - Edge of pool, floating surface mat
Dynamic Standing Balance <ul style="list-style-type: none"> - Throwing toys at target - Engaged in reciprocal play with parent 	<ul style="list-style-type: none"> - Platform dock, bath toys (with net), squirt toys, kickboard - Platform dock, bath toys with net, bath bucket toys, small strainer, squirt toys, flashing light bath toys
Functional Mobility <ul style="list-style-type: none"> - Kicking laps - Safe water exit - Creeping with physical handling 	<ul style="list-style-type: none"> - Bar float - Edge of pool, floating surface mat - Squirt toys, flashing light bath toys, floating surface mat
Postural Control <ul style="list-style-type: none"> - Engaged in play while seated on kickboard - Engaged in play while lying on stomach on kickboard - Neck rotation while lying on stomach on kickboards 	<ul style="list-style-type: none"> - Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, kickboard - Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, kickboard - Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, kickboard

DOMAIN	SUPPLIES/EQUIPMENT
FINE MOTOR	
Reach/Grasp	<ul style="list-style-type: none"> Bath toys (with net), bath bucket toys, small puppet toys, squirt toys, flashing light bath toys, kiddo board Bath toys (with net), small puppet toys, squirt toys, flashing light bath toys
Intentional Release	<ul style="list-style-type: none"> Bath toys (with net), small puppet toys, squirt toys, flashing light bath toys
Bilateral Integration	<ul style="list-style-type: none"> Bath toys (with net), bath bucket toys, small puppet toys, squirt toys, flashing light bath toys
Tool/Utensil Use	<ul style="list-style-type: none"> Squirt toys, flashing light bath toys, small puppet toys, bath bucket toys Tongs, small puppet toys, bath bucket toys
Pincer/Grasp/Fine Motor Coordination	<ul style="list-style-type: none"> Tongs, small puppet toys, bath bucket toys Bath toys (with net), squirt toys, flashing light bath toys, bath bucket toys Bath bucket toys



DOMAIN	SUPPLIES/EQUIPMENT
SENSORY INTEGRATION	
Self-Regulation	<ul style="list-style-type: none"> Floating bath mat, platform dock
Arousal State/Self-Modulation	<ul style="list-style-type: none"> Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, small strainer, tongs, kiddo board, floating bath mat, platform dock
Attention to Task	<ul style="list-style-type: none"> Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, small strainer, tongs, kiddo board, floating bath mat, platform dock
Direction Following	<ul style="list-style-type: none"> Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, small puppet toys, dolphin ring toys, small strainer, tongs Bath toys (with net), squirt toys, flashing light bath toys, bucket Small strainer, squirt toys, flashing light bath toys, bucket



DOMAIN	SUPPLIES/EQUIPMENT
SOCIAL SKILLS	
Sharing/Taking Turns	<ul style="list-style-type: none"> Small strainer, small puppet toys, bath buckets toys
Social Communication	<ul style="list-style-type: none"> Edge of pool, floating water mat Bath toys (with net), squirt toys, flashing light bath toys
Peer Modeling	<ul style="list-style-type: none"> Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, small puppet toys, dolphin ring toys, small strainer, tongs, kiddo board, floating bath mat, platform dock
Direction Following	<ul style="list-style-type: none"> Bath toys with net, bath bucket toys, squirt toys, flashing light bath toys, small puppet toys, dolphin ring toys, small strainer, tongs, kiddo board, floating bath mat, platform dock



DOMAIN	SUPPLIES/EQUIPMENT
WATER SAFETY	
Proper Stair Use	<ul style="list-style-type: none"> Pool stairs with handrail
Safe Water Entry	<ul style="list-style-type: none"> Edge of pool, floating water mat
'Please' To Enter Water	<ul style="list-style-type: none"> Edge of pool, floating water mat; pool stairs with handrail
Wall Walks	<ul style="list-style-type: none"> Bath toys (with net), squirt toys, flashing light bath toys, edge of pool



Group Sessions

- Composed of 3-4 parent-child teams
- Grouped according to similar goals/abilities
- Activities designed to target at least 2 individual goals for each child
- Objectives of Group Sessions:
 - Parental application of techniques/strategies
 - Parent-child bonding
 - Socialization between other parent-child teams
- OTD-S served as facilitator



Methodology

Single Subject Research Design



Single Subject Research

- Underwent process of Institutional Review Board approval
- Single subject research design
 - Individual participants acted as their own controls
 - A-B-A design
 - A: baseline measurements (3 data probes)
 - B: intervention (12 data probes)
 - A: return to baseline (3 data probes)
- Data collected during all three phases
 - Performance of activities was repeated in 15-minute intervals
 - Each 30-minute session allowed for 2 data collection probes
- Data not collected during group sessions



Single Subject Research

- A-B-A multiple baselines across participants

Week of Program	Methodology
Week 1	Initial Evaluations and Parent Interviews
Week 2	Baseline measurements
Week 3	Baseline and Intervention measurements
Week 4	Intervention measurements
Week 5	Intervention measurements
Week 6	Intervention measurements
Week 7	Intervention measurements
Week 8	Intervention measurements
Week 9	Intervention and Return to Baseline measurements
Week 10	Return to Baseline measurements
Week 11	Post Measurements and Make-up sessions as needed





Measures Overview

- ## Sensory Profile 2
- Standardized assessment used by occupational therapists
 - Determines sensory preferences/characteristics of infants and young children
 - High reliability and validity regarding sensory behaviors
 - Significant differences observed between typically developing peers and children with a variety of diagnoses
 - Internal consistency at .57-.80
 - Strong test-retest reliability at .83-.92
 - Parent report questionnaire

(Dunn, 2014; Pearson Education, 2014)

DAYC-2



Developmental Assessment of Young Children- Second Edition (DAYC-2)

- Administered by qualified professionals
 - Occupational therapists; physical therapists
- Gross and fine motor domains used, along with overall physical development
- Established reliability
 - Coefficient alpha, test-retest, scorer difference
- Validity
 - Content-description validity
 - Prediction validity
 - Construct-identification validity

(Swartzmiller, 2014; Vores & Maddox, 2012)

Parent Report Survey



- Developed by OTD-S
 - Adapted from Satisfaction Survey and Control Survey in Broggi and Sabatelli (2010)
- Examines
 - Parental feelings of isolation
 - Satisfaction with therapy services they are receiving
 - Perceived value of the program (social validity)
- Pre-intervention and post-intervention versions to assess change due to aquatic developmental play program

Individualized Goals



- Goal Setting
 - Parent interview, administration of standardized and non-standardized assessments, IFSP review, clinical observations during land and water evaluation
 - At least 3 goals were created for each child and received approval from parents
- Goal attainment scaling (GAS)
 - Each goal was scaled in order to accurately collect data and monitor change
 - Allows comparison of participants with very different needs, conditions, diagnoses, ages, and goals
 - Each goal was formatted onto an Excel spreadsheet for ease in recording
 - Data collected at poolside following each 30-minute individual session

Goal Attainment Scaling



- Used to evaluate progress of individual participants as well as monitor overall program effectiveness
- Goals are set on a scale of equal increments
 - -2 = Well below expectations (status at start of program)
 - -1 = Below expectations
 - 0 = Meets expectations (expected at end of program)
 - 1 = Above expectations
 - 2 = Well above expectations
- Increased reliability (91%)
 - Interrater reliability: 2 raters independently scored goals in over 25% of individual sessions

(McDougal & King, 2007)

Goal Attainment Scaling



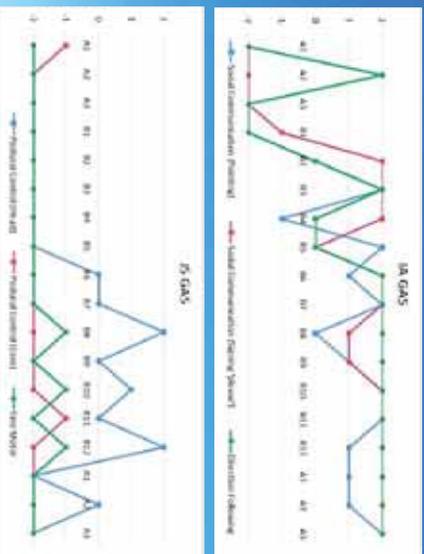
1	Goal #1: Postural Control (Head): Maintain upright head position at least 45° while prone on kickboard for consecutive minute	A	B	C	D	E	F	G	H	I	J	K	L
2	Date	Interval	-2 (1 min)	-1 (2 min)	0 (3 min)	1 (4 min)	2 (5 min)						
3	3/19/2019	A1	X										
4	3/19/2019	A2	X										
5	3/26/2019	A3	X										
6	3/26/2019	B1	X										
7	4/2/2019	B2	X										
8	4/2/2019	B3	X										
9	4/9/2019	B4	X										
10	4/9/2019	B5	X										
11	4/16/2019	B6		X									
12	4/16/2019	B7		X									
13	4/23/2019	B8			X								
14	4/23/2019	B9			X								
15	4/30/2019	B10				X							
16	4/30/2019	B11					X						
17	5/7/2019	B12						X					
18	5/7/2019	A1	X										
19	5/14/2019	A2		X									
20	5/14/2019	A3	X										

Program Outcomes

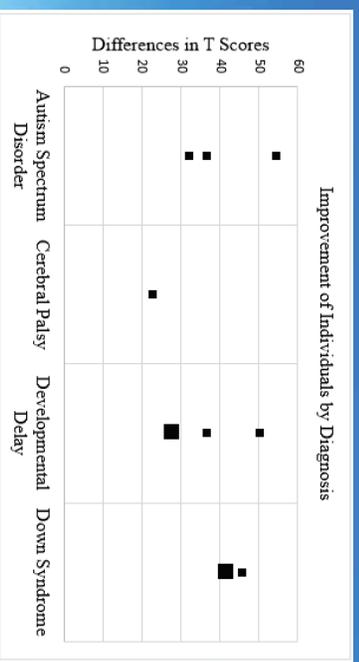


Analysis of Results and Evaluation of Outcomes

Goal Attainment Scaling



Goal Attainment Scaling



Note: Differences (before-after) in aggregate T-scores by diagnosis. Larger squares indicate two individuals at the same value.

Analysis of Results

Quantitative

- Motor Development
 - All 11 participants demonstrated changes in raw scores on 1 or more domains of the DAYC-2
 - 3 children improved from "Below Average" to "Average"
 - 2 with DS, 1 with DD
 - Greatest average changes in raw score in every motor subsection
 - DS, CP, ASD, DD
- Sensory Integration
 - All participants showed an overall positive change in sensory integration, except child with CP

Analysis of Results

Quantitative

- Parent Report Survey
 - Parental feelings of isolation decreased from 60% to 48%
 - Satisfaction with services increased from 76.4% satisfied to 99.2% satisfied
 - Social validity of Ocean of Change rated at 99.3%
- All 11 participants completed program in its entirety
 - Any missed sessions were made up within program timeframe



Case Study

Participant with Down Syndrome



Occupational Profile

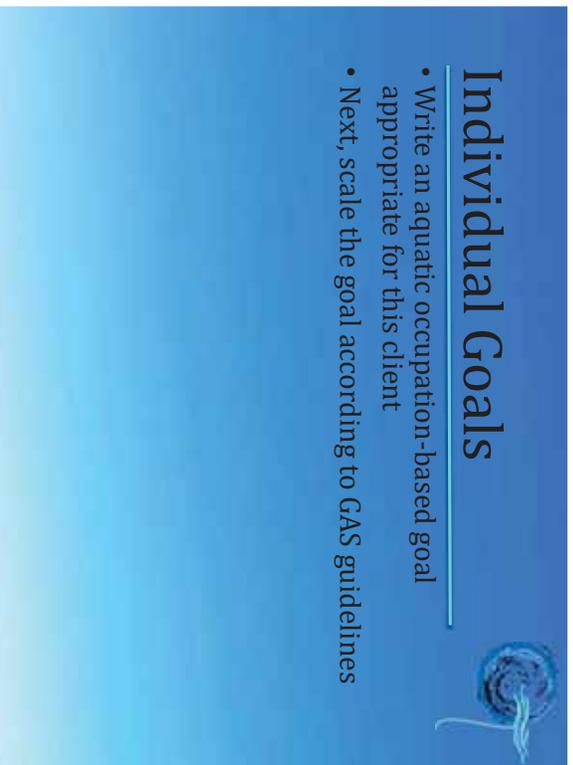


- 33-m/o girl with Downs syndrome
- Very sociable, even temperament
- Loves the water
- Can climb up stairs using handrail or holding hands
- Crawls downstairs backwards
- Climbs on furniture and play equipment
- Just started walking independently at ~28 m/o
 - Decreased dynamic standing balance
- Decreased fine motor skills
- Knows some sign language
- Participated in 4-week pilot study for Ocean of Change 2 months prior

Individual Goals



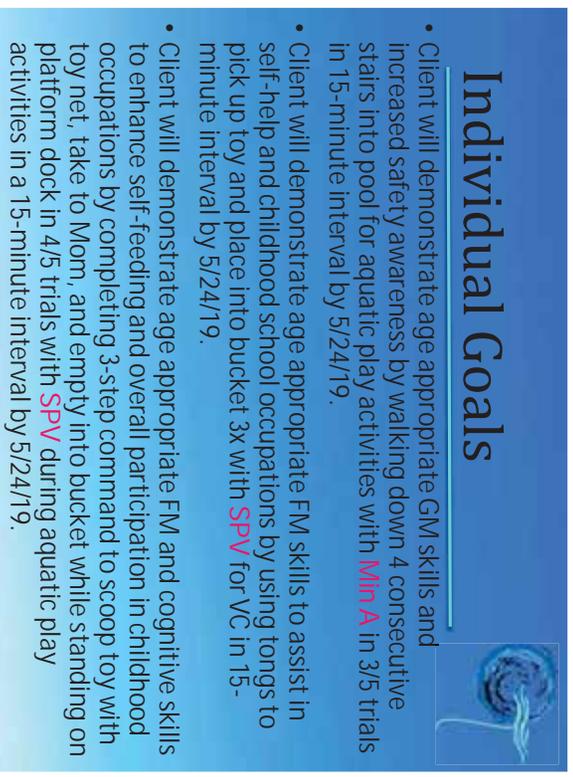
- Write an aquatic occupation-based goal appropriate for this client
- Next, scale the goal according to GAS guidelines



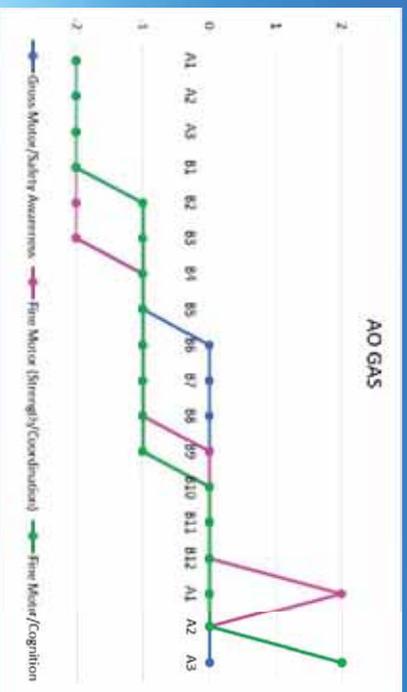
Individual Goals



- Client will demonstrate age appropriate GM skills and increased safety awareness by walking down 4 consecutive stairs into pool for aquatic play activities with **MIN A** in 3/5 trials in 15-minute interval by 5/24/19.
- Client will demonstrate age appropriate FM skills to assist in self-help and childhood school occupations by using tongs to pick up toy and place into bucket 3x with **SPV** for VC in 15-minute interval by 5/24/19.
- Client will demonstrate age appropriate FM and cognitive skills to enhance self-feeding and overall participation in childhood occupations by completing 3-step command to scoop toy with toy net, take to Mom, and empty into bucket while standing on platform dock in 4/5 trials with **SPV** during aquatic play activities in a 15-minute interval by 5/24/19.



Analysis of Results



Case Study

Participant with Developmental Delay



Occupational Profile



- 2.5 y/o girl with communication delay
- Very smart girl, learns quickly
- Loves the water
- Does not like to be told what to do (knows how to say some words, but chooses not to when asked)
 - Says “yes” and “please” but does not put the words together for “yes, please”
- Impulsive
- Decreased safety awareness, particularly around the water
- Gets overly excited/aroused affecting direction following
- Decreased attention in busy environments

Individual Goals



- Write an aquatic occupation-based goal appropriate for this client
- Next, scale the goal according to GAS guidelines

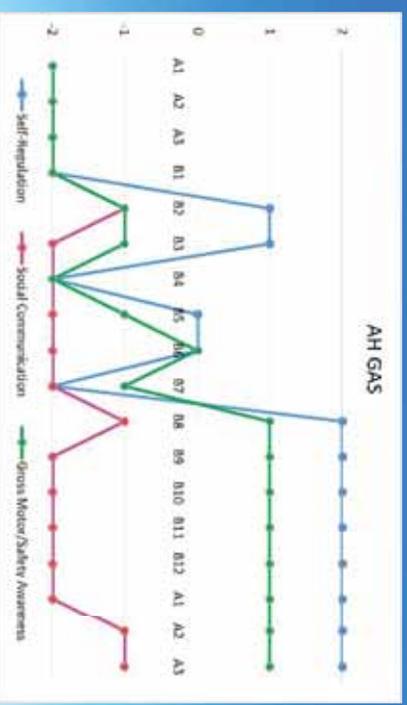
Individual Goals

- Client will demonstrate age appropriate self-regulation and increased safety awareness to assist in daily occupations by completing a 4-step obstacle course combining gross motor, fine motor, and sensory modulation activities 3x with **SPV** for VC during aquatic play activities in a 15-minute interval by 5/24/19.
- Client will demonstrate age appropriate social communication skills by combining two words to say 'yes, please' intelligibly in **2/5** trials when offered a toy during aquatic play activities in a 15-minute interval by 5/24/19.
- Client will demonstrate age appropriate GM skills and increased safety awareness by walking down 4 consecutive stairs into pool for aquatic play activities with **SPV** in 3/5 trials in 15-minute interval by 5/24/19.

Implications for OT

- Aquatic programming is effective in addressing sensory integration and motor development needs
- Community-based programming is needed and valued by stakeholders
 - Promotes inclusion and acceptance
 - Allows opportunity to receive therapeutic services alongside typical peers in a typical childhood occupation
 - Potential for increased support system for parents through social interactions
- Grows body of literature supporting aquatic programming among children with disabilities under 3 years old
- Potential for continued research with expanded ages

Analysis of Results



Questions

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	Example 1	Example 2	Example 3
	7 year old with poor handwriting legibility which is affecting her school performance (School-Based)	50 year old post-stroke with left upper extremity neglect (Impatient Rehabilitation)	17 year old male with depression, showing decreased leisure participation (Residential Psychiatry)
LEVEL OF ATTAINMENT			
Much less than expected -2	Jane will write 1-5 letters of the alphabet with 100% legibility.	Paul will demonstrate active reach with LUE with maximum assistance.	Max will engage in a leisure activity with peers 0x/day with verbal cues
Somewhat less than expected -1	Jane will write 6-10 letters of the alphabet with 100% legibility.	Paul will demonstrate active reach with LUE with moderate assistance.	Max will engage in a leisure activity with peers 1x/day with verbal cues
Expected level of outcome 0	Jane will write 11-15 letters of the alphabet with 100% legibility.	Paul will demonstrate active reach with LUE with minimal assistance.	Max will engage in a leisure activity with peers 2x/day with verbal cues
Somewhat more than expected +1	Jane will write 16-20 letters of the alphabet with 100% legibility.	Paul will demonstrate active reach with LUE with modified independence.	Max will engage in a leisure activity with peers 3x/day with verbal cues
Much more than expected +2	Jane will write 21-26 letters of the alphabet with 100% legibility.	Paul will demonstrate active reach with LUE with independence.	Max will engage in a leisure activity with peers 4x/day with verbal cues