International Journal of Aquatic Research and Education

Volume 2 | Number 3 Article 4

8-1-2008

Halliwick-Based Aquatic Assessments : Reliability and Validity

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International Journal of Aquatic Research and Education, 2008, 2, 224-236

Halliwick-Based Aquatic Assessments: Reliability and Validity

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Purpose: To investigate the reliability and validity of 2 aquatic functional-assessment tests (Water Orientation Test of Alyn 1 and 2: WOTA1, WOTA2) for evaluating adjustment and functional ability in the aquatic environment based on the Halliwick concept. ***Methods:*** Thirty-two children with disabilities participated in the reliability study. Thirty-three other children participated in the validity study, which tested the correlations between the WOTA total score and motor performance on land. ***Results:*** Test–retest reliability for total score was found to be excellent for both WOTA1 (ICC = .97) and WOTA2 (ICC = .97). The reliability for most of the individual item scores was fair to good (kappa > .4). A positive moderately significant association was found between the WOTA total score and motor performance on land. ***Conclusion:*** Both assessments appear to be reliable and valid for assessing mental adjustment and aquatic function in children with disabilities.

Keywords: Halliwick concept, children, disability

For many years, aquatic therapy and swimming have been recognized as rehabilitation modalities for people with special needs (Becker & Cole, 2004; Ruoti, Morris, & Cole, 1997). Recently, aquatic therapy has been reported as one of the most prevalent means of treating children with cerebral palsy (Hurvitz, Leonard, Ayyanger, & Nelson, 2003). The advantages of the aquatic environment as a therapeutic medium can be explained by its many unique properties: (a) Buoyancy assists in the performance of movement that is difficult on land because of the inability to overcome gravitational restraints (Getz, Hutzler, & Vermeer, 2006a; Harris, 1978; Hutzler, Chacham, Bergman, & Szeinberg, 1998); (b) hydrostatic pressure improves respiration and increases cardiac output (Becker & Cole; Hutzler et al.); (c) warm water temperature (32–33 °C), mostly used in therapeutic settings, encourages muscle relaxation, reduces muscle tone (Attermeier, 1983; Sweeney, 1983), and might provide pain relief (Michlovitz, 1986; Whitney, 1989); (d) the increased viscosity of the water compared with air provides isokinetic resistance forces to movement, across directions and velocities, which can be useful for facilitating muscle strengthening (Becker & Cole; Broach & Datillo, 1996). Viscosity also slows the speed of movement while buoyancy supports the body, which can

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further facilitate balance training (Geigle, Cheek, Gould, Hunt, & Shafiq, 1997); and finally, (e) continuous control of body positions regarded as a direct outcome of the relationship between contrasting forces of center of gravity and the center of buoyancy further enhances balance training, whereas on land, body control is affected mainly by the center of gravity (Becker & Cole).

To date, adapted aquatic specialists have employed a wide range of methods geared toward teaching individuals with special needs independence in the aquatic environment. With the introduction of the International Classification of Functioning Disability and Health (ICF) by the World Health Organization in 2001 addressing the importance of active participation as an essential outcome of therapeutic interventions, independence in the aquatic environment should be highlighted.

Most aquatic interventions aimed toward teaching aquatic independence follow the guidelines of typical learn-to-swim-progressions (American Red Cross, 2004; Langendorfer & Bruya, 1995). Gelinas and Reid (2000) studied the reliability of the learn-to-swim programs in children with special needs and reported that specific aquatic skills taught in traditional learn-to-swim progressions were not developmentally valid for most children with physical disabilities. The Halliwick concept, developed by James McMillan in England, is specifically aimed toward teaching aquatic independence for individuals with special needs while taking into account the specific attributes of the aquatic environment (Lambeck & Stanat, 2001a; McMillan, 1978). Specifically, the Halliwick concept includes a 10-point program based on a motor-learning sequence that focuses on maintaining body position in different movement planes while facilitating the unique properties associated with water. The 10 successive steps lead individuals, with or without disabilities, to experience and master a variety of unique movement patterns, culminating in functional swimming (Lambeck & Stanat, 2001a; McMillan).

The first step in the 10-point program is mental adjustment (Lambeck & Stanat, 2001a; McMillan, 1978). Because of the different qualities of the aquatic environment, one of the first things the novice participant encounters on entering the water is difficulty in maintaining body posture, often resulting in a feeling of uncertainty and anxiety. Several factors might influence the process of mental adjustment in the aquatic environment: (a) Because of the effects of buoyancy and the partial weight bearing the participant feels lighter and experiences altered superficial sensation (Lambeck & Stanat, 2001a); (b) when the center of buoyancy is not vertically aligned with the center of gravity, rotational forces begin to act and the body rotates in the water, which in turn requires adjustment of postural control (Becker & Cole, 2004; Lambeck & Stanat, 2001a); and (c) refraction of light beams through the water into the air requires the participant to adjust to the difference between the visually perceived position and actual position of body parts (Becker & Cole).

The mental adjustment to these factors evokes various movement patterns such as widening the base of support, increasing body muscle tone, using the hands for support (Lambeck & Stanat, 2001a), reducing functional degrees of freedom to execute an intended motor purpose (Lambeck & Stanat, 2001a), and moving in a fixed pattern (usually an extensor pattern; Haberfellner, 1986), all of which influence functional ability in the aquatic environment. Mastery of mental adjustment, exhibited by the ability to respond appropriately to different environmental requirements (McMillan, 1978), minimizes these uncontrolled movement patterns and therefore is a prerequisite for any further activity or therapy in the aquatic environment (Campion, 2000; Cunningham, 1997; Dulcy, 1983). Once mastery of mental adjustment is achieved, the person has adjusted to the aquatic environment constraints and is ready to learn and acquire the skills needed to achieve body control (American Red Cross, 1977; Dulcy, Getz et al., 2006a).

Compared with able-bodied people, people with disabilities often exhibit fewer strategies in the learning process. Limitations in postural control, motor function, controlled voluntary movement, and head control can increase altered sensations and the feeling of threat during immersion (Campion, 2000). Therefore, mastering mental adjustment is often a prolonged process for these individuals (American Red Cross, 1977; Campion).

To facilitate the use of aquatic intervention to improve the functional level of performance on land, it is recommended that aquatic professionals conduct functional assessment in both the aquatic- and land-based environments (Campion, 2000; Styer-Acevedo, 1997). Valid assessment provides the therapist with information regarding the patient's current state and level of ability. This enables planning for future treatment sessions in accordance with the patient's needs (Campion; Lepore, Gayle, & Stevens, 1998).

A review of the literature revealed that the topic of assessment in the aquatic environment has been neglected in comparison with assessment in land-based therapy (Getz, Hutzler, & Vermeer, 2006b; Geytenbeek, 2002). Several tools for evaluating adjustment and functional ability in the aquatic environment have been reported (Chacham & Hutzler, 2002; Killian, Arena, & Bruno, 1987; Killian, Joyce-Petrovich, Menna, & Arena, 1984; Langendorfer & Bruya, 1995; Lepore, Gayle & Stevens, 1998). Most of these have failed to address their reliability and validity. Although the Aquatic Adjustment Test (AAT; Chacham & Hutzler) was found to be highly valid and reliable in measuring motor function in the aquatic environment, it is not based on a specific aquatic method. The Water Orientation Checklist developed by Killian et al. (1984, 1987) was found to be reliable but was only tested in children with mental retardation and autism for interrater reliability and did not address test–retest intrarater reliability. Furthermore, data regarding validity were not reported, and its sensitivity for measuring functional change over time is questionable because of its dichotomous scoring scale (Lepore et al.). In addition, it could be argued that a number of crucial aquatic skills such as various components of breath control and rotational control were not included. Most of the aquatic assessment tools are scored on a pass–fail basis, which does not enable measuring gradation of improvement and therefore might be inappropriate for monitoring long-term follow-up. Functional improvement in the aquatic environment in people with special needs might be very slow, and any change over time might not be noticed on a dichotomous scale (Lepore et al.). Valid and reliable assessment tools enable follow-up of the participant's progress and guide therapists in planning and adjusting treatment goals and strategies. An assessment tool based on a specific therapeutic concept enables measurement and evaluation, facilitates goal setting, and recognizes progress using the same terms as the intervention.

The purpose of this study was to assess the reliability and validity of two assessment tools for evaluating adjustment and functional ability in the aquatic environment. An additional goal was to determine the clinical usefulness of the tools according to outcome goal setting. Both tools are based on the principles of the Halliwick concept. The Water Orientation Test of Alyn 1 (WOTA1) targets participants who have difficulty following simple verbal commands. WOTA2 targets participants who can more readily follow instructions.

Method

The study was conducted at Alyn Hospital, a pediatric and adolescent rehabilitation center in Jerusalem. All the participants were children who had been prescribed aquatic therapy by their physicians.

Development of the Two WOTA Tests

The two tests were developed in several stages. Initially, the WOTA2 was developed, but it was soon found to be too complicated for younger children and children with severe cognitive limitations. This led to the development of WOTA1. We sent the tests to two internationally recognized experts on the Halliwick concept for their comments regarding the content validity of the instruments. We subsequently incorporated their suggested corrections into the final version of both WOTA tests.

For WOTA2, the Halliwick concept was divided into its 10-point program. Each point was then subdivided into skills. A 4-point ordinal scale was developed for each skill based on the level of performance and functional independence, as described by the Halliwick concept (Lambeck & Stanat, 2001a; see an item example in Appendix 1). The total score comprises a total adjustment score, being the sum of the first 13 items, and a total function score, being the sum of items 14–27.

WOTA1 is mainly based on the mental-adaptation and balance-control phases of the Halliwick concept. Mental adaptation includes skills that evaluate the child's adjustment to the properties of the aquatic environment: breathing control and gradual disengagement of therapist support. The balance-control phase includes skills that evaluate functional abilities of balance control. Each item is scored using a 4-point ordinal scale (see an item example in Appendix 2).

The Reliability Study: Test–Retest Reliability

The reliability study of the WOTA2 form used a convenience sample of 16 children, age 3–15 years, capable of understanding and performing simple verbal commands. The reliability study of the WOTA1 form used a convenience sample of 16 additional children, age 1–8 years, with difficulties in following simple verbal commands. We present the patients' characteristics in Table 1.

A physical therapist who has experience both in aquatic therapy and in the Halliwick concept and had been working in a pediatric rehabilitation center for 9 years (Rater A) participated in the reliability study. The rater was not acquainted with the new WOTA tests before this study.

The rater received a "training pack" that included the evaluation form and accompanying score sheets defining the different scores for each item under detailed guidelines. The rater was asked to familiarize herself with the form before the day of rating and then practiced using the scale by testing two children. We addressed any clarifications on the testing identified by the rater. Then the rater was asked to evaluate each child twice at 1–3 days' interval. She asked the child to perform each task three times, and the best performance was used as the final score.

Table 1 Study Sample Characteristics

	Reliability Sample		Change Over Time	
	WOTA2 $N = 16$	WOTA1 $N = 16$	WOTA2 $N = 33$	WOTA1 $N = 24$
Age, years	9.1 ± 4.0 (3–15.1)	3.0 ± 2.0 (1–8)	8.1 ± 3.4 (4–16)	3.0 ± 2.0 (1–8)
Gender				
male	9	5	18	15
female	7	11	15	9
Disability				
acquired	12	0	21	0
congenital	4	16	12	24
Duration of aquatic therapy, months	9.5 ± 8.5 (2–30)	9.0 ± 7.0 (2–24)	9.5 ± 8.5 (2–30)	8.0 ± 6.5 (2–22)
Total WOTA score				
First evaluation	59 ± 17 (26–81)	36 ± 7 (22–46)	50.0 ± 18.0 (18–87)	33.5 ± 7.3 (19–45)
3 Months later			63.0 ± 15.0 (25–92)	41.5 ± 6.7 (23–41)

Note. WOTA = Water Orientation Test of Alyn. Values in table are numbers for category variables and $M \pm SD$ and ranges (minimum–maximum) for serial variables.

For testing outcome goal setting across raters, the level of agreement was determined between raters on "the main treatment goal" as exhibited from the form. Another sample of 16 out of 50 masked completed score sheets of each form was chosen randomly. Another rater (Rater B, with 1 year of experience in aquatic therapy) joined Rater A for this procedure. Each rater was asked to review the completed form and independently determine the main treatment goal. Specifically, on the WOTA1 form, the rater had to determine three treatment goals in three content areas including mental adjustment, breathing control, and function.

The Validity Study

The validity assessment of the forms included two stages: First, content validity was established by basing the forms on the Halliwick concept and then sending the structured forms to two internationally recognized experts on the concept, asking for their comments regarding content validity (as described under test development). The second stage involved establishing concurrent validity by directly comparing motor performance on land and in the aquatic environment. For this purpose a convenience sample of 9 children with cerebral palsy, age 3–15 years, suitable for the WOTA2 and another sample of 24 children, age 1–8 with various pathologies, suitable for WOTA1 were drawn and tested. The latter 24 children were tested both in the aquatic environment and on land by an expert physiotherapist who was blinded to the aquatic assessment results and using the Brief Assessment of

Motor Function test (BAMF; Cintas, Siegel, Furst, & Gerber, 2003). The 9 children with cerebral palsy were tested in the aquatic environment using the WOTA2 test and were evaluated on land by an expert physiotherapist who was blinded to the aquatic assessment results, using the Gross Motor Function Measure (GMFM; Russell et al., 1994).

Sensitivity to Change

It is important for an assessment tool to measure change of functional performance over a period of time. The change-over-time procedure of the WOTA2 form used a convenience sample of 33 children age 4–16 years. The change-over-time procedure of the WOTA1 form used a convenient sample of 24 children age 1–8 years. We have presented the demographic characteristics of the sample in Table 1.

We first assessed these 57 children using the appropriate form (WOTA1 or WOTA2). Each child was then reassessed twice at 3-month intervals. The administrative procedures for the tests in each assessment were the same. During the 3-month period between tests, each participant received aquatic therapy 2 days a week for a duration of half an hour at each session.

Statistical Methods

Test Reliability. Reliability was measured by calculating the intraclass correlation coefficients (ICCs) and the 95% confidence interval for total score, function, and adjustment subscore, as well as the kappa coefficient for each of the items in each test assessed twice by Rater A. We defined ICC and kappa values greater than .7 as highly reliable (Shrout & Fleiss, 1979). We used standard error of measurement (*SEM;* based on the formula $SEM = SD[1 - \text{ICC}]^{0.5}$) to quantify the measurement error in the same units as the original measurement (Stratford & Goldsmith, 1997). We calculated the 95% confidence intervals for all ICCs and *SEM*s (Shrout & Fleiss; Stratford & Goldsmith).

Test Validity. To test the assumption that there is a positive association between motor performance on land and in the aquatic environment we calculated Pearson's correlation coefficients (r_p) between WOTA1 total scores and BAMF scores, as well as betweenWOTA2 functional performance scores and the GMFM scores. We accepted coefficient values of .4–.8 as evidence of moderate levels of association indicative of moderate strength of concurrent validity (Guyatt et al., 1995).

Sensitivity to Change. We calculated the error associated with a measured value (i.e., 95% confidence interval) and the minimal detectable change at the 95% confidence level (MDC_{95}; Beaton, Bombardier, Katz, & Wright, 2001). We obtained the error calculation for a measured value by multiplying the point estimate for the *SEM* by the *z* value associated with the 95% confidence interval ($z = 1.96$). To calculate MDC_{95}, we multiplied the value obtained from the error calculation ($SEM \times 1.96$) by the square root of 2. We interpreted a change greater than MDC_{95} as a true change. We compared the participants' change scores among the WOTA measures with the MDC_{95} values.

Results

Reliability Study

Sixteen children participated in each of the reliability studies. Descriptive data for the participants are presented in Table 1. The ICCs of total scores of both tests and subscores of the WOTA2 test are presented in Table 2. The test–retest reliability for total score was strong and significant for both tests (ICC > .96). The reliability for individual item scores was low for Item 6 on the WOTA2 test (kappa = .35) but ranged from moderate to good for all other test items (kappa > .4–1; Table 3).

The agreement between raters on treatment goals as tested by a random sample of 16 masked score forms of the WOTA2 was excellent. The therapists agreed on the main treatment goals on 15 out of 16 charts. The agreement between raters on treatment goals based on the WOTA1 form was excellent for all test items.

Concurrent Validity Study

A positive significant but moderate association was found between functional motor performance and WOTA1 total score (BAMF and WOTA1 score, $r_P = .56$, $p < .05$) and WOTA2 functional performance score (GMFM and WOTA2 function subtest score, $r_P = .6$, $p < .05$; Table 4).

Table 2 Test–Retest Reliability, Intraclass Correlation Coefficients (95% Confidence Intervals)

	WOTA1, *N* = 16	WOTA2, *N* = 16
Total	.976 (.957–.988)	.969 (.933–.980)
Function		.965 (.925–.981)
Mental adjustment		.971 (.938–.987)

Table 3 Test–Retest Results of kappa Values of Individual Items

WOTA1, *N* = 16		WOTA2, *N* = 16	
Item #	kappa	Item #	kappa
1, 2, 5, 8, 9	.7	6	.3
4, 6, 10, 11, 12, 13	.8	3, 19	.5
3, 7	1	16, 17	.6
		12, 20, 22, 26	.7
		2, 4, 5, 13, 18, 21, 23, 25, 27	.8
		7, 8, 9, 15, 24	.9
		1, 10, 11, 14	1

Note. WOTA = Water Orientation Test of Alyn.

Table 4 Validity and Sensitivity to Change

	WOTA1	WOTA2
Concurrent validity: a positive correlation with motor abilities on land	.56* Brief Assessment of Motor Function[a]	.60* Gross Motor Function Measure
Minimal detectable change (points)	4.2	11.5

Note. WOTA = Water Orientation Test of Alyn.

[a]Cintas, 2003.

*$p < .05$.

Sensitivity to Change

Based on the test–retest reliability results, the MDC_{95} for the WOTA1 total score was at 4.2 on the scale (Table 4). In all, 75% of the sample (24 children), who were followed for a 3-month period, exhibited a change greater than 4.2 points. Based on the test–retest reliability results, the MDC_{95} for the WOTA2 total score was 11.5 points on the scale (Table 4). Only 52% of the sample who were followed for a 3-month period exhibited change greater than 11.5 points.

Discussion

The purpose of this study was to investigate the reliability, validity, responsiveness in terms of goal settings, and sensitivity of the WOTA1 and WOTA2. The assessment forms were designed to measure functional independence in the aquatic environment in accordance with the Halliwick 10-point-program concepts. Although both tests were designed to assess functional independence and postural balance control in the aquatic environment, WOTA1 targets individuals with severe cognitive limitation, whereas WOTA2 targets those who can follow instructions. Based on the results of this study it can be concluded that both WOTA1 and WOTA2 are reliable and valid in assessing motor performance in the aquatic environment for their intended populations.

Types and variety of assessment in the aquatic environment have been restricted compared with assessment in land-based therapeutic situations. Only one existing aquatic assessment tool was found to be reliable and valid for special populations (Chacham & Hutzler, 2002), and another tool had been tested only for reliability but lacked some important aquatic skills, thereby reducing the strength of its content validity (Killian, et al., 1984, 1987). Other instruments have not presented validity, reliability, or gradation of improvement (Lepore et al., 1998). In the sections that follow, each of the specific purposes of this study is discussed in detail.

Reliability

The reliability of scores obtained for both WOTA1 and WOTA2 were strong at the level of subscores and the total score. This is an essential prerequisite for any instrument employed to evaluate participants with physical and cognitive disabilities. It might be assumed that the most important factors contributing to the high level of reliability are the simple scoring technique, the comprehensive testing instructions, and the standardized testing scores.

The kappa coefficient for Item 6 in the WOTA2 form, "alternate exhalation, nose/mouth (3 cycles)," was only .35 in the test–retest results. A possible explanation for this finding is that the instruction given in the manual form and test guidelines is unclear regarding the application of this item. According to the written guideline in the manual, the child is asked to exhale through the nose and mouth, specifically; exhaling separately but not alternately is given a score of 1, and alternating once is given a score of 2. The ability to distinguish between these observations might be considered difficult for the rater. Using goggles during the evaluation of this item showed an increase in rater agreement, but this occurred across separate incidents, so the child's behavior could have changed. Because this item is considered essential for assessing aquatic mental adjustment, we now emphasize the use of goggles in the WOTA2 guidelines.

One contribution of the WOTA1 and WOTA2 tests in aquatic therapy is their prescriptive ability to determine treatment goals in the same terminology as treatment itself. The high degree of agreement between raters on treatment goals in the aquatic environment is encouraging. Results showed high agreement between therapists (15 out of 16) when determining treatment goals. Therefore, it can be assumed that therapists can determine treatment goals by observing a completed form, without having to perform the assessment themselves.

The extent to which the results of any reliability study can be generalized to clinical practice depends on how closely the conditions in the study approximate those of assessment in the clinical setting, specifically, the similarity of participants, raters, setting, and the manner in which the evaluations are conducted. The participants in this reliability study reflected the distribution and range of disabilities typically encountered in a pediatric rehabilitation facility.

Validity

Because there is no established gold standard for evaluating adjustment and function in the aquatic environment, we employed the following methods to support the WOTA1 and WOTA2's validity. Content validity was based on the fact that the tests were developed using the Halliwick concept (Lambeck & Stanat, 2001a, 2001b). WOTA2 includes the established steps of the Halliwick 10-point program. WOTA1 specifically focuses on the mental-adjustment and balance-control phases that are considered critical steps in the Halliwick process. In addition, to further establish the content validity, we included the judgment of two renowned, independent experts who reviewed and commented on the structure and content of the tests.

To date, from the several aquatic assessment tests published for individuals with special needs (Killian et al., 1987, 1984; Lepore et al., 1998), only one (the Aquatic Adjustment Test) reported validity coefficients (Chacham & Hutzler, 2002). Most of the published aquatic assessment tests are based on swimming-education methods specifically designed for children without special needs, such as progressive learn-to-swim programs (American Red Cross, 2004; Langendorfer & Bruya, 1995). In contrast, the Halliwick concept was designed specifically for acquiring balance control and functional independence in the aquatic environment for individuals with special needs. The Halliwick concept is widely accepted in aquatic interventions for individuals with special needs (Lambeck & Stanat, 2001a). Getz et al. (2006a) reported in a literature review on children with neuromotor impairments that 3 articles out of 11 employed the Halliwick concept, and the remaining employed a variety of methods following different philosophies.

Because the WOTA1 and WOTA2 assessments are based on the Halliwick concept, they are capable of providing guidance (i.e., being diagnostic and prescriptive) in setting a treatment plan.

The significant correlation found between WOTA 1 and land-based BAMF ($r = .56$) and WOTA 2 and GMFM ($r = .60$) might suggest that both land and aquatic measures identify similar but also different functional restrictions in participants' behavior in the aquatic and land-based environments. Getz et al. (2006b) studied the relationship between aquatic independence and gross motor function in children with neuromotor impairments. Their results indicated a relationship between the Aquatic Independence Measure, a slightly modified version of the Aquatic Adjustment Test, and the GMFM ($r = .69$, $p < .01$), thus confirming our findings. Results further showed a significant relationship between the Aquatic Independence Measure and the GMFCS (–.62, $p < .01$).

Sensitivity to Change

It is highly beneficial for an assessment tool to be able to measure change of functional performance over a period of time in a population with special needs in whom often only moderate changes occur. The study showed that both WOTA 1 and WOTA2 are appropriate tools to track change over time, providing clear and immediate information regarding a child's current functional level of performance, as well as the impact of past therapy.

The different trends of the change between WOTA 1 and 2 populations over time were expected and might have been related to the different target populations. The WOTA1 was designed for younger children or children with severe cognitive limitations. The expectation of change in these children is low compared with participants who are able to comply with instructions (WOTA2 population), in whom 75% showed a significant change over time.

Limitations

This study had several limitations. The first was that the sample of children who participated in this study was recruited from only one rehabilitation center and this was a convenience sample. Only children who agreed to participate in the study were included. As a result our findings might not be fully generalizable to other samples and settings. The number of participants in the concurrent validity study was small and included children with cerebral palsy, and ideally the validity should have been tested in children with other pathologies, as well.

Conclusion

The WOTA1 and the WOTA2 are aquatic assessment tools that measure adjustment and function in the aquatic environment for children with special needs. The tests are clinically relevant and are designed to assess and follow up on function of participants with both motor and cognitive deficits. The scales have been demonstrated to be reliable and valid. We encourage their use by other aquatic professionals and will be interested in feedback, as well as hoping to see additional research conducted with these instruments.

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Appendix 1: WOTA2 Item Number 19C—Right Longitudinal Rotation (Change Position From Back to Prone to Back Float)

The Instruction

The swimmer floats on his back and the instructor stands at his side in the direction of the turn. The instruction: "Turn your head and bring the outside hand over your body in the direction of the roll, turn onto your stomach, and continue the roll until you float again on your back."

Item-Scoring Guidelines

0 Not assessed—e.g., tracheostomy or ear infection.
0 Does not perform—does not initiate, resists, is afraid, or does not cooperate, stops and stands in the middle of the turn.
1 Maximal support—the swimmer initiates the movement, puts his head in, but requires maximal assistance with the turn onto his stomach and/or onto his back.
2 Partial support—the swimmer almost completes the task by himself but requires minimal assistance, mainly turning from prone back onto his back.
3 Independent—does not require support or supervision.

Appendix 2: WOTA1 Item Number 9—Ability to Maintain Vertical Position on Short or Long Arm Hold

Clarification of the Item

"Long or short arm hold" refers to the Halliwick concept. The instructor stands behind the swimmer supporting both of her upper extremities. The swimmer maintains a vertical stance. As the support lessens and is transferred to the forearms and hands, the grade is higher. A grade of 4 is for support at hands only—the long arm hold.

Item-Scoring Guidelines

4 Supporting under hands—maintains vertical balance, arms straight forward or sideward
3 Supporting under forearms and hands—maintains vertical balance
2 Supporting under shoulders and forearms and hands—maintains vertical balance
1 Unable to perform, sagging of shoulders, lack of head control, and/or afraid of disengagement