

LAND DRILLS FOR SWIMMING

Published in "*JTRM in Kinesiology*" an online peer-reviewed research and practice journal - May 22, 2014

Running Head: LAND DRILLS FOR SWIMMING

Basic Land Drills for Swimming Stroke Acquisition

Peng Zhang

East Stroudsburg University

Abstract

Teaching swimming strokes can be a challenging task in physical education. The purpose of the article is to introduce 12 on land drills that can be utilized to facilitate the learning of swimming strokes, including elementary back stroke, sidestroke, front crawl, back stroke, breaststroke, and butterfly. Each drill consists of four components (ready position; movement criteria; recommended practice time; and critical cues) which provide not only detailed descriptions of the drill but also pedagogical knowledge to optimize learning outcomes. Four recommendations are offered in the end of the paper to enhance the safety, effectiveness, and enjoyment factors associated with the applications of the drills.

Swimming is one of the healthiest physical activities for individuals to enjoy across the life span (Hiens, 2008). Research shows that swimming has an exceedingly positive effect on the functioning of the heart and lungs (Bíró, Fügedi, & Révész, 2007). It improves overall blood circulation and helps maintain healthy muscles, bones, and joints (Magno & Mascardo, 2009). Swimming, from a psychosocial perspective, can strengthen self-confidence, improve general state of mind and endurance, reduce stress levels, and enhance the ability to sleep soundly (Graćanin, Medjedović, Mekić, Mavrić, & Obreslikov, 2012; Hiens, 2008).

Although swimming is a popular activity with multiple health benefits, learning swimming strokes can be a challenging task. Teaching proficient swimming strokes is one of the major learning objectives of a swimming class (Magno & Mascardo, 2009). Given the fact that swimming requires learners to gain a coordination of arms and legs while maintaining a horizontal body position with breathing restrictions, learners, especially beginners, may experience difficulties while attempting to understand and perform the swimming stroke movements in water (Bradley, Parker, & Blanksby, 1996; Gelinas, & Reid, 2000). For instance, Hoare and Larkin (1991) reported that children (age 5 to 12 years) commonly displayed persistent problems in front crawl, including difficulty in breathing, lack of rhythm and timing, and combining arm strokes and leg kicking simultaneously during learning the strokes. These problems may result in unnecessary stress for teachers and an increased risk of learners having negative perceptions about their competence in swimming. Eventually, learners might lose interest and discontinue their participation. Thus, it is necessary for teachers to apply effective teaching methods to help

learners overcome these challenge and there by experience early success whilst learning each swimming stroke.

Appropriately designed and selected land drills can help learners learn swimming strokes in a shorter period of time than when not using land drills. Land drills refer to physical learning activities completed outside the pool to enhance the performance in the pool. In the literature and the field of practice, land drills are also termed as on-land or dry-land activity. Land drills traditionally have been used for training purposes to improve physical conditioning because they may increase the maximal power output through overloading the muscle groups applied for swimming (Aspenes, Kjendlie, Hoff, & Helgerud, 2009; Garrido et al, 2010; Morouço, Marinho, Amaro, Pérez-Turpin, & Marques, 2012). Nevertheless, land drills have another important function, which is to facilitate beginners in their attempt to master the motor skills that need to be performed in the water.

Land drills eliminate breathing difficulties that might occur, which can discourage many beginners; instead they can focus on their movements and learn skill concepts more effectively. Water, for most beginner swimmers, is a foreign environment that can significantly distract their attention from learning proper technique. To verify this point, Parker, Blanksby, & Quek (1999) indicates that even shallow parts of the pool can make learners feel disoriented and sometimes frightened. Swimming strokes, as previously stated, are complex skills requiring excessive cognitive participation for understanding the skill concepts and connecting it to their feelings physically (Coker, 2013; Magill, 2005). It can be difficult for beginners to understand the complex movements in the somewhat distracting working context that water can create. Swimming instructors can therefore

LAND DRILLS FOR SWIMMING

organize the learning activities out of the water where learners can easily breathe, have their eyes open, and stand still. When environment distractions are significantly eliminated or controlled in this way, anxiety can be decreased for the beginner swimmer, as long as the learning environment and learning tasks are conducive to success.

Land drills reduce resistance for performing the movements and can facilitate the learning of each swimming stroke since water is denser than air. Because of these features, individuals experience more resistance when they move in the water than they do on land. Moving with excessive resistance requires a great amount of energy which can result in learners experiencing high fatigue levels. Hence, land drills allow individuals to perform the same movements and expend much less energy. As skills develop, learners can practice the same movements in the water, thereby increasing the likelihood of successful performance. Accordingly, it would seem logical for teachers to introduce swimming strokes on land before they are performed in the water (Bradle, Parker, & Blanksby, 1996; Gelinas & Reid, 2000).

Given the fact that swimming stroke acquisition has not been a priority among researchers (Blanksby, Parker, Bradley, & Ong, 1995) little research has directly addressed how to use 'land drills' for swimming stroke acquisition; however, a few articles that addressed swimming pedagogy discuss water confidence development, and how to use buoyancy aids and assessment instruments in swimming instruction (Bond, 1989; Erbaugh, 1978; Kirk, 2012; Toposki, 2007).

In Toposki's research (2007), there is an explanation regarding how to apply isometric drills performed on dry land to develop a correct early vertical forearm (EVF) position; a

specific and vital technique of efficient swimming strokes. Toposki (2007) indicates that dry land drills could be used to learn and improve a specific aspect of a swimming stroke. This research supports the significant function of land drills for learning, albeit with an experienced swimmer to improve the speed of their swimming performance. The use of land drills within beginner swimming pedagogy remains largely unexplored, and it is clear that further research is needed to consider how these might improve overall swimming proficiency.

The purpose of this study is to provide swimming instructors and coaches with 12 on-land drills (see Appendix: 12 recommended Land Drills for Beginner Swimmers) that might be used to facilitate the learning of six basic swimming strokes: elementary back stroke, sidestroke, front crawl, back stroke, breaststroke, and butterfly. These land drills were selected based on two criteria. Firstly, each land drill must target either a specific aspect of a stroke technique or the entire technique of the stroke. For example, some land drills aim to develop a correct technique in the performance of just the arm action, while other land drills might focus on the performance of the whole stroke, which incorporates both the arm and leg action. Secondly, each land drill must require little space and be easy to perform. All the land drills selected in this paper have been trialled by hundreds of k-12 and college students who took swimming classes for this practical criterion.

The description for each land drill consists of the following parts: ready position, movement criteria, recommended practice time, and critical cues. Ready position will describe the correct body position for the start of a drill. Movement criteria describe the qualitative aspect for each land drill performance. Recommended amounts of practice is described in sets and repetitions. Teachers can change the amount of practice time based

on the needs of their class. Lastly, critical cues are provided to help students to recall the idea more easily. Moreover, to gain more favourable results, teachers and coaches might consider the subsequent suggestions when incorporating land drills into their swimming teaching.

Recommendations for incorporating land drills into the teaching of beginner swimmers

Part or easy drills:

Land drills may have similar progressions to swimming strokes that are taught in water (Gelinas & Reid, 2000). Swimming is a series of complex skills; sometimes it is even difficult to mimic the entire technique all at once on land. Therefore, it is recommended that instructors introduce *part or easy drills* before introducing whole or difficult drills (American Red Cross, 2009; Dybińska & Kaca, 2007). As children develop their competence and confidence in skills, teachers may modify the drills and make them more difficult to challenge students' ability to perform the movements.

Flexibility of routine

It is important to develop a *flexible routine* to accommodate the diverse needs of learners in your aquatics class. First and foremost, teachers and coaches need to observe and identify learners' desires and learning outcomes. Subsequently, it is essential to determine when and how many land drills will be utilized in one lesson. For example, aquatic instructors might consider adding one or two land drills to the warm-up section of each lesson. Permit learners to review the land drills through actual practice for five to ten minutes prior to 'in-water' practice.

Adaptability of drills

Land drills should be modified and adapted to accommodate all learners in a class. For instance, land drills can be performed in different positions such as standing up, bending over, and lying down (Guzman, 1998; Toposki, 2007). Land drills can be performed with a partner and/or in a small group. Instructors can manipulate the task goal or characteristics of the environment to address the teaching needs. Instructors are also encouraged to repeat the drills throughout the learning process for enhancing the positive learning outcomes.

Use of equipment

Equipment can be used in land drills with supervision. The use of equipment can provide a more successful learning environment for the beginner student. Equipment can also be used to enhance the enjoyment level, which in return, can encourage learners to practice more. Typical equipment includes kick boards, rescue tubes, noodles, and therapy bands. Learners might wear breaststroke fins and sit on the deck to practice rotary kick. Teachers should always be mindful of safety issues when using any equipment on a pool deck.

In conclusion, land drills are a useful tool for swimming stroke acquisition as they can simplify the learning process by reducing the breathing difficulty and resistance when performing the skills. The 12 land drills that have been used by the author for many beginners with different age are recommended to teachers and coaches for their swimming stroke instruction. These can easily be modified according to the group, task, environment and learning outcome. Researchers and practitioners are advised to explore various aspects of land drills in the future with beginner swimmers. Moreover, taking into account the

LAND DRILLS FOR SWIMMING

practical experiences of learners in relation to how land drills influence their ability to perform in the water could also contribute to the on-going development and evolution of land drills. Future research needs to focus on these aspects of the subject, if pedagogical methods for beginner swimmers are to continue to be enriched.

References

- American Red Cross. (2009). *American Red Cross swimming and water safety* (3rd ed.). Yardley, PA: American National Red Cross.
- Aspenes, S., Kjendlie, P. L., Hoff, J., & Helgerud, J. (2009). Combined strength and endurance training in competitive swimmers. *Journal of Sport Science and Medicine*, 8, 357-365.
- Bíró, M., Fügedi, B., & Révész, L. (2007). The role of teaching swimming in the formation of a conscious healthy lifestyle. *International Journal Of Aquatic Research & Education*, 1(3), 269-284.
- Blanksby, B. A., Parker, H. E., Bradley, S. S., & Ong, V. V. (1995). Children's readiness for learning front crawl swimming. *Australian Journal Of Science & Medicine In Sport*, 27(2), 34-37.
- Bond, R. F. (1989). Swimming for self-confidence and fun. *Exceptional Parent*, 38-44.
- Bradley, S. M., Parker, H. E., & Blanksby, B. A. (1996). Learning front-crawl swimming by daily or weekly lesson schedules. *Pediatric Exercise Science*, 8(1), 27-36.
- Coker, C. A. (2013). *Motor learning and control for practitioners*. (3rd ed.). Scottsdale, AZ: Holcomb Hathaway.
- Dybińska, E., & Kaca, M. (2007). Self-assessment as a criterion of efficiency in learning and teaching swimming. *Human Movement*, 8(1), 39-45.

- Erbaugh, S. J. (1978). Assessment of swimming performance of preschool children. *Perceptual & Motor Skills*, 47(3), 1179-1182.
- Garrido, N., Marinho, D., Barbosa, T., Costa, A., Silva, A. Pérez-Turpin, J., & Marques, M. (2010). Relationship between dry land strength, power variables and short sprint performance in young competitive swimmers. *Journal of Human Sport & Exercise*, 5(2), 240-249.
- Gelinas, J. E., & Reid, G. (2000). The developmental validity of traditional learn-to-swim progressions for children with physical disabilities. *Adapted Physical Activity Quarterly*, 17(3), 269-285.
- Guzman, R. (1998). *The swimming drill book*. Champaign, IL: Human Kinetics.
- Gračanin, I., Medjedović, E., Mekić, H., Mavrić, F., & Obreslikov, D. (2012). Effects of swimming within disabled persons. *Research In Kinesiology*, 40(1), 37-41.
- Hiens, E. (2008). *Fitness swimming*. (2nd ed.). Champaign, IL: Human Kinetics.
- Hoare, D. D., & Larkin, D. D. (1991). Girls, movement coordination and sport. *Sports Coach*, 14(4), 37-39.
- Kirk, L. (2012). Learning through repetition. *Swimming World*, 53(4), 31-32.
- Magill, R. A. (2007). *Motor learning and control: Concepts and applications* (8th ed.). New York, NY: McGraw-Hill.

Magno, C., & Mascardo, E. (2009). The effect of rehearsal learning and warm-up on the speed of different swimming strokes. *International Journal Of Research & Review*, 2, 46-56.





Morouço, P., Marinho, D., Amaro, N., Pérez-Turpin, J., & Marques, M. (2012). Effects of dry-land strength training on swimming performance: a brief review. *Journal Of Human Sport & Exercise*, 7(2), 553-559.

Parker, H. E., Blanksby, B. A., & Quek, K. L. (1999). Learning to swim using buoyancy aides. *Pediatric Exercise Science*, 11(4), 377-392.



Toposki, T. (2007). Early vertical forearm dry-land exercises. *American Swimming*, 6, 6-8.

LAND DRILLS FOR SWIMMING

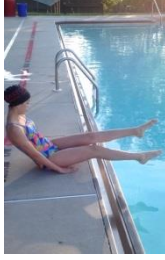



Appendix: 12 recommended Land Drills for Beginner Swimmers

Drill	Picture	Description of dry land drill	Exercise	Critical cues
1 Elementary Backstroke Kick		<p><u>Ready position:</u> Stand tall with both feet together.</p> <p><u>Movement criteria:</u> Use one leg to support your body. Draw heel toward buttocks with ankle in a dorsi-flex position. Rotate your foot outward to a 90 degree angle and make a circular movement.</p>	10 reps x 3 sets	Dorsi-flex ankle.
2 Elementary Backstroke Arm Stroke		<p><u>Ready position:</u> Stand tall and keep both hands on the sides of your thighs.</p> <p><u>Movement criteria:</u> Move your hands upward along the side of your body until your thumbs touch your shoulder. Point your hands outwards from your shoulders and extend your elbows. Smoothly drop your hands to the side of your thighs.</p>	10 reps x 2 sets	“Soldier chicken, and airplane”
3 Sidestroke (Scissors) Kick		<p><u>Ready position:</u> Stand with two feet together.</p> <p><u>Movement criteria:</u> Bend your right knee and lift it to your waist level. Extend your right leg forward and return it to the ready position like a hurdling movement. Bend your left knee, drawing the heel of your foot toward the buttock and move your lower left leg backward until the whole leg is straight. Return it to the ready position.</p>	12 reps x 2 sets	Top leg forward and bottom leg backwards
4 Sidestroke Arm Stroke		<p><u>Ready position:</u> Stand tall and keep the right arm down on the side of the body while raising your left arm upward over the side of your head.</p> <p><u>Movement criteria:</u> Bend your left elbow and move your left hand to the front of your chest</p>	10 reps x 3 sets	<i>Pick the apple, take the apple, and throw it into the basket.</i>



LAND DRILLS FOR SWIMMING

		as you pick up an apple from a tree. Drawing the right hand to the front of your chest and lower your hand back to the ready position.		
5 Front Crawl Arm Stroke A		<p><u>Ready position:</u> Stand tall and raise both arms overhead with hands together.</p> <p><u>Movement criteria:</u> Move one arm at a time our left arm stays. Move your right arm into forward, downward and backward as a loop. Keep your arm straight. Then duplicate the movement to your left arm while your right arm stays. Add breathing toward the end of the practice.</p> <p><i>Note: this is a simplified version of the technique for getting the general pattern of the movements. The regular front crawl arm stroke requires a catch, mid-pull and finish in the power phase which shall be practiced after the initial practice (American Red Cross, 2009).</i></p>	10 reps x 2 sets	Rotate hips and shoulders.
6 Front Crawl Arm Stroke B		<p><u>Ready position:</u> stand in a straddle position, right foot at the front. Lower your trunk and locate your right hand on top of your right knee while extending your left hand in front of the shoulder.</p> <p><u>Movement criteria:</u> move your left hand downward and backward. Press your hand toward your feet until your thumb touches your thigh. Imagine you draw a reversed question mark with your hand.</p>	10 reps x 4 sets	Keep the practicing hand close to the body while stroking.

LAND DRILLS FOR SWIMMING

<p>7 Backstroke Kick</p>		<p><u>Ready position:</u> take a sitting position on the floor with your legs extended at the front. <u>Movement criteria:</u> raise your legs in the air with both feet together and knees extended. Lower and raise one foot in a range of 12 -14 inches and alternate both feet. Repeat the cycle.</p>	<p>30 reps x 3 sets</p>	<p>Extend the toes when kicking. Power phase upward, recovery phase downward.</p>
<p>8 Backstroke Arm Stroke</p>		<p><u>Ready Position:</u> Stand straight with one arm overhead and one arm down by your thigh. <u>Movement criteria:</u> move your arm close to the wall forward and upward along the wall. Turn your palm out and move it back to ready position. Remain the other arm on the side in the process. <i>Note: this is a simplified version of the technique for getting the general pattern of the movements. The regular backstroke arm stroke requires a catch, mid-pull and finish in the power phase which shall be practiced after the initial practice (American Red Cross, 2009).</i></p>	<p>10 reps x 2 sets</p>	<p>Lift, turn, and recover. Arms in opposition.</p>
<p>9 Breaststroke Kick</p>		<p><u>Ready position:</u> lying down on your stomach with two feet together. Keep arms overhead. <u>Movement criteria:</u> Withdraw your feet up to your buttocks, flex your ankles and turn your toes outwards (ankle dorsiflexion). Press your feet outward and backward simultaneously. Close your feet at the end. Repeat the cycle.</p>	<p>10 reps x 2 sets</p>	<p>Try to keep the knees close in the entire kicking process.</p>
<p>10 Breaststroke Arm Stroke</p>		<p><u>Ready position:</u> Lay down in a prone position on the edge of the pool deck. Position both arms in the front with palms outward in a 45 degree angle and slightly below the surface of the water.</p>	<p>10 reps x 2 sets</p>	<p>Press hands downward and inward.</p>

LAND DRILLS FOR SWIMMING

		<p><u>Movement criteria:</u> Separate your arms outwards until they are shoulder width apart. Bend your elbows and sweep the hands downward and inward. Hands meet directly below your chin. Move your hands forward to the beginning position.</p>		
<p>11 Butterfly Kick</p>		<p><u>Ready position:</u> Stand straight and put hands on the sides of your waist. <u>Movement criteria:</u> thrust your hips forward as much as possible and move them backward for the same range of motion. Return to the ready position. Minimize the head's movement while moving hips back and forth.</p>	<p>10 reps x 2 sets</p>	<p>Press hips forward, then backwards</p>
<p>12 Butterfly Arm Stroke and Kick Rhythm</p>		<p><u>Ready position:</u> Stand tall and raise both arms overhead with hands together. <u>Movement criteria:</u> slowly tap the ground with your right foot for four beats. At the third beat draw both hands downwards and move your hands back to the ready position on the fourth beat. Its purpose is to get the rhythm of the coordination of the arm stroke and kick.</p>	<p>10 reps x 2 sets</p>	<p>Recovery hands overhead quickly on the fourth beat. Add breathing after the movements are mastered.</p>