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Massed and Distributed Practice Applied to Swimming

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ENG-220

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Introduction

Coaches occasionally face an issue of their team performing well at practices but cannot correctly execute skills during the competition (Brusseau et al., 2021, p. 153). The above citation mentions that underwhelming performances can be due to the lack of retention of skills learned and a failure to transfer the relevant skills to the competitive environment. The sport of swimming, being an athletic endeavor, is not immune from these underperformances. Swim coaches must deploy strategies to prevent underperformance from their athletes and develop swimmers who successfully retain and transfer information from practice into the competitive environment. One such strategy is to organize practices around skills in a way that best trains the skill in question (Schmidt & Timothy Donald Lee, 2014, pp. 227 - 252). For swimming, racing skills would have to be appropriately classified, and then the ideal organizational method would have to be applied. Swimming practices can be classified into the concept of massed practice sessions and distributed practice sessions, and the utilization of each of these concepts can help the retention and transfer of swimming skills into the racing environment.

An individual race in swimming can consist of various skill elements that are unique to the event or separate from the stroke. These skill elements do not include the plethora of swimming strokes and distances for competitions. Swimming events can consist of one of four strokes: breaststroke, backstroke, butterfly, and freestyle. The exception is an individual medley, in which all four strokes are present during the event (De La Cruz, 2024). Freestyle is the ability to choose whichever style a swimmer wants. However, the front crawl stroke is the primary stroke chosen. There could be more defined categories of swimming skills, but only three categories will be covered.

Most swimming events, except for the 50m Freestyle, include all the following elements. The first is the dive or the race start, which consists of a track start for butterfly, breaststroke, and freestyle and a specialized start for backstroke (Hall & Murphy, 2020, pp. 158, 176). The second skill comprises the underwater portion of a race. In the 2024 rulebook for swimming competitions, a swimmer is permitted to remain underneath the water's surface after the turn and dive for a distance of 15m (USA Swimming, 2024). There are differences between the underwater portion of swimming strokes (Hannula & Thornton, 2001, pp. 192, 197, 202, 204). The following independent skill, which again differs depending on the stroke, is the turns (Hannula & Thornton, 2001, pp. 193, 198, 202, 204). A swim coach is ultimately responsible for teaching the technique of all these skills.

Technical proficiency is the most important variable in winning swimming races and is more critical than physical conditioning (Rushall, 2016). Coaches who wish to develop proper technique in their athletes must understand motor behavior, which is how movements are learned (Brusseau et al., 2021, p. 144). To ensure a clear understanding, we must first define the key terms used throughout before exploring the classifications of skills.

Definitions

The first of these terms is retention. Retention is how much of a skill can be recalled after a period of absence from practice (Brusseau et al., 2021, p. 153). The amount of time of absence between practice sessions is known as the retention interval. The second term is known as transfer. Transfer is how the skill practiced in one task is affected by a change in the context of the skill or by performing a different task with similar features (Brusseau et al., 2021, p. 153). For example, as mentioned in the above citation, an example of transfer would be the ability to ride a bike and transfer that skill to other routes or terrain. Another example would be the

capacity of a team to apply the skills they have developed in practice in a competitive environment. Drawing from the definitions established earlier, coaches can design training protocols that specifically target these critical aspects of learning to optimize the learning experience and create the most effective training technique.

There are many ways to classify movement skills (Schmidt & Timothy Donald Lee, 2014, p. 8). The classification focus will be on the extent to which a movement is an ongoing movement or a movement with a definitive beginning and completion point (Schmidt & Timothy Donald Lee, 2014, p.9). According to the above citation, the first skill to be defined would be the continuous skill. Continuous skills are those which have no definite start or stop point. An example of a continuous skill would be a swimming stroke, as the nature of the movement does not end. The second is a discrete skill defined by a beginning and an endpoint; each is identifiable. A third classification is called a serial skill. A serial skill is a group of discrete skills combined to form a new action.

Skill Classifications

With these terms defined, the next stage would be the classification of the movements. Freestyle, breaststroke, backstroke, and butterfly strokes are classified as continuous movements (Schmidt & Timothy Donald Lee, 2014, p.12). The other skill classifications are based on the above definitions of discrete and serial. The swim start is a discrete skill (Thng et al., 2021). Based on the above definitions, one could classify turns as discrete skills since they have definitive start and stop points to the action. The underwater portions of the races comprising dolphin kicks would be considered continuous skills (Hannula & Thornton, 2001, pp. 193, 197, 202). The final skill, the breaststroke pullout, might be the only serial skill in the sport. The classification is due to the unique string of skills that are put together after each turn and dive.

Although there can be variations on the pull-down technique, the movement sequence that will be assumed is the Fly kick first technique (McCabe et al., 2022). The classification of these skills is relevant as specific skills are learned better through different motor learning methods.

Massed vs. Distributed Practice

The first type of motor learning method to be analyzed will be the concepts of massed practice and distributed practice. These two concepts deal with how a practice should be spaced and the time spent on skills within a practice session (Coker, 2003, p. 190). Massed practice is defined as the time allotted to practice as more than the resting period. Massed practice sessions are also longer in duration than distributed practice sessions (Magill, 2008, p. 396). Distributed practice sessions are defined as the time spent on practice as less than or equal to the amount of time resting (Coker, 2003, p. 190). As mentioned above, distributed practice schedules have less practice per session and, therefore, require sessions to be extended over a longer period to achieve the same amount of practice time. These practice schedules have specific strengths and weaknesses depending on the skill classification one is participating in.

The first skill to investigate will be the swimming strokes. As mentioned previously, swimming is classified as a continuous skill. A characteristic of continuous skills is the accumulation of fatigue between practice trials (Schmidt & Timothy Donald Lee, 2014, p. 238). The problem with higher levels of fatigue is the effect of having an athlete practice motor patterns that are not correct (Coker, 2003, p. 191). Fatigue inhibits the learning process (Rushall, 2018). Because of the chance that fatigue can reduce learning potential, practices with the intent of teaching strokes should be built around the distributed practice model. Giving swimmers plenty of rest between practice trials while learning the skills would tone down fatigue and offer a better learning environment. There is evidence that longer rest periods for continuous skills

improve performances within the practice session and allow for greater retention rates of the skills being learned. (Schmidt & Timothy Donald Lee, 2014, p. 239). A distributed practice model would also be used to teach underwater dolphin kicks, which are also considered continuous skills.

For discrete skills, such as starts and turns, the best organizational practice method would be massed practice sessions (Coker, 2003, p.190). The only issue with massed practice sessions for these particular skills is the limited pool space swim teams tend to have (Poirier-Leroy, 2013). The movement of a racing start takes only a second or two from the initial start of the dive to the entry point. However, depending on the number of diving blocks a coach might have to use, there would have to be a waiting period between each trial simply due to the number of athletes and lessening the effectiveness of the practice session. Another issue would be massed practice sessions for turns, although that could be more easily remedied. Depending on how many swimmers there are per lane, there is limited wall space to practice the turn, and, like diving, there is naturally some time that swimmers must wait before their trial opportunity returns. There could be an organizational strategy of lining swimmers up across the length of the pool and having athletes practice the complete turn without the wall to work the motion before applying the movement to the walls. Massed practice is effective for learning discrete skills, but swim coaches must learn how to effectively organize practice sessions to apply the methodology.

The serial skill, in the form of the breaststroke pull-down, can be trained differently due to the nature of serial skills. Serial skills can be practiced with separated components (Coker, 2003, p.9). Breaststroke pull-downs would be unique in swimming as the characteristics of the skill are practiced in various forms throughout other strokes. For example, the dolphin kick is practiced during freestyle, and the butterfly repeats after dives and turns. At the end of the pull-

down sequence, the breaststroke kick is practiced in every breaststroke cycle. Two of the serial skill's motions are continuous skills isolated to one repeat. The only motions that could be considered a discrete skill within the breaststroke pull-down have to do with the arm components. The arms, starting from a streamlined position, separate, and the hands push back towards the feet and end in front of the hips (McCabe et al., 2022). The elbows then flex, and the hands move up to an outstretched position in front of the body. These actions would be the only discrete actions within the movement. Unlike turns and dives, which would suffer from logistical issues in practice, the pull-down sequence can be done in a massed practice method by isolating those two skills and running sets repeating the action. A coach would then have to teach the skill components in order as serial skills must be combined to be successful (Coker, 2003, p.9).

Conclusion

Given the issues coaches face in terms of retention and transfer and the inability of some athletes to take what was learned in practice and apply the skills to the competition, learning motor behavior concepts and applying them to practice sessions is necessary. In swimming, coaches must understand the skill classifications of components of a race. Each component must be trained in a certain way to train the best technique. Continuous skills, which include the four strokes and the underwater portions of races, need to be taught using the distributed organization model, which means the rest is equal to the work time done during the set. For discrete skills, which include dives and turns, the best practice method is using a massed practice model, which means very little rest between work sessions. Finally, the serial skill of the breaststroke pull-down has elements of continuous and discrete skills that individually need to be trained according to their respective classifications. After the skills have been practiced in a way suitable

to learning, a coach combines the elements. Through proper training, athletes will be better able to apply what was taught in practice to the competitive environment.

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