Interpreting and Implementing the Long Term Athlete Development Model: English Swimming Coaches' Views on the (Swimming) LTAD in Practice

Melanie Lang[1] and Richard Light[2]

[1] Faculty of Arts and Sciences, Edge Hill University, The Wilson Centre/ Sport, St. Helen's Road, Ormskirk, L39 4QP.

E-mail: Langm@edgehill.ac.uk

[2] Carnegie Research Institute, Leeds Metropolitan University, LS6 3QS.

E-mail: R.Light@leedsmet.ac.uk

ABSTRACT

The LTAD (Long Term Athlete Development) model has come to represent a sports-wide set of principles that significantly influences national sports policy in England. However, little is known about its impact 'on the ground.' Research is yet to investigate how national sporting bodies have adapted the model to their specific requirements and how local interpretation and implementation of this is operationalized and delivered. The study reported on here sought to redress this oversight by inquiring into competitive swimming coaches' views on the interpretations and implementation of the LTAD model used in English swimming. It draws on data generated during interviews with six elite and five non-elite swimming coaches in the north of England. While there were concerns with aspects of the ASA (Amateur Swimming Association) regulations governing competition for age-group swimmers, the major concern expressed by participants was with over-emphasizing volumes of training, leading to the neglect of technique.

Key Words: LTAD, Swimming Coaching, England, Youth Sport

INTRODUCTION

Growing recognition of the political and commercial value of sport over recent decades has seen government initiatives and funding aimed at developing elite athletes supersede those targeting mass sports participation [1, 2]. Within this context, the development of progressive pathways that nurture talented athletes from junior to senior level has come to form a core focus for national governing bodies of sport (NGBs) in the UK, which are now required to have a sport-specific Long Term Athlete Development (LTAD) plan to receive state funding [3].

The aim of the LTAD model is to ensure that athletes develop fundamental motor abilities at their optimal physical development stage based upon the assumption that these skills do not develop automatically but must be learnt [4, 5, 6]. In particular, research highlights the need for the systematic development of fundamental physical and movement skills as pre-requisites for the development of more sport-specific skills and effective long-term development [5, 6, 7, 8]. Moreover, following suggestions that performance levels can be increased through the extended use of "activities that have been specially designed to improve the current level of performance" [9], the notion that it takes at least 10 years or 10,000 hours of deliberate practice to excel, the so-called 10-year or 10,000-hour rule, has become central to the LTAD model [9, 10, 11].

In English swimming, the adapted version of the LTAD provides guidelines for ASA-affiliated clubs to develop athlete-training programs and is known as *The Swimmer Pathway* [12]. However, although coaches at ASA-affiliated clubs have been obliged to develop programs that follow the principles laid down in *The Swimmer Pathway* since its introduction in 2003, little is known about the ways in which this model is realized in practice. In redressing this oversight, this study inquired into competitive swimming coaches' views on the interpretation and implementation of the LTAD model used in English swimming.

LTAD IN SWIMMING

The LTAD model was created in the early 1990s by Canadian sports scientist Istvan Balyi to ensure that athletes develop fundamental motor abilities at their optimal physical development stage based upon the assumption that these skills do not develop automatically but must be learnt [4]. The swimming-specific LTAD model, *The Swimmer Pathway*, was introduced in 2003 and all ASA-affiliated swimming clubs are required to implement it in order to receive NBG funding. Under the plan, swimming is categorized as a late-specialization sport comprising the following stages: 1) FUNdamentals (boys aged 6-9 and girls aged 5-8); 2) Learning to Train (boys aged 9-12 and girls aged 8-11); 3) Training to Train (boys aged 12-16 and girls aged 11-15); 4) Training to Compete (males aged 16-18 and females aged 15-17); 5) Training to Win (males aged 18 and over and females aged 17 and over); and 6) Retirement/Retention [12]. However, in a departure from the generic LTAD model, *The Swimmer Pathway* specifies the frequency of swim training sessions and weekly volume to be covered (see Table 1).

Table 1: Framework suggested for athletes under *The Swimmer Pathway* according to age and sex

	FUNdamental	**SwimSkills**	**Training to Train**	**Training to Compete**	**Training to Win**
Chronological/ biological age	Male: 6-9 Female: 5-8	Male: 9-12 Female: 8-11	Male: 12-15 Female: 11-14	Male: 15-18 Female: 14-16	Male: 18+ Female: 16+
Recommended no. of sessions/week	5-6 general sports of 30-45 minutes each	4-6 swim-specific, plus additional participation in other sports	6-12 swim-specific, including land work	8-12 swim-specific, including land work	10-15 swim-specific, including land work

Recommended training hours/week	Sessional	4-7 hours in pool 1-2 hours land work	12-24 hours in pool 2-3 hours land work	16-24 hours in pool 3-4 hours land work	20-24 hours in pool 3-6 hours land work
Recommended training volume/week	None stated	8,000-16,000 meters	24,000-32,000 meters	24,000-52,000+ meters	Min. 44,000 meters, depending on specialism(s)

At the FUNdamentals stage, participation in general sports is encouraged and a structured but a fun approach is advocated to learn basic swimming-specific skills, such as stroke technique, through what the ASA terms the ABC's of athleticism, which although not an acronym refers to agility, coordination, power, endurance and speed [12, 13]. At stage two, SwimSkills, stroke technique is further developed ahead of endurance training, based on the understanding that the former is an essential precursor to future excellence [5, 14]. Here, 4-7 hours per week of swimming training covering 8,000-16,000 meters is recommended in addition to continued participation in complementary sports that use similar energy systems [12, 15]. Stage three, Training to Train, advocates more individualized training of predominantly high volume, low intensity workloads in order to develop the aerobic base, or in Balyi's terms 'build the engine' [15].

The Training to Compete stage aims to optimize individual and sport-specific skills and fitness, referred to as 'optimizing the engine,' through year-round, high-intensity training. It emphasizes aerobic conditioning and, towards the end of the stage, strength work, with between 16-24 hours per week pool training recommended, covering between 24,000-52,000+ meters [15]. Finally, the Training to Win stage aims to capitalize on the training that has been completed thus far – in Balyi's language to 'maximize the engine' – through more specific specialization of generally high-intensity,

high-volume training punctuated by frequent breaks to obviate physical and mental burnout [13]. It suggests 20-24 hours of swim training weekly, covering at least 44,000 meters [12, 15]. The final stage, Retirement/Retention, was added in recognition of the need to retain athletes who have retired from competitive swimming and assumes the previous stages of the LTAD model will increase the likelihood of former athletes remaining within sport.

CRITICISMS OF LTAD

Although the take-up of LTAD model across sports has been buoyed by the requirement that NGBs produce 'one-stop' plans for athlete development to receive government funding, support for the model is not universal. Three core concerns have been raised about the LTAD model and underpin the rationale for the study reported here. These concerns are outlined below.

1) There is concern that *The Swimmer Pathway* places too much emphasis on achieving specified volumes of training, which has the potential to lead to the neglect of technique [16]. The primary goal of the LTAD is to ensure that children learn fundamental skills during their optimal physical development stages and this is seen as being pivotal for long-term athletic improvement [17]. Research supports this goal, highlighting the systematic development of fundamental generic physical and movement skills as pre-requisites for the later development of sport-specific skills and effective long-term development of athletes [5, 6, 7, 8]. Unless these basic skills are learned by age 13, elite success in the long term is improbable [5] with most coaches considering technique to be an essential precursor to future sporting excellence [5, 14]. Moreover, Balyi himself emphasizes the development of basic skills as fundamental to future success, suggesting these motor skills must be learned between the ages of 8-12, in LTAD stages 2 and 3 [13, 18]:

> If fundamental motor skill training is not developed between the ages of 8-11 and 9-12 respectively for females and males, a significant window of opportunity has been lost, compromising the ability of the young player/athlete to reach his/her full potential. … The

> Learn to Train and Training to Train stages are the most important phases of athletic preparation. During these stages, we make or break and athlete! [13]

In swimming, technical skills such as stroke technique are more closely related to performance than in other disciplines [19] with the ability to swim with efficient stroke technique "lay[ing] down the foundations for more serious swimming down the line" [20, p.42].

From the second stage of *The Swimmer Pathway*, however, the frequency of swimming training sessions and the stipulated weekly volume to be covered increase. For example, a minimum of 8,000 meters, or five miles, per week is recommended at the SwimSkills stage, which is aimed at children who are still in primary school. A lack of attention paid to technique in early training can have a negative impact on swimmers' future development [5, 21] yet, despite the importance of technique in swimming it is yet to attract significant research attention. However, the need for high-training volume has been questioned in terms of its benefits for most swimming events. Research has found that high-training volumes and the corollary high-aerobic capacity this brings have little impact on performance in events lasting between 20 seconds and 5 minutes [22]. Given that 80 percent of swimming events do not exceed 5 minutes, this is significant [22]. Such research encourages questioning of the training loads stipulated in *The Swimmer Pathway* and, particularly, in relation to stage three, Training to Train. According to Balyi [13], this is one of the most important phases of athletic preparation – where more individualized training of predominantly high-volume, low-intensity workloads is advocated [15]. The risk here for young athletes is that a focus on high volume can lead to overuse injuries [21], physical and mental 'burnout' [23] and dropout [24], as well as squeezing out time for developing swimmers' technique. In addition, in specifying training frequencies and volumes at each stage and age, *The Swimmer Pathway* has been criticized for 'writing off' young athletes who, for various reasons, do not/cannot commit to recommended training loads or who enter the sport late [21].

2) A second criticism of the implementation *The Swimmer Pathway* is that several ASA regulations appear to contradict elements of the model. The first contradiction relates to the emphasis in the second stage, SwimSkills, on placing technique work ahead of endurance training and the ASA's competition entry requirements for its youngest competitors [16]. As of 2000, the sprint 50-meter events at national age-group swimming championships, which were open to girls 11-13 years old and boys 11-14 years old, were dropped "to discourage the 'bash-and-dash' approach of one-length events" [25]. At the same time, girls aged 10 and boys aged 11 were prohibited from competing in 100-meter sprint events at district, regional and national events unless they had first achieved a qualifying time for the corresponding 200-meter event. Meanwhile, 800 and 1,500-meter events, the two longest events in pool-based swimming competitions, were added to the schedule for girls aged 11 and boys aged 12 [25].

The ASA argues this system of encouraging young swimmers to compete in longer 200-meter freestyle but not in 50-meter events is beneficial to young competitors who "do not have the physiological development required to swim [sprint] events correctly" [25, p.4]. However, with only limited opportunity for youngsters to compete in shorter 50- and 100-meter events at a national level, the current system encourages coaches to train young athletes for 200-meter events, which involves higher training loads and intensity than for the shorter 50- and 100-meter sprint events and places young swimmers' bodies under more physical stress than would be the case if they were training for sprints [26, 27].

A second apparent contradiction relates to ASA regulations on minimum competition qualifying ages. As of 2000, changes in ASA law reduced the minimum qualifying age for national competitions to age 10 for girls and age 11 for boys. In doing so, the ASA is encouraging youngsters who, according to *The Swimmer Pathway*'s SwimSkills stage, should just be beginning to develop sport-specific skills and excellent technique [25] into an elite competitive environment at an increasingly young age. This is despite Balyi's comments that: "Overemphasizing competition in the early phases of training will always cause shortcomings in athletic abilities later in an athlete's career" [13, p.4].

3) The final central concern with the LTAD that is of relevance to this paper arises from the fact that *The Swimmer Pathway* and the LTAD model upon which it is based are guidelines, that is, they have no enforceability and it remains unclear how adherence to LTAD is monitored and evaluated [28, 29]. As such, the benefits for children included within the plan – its avoidance of basing training and competition models on athletes' chronological age and its emphasis on trying to modify training programs to meet the physical, social, and psychological developmental needs of youth athletes – may be pushed aside by coaches who are driven to pursue podium results.

Numerous scholars have highlighted the potential for lack of implementation of the LTAD [16, 17, 21, 28, 30]. Indeed, while coaches from a range of sports in Martindale *et al.*'s [30] study suggested that de-emphasizing age-group success was crucial for effective implementation of talent identification pathways such as LTAD, they also recognized that this was not currently occurring. Similarly, others have suggested that the drive for early success pervades contemporary English sports culture [16, 21] and is often even built into athlete and coach selection procedures [21] despite evidence that an emphasis on winning contributes to dropout rates within competitive programs [24, 31]. Moreover, as a large proportion of coaching knowledge and practice comes from personal interpretations of previous experiences [17, 32, 33, 34], this lack of monitoring of the implementation of LTAD has led to suggestions that policy slippage and incomplete implementation may occur [17].

THE STUDY

This article draws on data collected in a wider ethnographic study conducted by the first author on coaches' perceptions of good practice within competitive youth swimming [16]. Although this larger study employed observational and interview methods to generate data, the data reported in this paper emerged from interviews with coaches conducted by the first author. Only interview data that covered responses linked to the LTAD (see interview guide in the appendix) and which has not previously been published is used in this paper. The LTAD model has been hailed within swimming as "a conveyor belt of swimming excellence" [35, p.20] and is widely used to define good coaching

practice when working with youth athletes [12, 35]. Questions aimed at exploring coaches' understandings of and views on the implementation of *The Swimmer Pathway* were thus asked during interviews. A copy of the interview guide is included in the appendix and further details on the interview process are provided below.

SAMPLING AND RECRUITMENT

Three ASA-affiliated swimming clubs in the north of England were purposefully selected to take part in the study. Clubs in the north in particular were selected to facilitate access as the first author, a former international swimmer from this region, benefits from what McNeill [36] calls 'an insider identity' and was able to approach gatekeepers there who acted as brokers to facilitate access to the coaches. Meanwhile, coaches at clubs were approached to take part in the study if they held an ASA-accredited coaching qualification and worked with competitive age-group, youth or open-age swimmers, as opposed to beginning swimmers or Masters competitors (swimmers aged over 25).

Once ethical approval for the research had been granted by the first author's faculty Research Ethics Board, a meeting with the head coach of each club was arranged to explain the study and negotiate access to the coaches who operated there. Coaches at Central Seals were approached first as the research began in late spring, before the main competitive swimming season has begun, and it was recognized that coaches at an elite club such as Central Seals would have less time to take part in the research when they are regularly traveling to and from competitions. Coaches at North Eels and South Dolphins were approached next, after the main competitive season for their respective club levels was complete. Coaches were purposefully sampled [37, 38] and, as the study was concerned with *competitive* swimming, only coaches who worked with swimmers who competed were involved. All participants provided written informed consent.

PARTICIPANTS

Eleven coaches participated in this study, comprising six elite-level coaches and five non-elite-level coaches. Coaches were classified as elite or non-elite according to the level of club in which they operated. The annual National Arena League competition, England's largest inter-club swimming competition with more than 500 teams and 12,000 competitors [39, 40], was used to categorize clubs. The league divides clubs into three competitive categories rather like the Football League in England: Premier League, Division One and Division Two. Coaches from Central Seals, which competed in the Premier League division at the time of the research, were categorized as elite, while coaches from North Eels, which competed in Division One during the research, and those from South Dolphins, which competed in Division Two, were categorized as non-elite. In total, six coaches from Central Seals, three coaches from North Eels and two from South Dolphins took part in interviews.

Two of the eleven coaches were women. All were white and classified themselves as middle class, which is in line with previous research that suggests 94 percent of sports coaches are white and almost three-quarters come from the ABC1 socio-economic bracket [41]. Participants were between 22 and 60 years old and all were ASA qualified. Table 2 outlines the clubs and staff that participated in interviews. Pseudonyms have been used throughout this paper to protect participants' identity.

Table 2: Clubs and staff that participated in the research

	Central Seals	**North Eels**	**South Dolphins**
Division in Arena League	Premier	One	Two

Club Level	Elite	Non-elite	Non-elite
Head Coach	Andrew	Amanda	Jim
Assistant Coaches	Steven	Keith	Kevin
	John	Dave	–
	Mike	–	–
	Chris	–	–
	Jenny	–	–

DATA GENERATION

Interview guides were sent to participants in advance to prepare them for the content and form of the interview. The interviews were semi-structured and took place in a private area within the leisure center where the coaches were based. Interviews lasted between 50 minutes and two hours and were digitally audio-recorded. The interview guide, which is reproduced in the appendix, was devised from

reading past literature on, among other issues, the LTAD model, and sought coaches' perspective on athlete development, talent identification and the LTAD model used in swimming. Interviews included two types of approaches to guide the conversation to the areas of interest: 1) main questions, such as those surrounding the main principles that coaches emphasize in their coaching, how they aim to develop athletes' skills, how they incorporate each of *The Swimmer Pathway* stages into their training plans and their perceptions of the strengths and limitations of *The Swimmer Pathway*; and 2) probes to elicit expanded responses [42].

DATA ANALYSIS

Interviews were conducted by the first author and transcribed verbatim within 24 hours of taking place, with identifying information removed from the transcripts. Data from Central Seals were transcribed and analyzed first because they were the first complete data set obtained. This procedure was repeated for data from North Eels and, finally, South Dolphins.

Content analysis was used to analyze the data inductively as an approach that produces a "systematic and comprehensive summary or overview of the data set" [43, p.182] through the reduction of information that is categorized into themes by finding relationships and grouping similar topics. In this case, the transcriptions were the unit of analysis so the process began with the first author reading and re-reading the interview transcripts to identify recurrent themes. These themes were then systematically identified across the data set and re-grouped together into categories. Next, data were coded into the two core categories presented below, relating to concerns over emphasis on volume at the expense of technique and competition rules that appear to contradict elements of *The Swimmer Pathway*.

METHODOLOGICAL RIGOR

Several methods were employed to enhance the data collection process. First, interviews were digitally audio-recorded to ensure the interviewer did not miss or mishear any details and to allow for full concentration on the interview [44]. These transcripts were then returned to participants for verification and comment. Moreover, as the analysis developed, member validation was used [45], with participants asked to comment on extracts of their interview and examples of the first author's interpretations of these. Four of the eleven participants – all from the two non-elite clubs – responded to this request and all returned the documents unchanged.

In addition, the study was based on interviews with eleven coaches at three different competitive swimming clubs. Working in different settings in this way enabled data gathered from one club to be compared and contrasted with that gathered from the others and, as such, data triangulation was used to enhance the methodological rigor of the study [46].

RESULTS

In order of importance, the two central findings to emerge from this study were coaches' concerns with 1) the negative impact of an over-emphasis on volume, and 2) competition rules that appeared to contradict elements of *The Swimmer Pathway*.

1. Too much volume: 'Building the engine' at the expense of technique

Across all clubs and all coaches, there was unanimity regarding the objective of promoting good stroke technique as it was seen as an essential building block for swimming fast in competition:

> ... what I understand is that if your technique is good then *anyone* can build up strength and speed, so if your technique is great when you're 13 and you've got *no* good times then you can still say 'I know my technique, I just need to get in the gym and build some muscles up' then you *will* get to be a fast swimmer. Whereas if you get to 13 and you're thinking, 'I've got

> muscles like I don't know what but I can't swim for toffee' ... then it's too late to learn. (Keith)

Both the elite-level and non-elite level coaches identified similar problems with *The Swimmer Pathway*, although they differed in their views on their cause. The dominant concerns of both groups of coaches were with an over-emphasis on volume at the expense of the development of technique and with aspects of competition that saw coaches neglecting the long-term development of swimmers for short-term podium results. The elite-level coaches felt that these problems arose from the misinterpretation and misunderstanding of LTAD and a failure to implement it correctly, which was linked to a lack of monitoring of the plan. Meanwhile, the non-elite coaches tended to feel that the content of the swimming LTAD itself was at fault.

The elite-level coaches consistently expressed a belief in the importance of learning technique early in the first and second stages of *The Swimmer Pathway* and concern with the impact that a lack of attention to technique can have on the long-term development of swimmers. They felt that good technique needed to be established and developed as the basis for improvement and that it should not be neglected in favor of high volume and intensity training at a young age:

> When they're in the younger groups it's all about their skills and the acquisition of those skills and refining them. ... These clubs that just think very short-term, they miss all that out and it's no good in the end, it's not what makes a great older swimmer. (Chris)

However, they felt that many coaches in clubs in the region generally misunderstood or misinterpreted *The Swimmer Pathway* and that this had significant consequences for the development of age-group swimmers. They suggested that some of these coaches were having their swimmers do too much volume and were not paying enough attention to making swimming fun and developing technique, as outlined in stages one and two of *The Swimmer Pathway*, FUNdamentals and Learning to Train. They consistently suggested this was a result of focusing too much on 'building the engine' and increasing speed at the expense of developing swimming technique. The coaches interviewed feared this

omission would have negative consequences for the development of swimmers' stroke technique in the long term:

> [*The Swimmer Pathway*] is about getting them to swim right, doing the technique. ... Other clubs I know who might beat us sometimes ... they're working less on skill and less on technique and they're missing out the key stages, the FUNdamentals and that, so the swimmers don't get the technique and the skills they need. (Steven)

The five non-elite coaches were also concerned with other coaches having young swimmers do too much volume, suggesting that *The Swimmer Pathway* was at fault because the frequency of swim training sessions and weekly volumes specified within it were excessive. In particular, they singled out the elite-level development programs that their better swimmers attended and the impact that these had on swimmers' technique:

> Quite often when swimmers come training here after being in the [elite] squad system, I give them a real easy session with lots of technique work because you find they forget that when they're training at the [elite] squads. … They might be putting in a lot of yardage but they start swimming sloppy, forget what you've taught them, you know. (Jim)

They suggested that the elite training regimes were undoing much of the good work they had done with their swimmers in developing good technique. Typically, they identified an over-emphasis on volume and intensity that they considered was leading to the deterioration of swimmers' technique. Kevin at South Dolphins was explicit about this:

> They [elite clubs] focus too much time on mileage. There's more quantity than quality. I understand that quantity, there should be some, but I think the quality should be maintained all the way through the quantity and from what I've seen it's *not*. They're losing their technique just so they can do more yardage.

While the elite-level coaches suggested that over emphasizing volume was a misinterpretation or mis-implementation of the swimming LTAD, the non-elite level coaches suggested that technique was

neglected due to the time it took from the coaches' sessions, thus limiting coaches' ability to meet the distance requirements specified in *The Swimmer Pathway*. Most suggested that the emphasis on technique in stages one and two should be continued through *all* stages of swimmers' development and not sidelined by attempts to 'build the engine':

> I've seen it too often where, you know, the focus is on distance and they're doing 7,000 meters [four and a half miles] a session and I think there should be more emphasis on the coaches *looking* at the swimmers and saying, 'oh they're absolutely knackered so let's stop them now; let's do some technique.' ... You know, I've been sat there thinking, 'why doesn't somebody recognize the fact that they're tired?'... Perhaps somebody should be asking what's going on in these higher level squads. (Kevin)

The non-elite coaches also felt that the focus on volume within *The Swimmer Pathway* and what they saw as being the increasing normalization of specialization at a young age was detrimental to the FUNdamental principle of participation in varied sporting activities and the development of the basics of athleticism. The idea that children should experience a range of sports and other physical activities informs *The Swimmer Pathway*, but several of the non-elite level coaches suggested the frequencies of training specified in the plan left little time for alternative activities:

> We're also told by the ASA [LTAD plan] that they *need* to be doing other activities at FUNdamentals [stage]. Well if we're asking them to train so much and parents want them to train so much, when are they going to do these other activities? (Amanda)

> I'm not sure when they're supposed to do their football, or their netball though. I mean they're [swimming] training from such a young age now. They do a full day at school, then they go swimming five times a week. Where are they supposed to be fitting in the other stuff? It's no wonder they get sick of swimming and join a football club! (Dave)

This concern with excessive training volumes and frequencies was seen by the non-elite coaches to discourage lifelong participation in sport. While Dave from North Eels saw it as ignoring the FUNdamentals stage, Kevin at South Dolphins felt *The Swimmer Pathway* was itself at fault as it did

not consider lifelong participation after the first stage. He and other non-elite coaches were critical, suggesting that *The Swimmer Pathway* was elitist and did little to encourage lifelong participation in swimming or any other sport:

> There is this *drive* now to get people more active, *lifelong* participation in sport and swimming does have a *huge* problem of dropout and I often wonder if that's because there's *too* much asked of them at too young an age now. We should be trying to keep them in the sport and I'm not sure ... not sure that LTAD [in swimming] is helpful in that. (Kevin)

2. Competition rules that contradict The Swimmer Pathway principles

Both elite and non-elite coaches expressed concerns with the rules and regulations regarding competition that were largely tied into the issue of excessive volume and time spent on this.

2.1. Fast tracking young swimmers for podium results

Coaches from the elite club were critical of the hothouse atmosphere of competitive sport and the desire of many coaches and clubs for short-term podium results rather than long-term development. The coaches at elite-level club Central Seals suggested that many other coaches focused on results, resulting in them ignoring the principles of *The Swimmer Pathway* in favor of a 'fast track' approach for short-term results. Several of these elite coaches discussed neighboring clubs and coaches that they visited who trained swimmers over and above the volumes recommended in *The Swimmer Pathway* in order to produce champions at a young age:

> Other clubs around the area might be beating us at age-group level ... well, these clubs are working *higher* volumes than us and *more* intensity, above and beyond Long Term Athlete Development ... A lot of clubs they *do* think short term, they *do* think solely about national age groups year to year, erm, but it's the wrong way of producing an international swimmer. (Steven)

> I know down the road at Eastern Otters they don't follow [the swimming] LTAD at all. They do loads more yardage when they're only still young than we do here. There's *loads* of clubs

like that, that just slog them up and down, doing sloppy yardage just to get them dead fit when they're, like, 12 ... because Bob [the head coach] just wants to get some winners at age groups to raise the club's profile and I *understand* that but it's no good in the long term (Mike).

2.2. Forcing young swimmers to compete in 200-meter events

As of 2000, 50-meter events at national age-groups championships were dropped by the ASA and boys aged 10 and girls aged 11 were also prohibited from competing in 100-meter events at district, regional and national events unless they had first achieved a qualifying time for the corresponding 200-meter event [29]. Coaches from both the elite and non-elite clubs in this study noted the apparent contradiction between this policy and the emphasis in the second stage of *The Swimmer Pathway* on technique rather than endurance. The concern was that with only limited opportunity for talented youngsters to compete in shorter 50- and 100-meter events, coaches are being encouraged to train youngsters for more endurance based for 200-meter events:

I can't understand it, on the one hand they're bringing out the Long Term Athlete Development plan and on the other they're telling us we've got to train athletes younger for longer distances ... that's promoting them to train for 200 [meters] at 9 years old ... so again they're promoting swimmers to swim as fast as they can for distance, which isn't good. (John)

It's really not good that they have to qualify in the 200 [meters] before they can swim in the 100 [meters] at nationals. All that's doing is telling coaches to train swimmers harder, erm, you know, for the longer distances and, erm, well surely that's not what LTAD is about? Well I thought, erm, and maybe I'm wrong, but I thought it was about getting them to swim with the right technique at that age. (Jim)

2.3. Competing at national level too early

Similarly, most of the elite-level coaches felt that by permitting swimmers as young as 10 years old to compete in longer distance events, coaches are being encouraged to build swimmers' aerobic base so

they can compete at longer distances rather than focusing on developing and consolidating movement and basic sport-specific skills as the early stages of *The Swimmer Pathway* suggest:

> I'm very unhappy about the introduction of age-group nationals at 11 years old. ... I think it's promoting to clubs now to get swimmers better at a younger age. ... What are we trying to promote there? We're only trying to promote one thing and that's making kids swim as fast as they can. (John)

Swimmers as young as 10 years old are able to compete in the national age-group championships and many non-elite coaches felt this was too young. They suggested that exposing children this young to competition at a national level and the related pressure on them to perform was a specific issue, with some suggesting limiting competition for the younger swimmers to reduce pressure placed on them by over zealous coaches and parents:

> Now that the age is so low, they're actually competing nationally at 10 and regionally younger, I don't think it's good practice. ... I think raising the age would take all the pressure off the child, the coach and the parent until they're 10, because they could only swim for the club so all that pressure is gone, so you get a good 7 or 8 year old swimmer and there's no pressure there to come through, or *fast track* as they call it now, because there's nothing to fast track for. (Jim)

The emphasis on volume in *The Swimmer Pathway* led coaches at the two non-elite clubs to express concern with the impact of high workloads on the motivation and welfare of many young swimmers. Stage one of *The Swimmer Pathway* emphasizes fun, but there was concern among the non-elite coaches with the impact that too much hard work and too much pressure to perform might have on young children:

> If this 7-year-old child is training *three* times a week! At 7, a one-hour session, maybe two, that's fine. Let them enjoy what they're doing. You can't even compete at 7, you know. ... I disagree with children of age *11* going to a *performance* squad ... it can be too much for them, too much pressure to go training a lot. I mean, they're children, just children! (Amanda)

DISCUSSION

In swimming, technique is paramount to the long-term development of age-group swimmers as it "lays down the foundations for more serious swimming down the line" [20, p.42]. The coaches in this study regarded developing good stroke technique and other skills in competitive swimming as being essential building blocks for future successful performance. Indeed, research suggests that most coaches feel that learning technique is an essential precursor to future sporting excellence and should not be neglected [5, 14]. Research also suggests that unless these basic skills are learned by age 13, elite success in the long term is improbable [5]. Balyi sees the period from 9-12 years old as the time when motor skills must be learned [18, 13]. Stage two of his LTAD model covers children of this age, emphasizing the development of skill that Balyi sees as being fundamental to future success. Balyi also argues that stages 2 and 3, Learning to Train and Training to Train, are the most critical stages in the long-term development of athletes [13].

The ASA recognizes the importance of technique and clearly emphasizes the focus on skill development at this age by naming the second stage of *The Swimmer Pathway* SwimSkills. However, the coaches in this study felt that this critical stage is often neglected through an exclusive focus on volume that squeezes out time for technique. This can impact upon the development of technique in two ways. First, the time taken to complete high-volume sessions does not leave enough time to focus on technique. Secondly, the state of fatigue associated with high-volume training regimes makes it difficult for swimmers to 'hold their form,' detracting from the maintenance, improvement and embedding of technique that results in what Mike from elite-level club Central Seals terms "sloppy yardage."

Concerns with excessive volume also structured the coaches' concerns with the ways in which they thought that some ASA rules and regulations for competition actually contradict the principles of *The Swimmer Pathway*. These included criticisms of (other) coaches fast tracking young swimmers, ASA

rules that force the youngest swimmers to compete in and train for minimum distances of 200 meters, and allowing swimmers to compete at national level at an age they considered to be too early.

Problems with interpretation

Despite the common concerns expressed by all coaches with excessive volume, there were differences in the causes of this, related to different views on misinterpretation of the LTAD/*Swimmer Pathway.* The elite-level coaches blamed misinterpretation of *The Swimmer Pathway* by English coaches, while the non-elite coaches found fault in the minimum distances set out in *The Swimmer Pathway* document. To provide a point of reference for considering this view, we compare the requirements of *The Swimmer Pathway* with the equivalent in Australia: the *Australian Swimming Multi-Year Age-Group Development Model,* specifically focusing on two similar age groups. The UK model suggests distances for males aged 9-12 and females aged 8-11 of 8,000-16,000 meters over 4-6 pool sessions a week, while the Australian model's suggestions for males and females aged 8-12 are 2,000-3,500 per session over 3-5 weekly pool sessions (a weekly total of 6,000-17,500 meters). For males aged 12-15 and females aged 11-14, the UK model suggests 24,000-32,000 meters a week over 6-12 pool sessions, while the Australian model suggests that females aged 11-13 and males aged 12-14 complete 3,500-6,000 meters a session over 4-6 weekly pool sessions (a weekly total of 14,000-36,000 meters). Although there is a wider range available in the Australian model, there is not a significant difference between distances suggested in the two models. This suggests that either both models ask for excessive volume or that the problem lies in some coaches exceeding *The Swimmer Pathway*'s requirements. It may also support the claims of the elite-level coaches that many coaches are misinterpreting *The Swimmer Pathway* by failing to integrate technique into the volumes of training they have their swimmers undertake.

CONCLUSION

The views of the coaches in this study on the implementation of *The Swimmer Pathway* identify some specific areas for concern in regard to the ways in which it is being used to regulate coaching practice in swimming. Introduced in 2003, *The Swimmer Pathway* has seen a significant rise in the success of the Great Britain swimming team, as evidenced from Beijing with the best results in Olympic swimming since the 1908 Olympic Games in London a hundred years prior. Subsequent success in international competition suggests that results for swimming in London 2012 are likely to be even better. However, the reservations that the coaches in this study express about the implementation of *The Swimmer Pathway* suggest the need for a revision of, or at least an inquiry into, the implementation of the model for the good of the long-term future of swimming as a sport in the UK and the maintenance of its ongoing growth.

The strongest reservation expressed by the coaches in this study was with the impact of excessive volume upon the development of technique and, to a lesser degree, motivation. Given the importance of developing good technique by the age of 13, it clearly needs to be emphasized in any program of training with long-term development as its aim. If, as the non-elite coaches in this study suggest, the training volumes required by *The Swimmer Pathway* take too much time to fit in time to work on technique as well, then its distance requirements might need revising. If, on the other hand, as the elite coaches suggest the problem is coaches misinterpreting *The Swimmer Pathway*, then strategies for monitoring coaching or for coach education would seem to require consideration. If coaches are not implementing the swimming LTAD as set out by the ASA then this would make any assessment of its efficacy very difficult.

Beyond the detail of the coaches' concerns expressed about the implementation of *The Swimmer Pathway*, this study points toward challenges involved in the process of adapting a general model for athlete development to specific sports. The LTAD was originally developed for the sport of alpine skiing before being proposed as a general model for all sports. This study identifies two stages of interpretation and adaptation in the process of having the LTAD guide swimming coaching practice from where the problems identified by participants originated. They are 1) the interpretation of the LTAD and its adaptation to swimming in the form of *The Swimmer Pathway*, and 2) coaches'

interpretation of *The Swimmer Pathway*. These are both points in the process of adapting a model of athlete development that are likely to provide challenges for NGBs. Given the impact that the LTAD seems to have had on the organization of coaching across a range of sports in the UK, this compels us to ask: What is the nature of its influence on practice 'on the ground' and what are the implications for the development of the specific sport? Similar questions might well be asked of other NGBs using the LTAD to structure athlete development. They certainly warrant investigation and we suggest this might provide a starting point for critical research on the LTAD and its adaptation to a range of sports across the globe.

REFERENCES

1. Houlihan, B., Sport, Policy and Politics: A Comparative Analysis, Routledge, London, 1997.

2. Theodoraki, E., The Making of the UK Sports Institute, Managing Leisure, 1999, 4(4), 187-200.

3. Department for Culture, Media and Sport (DCMS), A Sporting Future for All, HMSO, London, 2000.

4. Gallahue, D.L., Fundamental Movement Experiences for Children, Wiley, New York, 1982.

5. Moore, P. M., Collins, D. and Burwitz, L., The Development of Sporting Talent 1997: An Examination of the Current Practices for Talent Development in English Sport, English Sports Council, London, 1998.

6. Schmidt, R. and Wrisberg, C., Motor Learning and Performance: A Problem-Based Learning Approach, Human Kinetics, Champaign, IL., 2004.

7. Bloom, B. S., Developing Talent in Young People, Ballantine, New York, 1985.

8. Van Rossum, J. H., Talented in Dance: The Bloom Stage Model Revisited in the Personal Histories of Dance Students, High Ability Studies, 2001, 12, 181-197.

9. Ericsson, K.A., Krampe, R.T. and Tesch-Romer, C., The Role of Deliberate Practice in the Acquisition of Expert Performance, Psychological Review, 1993, 100(3), 363-406.

10. Ericsson, K.A. and Charness, N., Expert Performance: Its Structure and Acquisition, American Psychologist, 1994, 49(8), 725-747.

11. Salmela, J.H., Young, B.W. and Kallio, J., Within-Career Transition of the Athlete-Coach Triad, in: Wylleman, P. and Lavallee, D., eds., Career Transition, Fit Publications, Morgantown, VA., 1998, 181-193.

12. Amateur Swimming Association (ASA), *The Swimmer Pathway*: Long Term Athlete Development, ASA, Loughborough, 2003.

13. Balyi, I. and Hamilton, A., Long-Term Athlete Development: Trainability in Childhood and Adolescence – Windows of Opportunity, Optimal Trainability, National Coaching Institute British Columbia & Advanced Training and Performance, Victoria, B. C., 2004.

14. Jess, M., Collins, D. and Burwitz, L., Children and Physical Activity: The Centrality of Basic Movement Skill Development, Presentation at the International Council for Health, Physical Education, Recreation, Sport and Dance Conference, 1998.

15. Gordon, R., A Shorter Guide to Long Term Athlete Development [Internet], 2004, available from: http://www.sportcentric.com/vsite/vfile/page/fileurl/0%2C11040%2C4716-137912-155128-38041-0-file%2C00.pdf [Accessed: 09/07/09].

16. Lang, M., Swimming in the Panopticon: An Ethnographic Study of Good Practice in Competitive Youth Swimming, PhD Thesis, Leeds Metropolitan University, 2009.

17. Black, D.E. and Holt, N.L., Athlete Development in Ski Racing: Perceptions of Coaches and Parents, International Journal of Sports Science & Coaching, 2009, 4(2), 245-260.

18. Balyi, I., Quadrennial and Double Quadrennial Planning of Athletic Training. Canadian Coaches Association, Victoria, B.C., 1990.

19. Sharp, R. L., Physiology of Swimming, in: Garret, W. E. Jr. and Kirkendall, D. T., eds., Exercise and Sport Science, LippincottWilliams & Wilkins, Philadelphia, 2000, 895-904.

20. Rusnack, J., From Age Group to Elite, Swimming in Australia: Journal of the Australian Swimming Coaches & Teachers Association, 2008, 24(3), 42-43.

21. Abbott, A., Collins, D., Martindale, R. and Sowerby, K., Talent Identification and Development: An Academic Review, sportscotland, Edinburgh, 2002.

22. Faude, O., Meyer, T., Scharhag, J., Weins, F. Urhausen, A. and Kindermann, W., Volume vs. Intensity in the Training of Competitive Swimmers, International Journal of Sports Medicine, 2008, 29, 906-912.

23. Hollander, E. B., Meyers, M. C. and LeUnes, A., Psychological Factors Associated with Over-Training: Implications for Youth Sport Coaches, Journal of Sport Behaviour, 1995, 18, 3-20.

24. Salguero, A., Gonzalez-Boto, R., Tuero, C. and Marquez, S., Identification of Dropout Reasons in Young Competitive Swimmers, Journal of Sports Medicine and Physical Fitness, 2003, 43(4), 530-534.

25. Grange, J. and Gordon, R., Success is Long Term: Long Term Athlete Development Related to the Journey Through Swimming, ASA, Loughborough, 2004.

26. Brandon, R., Why High-Intensity Training is a Better Model Than High-Volume Training for Swimmers, Especially Sprinters, Peak Performance, 2002, 167, 8-14.

27. Maglischo, E. W., Swimming Fastest: The Essential Reference on Technique, Training and Program Design, Human Kinetics, Champaign, IL., 2003.

28. Mazzucco, M., Protecting Children's Rights in Canadian Sport, M.A. Thesis, University of Toronto, 2007.

29. Martindale, R. J. J., Effective Talent Development Environments: Bridging the Theory-Practice Gap within a UK Context, PhD Thesis, University of Edinburgh, 2008.

30. Martindale, R. J. J., Collins, D. and Abraham, A., Effective Talent Development: The Elite Coach Perspective in UK Sport, Journal of Applied Sport Psychology, 2007, 19, 187-206.

31. Valeriote, T.A. and Hansen, L., Youth Sport in Canada, in: Weiss, M. R. and Gould, D., eds., Sport for Children and Youths, Human Kinetics, Champaign, IL., 1986, 1-15.

32. Gould, D., Gianinni, J., Krane, V. and Hodge, K., The Educational Needs of Elite U.S. National Pan American and Olympic Coaches, Journal of Teaching in Physical Education, 1990, 9, 332-344.

33. Gilbert, W. and Trudel, P., Learning to Coach Through Experience: Reflection in Model Youth Sport Coaches, Journal of Teaching and Physical Education, 2001, 21, 16-34.

34. Cushion, C. J., Armour, K. M., and Jones, R. L., Coach Education and Continuing Professional Development: Experience and Learning to Coach, Quest, 2003, 55, 215-230.

35. Gordon, R., The Search for Excellence, Swimming, 2003, 80(6), 20-21.

36. McNeill, P., Doing Social Research, Macmillan, Basingstoke, 1988.

37. Patton, M. Q., Qualitative Research and Evaluation Methods, 3rd edn., Sage, Thousand Oaks, CA., 2002.

38. Gratton, C. and Jones, I., Research Methods for Sports Studies, Routledge, Oxford, 2004.

39. National Speedo League North West, National Speedo League North West Handbook [Internet], 2005, available from: www.speedoleague.org.uk [Accessed: 05/02/07].

40. National Arena League, National Arena League [Internet], 2009, available from: http://www.nationalswimmingleague.org.uk [Accessed: 12/11/09].

41. Townend, R. and North, J., Sports Coaching in the UK II: Main Report [Internet], 2007, available from: http://www.sportscoachuk.org/NR/rdonlyres/FD1F4E98-2C84-4359-BD46-FFBD73043E10/0/SportsCoachingintheUKIIMainReport.pdf [Accessed: 29/02/08].

42. Zeisel, J., Inquiry by Design: Tools for Environment-Behaviour Research, Cambridge University Press, Cambridge, 1984.

43. Wilkinson, S., Focus Group Research, in: Silverman, D., ed., Qualitative Research: Theory, Method and Practice, 3rd edn., Sage, London, 2004, 177-199.

44. Robson, C., Real World Research, 2nd edn., Blackwell, Oxford, 2002.

45. Lincoln, Y. S. and Guba, E., Naturalistic Enquiry, Sage, Beverley Hills, CA., 1985.

46. Denzin, N., The Research Act: A Theoretical Introduction to Sociological Methods, 2nd edn., McGraw-Hill, New York, 1978.

APPENDIX

Interview Guide

- Introductory Questions
    a. Coaching background/career
    b. Highlights/low points
    c. Coaching role
    d. Coaching philosophy

- Club/Squad Questions
    e. Club mission/philosophy and reputation
    f. Structure of club
    g. Squad system
    h. Content of training sessions

- Athlete Development Questions
    a. Athlete development process/practice
    b. LTAD/ *The Swimmer Pathway*
    c. Role of elite clubs/squads
    d. Role of training and competitions
    e. Talent-identification process

    f. Categories of swimmers

- Concluding Questions
    a. Future of swimming
    b. Anything I've forgotten?