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Comparing the practices of USA tennis against a global model for integrated development of mass participation and high performance sport

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This study analyzes the current state of tennis in the USA against a model for developing elite sport in integration with mass participation. A questionnaire was constructed to examine the following elements of the model: talent identification and development; advanced athlete support; training centers; competition systems; educational, scientific/medical, philosophical, and promotional support; partnerships with supporting agencies; and balanced and integrated funding and structures of mass and elite sport. The 54 statements reflecting desired practices were validated by 12 international experts and rated online by 107 US tennis coaches. Semi-structured discussions with eight administrators were also conducted. Suggested advancements for US tennis included collaboration of overlapping national governing organizations to advance and standardize personnel education, medicine, science, competitions, and facilities. Highly qualified coaches at all participation levels are recommended, to use evidence-based methods for lifelong athlete development. Affordable mass participation, local training, and competition conditions are also recommended to be created at clubs and schools.

Keywords: tennis, USA, high performance, mass participation, sport development

INTRODUCTION

Tennis is one of the fastest growing sports in the twenty-first century USA. This is commonly attributed to a series of grassroots initiatives, active promotion of the game's health and fitness benefits, and excitement provided by the professional game. However, the ever improving quality of international competition demands concerted player development efforts from the USA to remain a top tennis nation. Analysis of August 2010 Association of Tennis Profession (ATP) rankings showed that among the top 50 male tennis players, 8 players were from Spain, 6 from France, 4 from the USA, 2 were from Russia, and 14 were from Central and Eastern Europe combined. Among women, American tennis players held three spots in the top 50 Women's Tennis Association rankings. This represented a 90% drop from 30 years ago (Kimmelman, 2010).

According to the USTA (2009), tennis participation in the USA reached 30 million players in 2008, but the Sporting Goods Manufacturers Association (2012) estimated that only about 18 million played once or more in 2008 and 2011. China's estimated 14 million tennis participants present growing competition (Demick & Haas, 2011). The number

of Russian amateur players has become similar to the USTA membership of 700,000 (Russian Tennis Federation, personal communication, April 3, 2013; USTA, personal communication, December 14, 2012). Since 1988, when tennis was restored as a medal Olympic sport, various countries have increased investments into both mass participation and elite tennis player development. There are also more nations competing at the highest level, particularly after the disintegration of Central and Eastern European socialist countries into smaller independent states (e.g. Croatia, Serbia, Czech Republic, Slovakia, and Slovenia), each retaining their elaborate sport systems inherited from the former Union of Soviet Socialist Republics (USSR) where high performance (HP) was developed together with mass participation. The USA is well known for being home to world renowned sports academies and university programs that attract top international talent. Nonetheless, technical fundamentals, discipline, and methodological sophistication at all levels of development from grass roots to elite performance, in areas such as coaching, facilities, medicine, science and other athlete services, have been regularly mentioned as being superior in other leading sport nations (Coyle, 2007; *Daily Times*, 2004; De Bosscher, De Knop, Van Bottenburg & Shibli, 2006; Riordan, 1978, 1980, 1991; Smolianov & Zakus, 2008).

The purpose of this study was to examine the current state of tennis and its national governing body, USTA, in relationship to an ideal-type global model for HP sport development that integrates mass participation (Smolianov & Zakus, 2008, 2009). The consideration of global practices to both improve international performance and maximize national participation is particularly relevant in light of the US Olympic Committee's (USOC) recent move away from grass roots funding (Dittmore, Mahony & Andrew, 2008). This research seeks to understand perspectives of coaches and administrators who are active in the development of tennis in the USA and to identify practices that could advance both mass participation in tennis and international performance. The main questions of this study were: to what extent does HP lead mass participation of US tennis and how could it be done better across the key sport development areas?

THEORETICAL FRAMEWORK

The Smolianov and Zakus (2008) model emerges from the integration of models that have been used to analyze and compare national elite sport systems (Baumann, 2002; De Bosscher et al., 2006; Digel, 2002; Green & Oakley, 2001). While the previous models have focused solely on elite sport, the model used in this study was originally developed in reference to practices in the USSR where mass and elite sport were integrated (Matveev, 2008; Riordan, 1980; Smolianov & Zakus, 2008). The model has received scholarly validation (Smolianov & Zakus, 2009) and has been shown to be a framework for program analysis that is not culturally limited. It has recently been accepted as a model for further understanding North American sport systems, in particular the US rugby (Carney, Smolianov, & Zakus, 2012) and US soccer (Murphy, Smolianov, & McMahon, 2012). The model incorporates concepts not mentioned in previous models where emphasis was on practices of Eastern Europe (Fetisov, 2005; Isaev, 2002; Matveev, 2008; Platonov, 2005; Tumanian, 2006). This is reflected in core concepts such as:

- emphasizing the importance of allocating resources to enhance mass participation, including improving the affordable access to high-quality coaching at the mass participation level;
- training, ranking, and rewarding athletes based on multi-stage development

methodology used by expert coaches from beginner to elite levels;
- balancing athlete support between coaches and advisors, applying scientific research to immediately benefit performance, providing sport-specific medical personnel, giving HP athletes paid time off work to train and compete;
- providing specialized facilities for each level of participation close to educational, medical, and other services, training centers in different geoclimates, all at affordable costs;
- integrating professional and amateur, domestic and international competitions for all ages, levels and organizations, sharing incomes to develop competitions at all participation levels;
- comprehensively educating all specialists engaged in athlete development, fostering research on all sport aspects and communicating it to coaches, teaching principles of Olympism and national values and identity, and providing vision and leadership through sport; and
- integrating multi-stage qualifications for athletes in each sport with fitness tests for all.

The Smolianov & Zakus (2008) model reflects the hierarchy of a sport system led by HP. In all parts of the world HP and mass participation sport are identified as distinct, often conflicting, areas which are in recent years developed in integration under one organization. In Australia, for example, all key sport development stakeholders aim to both increase mass participation and achieve international success, strengthening the argument that elite and mass participation complement each other (Sotiriadou, Shilbury, & Quick, 2008).

The increasing isolation of elite sport and its dominance over mass participation became particularly evident in the second part of the twentieth century and realized as one of the problems related to increasing inactivity and obesity of the population and an obstacle to HP over the long term (Fetisov, 2005; Isaev, 2002; Smolianov & Zakus, 2009). This is further evident as sport moves under the health portfolio in countries such as Australia and the Netherlands. Schools, colleges, and universities increase both mass participation and HP as many teams at one institution provide opportunities for a wider number of participants as well as the elite representative teams, particularly in US tennis. Sport schools, including USTA academies are growing around the world to connect mass and elite participation. A variety of efforts have begun internationally to re-integrate mass participation with HP goals (Hanstad & Skille, 2010). Many authors agree that elite sport finds its foundation in broad sport participation, given that all stakeholders in cooperation nurture participants toward excellence (De Bosscher et al., 2006; Digel, 2005; Fetisov, 2005; Green, 2005; Matveev, 2008; Platonov, 2005; 2010; Sotiriadou et al., 2008).

Macro-level elements in this study refer to socioeconomic, cultural, legislative, and organizational support for a national sport system by the whole society and the State. The meso-level includes infrastructures, personnel, and services enabling sport programs; that is, those required for the delivery of sport policy. The micro-level consists of operations, processes, and methodologies for development of individual athletes. The model is depicted in Figure 1.

The sport system components identified in the literature were merged into the seven elements which together provide a methodical development from mass to elite sport. Participants are nurtured with all necessary conditions for healthy participation and harmonious development when all elements are managed in unison. The micro-level elements 1 and 2 indicate that successful sport systems have been identifying talent

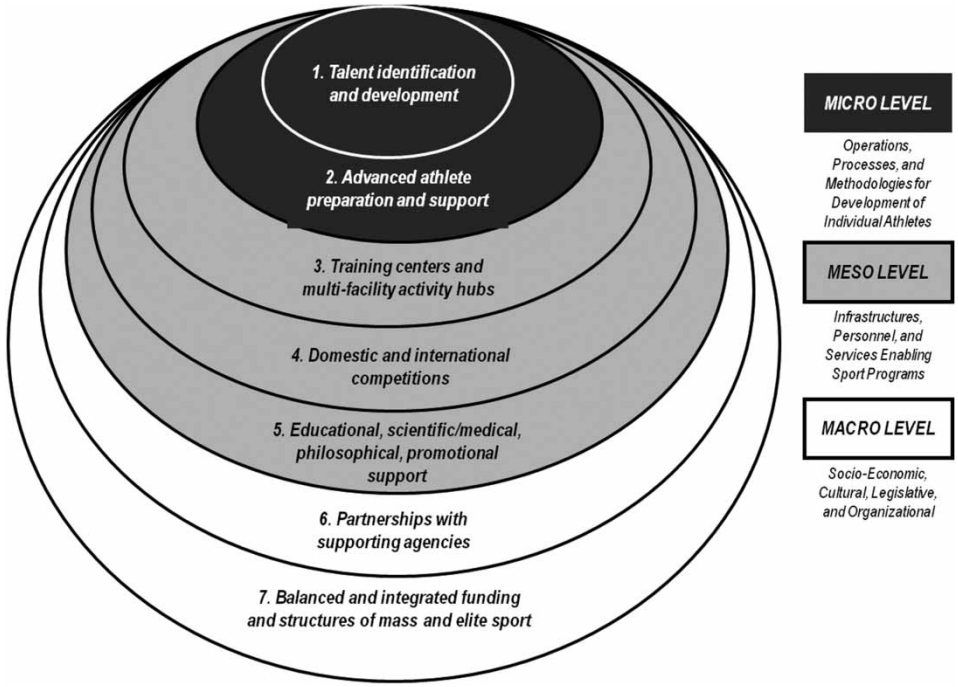

Fig. 1. Model of Integrated HP and Mass Sport Development

and gradually developing participants into high performers since the ancient Olympics (De Bosscher et al., 2006; Platonov, 2005).

The optimal early start in sport, particularly in tennis, should focus on the mastery of basic psychomotor skill development, coordination, fitness, and sportsmanship. An early, fun, and healthy start should be followed by careful individualized nurturing of each player to the highest possible level of performance in the most suitable discipline, achieving both mass numbers and elite results in each age category (cf. Dallis, 2002; De Bosscher et al., 2006; Reid, Crespo, & Dimmock, 2007a; Reid, Crespo, Santilli, Miley, & Dimmock, 2007b; Smolianov & Zakus, 2008, 2009; Sotiriadou et al., 2008; Tumanian, 2006). Reid, et al. (2007a) pointed out that Slovakia, Switzerland, and Slovenia have fewer ranked players than other successful tennis nations, yet the proportion of these players ranked inside the top 200 is high (e.g. 35% of their women). Reid et al. (2007a) agree with De Bosscher, De Knop, and Heyndels (2003) that these nations might allocate resources more effectively to talent identification and development, coordination of affiliated bodies, and personalized athlete support.

Element 2 relates to the importance of progressively rewarding hierarchical pools of players with scientifically based multidisciplinary performance, restoration, career, and lifestyle support and financially (cf. Conzelmann & Nagel, 2003; De Bosscher et al., 2006; Digel, 2005; Green & Houlihan, 2005; Green & Oakley, 2001; Greenleaf, Gould, & Diefen, 2001; Houlihan & Green, 2008; Nys, De Knop & De Bosscher, 2002; Oakley & Green, 2001; Smolianov & Zakus, 2008, 2009; Wells, 1991).

Effective functioning of the micro-level depends on element 3, which includes high-quality facilities, equipment, and coaching

for each age and level of participation, all easily accessible so that masses are inspired to pursue sport excellence. In each community, tennis should be part of a multi-sport hub where sports share resources and expertise, travel takes little time between home, training, school, university and medical, science, and other services. In the best sport hubs, facilities and programs are integrated with socioeconomic infrastructures to benefit both elite programs and community wellness. A coordinated national network of centers for training and recreation is valuable for HP (cf. Clumpner, 1994; De Bosscher et al., 2004, 2006; De Knop, De Bosscher & Leblicq, 2004; Gibbons, McConnel, Forster, Riewald, & Peterson, 2003; Green & Houlihan, 2005; Green & Oakley, 2001; Houlihan & Green, 2008; Larose & Haggerty, 1996; Nys et al., 2002; Oakley & Green, 2001; Platonov, 2005; Smolianov & Zakus, 2008; Tumanian, 2006; Wells, 1991).

The next condition for the micro-level is element 4, including sufficient well-structured high-quality competitions integrated across club, regional, national, and international levels (cf. Bernard & Busse, 2000; Clumpner, 1994; De Bosscher et al., 2004, 2006; De Knop et al., 2004; Gibbons et al., 2003; Green & Houlihan, 2005; Houlihan & Green, 2008; Nys et al., 2002; Platonov, 2005; Smolianov & Zakus, 2008, 2009). Elements 1–4 imply that educational, scientific/medical, philosophical, and promotional support (element 5) should be available at each level of participation for both international sporting success and mass national participation. Systems of education, accreditation, scientific, and other support should ideally be provided to all US tennis specialists, most importantly to coaches (cf. Bloom, 1985; Clumpner, 1994; De Bosscher et al., 2004; De Bosscher et al., 2006; De Knop et al., 2004; Digel, 2005; Gibbons et al., 2003; Green & Houlihan, 2005; Greenleaf et al., 2001; Houlihan & Green, 2008; Larose & Haggerty, 1996; Nys et al., 2002; Platonov, 2005; Riordan, 1991; Sedlacek, Matousek, Holcek, & Moravec, 1994; Smolianov, 2005; Smolianov & Zakus, 2008; Sotiriadou et al., 2008; Wells, 1991).

Provision of the meso-level services results from multiple partnerships (element 6) in order to obtain sufficient resources, exchange expertise, and achieve common goals (cf. Digel, 2005; Isaev, 2002; Sotiriadou et al., 2008). De Bosscher et al. (2006) cited Larose and Haggerty (1996) and Nys et al. (2002) to stress the important but challenging task of influencing the environment of elite sport, particularly media attention, sponsorship, a nation's traditional sports, the social position of sport, and the development of sport around the world. This task can be accomplished through effective partnerships.

For a cooperative long-term functioning of all the elements, funding and structures of mass and elite sport systems should be balanced and integrated (element 7), which relates more to legislative and ideology inputs for a rationalized sport delivery system. Successful sport systems, including US tennis, require the macro-level societal support and balanced funding of both elite and mass sport from each source; physical education at childcare, schools, colleges, and universities; coaching expertise across all regions, participant ages, levels, and types; subsidization of and incentives for recreational and elite sport ensuring diversity and availability for all (cf. Bloom, 1985; Broom, 1991, Clumpner, 1994; De Bosscher et al., 2004, 2006; De Knop et al., 2004; Fetisov, 2005; Gibbons et al., 2003; Green & Houlihan, 2005; Greenleaf et al., 2001; Houlihan & Green, 2008; Larose & Haggerty, 1996; Nys et al., 2002; Platonov, 2005; Riordan, 1980, 1991; Sedlacek et al., 1994; Smolianov & Zakus, 2008, 2009; Wells, 1991).

The developed model suggests a globally applicable theory of how to advance HP sport (programs preparing athletes for national and international competitions) by benefiting mass participation (physical

education, recreation, and fitness programs), which is the key dilemma of sport developers challenged by insufficient conceptual and practical frameworks resulting in fragmented sport systems disadvantageous for participants (Green, 2005). When HP and recreational sport is connected at these dynamic levels, it can effectively reach goals of supporting agencies, including commercial objectives as well as health, fitness, social capital and community development, success in major global competitions, and national identity and pride (Fetisov, 2005; Isaev, 2002; Smolianov & Zakus, 2008, 2009). The model would seem to hold a particular value to the USA which is ahead of other developed nations in becoming unhealthy, overweight, and under-exercised (CDC, 2008), and where the sport system is less structured, and sport participation paths are disconnected (Green, 2005; Sparvero, Chalip & Green, 2008). This model provides a broad spectrum of sport-related specialists across the world with useful lessons in reference to practices in the USA.

METHOD

Previous inquiries into HP sport systems used either predominantly highly structured (De Bosscher, Shibli, van Bottenburg, De Knop, & Truyens, 2010) or minimally structured (Houlihan & Green, 2008) approaches, some without a specific comparison frame (Platonov, 2010). In order to obtain both quantitative diagnosis and qualitative analysis of the distinct dynamics within US tennis, this study included a survey of tennis coaches where open responses accompanied structured questions, as well as semi-structured discussions with administrators. Also, a content analysis of USTA's and United States Professional Tennis Association's (USPTA's) websites and organizational documentation was conducted. The same method was used to analyze US rugby (Carney et al., 2012) and US soccer (Murphy et al., 2012).

The theoretical framework and literature detailed earlier were used for the development of a 54-item questionnaire. The statements were validated by 12 international experts, including executives from tennis governing bodies, academics who have published on HP and sport development and tennis coaches and administrators. The experts reviewed the instrument and made comments, as a result of which several items were added and clarified in the questionnaire. Questions examined the seven elements operationally defined by the model. Respondents were asked to think about the US tennis system as a whole and indicate how often each of the desired 54 practices was performed, from 'never' (1) to 'always' (5) on a 5-point Likert scale. Opportunities to elaborate on practices and whether some should be improved or implemented were given through open-ended questions.

Organizational directories of National Collegiate Athletic Association tennis division I, II, and III coaches were used to identify potential survey participants. The online questionnaire was delivered to 398 US tennis coaches and administrators via email. A total of 107 professionals participated in the survey (response rate of 26.8%). Respondents proved to be diverse in the level of player coached and region of the country of residence. Survey participants had an average of 21.7 years (SD = 11.5) of coaching experience and have coached in 14 out of the 17 USTA geographical sections. Forty-nine percent of respondents coach beginners, 31.7% coach nationally ranked players, 37.6% coach collegiate players, and 5% coach professionals. Seventy-four percent of respondents were certified by at least one governing body for tennis teaching professionals (USPTA, United States Professional Tennis Registry (USPTR), and USTA).

Seven administrators from USTA and USPTA including those in charge of national player development and science, as well as divisional leaders representing different regions of the country, provided oral and written feedback on the state of US tennis. The semi-structured interviews were based on the seven core elements of the model of integrated HP and mass sport development. The interview schedule paralleled items of the online survey. Analysis of the online and telephone qualitative response data was coded and themes were identified for the seven elements. The sample has more HP coaches than in the overall population tennis coaches. This fulfills the purpose of examining how HP leads mass participation. The seven participating administrators further triangulate the data and enhance the validity of this examination.

RESULTS AND DISCUSSION

Coaches and administrators responded to this inquiry with a critical eye, highlighting concerns they had with player development in USA, identifying "wish lists" for systematic change, and acknowledging cultural realities and demands. Tables 1–7 present the findings of the online survey. Each table displays two types of results. The first is an average of the overall 5-point Likert results for each variable (the second column). The next three columns summarize how respondents perceived each variable in terms of how often it is observed in US tennis operations or structures. The third column aggregates the two responses ('never' and 'rarely') which are both seen as perceptions of what is lacking. The fourth column is an aggregation of the neutral response of 'sometimes' and 'do not know'. The fifth column is an aggregation of the responses 'often' and 'always'; both seen as positive perceptions of what exists.

Element 1: Talent Identification and Development

A perceived challenge within US tennis system was related to how children are introduced and attracted to the game. As shown in Table 1, this statement received an average score of 2.6 out of 5, with 47% of respondents indicating that tennis players never or rarely are attracted from outside the sport's participation base. The main barrier for youth to make their first steps in tennis was indicated to be the cost: 20 surveyed coaches commented in their open responses that it is too expensive to play tennis. Another obstacle to tennis development is competition from such sports as football, basketball, baseball, and soccer, which was mentioned by 13 surveyed coaches. To better attract the tennis-predisposed children, 13 coaches suggested in their open responses to enhance scouting: "Send out experts to look for talented tennis players."

Administrator A (on 18 February 2011) indicated that

> schools could provide a better avenue for kids to be introduced to tennis ... but schools are controlled by cities, counties, school districts and school administrators, which makes it very difficult to coordinate and develop a national program when every area is different.

Related to this was the concern from both coaches and administrators' perspectives regarding integration of tennis with academic education (rated 2.8 out of 5). Sport organizations in many successful sport nations cooperate closely with public education and local governments.

The level of tennis coach expertise was perceived to be never or rarely high across all participant ages and levels by 57% of surveyed coaches. Insufficient education is likely one reason that over one-third of the respondents were uncertain or not

Table 1. Talent Search and Development

Desired practices	Average score	Distribution of responses		
		Never and rarely (%)	Sometimes and don't know (%)	Often and always (%)
(1) In addition to children being introduced to tennis by themselves and parents, potential tennis players are attracted from outside the sport's participation base (e.g. by a search at schools)	2.6	47	40	13
(2) Young tennis players are trained based on guidelines for multiple development stages recommended by USTA (many national governing bodies have guidelines for nurturing players from the introduction to sport through the achievement of peak performance on to retirement from sport)	2.9	27	53	20
(3) Sufficient resources are available collectively from various supporting organizations for all young talented tennis players to progress through all developmental stages	2.9	57	36	7
(4) A multi-stage system of player qualification based on results/ranking within age groups is used to reward player progress from beginner to top international level	3.5	39	12	49
(5) Performance of tennis players in each competitive age group is monitored and developed using a national database	3.6	32	17	51
(6) A high number of full-time tennis coaches are available making the athlete–coach ratio low	2.9	34	41	25
(7) Tennis coach expertise is equally high across all participant ages and levels	2.4	57	36	7
(8) Tennis coaches are paid according to multi-level certification based on coaches' education and achievements of entrusted players	2.5	51	37	12
(9) Players with potential to represent the country (e.g. nations top 50 players per age group) are offered the conditions to train full time with HP standards	3.5	10	44	46
(10) Tennis training is well integrated with school/college/university education for harmonious development of athletes	2.8	39	38	23

Table 2. Advanced Athlete Support

Desired practices	Average score	Distribution of responses		
		Never and rarely (%)	Sometimes and don't know (%)	Often and always (%)
(1) HP players are ranked into hierarchical levels/pools with appropriate financial and technical support	3.1	19	59	22
(2) Athletes are assisted with formal education and career outside sport	2.8	35	47	18
(3) Athlete support is well shared/balanced between coaches and advisors (e.g. coach may provide psychological, nutritional, and performance science support, while independent advisors may best assist with medicine, career, education, and personal finances)	2.8	31	52	17
(4) Scientific research (e.g. biomechanics of athlete movement and psychophysiological analysis) is applied quickly and effectively to immediately benefit player performance	2.7	36	52	12
(5) Player career is prolonged by medical personnel knowledgeable in tennis (helping with such things as injury prevention, adjustment of training levels, nutrition, pharmacology, rest and stimulation therapy, and doping use prevention)	3.1	22	49	29
(6) Doping is controlled by the USTA based on the most recent guidelines from World Anti-Doping Agency	3.1	14	73	13
(7) Athletes leaving elite sport are provided with individualized lifestyle plans for physical and psychological health	2.1	39	59	2
(8) Athletes, including tennis players, are supported at places of work and service with conditions similar to those at Home Depot and US Army (paid time off given to train and compete)	2.0	58	39	3

familiar with most talent identification and development practices. In their open responses, 21 respondents indicated the need for more experienced coaches at the beginner level. Administrator F (25 November 2011) said:

> There are fewer good coaches at the introductory programs as well as at the national level ... There are many good coaches spread throughout the country but many of them are at the club, high school and college level. We need to promote the 10 and under coach training more ...

Table 3. Training Centers

Desired practices	Average score	Distribution of responses		
		Never and rarely (%)	Sometimes and don't know (%)	Often and always (%)
(1) HP athletes are provided with priority access to specific high-quality equipment and facilities	3.4	12	49	39
(2) Training centers provide specialized facilities and equipment for each age and level of participation	3.2	15	54	31
(3) All national, regional and local training centers are available to athletes at affordable costs	2.6	39	50	11
(4) Travel from home to training facilities takes little time for players of all levels and types	2.5	47	49	4
(5) Training facilities are close to all facilities for athlete support (e.g. school/college, medical, room, and board, leisure/ entertainment)	2.9	22	64	14
(6) A network of training centers is used to prepare players in different environments/ sociogeoclimates (e.g. high altitude/ temperature/humidity, city/pollution, and rural/resort)	2.4	39	57	4
(7) Tennis training centers are located close to other sport facilities so that players participate in and learn from other sports	2.7	31	65	4

Administrator A (18 February 2011) stressed the importance of continuing education for part-time coaches and volunteers and noted that tennis coaches are rarely paid according to multi-level certification based on coaches' education and achievements of entrusted players. While 51% of coaches also indicated this never or rarely happens, seven coaches in their open responses asked for better coordination between different levels of coaching. The value coaches and their employers place on education is reflected in the fact that a quarter of our survey respondents indicated having no certification. Administrator B (on 23 February 2011) noted that tennis coaches are usually paid according to market, but it should be based more on certification: "one unified tennis teaching governing body in the USA with well-defined certifications is needed".

Element 2: Advanced Athlete Support

Surveyed coaches desire improvement in how tennis players are supported at places of work and service (Table 2). According to 58% of coaches, this never or rarely occurs in the USA. In their open responses, 18% of coaches agreed that there is a need for more funds and greater athlete support, particularly with job career outside competition, noting that a lot of potential players out there did not get the chance to play,

Table 4. Competition Systems

Desired practices	Average score	Distribution of responses		
		Never and rarely (%)	Sometimes and don't know (%)	Often and always (%)
(1) Hosted international events and international opportunities are sufficient for all athletes with potential to represent the country	2.9	29	53	18
(2) Competitions are well structured at all levels (e.g. club/training center, regional, and national)	3.3	16	48	36
(3) USTA and its support mechanisms sufficiently assist in local and sectional developmental events (e.g. 14 and under regional)	3.2	20	45	35
(4) USTA attempts to integrate professional and amateur tournaments into a progressive plan of competitions gradually preparing athletes for peak performance at "Majors", Paralympic Games, and Olympic Games	3.3	14	52	34
(5) USTA tries to coordinate all domestic and international competitions for all ages and levels, between and within all possible organizations	3.3	11	61	28
(6) Event sponsorship incomes are used to develop competitions for all participation levels	2.9	20	68	12

while international players are taking away opportunities from US athletes.

Advanced support of tennis players appears to be reserved for an elite few. Administrator A (18 February 2011) highlighted this: "Only players who have achieved the highest levels are provided with a lifestyle plan and assisted with their careers outside of the sport." It was regularly heard across open responses that these areas receive little attention from the governing bodies. Coaches also noted that European athletes and coaches educated them about other countries' comprehensive support of talented athletes during their journey toward excellence, which is lacking in the USA – particularly frequent medical examinations, conditioning to prevent injuries, assistance with education, lifestyle and employment ensuring sufficient rest and harmonious development, and financial assistance. Respondents indicated that some of this support is provided at academies, but that it is cost prohibitive for most families. Administrator E (22 November 2011) proposed that: "Tennis needs to take the approach of MBL or NBA in supporting a minor league. Perhaps USTA could create an endowment to aid athletes, much like artist support (National Endowment for the Arts)."

An important potential area for advancement which received a relatively low score was the provision of individualized lifestyle plans for athlete health on final stages of playing career (with the average of 2.1,

Table 5. Educational, Scientific/Medical, Philosophical, and Promotional Support

Desired practices	Average score	Distribution of responses		
		Never and rarely (%)	Sometimes and don't know (%)	Often and always (%)
(1) All specialists engaged in the development of tennis players are well educated for their professional roles	3.2	16	55	29
(2) USTA fosters research on all important aspects of tennis development	3.6	8	43	49
(3) Research results are well communicated to coaches (e.g. by research institutes, universities, and USTA)	3.0	24	52	24
(4) Principles of sportsman like conduct and Olympism and Olympic tennis history are communicated well (e.g. through mass media, school education, and through the arts as part of tennis events)	2.3	49	41	10
(5) USTA's communication contributes to national values and identity by inspiring participants to strive for excellence, to show the best results, and character in the world	3.0	27	48	25
(6) The USTA provides vision and leadership in improving all aspects of the participants' well-being through tennis (e.g. physical, social, emotional, mental, spiritual, and environmental/ecological)	3.1	25	45	30

only 2% of coaches said it is always or often available, but 39% indicated never or rarely). There have been significant efforts by healthcare researchers and social science professionals to study and assist athletes in transition to the general workforce (Coakley, 2006; Lavallee, 2005; Taylor & Oglivie, 1994). Providing elite athletes with holistic plans for gradual reduction of training and competition loads and ultimately retirement from competition is both a humane and important service.

Element 3: Training Centers

Table 3 illustrates perceptions regarding training centers. Below average scores suggest potential to improve training centers, that respondents do not understand, or being part of advanced training conditions reserved for the elite. A challenge is that training centers are not often available to athletes at affordable costs (2.6 of 5). A regular theme seen throughout the data is that there needs to be greater accessibility to quality training centers by creating academy conditions at better utilized local clubs and schools. Sixteen coaches indicated in their open responses that more training centers are needed and an additional seven said that more coaches need to be hired for these facilities. Eight coaches also said that more funds should be devoted to make tennis less expensive. Unless a player is identified to be

Table 6. Partnerships with Supporting Agencies

Desired practices	Average score	Distribution of responses: Never and rarely (%)	Sometimes and don't know (%)	Often and always (%)
(1) Support for tennis player development is adequate from various levels of government	2.1	60	34	6
(2) Sufficient help is obtained from bodies which govern tennis and provide coach education and certification (e.g. USOC, USTA, USTPA, and USPTR).	3.0	29	42	29
(3) Role of clubs/community programs in tennis development is sound	2.8	37	47	16
(4) Tennis is well supported by educational sector (e.g. schools, colleges, and universities)	3.1	23	46	31
(5) Cooperation with agencies outside of sport industry (e.g. medical, scientific, military, philanthropic and sponsoring organizations, and lotteries) is in place	2.5	40	56	4
(6) USTA influences media coverage and popularity of tennis to increase support from the society	3.1	22	52	26

part of a USTA national training program, access to coaches and competitive preparation opportunities is solely the player and family responsibility.

In 2007, USTA centralized some of its national player development program at the Evert Tennis Academy in Boca Raton, Florida, where tuition with room and board could cost as much as $42,000 a year if not subsidized (Coyle, 2007). Administrator D (on 10 March 2011) said that the eight regional training centers USTA had recently started is a good first step in improving accessibility and affordability. Respondents said that regional and local centers are to provide more continuous year round training and give all gifted players subsidized facility use and coaching. Coordinating these training opportunities with local schooling and other athlete services is an example of a transferable best practice from other highly successful sport nations.

Convenience of facility locations is an important challenge in a large country. Players may have to travel in excess of an hour to find competitive matches on a regular basis. Travel time was rated at 2.5 of 5, with only 4% of coaches indicating that travel from home to training facilities takes little time. According to Administrator D (10 March 2011), many families travel far to get the training that their children need, and not all players are provided with access to the same facilities, depending on the part of the country.

It is worrying that over half of coaches are neutral or do not know about most of the facility-related practices, particularly the integration of training centers for tennis with other sports (2.7 out of 5 in Table 3). It is important to share tennis facilities,

Table 7. Balanced and Integrated Funding and Structures of Mass and Elite Sport

Desired practices	Average score	Distribution of responses		
		Never and rarely (%)	Sometimes and don't know (%)	Often and always (%)
(1) Corporate and philanthropic tax incentives provide sufficient support of mass and elite tennis	2.0	52	47	1
(2) Participation in various sports, as a foundation for tennis development, is encouraged through physical education requirements	2.7	46	39	15
(3) Sport participation, including tennis, is rewarded with reduced personal tax	1.5	69	30	1
(4) Tennis programs service both recreational and HP players	3.4	17	39	44
(5) Specialized sport schools similar to International Management Group academies are available and affordable to all talented players	2.1	72	25	3
(6) A multi-stage system of elite tennis player qualification is integrated with a system of fitness tests for mass participants such as the President's Challenge Awards Program	2.3	39	56	5
(7) Programs affordable for all are available in various tennis clubs	2.4	51	3	46
(8) Tennis participants are diverse as general population	2.8	42	11	47
(9) USTA demonstrates systematic/ strategic management in developing tennis on every level	3.0	23	54	23
(10) USTA is effective in fostering both mass participation and HP in tennis	2.9	28	54	18
(11) Tennis is developed in integration with Olympic and Paralympic sports to achieve sustainable competitive excellence	2.7	32	54	14

athlete conditioning, science, and medical services with such disciplines beneficial for preparation of tennis players as racket sports, soccer, and baseball. The multi-sport academies, Olympic training centers, and university athletic programs have shown benefits of such cooperation. Open responses agreed with the ideal model's concept of cooperation between tennis centers and primary, middle, and high schools, colleges, and universities, as done at such world's leading academies in the USA and Team Bath in the UK. This is also to improve the positioning of training close to facilities for athlete support (2.9 out of 5) and help create more full service sports

hubs in the USA as they grow in other areas of the globe (Bath Sport, 2011).

Element 4: Competition Systems

All six survey statements related to competition systems received modest scores. However, the first and the last statements had more 'never' and 'rarely' responses than 'often' and 'always' (Table 4), and qualitative analysis also revealed several areas for improvement.

The two areas of greatest concern to respondents were the opportunities for international competition at home or abroad (29% said these are never or rarely sufficient) and the use of sponsorship revenue to develop competitions for all player levels (20% said this never or rarely happens). These beliefs were supported in the open responses. These concerns further resonated in the interviews with administrators. Coaches and administrators agreed that amateur and professional competitions should be better integrated. One coach also suggested that International Tennis Federation (ITF) and ATP rankings should coincide with college and university rankings. Administrator B (23 February 2011) said that:

> Elite players must currently decide if they are going to play USTA or ITF tournaments. You are penalized if you try to play both because they are separate ranking systems. If you can blend the two ranking systems it would provide more opportunities for international competition for US players. To play just ITF tournaments without support is financially impossible for most families ...

Element 5: Educational, Scientific/medical, Philosophical, and Promotional Support

While survey responses in Table 5 showed that communication of sportsmanship and Olympism only occurred occasionally in tennis (49% indicated never or rarely), open responses from coaches suggested that it was not as concerning to them as education and research. Beyond continued education and research initiatives, respondents desired communication of best coaching practices to be shared at greater levels and funding to assist in this. Concerning is that over 50% of coaches were neutral or unaware about education of other specialists surrounding their entrusted players and about communication of research so important for coaches' competence and success.

While survey scores suggest that the USTA does a good job of fostering research geared toward tennis development (49% were positive about it), open responses and administrator interviews are contradictory. Administrator A (18 February 2011) noted that USTA relies on other organizations to conduct the research. Administrator B (23 February 2011) observed that most of the breakthroughs in tennis research have been made by individuals outside the system and suggested that if more grants are available for these innovators more progress could be made. Administrator E (22 November 2011) said: "The USTA sport science grants and research have been non-existent over the past 5 years. Only this coming year (2012) will research start again."

Element 6: Partnerships with Supporting Agencies

Survey responses in Table 6 suggested that partnerships are an area rich in growth opportunity. Support for tennis by various levels of government is perceived by 60% of coaches to 'never' and 'rarely' occur, with only 6% indicating 'often' and 'always'. Other agencies outside the sport industry are also perceived to be underutilized in tennis support (with 40% of 'never' and 'rarely' and only 4% of 'often' and 'always'). Over half of the coaches are neutral or do not know about US tennis' cooperation with external stakeholders and the media.

While direct support by the government is seen as limited or non-existent, indirect funds and resources through education and health systems were mentioned as more accessible. Administrators agreed with this, suggesting a possibility of governmental help with funding of tennis for the purpose of development of life skills and physical education. Respondents also felt funding from the private sector was a realistic option for greater immediate support. Administrator A (18 February 2011) noted:

> The corporate community does provide a great deal of the financial support for mass and elite tennis, but USTA could do even better in fostering participation if it was willing to adopt a friendlier stance with other programs within the industry.

Coaches' open responses also regularly stressed the need for better promotion of tennis through the media.

Element 7: Balanced and Integrated Funding and Structures of Mass and Elite Sport

Only one statement in Table 7 (Tennis programs serve both recreational and HP players) had an average score of above 3 (sometimes), while all others showed lack of the integration of all aspects of tennis development, being practiced never and rarely rather than often and always according to coaches. Only about a quarter of coaches thought USTA develops tennis systematically and fosters mass and elite tennis; others were uncertain, unaware, or negative about it.

Open responses and interviews continued to show that the fiscal realities of tennis can be quite challenging. This was highlighted by the low scores on both the personal and corporate tax incentives statements. Administrator G (7 December 2011) stressed that the current tax incentives do not motivate sufficient corporate and philanthropic support, and that reduced personal tax for sport participation is a good idea. According to administrator E (22 November 2011),

> Aside from business and insurance incentives, there are few. Lobbying for a healthier America is essential with cooperation of medical, health and insurance agencies. It serves us better to have a fitter nation and there's no reason why there can't be greater government support. But it requires non-sporting organizations, particularly those in the health industries to get support.

Administrator E also reflected opinions of other administrators in the following concept: tennis academies are private enterprises and are not egalitarian; however, most academies do have scholarships and try to recruit talented players for marketing purposes ('this star trains here'); therefore, offering such academies tax breaks when they balance their diversity might be a good incentive.

A national network of tennis programs at public schools could improve the scores on programs' affordability and availability for all and open tennis to a diverse base of participants. According to administrator E,

> USTA makes a conscious effort to recruit a diverse group of people. Colleges also recruit international students ... The problem is at the club level where wealthier, more homogeneous suburban populations may have better facilities and more disposable income to train. USTA and other agencies need to support urban efforts. Setting up non-profit urban youth tennis centres may help significantly. There are a few, but not enough and they are not well-endowed.

CONCLUSIONS

As with any critical inquiry, respondents identified many areas for potential improvement. Nonetheless there are a few core issues that pervade the data that deserve particular attention. Core concerns gleaned from the data are: communication,

collaboration, and funding allocation for better education, medicine, science, and facility services.

The key sentiment of surveyed tennis coaches and administrators was that more money ought to be invested into the advancements of all the studied elements of tennis system. The USTA appears to be in a good position to further invest in US player development. In contrast with almost all other professional sports leagues and events, the US Open has escaped much of the financial impact of the recession of the beginning of the twenty-first century, generating more than $200 million in revenue for the third year in a row, as reported in 2010 (Weil, 2010). This is largely because compared to other major sports, US tennis attracts more affluent consumers and premium sponsorships. It is a good time to develop new participant and coach service structures, new partnerships, and sources of USTA support.

The research results agreed with USTA's strategy that masses of young developing players should be supported with services previously available to elite athletes. USTA has been increasing investments into training methodology and conditions for 8–14-year olds since 2009. Another current intervention throughout the USA and other ITF member nations is Ten and Under programs. It will help develop talent and improve retention, particularly if US coaches receive better support and education than in other successful tennis nations, where some of the best professionals are assigned to early player development. Coaches could be provided with more age specific guidelines for long-term athlete development, as recently started by US National Governing Bodies (NGBs) such as USA Soccer. US tennis scientists have a great body of knowledge to draw from within the US universities as well as from athlete development guidelines of Australia, Canada, China, France, Germany, Russia, Scandinavia, and the UK (Bergsgard, Houlihan, Mangset, Nodland, & Rommetvedt, 2007; Canadian Sport for Life, 2011; Houlihan & Green, 2008; Platonov, 2005; Riordan, 1980; Smolianov & Zakus, 2008; Tumanian, 2006).

Results of this research agree with Fish, Gallo, and Smolianov (2011) that one emerging contribution of US tennis scientists and governing organizations is the support of long-term athlete development through a modernized system of player ranks which emulates world's best practices and serves US conditions. US tennis leaders are also considering a French-style ranking: the 16 levels which provide players worldwide a common language to determine their level of play without regard for age or gender. This is an important topic for future studies as we continue to search for more nurturing sport development mechanisms (Green, 2005; Sotiriadou et al., 2008).

The current research suggests that there is a strong need for more training centers at the local level. Fish et al. (2011) also recommended that colleges, municipalities, local tennis clubs, corporate sponsors, former college players, and professional tennis teaching and coaching organizations collaborate to form community "Metropolitan Tennis Co-ops". This model of collaboration provides local facilities, coaching, sport science services, and competition to US junior players without them having to travel long distances on a regular basis. Tennis coaches and administrators also expect better conditions for athlete development to be created at schools through closer cooperation with systems of public education and local governments. In both Australia and the UK, specialized sport schools positively influenced youth in lower socioeconomic areas (BBC, 2004a, 2004b; Davies, 2008; Wynhausen, 2007).

In the first decade of the twenty-first century, USTA has more than doubled its number of national tournaments. The USTA and ITF professionalized the junior circuit

in 2004 by enacting a professional ranking system that awarded points for advancing through rounds in tournaments. The larger the number of competitions a player enters, the greater his/her opportunity to accrue points. Participation has increased. The junior majors are now using the world junior ranking of the ITF, which offers tournaments in the USA and 120 other countries that overlap the USTA schedule. This makes many players overuse their body and miss school. It is important to improve rather than increase the system of youth competitions and create competition at the 8–12-year-old level that is inexpensive and local with minimum travel (Alfano, 2011). Reid et al. (2007b) stressed the importance of junior boys' circuit in the development of professional tennis players, indicating that 91% of top 20-ranked boys achieved a professional men's ranking. However, the prerequisite for elite player development is not a high number of tournaments, but an optimal number and regularity of events (Crespo, Reid, Miley, & Atienza, 2003), with minimum event clutter detrimental to participants' health and intellectual development. The USTA and US tennis coaches should continue to examine and address the problem of event clutter. A rational calendar of competitions can be developed with progressive difficulty to each level and kind of participation, as was done in the USSR and now attempted by such countries as Russia and China.

The better communication with organizations outside of sport recommended by coaches and administrators will achieve multiple common goals of both tennis development and social development through tennis and allow USTA to assist its partner organizations with diverse goals, such as to increase productivity, reduce healthcare costs, reduce crime and drug use, and better communities (Boshoff, 1997; Burnett, 2001; Burnett & Hollander, 1999; Cameron, Craig, & Beaulieu, 2000; Crabbe, 2000; Cunningham & Beneforti, 2005; Fetisov, 2005; Foster, 2000; Katzmarysk, Gledhill, & Shephard, 2000; Lawson, 2005; Nichols, 2004; Pate et al., 1995; Tremblay & Willms, 2000; Vail, 2007). Additional resources are available through closer partnerships with different levels of government. At federal and state levels, more educational resources will be accessible to tennis when it plays a more integral role in school physical education curriculums.

At local level, governments, schools, colleges, universities, communities, and businesses could provide better support and build more facilities. The USTA's Community Partnership Investment Grants, ranging from $35,000 to $70,000, are awarded for alliance-building funds to organizations which are expected to match the USTA's investment over a three-year period (Tennis Panorama News, 2011). Not just money but hands-on assistance is needed for building sustainable partnerships. Tennis Canada supported 18 communities which only built effective partnerships and increased tennis participation after Tennis Canada provided educational materials, and implemented community training workshops, using a three-year grant totaling $280,000 from Canada's federal government, matched by Tennis Canada (Vail, 2007). Germany also provides a good example for clearly defined and agreed responsibilities in partnerships of local governments and clubs for sport development, as described by Bergsgard et al. (2007). USTA could help local governments across the USA replicate the effective practices and comprehensive support of tennis by municipalities in Florida and California. The challenge for the USA is to take the best from partnership models that exist across the globe to fit local values, competitive goals, and logistics in the USA.

Given the country's wealthy elite and rich history of stimulating philanthropic and entrepreneurial behavior, it would be wise

for USTA to consider the US Open income as seed funding for maximizing all other sources and partnerships contributing to tennis development. Tax deductions and non-profit organizations targeting specific sport development goals can emulate incentives available in other successful sport nations, particularly if different local conditions of individual states within the USA are taken into account, instead of borrowing federal programs from more centralized countries. In Canada, a 2007 tax credit is available from the federal government to cover fees for programs which promote physical activity and fitness in children. Similar credits are being discussed by Australian and the US governments, and our respondents thought it is a good idea. US employer health insurance plans reimburse $150 or more per year for fitness classes or a health club membership, which could include tennis. New financial solutions for subsidizing underfunded levels of participation around the world are worth considering for US tennis.

Many successful international practices have been utilized in the USA, particularly support of top athletes through the universities, elite training centers, and academies. However, mass participation practices are still underutilized, specifically physical education curricula with sufficient quantity and quality of physical activities including tennis. If USTA would lead other NGBs and take full advantage of best mass participation practices, the country could improve on the international sport stage while achieving mass participation benefits.

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