

Retrospective analysis of long-term preparation of outstanding athletes for earlier identification of athletic talent

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Summary

Athletic talent as biological, social and methodological phenomenon is one of the most scientifically complicated and practically important problems of contemporary sport. The earlier discovery of athletic talent permits more rational management of gifted young prospects' preparation increasing their chances for the most successful athletic carrier. With this position, the thorough investigation of the long-term preparation of outstanding athletes allows to find earlier indications of athletic talent that can be utilized for recognition of extra-ordinary abilities in young athletic candidates. Correspondingly, this study is aimed to investigate long-term preparation of several Olympic champions, focusing on their training time expenses and earlier indications of athletic talent for possible evaluation of young athletic prospects. The personal data of nine Olympic Champions were collected by means of specially organized interviewing, where retrospective data were collected for characterization of time expenses for training until achievement of the first big success, earlier recognition of giftedness, and availability of parental support during initial part of athletic carrier. The unique data of nine Olympic champions evidenced that they attained their first big success after 4-6 years of their purposeful preparation when total amount of accumulated time expenses for training varied between 1840-5000 hours. Available findings allow indicate three general factors affecting discovery and development of extraordinary athletic talent: high internal motivation (1), creative and intelligent coaching (2), high rate of learn- and trainability (3). Comparison of annual time expenses of respondents with junior standards gives firm evidence that studied outstanding athletes executed much larger training workloads even on the earlier stages of their multi-year preparation. The study outcomes contradict to popular theory of deliberate practice (Eriksson et al., 1993) that postulates 10-years rule and accumulation of 10 000 hours training for attainment of high-level expert performance. Importantly, that majority of respondents were early recognized as potentially talented individuals and received appropriate family support.

Keywords: *athletic talent, long-term preparation, identification of gifted youngsters.*

Introduction

Recognition and development of athletic talent can be considered as one of the most intriguing and practically important problems in high-performance sport. Apparently, this problem raises increasing attention and interest of sport analysts, advanced coaches, and sport managers, who are responsible for prospective preparation of potentially talented young candidates (Sokolovas, 2003; Breitbart, 2011). This problem is extensively considered during the recent decade, correspondingly, a number of reviews have been published (Davids, Baker, 2007; Vaeyens et al., 2008; Lidor et al., 2009). From this position experiences of great athletes can give unique and valuable material that may assist in comprehension of the athletic talent's nature and its earlier discovery.

One more disputable aspect is associated with the theory of deliberate practice and 10-years rule that has been proposed by Ericsson with co-authors (1993). According to this theory, the highest level of performance in chosen domain (sport) can be

obtained following 10 000 hours or 10 years of deliberate practice.

From the scientific and practical points of view, it can be hypothesized that extraordinary abilities of outstanding athletes can be recognized on the earlier stages of their long-term preparation. It can be assumed that very talented athletes can reach level of excellence much earlier that it is claimed by popular theory of Eriksson. Besides, it can be suggested that retrospective investigation of outstanding athletes during their initial preparation allows revealing earlier indicators of athletic talent, which can be used for prediction of extraordinary athletic abilities in young prospects. Apparently, sub-population of Olympic champions can be considered as the most prospective for in-depth examination of athletic talent.

The present study is aimed to investigate long-term preparation of several Olympic champions focusing on their training time expenses and earlier indications of athletic talent for possible evaluation of young athletic prospects.

Study design

The personal data of nine Olympic champions were collected by means of specially organized interviewing, where retrospective data were collected, namely:

- age when systematic training in favourite sport had been started;

- age when the first big success was obtained (it was specified that big success meant earning the medal in the World/Continental junior championships or National senior championships);

- frequency and average duration of workouts listed for each year of the training till the first big success;

- participation in summer training camps indicating the number and duration of weekly workouts, the number of weeks, when the regular summer training was executed;

- availability of indications of extraordinary abilities on the earlier stages of long-term preparation;

- availability of parental support on the earlier stages of preparation.

Using above mentioned primary data the total annual amount and accumulated time expenses for training until the first big success were calculated. The list of respondents and their personal record is presented below (Table 1). All respondents were informed on the purpose of this study and expressed their readiness for cooperation.

Results

The personal data of studied athletes allow indicate time span and accumulated training time expenses (TTE) until achievement of the first big success (Table 2).

Table 2

The age when respondents started training and obtained the first big success and accumulated training time expenses (TTE) until the first big success

Athlete's name	Age starting training	Age of the 1 st big success	Training time expenses until the 1 st big success
Viatcheslav Ivanov	14	17	1840
Sergey Chukhray	13	17	3195
Vladimir Parfenovich	14	18	3120
Ivan Klementiev	15	21	4495
Maxim Opalev	12	16	3245
Gal Fridman	12	15	2735
Massimiliano Rosolino	7	17	2480
Sergey Fedorovtsev	13	17	3840
Ruta Meilutyte	7	14	2807

Familiarity with individual data of studied champions (Table 2) reveals that their time period between starting the carrier and the first big success varies between 4 and 7 years, much less that it was proposed by 10-years rule. The age when the first big success was obtained varied within 14-21 years; athletes, who started dedicated training earlier, achieved their big success at 14 (Ruta Meilutyte, gold, silver, and bronze medals in European Youth Olympic Games), at 15 (Gal Fridman, silver medal in junior World Championship), and at 16 (Maxim Opalev, two gold medals in junior World Championship). These extraordinary achievements can be definitely qualified as big success, however, this age variation is not consistent with previously published data that indicated age 22-26 (Bompa, 2000). To the date, these publications do not contain any statistical support for presented findings.

The average accumulated training time expenses (TTE) until the first big success in examined sub-population is equal 3084 hours varied between 1840 (VI) and 4495 (IK). These values are much lower than 10000 hours claimed by Eriksson with co-

Table 1

List of the respondents in the study and their personal records

Name, country, date of birth	Preferred athletic discipline	Personal achievements
Viatcheslav Ivanov (VI), USSR, 30.7.1938	Rowing, single sculls	Olympic Champion 1960, 1964, 1968; world champion, four-fold European champion
Sergey Chukhray (SCh), USSR, 31.5.1955	Kayak pair, Kayak four	Olympic Champion 1976 and 1980 (twice); three-fold world champion
Vladimir Parfenovich (VP), USSR, 2.12.1958	Kayak single, kayak pair	Olympic Champion 1980 (three times); ten-fold world champion
Ivan Klementiev (IK), USSR, Latvia (since 1991), 18.11.1960	Canoe single	Olympic Champion 1988; Olympic silver medal winner in 1992 and 1996; seven-fold world champion
Maxim Opalev (MO), Russia, 4.4.1979	Canoe single	Olympic Champion 2008; Olympic silver (2000) bronze (2004) medal winner; eleven-fold world champion
Gal Fridman (GF), Israel, 16.9.1975	Sailing, windsurfing	Olympic Champion 2004; Olympic bronze medal (1996); world champion in 2002
Massimiliano Rosolino (MR), Italy, 11.7.1978	Swimming, 200 medley, 200-400 free	Olympic Champion 2000; world champion at 2001; three silver medals in world championships
Sergey Fedorovtsev (SF), Russia, 31.7.1980	Rowing, quadruple sculls	Olympic Champion 2004; European champion in 2011
Ruta Meilutyte (RM), Lithuania, 19.3.1997	Swimming, 100, 50 breaststroke	Olympic Champion 2012; world champion in 2013, European champion in 2014

authors (1993) as necessary condition for attainment of excellent performance.

Table 3 embraces individual data of annual time expenses for training in different ages of the long-term preparation of studied athletes. These data presented in comparison to junior standards proposed by world recognized experts in youth training.

Table 3

Average annual time expenses for training in different ages compared to junior standards

Age	Respondents	Mean value (hours)	Minimum-maximum	Junior standard*
7	RM, MR	112	58-166	65
8	RM, MR	149.5	85-214	100
9	RM, MR	228.5	175-282	120
10	RM, MR	303	190-416	140
11	RM, MR	362.5	285-440	175
12	RM, MR, MO, GF	520	420-619	200
13	RM, MR, MO, GF, SCh, SF	550.5	360-670	220
14	RM, MR, MO, GF, SCh, SF, VP	577.8	350-796	280
15	All	620	380-840	320
16	MR, MO, GF, SCh, SF, VP, IK, VI	688.9	540-830	400
17	MR, MO, GF, SCh, SF, VP, IK, VI	782.6	640-920	470

Note. * average norms of annual time expenses in endurance sports have been summarized basing on preparation programs for young athletes published in USSR and GDR (Issurin, 2008).

Observation of Table 3 reveals that data corresponded to ages 7-11 collected from sport history of two athletes (RM and MR). The other respondents started their carrier at age 12 years or later. Comparison of the real annual time expenses with junior standards gives firm evidence that studied outstanding athletes executed much larger training workloads even on the earlier stages of their multi-year preparation. The individual trend of training time expenses of Ruta Meilutyte gives the salient example of such proportion between real preparation of extremely talented athlete and average norms recommended from general scholastic positions (Figure 1).

The interview of athletes and/or their coaches revealed that all questioned individuals were early recognized as very gifted and potentially successful persons. In all cases their high internal motivation, readiness to train more than other team-mates, consciousness, high learnability, competitiveness, and initiative were marked. Importantly, all respondents performed larger than other athletes training volumes following their internal impetus without any additional demands from the coaches and/or parents. Nevertheless they reported on the availability of permanent parental support.

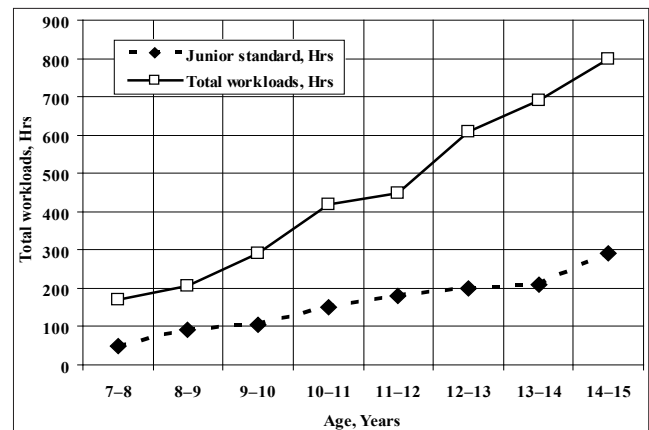


Fig. 1. Individual trend of annual training time expenses of Ruta Meilutyte until earning Olympic gold in 2012

Discussion

The theory of deliberate practice of Ericsson has been proposed about two decades ago. Its framework outlines that to reach the highest level of performance, one must engage in 10 000 hours or 10 years of deliberate practice in their chosen domain (sport). The deliberate practice was defined as *high quality; high concentration practice that was not usually inherently enjoyable; practice activities became increasingly more complex over time; and practice was done with the primary goal of improving performance*. Our findings allow suggesting that extra-ordinary gifted athletes had obtained level of excellence much earlier than it could be predicted basing on the framework of deliberate practice.

Contemporary theory of training proposes general positions of long-term athletic preparation that specifies average norms of workouts frequency and duration as well as annual time expenses for different periods of athletes' maturation and development (Matveyev, 1977; Lee, 1993; Bompa, 2000; Van Praagh, 2000; Sokolovas, 2003; Smith, 2003; Wells, 2006). Certainly, these norms have been proposed for average population of schoolchildren following demands of general physical activity and health related training. Apparently, generally recognized norms of annual workloads expenses do not satisfy demands of high-performance training. The practice of purposeful preparation of specially selected gifted youngsters presupposed elaboration of specialized training programs where general training volumes tended to increase to the level of senior high-performance athletes (Issurin, 1994; 2008; Swanson, 2004). As the result, talented individuals attain their big athletic success much earlier than it can be expected following world recognized theory of Eriksson.

Considering the main outcomes of present study, three general factors affecting discovery and developing of extraordinary athletic talent can be specified.

1. High internal motivation. This factor was marked by each respondent, who practiced extra-time for workouts and additional sessions in days-off following exclusively their self-initiative without any external demands. Usually the content of their planned and additional workouts consisted of low-medium intensity exercising focusing on perfection of movement technique and fatigue resistance. Fitness exercises included continuous running, general drills, and sport games. The summer program of respondents included prolonged training camps and they were selected for participation despite that some of them (Ruta Meilutyte, Maxim Opalev, Gal Fridman) were younger than other participants of these camps. Athletes reported exercising as usually enjoyable and each case of missed session elicited their disappointment. Eventually that maintenance of internal motivation and willingness to train were predisposed by high rate of athletic improvement, enhancement of technical skills as well as familial support.

2. Creative and intelligent coaching. All respondents reported that their coaches supported their initiative to perform greater workloads; they assisted for execution of additional sessions joining the athlete to other group or administering individual exercising with minimal supervision. Notably, coaches put special efforts to reduce any formal obstacles for execution of additional sessions that were not indicated in formal time-table of athletic club. However, athletes noticed that they did not receive additional demands and any kind of pressure. They also did not receive any exclusive conditions or financial support prior achievement of superior athletic results (Hong, 2008).

3. High rate of learn- and trainability. This factor determines possibility to obtain superior expert performance much earlier than it can be expected following general concept of accumulated deliberate practice. The evidences of present study indicate border of accumulated deliberated practice 3500-5000 hours for achievement of sport excellence by extremely talented athletes during the time period equal to four-six years. Taking into account the extra-ordinary athletic history of respondents, it can be suggested that their exclusive giftedness

affected both high rate of skill improvement combined with favourable training response and high internal motivation to perform much greater training workloads than their team-mates.

It is worthy to notice that in cases when several young athletes performed greater volumes of initial preparation following external motivation and demands (from parents or ambitious coach), their initial improvement rate was higher than in other team-mates but they did not attain level of pure excellence. Beside of that, there are thousands examples of amateur athletes, who have continued highly dedicated training approaching the level of 10 000 hours of accumulated practice but did not obtain superior athletic performance.

Conclusions

The study outcomes highlight the role of athletic talent in obtaining the superior performance and time span that is necessary for achievement of exclusive athletic position. As it was previously marked, all studied outstanding athletes had shown very high internal motivation for execution of more frequent and prolonged workouts. This high motivation was supported with pronounced positive training response and much faster acquisition of technical skills. These particularities of their individual progression can be reasonably indicated as precursors of athletic talent. The further preparation gave them experience of competitiveness and successful fighting. Thus, the favourable training responses and enjoyable competitive practice played decisive role in formation of extra-ordinary adaptation potential, mental toughness, and willpower. Presumably, these particularities of training attitude and individual progression can be used as earlier indications of extraordinary abilities and can serve for identification athletic talent. Of course, the presented data and their analysis have restrictions associated with specificity of athletic domain where these data were collected. Obviously, future studies are necessary to shed the light on considered issues. In any case, it can be assumed that personal way to success of each great athlete deserves serious analysis and particular attention.

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ŽYMIŲ SPORTININKŲ DAUGIAMETĖS TRENIRUOTĖS RETROSPEKTYVINĖ ANALIZĖ TALENTO IDENTIFIKACIJOS ASPEKTU

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SANTRAUKA

Sporto talentas, kaip biologinis, socialinis ir metodologinis reiškiny, yra sporto mokslui vienas sudėtingiausių, o praktikams – svarbiausių dalykų šiuolaikiniame sporte. Ankstyvas talento pastebėjimas leidžia racionaliau valdyti jaunų ir gabių sportininkų rengimą, didinti jų sėkmingos sportinės karjeros galimybes. Žymių atletų daugiametės treniruotės retrospektyvus tyrimas šiuo aspektu leistų atpažinti jaunųjų atletų ypatingus gebėjimus ir treniravimo ypatumus.

Šio tyrimo tikslas – ištirti kelių olimpinų čempionų sportinės karjeros pradžioje treniruotėms skirto laiko rodiklius ir nustatyti sporto talento identifikavimo bei evoliucijos panoramą. Specialiai organizuotu interviu metodu buvo apklausti devyni olimpiniai čempionai ir surinkti unikalūs duomenys, charakterizuojantys treniruotėms skirto laiko rodiklius iki pirmosios didelės sėkmės sporte, ankstyvuosius talento atpažinimo požymius ir tėvų paramos svarbą atletų karjeros pradžioje.

Unikalūs devynių olimpinų čempionų apklausos duomenys rodo, kad pirmąją didelę sėkmę sportininkai pasiekė nuo treniravimosi pradžios praėjus 4–6 metams, pratybų apimtis svyravo tarp 1840 ir 5000 valandų. Tyrimo duomenys leido identifikuoti tris pagrindinius talentingų sportui jaunųjų atletų atpažinimo ir jų vystymosi veiksnius: 1) vidinė motyvacija, 2) kūrybingas ir sumanus treniravimas, 3) didelis mokymosi ir treniruotumo augimo tempas.

Lyginant metinius treniruotėms skirtą laiką rodiklius, matyti, kad buvo atliktas didelis treniruotės krūvis ankstyvojoje treniravimosi stadijoje. Tyrimo rezultatai prieštarauja populiariai atsargios praktikos teorijai (Eriksson et al., 1993), pagal kurią, norint pasiekti didelio meistriškumo lygį sporte, būtina 10-ies metų ir 10 tūkst. treniravimosi valandų taisyklė. Svarbu, kad dauguma respondentų buvo anksti atpažinti kaip talentingi individai ir gavo tinkamą šeimos paramą.

Raktažodžiai: sporto talentas, ilgalaikis rengimas, gabių jaunuolių identifikavimas (paieška).

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