Study about the fundamentation of Tudor Bompa sports trainning periodization model

ABSTRACT: Annual Plans of simple training have been used for centuries. Periodization is the general and detailed planning of the available time for the training, according to intermediate objectives perfectly established, being respected the scientific axioms of the sport exercise (DANTAS, 2003). This study made a comparison between the periodization models (MP) of Matveev and Bompa, using literature revision as research element, seeking compare the described authors’ MPs. In 1965 Matveev published the MP would se used for decades. According to BOMPA (2002), this MP would be typical of sports the used mainly potency and speed. Therefore accoding to that author this MP could not serve as parameter for sports with resistance predominance. To set out such problem, Bompa it proposed a modification in the traditional model, inserting loads of work of high volume during practically the whole season. Another problem is related the new world order of high level sports, with tournaments distributed throughout the year, where several peaks are necessary. Bompa also proposes an equation for this problem with double, triples and multiple cycles of training. However, in spite of the changes to the traditional model, Bompa doesn’t disrespect the classic model, he just adapts it.

Keywords: Sports Trainning, Trainning Periodization, Periodization Model

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INTRODUCTION

The concept of timeline is not new, annual plans for standard training are used for centuries. This concept has its first evidence in Ancient Greece, being used in the olympics and also for training of feudal armies (BOMPA, 2002). Through the centuries the act of period training has been improved. Sometimes seasons passed blank in relation to training, but nothing compared the production of knowledge on this subject of study as the century that this has happened and where we are.

Wars have never been in the daily news of the man, but the evidence of major collisions at the beginning of the century XIX, followed by the big wars and its consequences have with the physical preparation of the men became crucial issue for the supremacy of some nations. Until half of the last century, the military influence was predominant in progress on the act of physical training. However over the years the challenges before focused on the armaments question, literally became a science and technology race to promote better physical performance. Several nations have started to invest in the human athlete and the act of periodical training that becomes primordial.

In the middle of the sixties, in the USSR, a group of scholars led by Lev Pavilovch Matveev publishes a timeline model that would become a reference for decades. This is because, from now, physical coaches before conditioned to disorderly experimentation began to organize their training for several years.

Athletes come to have a higher survival, an appropriate training and a better performance, such as the Soviet athletes that came to dominate the Olympic world scene.

With the passage of decades the world sports scenario changes from the moment the socialist bloc got cut. Capitalism starts to dictate a new course for the sport worldwide, with more competitions and great awards values for the Olympics period in a fierce competition for the promotion of Olympic headquarters. From this moment the traditional Matveev’s periodization becomes questioned by some and adapted by others. Bompa follows the traditional Matveev’s line, but makes some caveats in his work and says that the difference between traditional timeline models and the preceding is in the fact that the traditional have been the first to be published, not more than this (2002).

OBJECTIVE

This study aims to compare the timeline models (MP), of Matveev and Bompa, using the meta analysis as a search tool. This is made necessary by still having discussion about the applicability, the adequacy and comprehensiveness of the timeline models cited with the new world sports order.

LITERATURE REVISION

The planning of sports training or simply training timeline is not new and neither a russian discovery. The Greeks already wrote
about it, but the story and time only reserved a few writings of this era (BOMPA, 2002). Periodization is the general detailed planning of the time available for training, according to the intermediaries' objectives perfectly set, respecting the principles of the scientific sports exercise (DANTAS, 2003).

But time passed and the matter is still unknown for many, despite the significant advances made in recent decades, highlighting 1965 of the annual sports training planning model. This model has been widely and quickly disseminated in the western world and, for this reason, known as a model of classic or traditional timeline.

The model in question recommends a timeline of training in several years, from childhood the motor and cognitive learning overall is crafted to youth, with the appropriate targeting sports for those who demonstrate the ability during these years to become athletes. In this initial period the future athletes are still in school period. Involvement of the school on identification of talent also assures individuals at least some professional expertise of involvement in identification of talent and relieves some costs that could be restrictive (Thomson, 1985). So they are targeted according to their skills, whether motor or not, to get trained at the same school. Each one, when entering the school, has records of school history, history of motor skills and medical history, where the training aims to provide the experience in motor shares and the increase of ballast distinct physiological through 4 month periodizations and semester periodizations over the years. However, there is no direction to a particular sport early.

The level of expectation of the sport athlete reaches its peak when there is a direction to the high level training. The macro cycle is structured in annual periods, divided into meso cycles, where each physical quality is performed by four to six weeks. To better adapt to the calendar the micro cycles are created in periods of a week, and the different loads of training determined with the objective of the micro cycle.

Bompa adds to his model the same structure of the classic model, with preparatory period, divided into general and specific phases, and competitive period, subdivided into pre-competitive and competitive stage (Figure 1). However, Bompa uses the macro cycle term to describe the periods of four to six weeks (microcycles) that are designed to work the basic and specific physical qualities, that is, as the structural model of the timeline of Bompa, the macro meso cycle correspond to the classic model of Matveev. In his model, Bompa repeatedly stresses the importance of the training recovery. After a great stimulus, one session of training the period of recovery is approximately 24 hours (HERBERGER, 1997). Variations to the overcompensation are given according to the intensity taught in session and can be extended by up to 36-48 hours or eliminated in 6-9 hours. Normally, high level athletes workout two sessions per day, leading to the same to have short recoveries, allowing them to be higher adapted on recovery of larger size (BOMPA, 2002). According to the theory of recovery, with athletes aged over 25 years need greater recoveries between sessions. Athletes under the age of 18 also facilitate the overcompensation (1989; ROWLAND, 1990; SCHÖNER-KOLB, 1990; BOMPA, 2002). The sex also affect the recovery, that means, women need greater intervals because the endocrine difference, mainly regarding testosterone makes the answers slower (NOAKES, 1991; NUDEL, 1989; VANDER et. Al. 1990; MAKSUD and MWLICHNA, 1989; BOMPA, 2002). Environmental factors can also influence the recovery, as the altitude where the taking of oxygen is deficient (1992), the low temperatures where production of hormones, such as growth hormone and testosterone, is affected (LIVENE et. Al. 1994; STRASSMAN et. Al. 1991) and the levels of lactate grow, thus decreasing the metabolism of lipids also due to the vasoconstriction (DOUBT, 1991).

During the competition period, Bompa recommends that before the foreseen competitions a period of recovery is done, called by that author as polishing macro cycle, with the aim specifically to train for a major competition, remove the fatigue and facilitate the occurrence of overcompensation, through a decrease in the training loads (unloading), lasting at most two weeks or two microcycles (BOMPA, 2002). The training loads depend on the sport in question, and how coaches want their athletes to act. For collective sports with one or more games per week if the training loads remain stable, but the individual sports take variable loads (BOMPA, 2002).

In the transition macrocycle the loads are suppressed, with the aim to recover the body of the athlete of excess loads applied in competitions and to prepare the body for the next macrocycle. In this case, recovery microcycles with loads in progress are used.

Considering the current sports scene, with several major competitions a year, some scholars began to consider the traditional model of periodization of the sport training to

**Picture 1 – Annual training planning**

<table>
<thead>
<tr>
<th>Training Periods</th>
<th>Preparatory</th>
<th>Competitive</th>
<th>Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subphases</td>
<td>General</td>
<td>Specific</td>
<td>Before-competitive</td>
</tr>
<tr>
<td>Macrocycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microcycles</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Bompa, 2002
promote more than a peak season, and therefore would be exceeded. These Bompa circumstances lead to make two caveats to the traditional model. The first is related to their view that the traditional model would be typical of strength and speed sports. Thus it would be a mistake to apply it to resistance sport training. Anaerobic power is a crucial part to the success of the training and it is often the determinant to wins and losses. You can have a strong aerobic system, but if you have a weak anaerobic system, it will be very unsuccessful (Tanaka, 1993). So Bompa proposes to these sports a model with loads of high volume, and higher than intensity loads, throughout the season.

The second reflects on the need of the current sports world scene, where new types of training to promote “Peaks” of performance in various competitions over the same season, according to the high values of awards and other commercial interests involved.

The peak is the apex of the physical, technical, tactical and psychological ways, hit by an athlete as a result of a training program (Dantas, 2003). The traditional model admits up to three peaks a year, so Bompa proposes double, triple and multiple models to meet these demands (Bompa, 2002).

The double model is designed to power and speed sports, with the same structure of the traditional model, producing two peaks in the same season, with two history periods, two competitive, two or one transition period, the last being more effective.

The triple model is designed to sports competitions with three target competitions with a growing level of importance throughout the season. As in the previous model, the structure is not different from the traditional, it is just repeated three times in the same season with three history periods, three competitive times and three transition periods, more effective in the latter.

The multiple model (Figure 2) is intended to seasons with four or more target competitions a year and structured like the double and triple models. The clearer example of the application of this structure would be applied in a athlete who participates in ATP tour, where we have four major tournaments distributed throughout the year.

As can be shown in the example above, as it approaches the end of the season, the structure will be modifying so that the preparatory period is replaced by shortened dimensions, depending on the physiological ballast obtained during earlier periods. Over the years, and a repetitive accumulation of these charges, the history periods are shortened yet more, with greater specificity in the preparatory training period.

MATERIALS AND METHODS

This study used the meta analysis (Thomas & Nelson, 2002) to translate the data needed for this research. This methodology aims to combine and summarize the results of several studies in a mathematical synthesis to integrate the results of the studies with the aim of solving the problems of traditional review (2002 2001; Vieira & Hassne, 2001).

According to Galvão, Sawada & Trevizan, the meta analysis is indicated when the results of several studies disagree on the magnitude or the direction of the effect and when tests evaluate a particular subject are expensive or require a long time to be made.

SAMPLE CHARACTERIZATION

The studies used in the research were selected from a randomized database called EMBASE, SPORT DISCUS and MEDLINE search through the “timeline or periodization or periodización and training or training or entrenamiento. “ Were used 103 references, including articles and books published by available and accessible authors of training timeline.

In the table can be observed that all variables have a high dispersion (CV> 25%), and therefore is the best average measure of central tendency (Shimakura, 2005).

INSTRUMENTATION AND PROTOCOL

Information obtained through referrals was submitted to a table with 24 criteria that were scored. These scores serve as criteria to validate the reliability and the weight of each scientific study.

The 24 selected criteria were: article number, ending year; research situation; information from the source, if published, where was published; if it was published as a book or no, edits; if it was published in serial, number of exemplars; timeline structure; variation of loads, number of peaks; sport level; applicability of the model; level of the subjects tested; defining quality of the group; classification of confidence in the performance selection, how this level was determined; total number of subjects in the group; sex of the subjects; average age of the samples used in groups; average number of years of experience with the sport; status of the subject; experience up to the task; scoring average performance of the group in the task; standard deviation group’s task.

Table 1 – Results of the descriptive and inferential analysis of the control group

<table>
<thead>
<tr>
<th>Variables</th>
<th>3</th>
<th>X</th>
<th>e</th>
<th>Md</th>
<th>S</th>
<th>a2</th>
<th>a4</th>
<th>CV%</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPOT</td>
<td>103</td>
<td>34.65</td>
<td>0.77</td>
<td>34.93</td>
<td>7.85</td>
<td>0.17</td>
<td>0.63</td>
<td>22.65</td>
</tr>
</tbody>
</table>

X = average; E = average standard error, median = Md; s = default deviation; a3 = asymmetry; a4 = curtose; CV = variation coefficient
A meta analysis uses an estimate called Size Effect (TE), determined by the following formula (THOMAS & NELSON, 2002), to determine the statistical potential of the sample:

\[ \text{ME} - \text{MC} / \text{SC} \]

**ME** = average of the experimental group  
**MC** = average of the control group  
**SC** = standard deviation of the control group

The instrument used will be a computer table developed in the computer program Excel 97. The table was submitted to the “Face Validity” process, and was reviewed and approved by 3 notorious doctors in the Sports Training area.

**RESULTS AND DISCUSSION**

With the information of the cutting percentiles we can group the studies for each of the models investigated and through its averages, identify them within the limits of percentiles.

The result of quartiles of each experimental group demonstrates within that from 103 references on the timeline training, Matveev and Bompa have a good acceptance and relevancy. The Matveev´s model is the most considered within them, being more accepted than Bompa.

The calculation of the size effect (TE) classifies data on: TE small (<0.2); TE moderate (= 0.5); TE large (> 0.8). (Cohen, 1969 in Domingues, 2004).

According to the TEs presented, the model of Matveev and the model proposed by Bompa, are classified as large TE. It is worth emphasizing that the analysis which uses the meta analysis, as the calculation of TE are based in aiming higher theoretical models of consistency in the proposed timeline by Matveev and by Bompa.

The results demonstrate the expression of each model timeline within the mass of references on the subject. Bompa’s model is inserted between more current periodizations, in the presence of significant manner between periodizations studied in the scientific means. Already Matveev’s model presented a strong relevance, even this being the oldest of them, still shows its importance in the scientific world regarding the training timeline.

The adequacy of these models timeline is defined on the structure of the timeline and the variation of loads. To identify the structure of the timeline, it was divided into three: Traditional, Competition and Transition (AZEVEDO, 2005). The Traditional originates from the classical timeline, has three stages: preparation, competition and transition. The adapted, as its name suggests, classifies any of which have only one or two of the traditional stages, but never all three of them. Now the indefinite is applied in cases of not being identified to the periodization structure form. Another adequacy way is as to the appropriateness of load variations. To find a classification when it is about loads it could be founded some difficulties.

An extensive survey concerning the general concepts on the burden of training shows that, if we take into account all the concepts explained by several authors, the training loads can deploy almost ten different elements, such as; volume, intensity, density, length, frequency, nature of the exercises, duration and nature of the rest intervals, number of repetitions, stimulus magnitude (FORTEZA, 2001).

However, it is noted the importance of two of these elements in sports training, supported by Verkoshanski (1990), and the rates being used in more general cargo training; volume and intensity. It emphasized the scientific principle of sports training of interdependence between volume and intensity (DANTAS, 2003).

This interdependence can behave in three different ways: predominance variation, volume predominance and intensity predominance.

We can see that Matveev’s traditional model got the best results of suitability and TE, suitability. We can attribute this to the fact that model is suitable to base categories and high performance intensity adult athletes. Meanwhile, Bompa obtained an intermediate relevance in the universe of the sample.

The range of periodization models of sports training is divided in two different ways: on the number of peaks and on the sports level. The criteria for identification of the number of peaks in a season were classified in two ways: allowing up to 3 peaks or more than 3 peaks. For the identification of the sports level were established three classifications: high performance, amateur or beginner.

According to the data obtained by the meta analysis we can note that the coverage degree of the timeline models of sports training, points to Matveev’s model (Traditional) as preferential, to give to the same major interference in contemporary training procedures and sports science productions of the same theme. Regarding Bompa’s model the coverage degree becomes more limited.
Perhaps, the fact of disregarding the mesocycle and calling it as "macro", may partly explain the exclusion of the training curves. In the classic model of training planning, the mesocycle is the essential part in obtaining the development of sport physical qualities to be trained. The macrocycle is a part of the expectation sports plan which consists of periods of training, competition and recovery, executed over a season, targeting to lead the athlete, or a team, to a level of conditioning that enables them to perform the desired performance under chosen conditions within a training plan previously done.

Only introducing this model to a group of athletes can be found the results that will show the path in such a model. For double, triple and multiple models promoting various peaks during the season, not differentiate in its essence from the models of other authors who also adapted the traditional model, such as: Dantas (Meeting), Valdivielso (ATR) and Platonov (multicíclico).

In particular literature, the traditional model is still cited as a model that provides a more appropriate performance, applicable and comprehensive, such about the periodization structure, or the training loads variation. Once monastic, to develop a physical quality as a priority, yet eclectic, when it aims to develop several physical qualities concurrently. Both in relation to sports level, as in the number of peaks desired.

Bompa’s priority model is inserted between more current periodizations, in the presence of significant ways between periodizations studied, but in terms of meta analysis, behave in such a less consistent way. It is suggested that, in further studies, seek to include a comparison of other periodization models, seeking ever more specialized references about the subject, so you can add to the results found in this study.

**BIBLIOGRAPHY**


