INCREASE IN RELEASE VELOCITY AS THE MAIN OBJECTIVE IN THE THROWING EVENTS

Report on the "International Seminar on the Javelin and Hammer Throws" in East Berlin, March 4-7, 1987

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This report covers all the findings and the main points of discussion of the Seminar organized by the DVfL of the GDR. These were the main lectures of the East Berlin Seminar. It may also be considered an introduction to two of the articles posted on this site, one on the Hammer Throw and the other on the Javelin Throw (both articles are on the topic of talented development and selection procedures of the GDR). Translated from the original German by Jürgen Schiffer. Re-printed with permission from New Studies in Athletics.

The lectures given at the "International Seminar on the Javelin and Hammer Throws" in East Berlin covered a wide range of subjects including: analyzing performance development in the throwing events, structurally analyzing the prerequisites of performance, methods of strength training which serve to improve throwing performances most effectively, talent promotion and top level training in the throwing events. The aim of the seminar was to make possible an exchange of experience among the more than eighty participants.

The results of the seminar can be summed up by the following five points:

- The development of performances in the throwing events is not yet complete. For example, in the Hammer Throw 90m is the immediate goal. In the Men's Javelin Throw, where the situation is more complex because of the new javelin, 90m is again a realistic target as is 80m in the Women's event.

- The most important factor for reaching these goals is an increase in release velocity. In the men's events release velocity should be 32m/sec while in the Women's Javelin it should be 26m/sec.

- These goals can only be achieved if the quality, quantity and intensity of training is improved. These three aspects each merit equal consideration.

- Training systems currently in use vary greatly, even within the same country. This shows that, particularly in top-level athletics, there are not only universal and scientifically proven principles which must be respected but

also individual characteristics within the athlete which call for and allow a broad spectrum of training systems.

- The first step on the way to top-level sport is a training system whose main aim is to detect young talent, since talent really shows itself only in training. Talent is dependent on hereditary factors whose development can be supported by training. Thus training is the most important measure for talent promotion.

In addition to these main findings I would like to present the following selected points which are worth being emphasized. These points are neither interpreted nor critically commented on.

1. The premature development of “condition” - particularly maximum strength - limits the full development of talent. Technical mistakes prove to be performance and load limiting factors.

This serves to make clear that, in beginner’s training the main focus should be on technique training. Only when the level of technique has reached a certain stability should the specific strength, which is necessary for the respective throwing event, be purposefully improved by increasing the level of maximum strength. If the athlete tries to improve his maximum strength without having first of all improved his technical level, he runs the risk of injury. There will also be an irreparable incongruity between the optimum technique and the strength level which is suited to that technique. It should require a minimum of two to three years of basic training before the “fine form” of technique is reached.

All loads must be systematically prepared if injuries are to be avoided. In beginners training (12 to 16 years of age) the development of strength is not very important. Technical-coordinative losses however, can hardly be made up for later. It must be emphasized that there is a relationship between “technique” and “condition”. A certain amount of strength is absolutely necessary for the optimum performance of the throwing movements. In youth training, this strength is required for the technical improvement of these movements, but it does not serve performance maximization.

2. From the point of view of physics, throwing distance is determined by the release velocity, release height and angle of release. In practice, release velocity is the most important factor as far as improvement potential is concerned. The GDR Hammer Throw record (82.64m) was achieved with a release velocity of 29.3m/sec, and an angle of release of 38°. According to experts, a higher release angle would have had a negative influence on release velocity. Release velocity would have to be increased to 32m/sec in order to achieve throwing distances of about 90m.

This underlines the importance of speed. Training for the throwing events should aim at giving athletes the best possibility to utilize, to the full, their strength potential in a shorter time. Thus time is a performance limiting factor.

Training for speed as a decisive performance determining factor is of essential importance in beginner's training. To start with, technique in the GDR is done with a 2kg hammer (!). With advancing age, the weight of the implement is gradually increased. Seventeen year olds should be capable of achieving their final performance goal - i.e. a distance of more than 80m - with a hammer of any weight (!). The temporal-dynamical structure of the hammer throwers' technique should at this stage, already be similar to the final form demonstrated by top-level athletes.

The increase in the weight of the hammer is a secondary training and competition aim. Thus, the use of a light throwing implement is not only an important training means, but also an effective competition aim of basic and build up training. In every training phase, the athlete should try to achieve a maximum release velocity.

3. Youth training is oriented towards a specific goal, and in each training phase particular norm values must be achieved. In spite of this, the athletes' development should also be many sided. Even hammer throwers should play games and do gymnastic exercises. In addition to this, they must also do some hurdling (!) as well as sprinting, jumping and coordination training. The training programme should include many diverse elements and the training loads must be systematically varied. Only in top-level training should the spectrum of exercises become narrower and more specific.

The reasons for this concept of a many sided and goal-orientated training programme are as follows:

- The main aim should be the development of muscular balance. This is because that within the framework of whole-body movements, which are typical of track and field athletics, the whole system is only as strong as its weakest part.

- The central nervous system, which is responsible for the control of movements as well as inter- and intra-muscular coordination, can only be optimally stimulated by a variety of different exercises.

4. In a noteworthy lecture by Professor M. Bührle (Freiburg University) the importance of strength training was scientifically explained and a practical application was presented. The lecture was based on the Freiburg research results which are published in: M. Bührle (ed.): *Basics of Maximum and Speed Strength Training.* Schornodorf 1985; and D. Schmidtbleicher: *Maximum Strength and Movement Velocity.* Bad Homburg 1980. The 90 minute lecture centred around the following three aspects:

- Like explosive strength, maximum strength is a basic feature of speed strength. This clearly shows that maximum strength and speed strength do not act in opposition to each other and that a high level of maximum strength has no negative influence on movement speed.

- There are two different possibilities for improvement of maximum strength:

    - increasing the volume and size of the muscle cross section;

    - voluntary activation of as many muscle fibers as possible.

Muscle cross section is increased by performing up to twelve repetitions in weight training with the athlete being just about able manage the twelfth repetition. The load should be between 75 and 85% of maximum and training should continue until muscular exhaustion.

Voluntary muscle fiber activation potential is improved by short-term, explosive, maximum contractions (1 to 3) which are carried out against high resistance (95 to 100%). Since these exercises are only effective if the athlete is free of fatigue, long regeneration pauses are necessary. High numbers of sets and repetitions negatively influence the voluntary muscle fiber activation potential. This means that there is a great difference between the theoretically possible contraction performance of a muscle and the real number of activated muscle fibers ("strength deficit"). The strength training method of short-term maximum contractions results in the optimum utilization of fibers in a given muscle cross section

5. "Talent identification Training" in the GDR is based on a set of "guidance values" which, together with the athlete's performance phases, serve as reference points for the beginning of training measures in beginning and basic training. Two aspects attract attention:

- The spectrum of "test exercises" is relatively narrow, and these exercises do not differ very much.

- Considerable deviations from the "norm values" are accepted (e.g. R. Fuchs and P. Felke: snatch).

Conclusion

Coaches cannot do without basic scientific knowledge, but it should be combined with practical knowledge gained through experience . Training should never be exclusively regulated by scientific data as a certain amount of experimentation and the consideration of the athletes' individual characteristics are absolutely necessary. However, experiments must always be carried out from a sound scientific basis.