

APPLICATION OF BIOMECHANICAL MODELLING FOR INVESTIGATION OF ATTACKING ACTIONS IN WRESTLING

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The worth-while trends in the development of skills and tactics of wrestlers are considered to be the following: the approximation of actions and combinations to individual optimal patterns, corresponding to the supporting and motional system of a sportsman, mastering of non-standard technical actions, providing one has advantage in the bout.

To succeed in the above-mentioned attempts information is necessary about the internal structure of technical actions, its major and secondary components and objective rules of its formations in the course of wrestling. Obviously it is rather difficult to obtain such data applying only methods of technical actions, namely, evaluating supporting reactions or various types of cyclo- and video-filming. Application of biomechanical modelling technique considering the antagonistic nature of wrestling is more worth-while in this respect.

Our approach is based on the idea that any moving action is a simultaneous limitation of motion in the joints (elements of dynamic bearing) and purposeful variations of angles in the other (controlling movements). To learn an exercise it is necessary to find out the above components in it (Nazarov V., 1974, 1985).

In the case of wrestling, technical actions are realized by two sportsmen at a time, each of them influencing their parameters. Both sportsmen's movement programs are of an antagonistic nature and the latter makes the study difficult. To eliminate this difficulty one should separate the programs in the course of study. This can be achieved by means of dividing the biomechanical modelling process into three stages.

At the first stage one should analyze the main laws regulating the technique of an attacking sportsman, without taking into account the influence of his opponent's defensive actions.

The second stage should be characterized by stabilization of the attacking action on by analysis of possible influence exerted on it by a defending opponent. One can analyze defending actions at this stage.

The third stage is connected with the analysis of the possibility to overcome defensive actions. In the course of its realization the defensive action of an opponent is stabilized and these attacking actions are specified that they make the defence effectless.

In our study we analysed the first stage and namely the attacking actions in standing hanks and buttock while there was no active opposition on the part of the opponent.

We considered the body of the attacking wrestler to be a two member movable system, and that of the defending sportsman a solid one, that meant that there was no opposition on the part of the latter. While modelling the motion equations of the above system in the form of the angular momentum were solved by means of digital integration on a computer. The obtained data was used to compare the effect of controlling movements on the results of technical actions. The following items were specified as the basis for future teaching of actions: dynamic bearing elements, major and correcting controlling motions in joints, prediction of main motion mistakes, that appear in the course of teaching and the main ways of correcting the latter.

This study allowed to arrive at a conclusion that the main dynamic bearing elements and the controlling movements in joints realizing various technical actions, are of the same type. In particular movement limitations in joints responsible for catching as well as knee joints can be attributed to dynamic bearing elements both in standing hanks and buttocks. The major controlling movements were carried out in his joints in both cases, moreover, being of the same anatomic types they are realized in different succession in various groups.

The obtained data made it possible to realize new highly effective program methods of mastering techniques in wrestling that comprise successive teaching of the dynamic bearing elements, controlling movements and their further assembling in technical actions. In such case there is no need to demonstrate model actions before the sportsmen being taught. The effectiveness of the suggested methods have been proven by practice.