SOME DIFFERENCES BETWEEN KOVACS AND GAYLORD SALTOS ON HIGH BAR

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Present Code of points in men's artistic gymnastics is dividing elements by subjective criteria into the different groups of difficulty. There are five groups of difficulty, the easiest is an A group and the most difficult is an E group. On the high bar we have an interesting situation, where are two flight elements - Kovacs salto (double salto backward tucked over the bar to the regrasp) and Gaylord I (11/2 salto forward tucked over the bar to the regrasp) in the two different difficulty groups. Gaylord I is a D and Kovacs salto is an E element. The gymnast who performs Gaylord will recieve 0.1 bonus points and those who performs Kovacs 0.2 bonus points. This is the main reason why at the Worldchampionship in Brisbane 1994 and Europen championship 1994 in Praque we could not se more than one Gaylord and on the other hand we could see that the gymnasts are performing even two Kovacs saltos in their routines. This shows bad balanced routines by using elements from the same structural groups. The aim of the investigation is to find kinematical and dinamical characteristics of both elements and decide weather they should belong to the same difficulty or not.

The Gaylord I was succesfully performed by Blaz Puljic, member of Slovene national team. The gymnast is 177 cm tall and weights 70 kg. The Kovacs salto was succesfully performed by Csaba Fajkus, member of the Hungarian national team, The gymnast is 167 cm tall and weights 64 kg. As this is quite big difference between the gymnasts the dinamic parameters will be related to the body weight.

Both elements were analyzed by the Consport Motion Analysis System. For the definition of the 3D coordinates we used two one meter cubes. We recorded the motion with two SVHS cameras at a frequency of 25 frames per second. The digitalization of the chosen points, from the videorecorder to the computer was done with the genlock supported with the Consport Motion Analysis Software. For the analysis the following points of the body were chosen: face up and down, left and right wrist, elbow, shoulder, foot, ankle, knee and hip, body centre of gravity (BCG), all together 17 points which formed the following 15 body segments: face, left and right forearm, upperarm, instep, calf, thigh, hip, tranversal segments of hips and shoulders.

We used the Susanka body model, which is implemented into the CMAS software.

For the calculation of the forces we made a special computer program.

In both cases we started with the analysis when the body passed from the first quadrant to the second. Both elements were analyzed up to the regrasp moment plus 3 frames. We analyzed the preparation phase, the release from the bar, the flight and regrasp.

For this presentation we chose the following results:
- velocity of the body centre of gravity (BCG) in x, y axis and space,
- angle y plane - horizontal bar - BCG
- trajectory of the BCG in y axis
- force of BCG in x, y axis and space.
RESULTS
- results on Gaylord I are better but still in range with the results of other authors (Alp, Brueggeman, Cheetham 1993, Oester 1993, Cuk 1993).
- kinematic results on Kovacs are in range with other results (Alp, Brueggeman, Cheetham 1993, Oester 1993, Krug 1993), but calculated forces are on the low level of other results (Krug 1992, Krug 1993),
- we would need a statistics analyse to prove there is no difference between those two elements,
- simple comparation between those two elements shows no big difference, neither in kinematics or dinamics,
- the definition of the Kovacs salto should be changed into 1112 salto backward over the bar to regrasp,
- the Men's Technical Comite of the FIG should determine biomechanical parameters or criteria to range the elements into different difficulty groups,
- as almost all known elements can be developed i.g. Kovasc to Kolman or Gaylord I to Pegan, there should be no limits for the number of the difficulty groups.

REFERENCES
Krug J., Technik und techniktraining im geraettturnen, First.Int. Conference Biomechanics in Gymnastics, proceedings p.95 to 114, Cologne, Bundesinstitut fur Sportwissenschaft, 12/93
Oester S., Zweckmassige technik bei flug-elementen am reck, First.Int. Conference Biomechanics in Gymnastics, proceedings p.55 to 72, Cologne, Bundesinstitut fur Sportwissenschaft, 12/93