Ovidius University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XVIII, ISSUE 2, 2018, Romania
The journal is indexed in: Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST,
DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengage Learning, Cabell's Directories

Science, Movement and Health, Vol. XVIII, ISSUE 2, 2018
June 2018, 18 (2): 208-213
Original article

IMPROVING YURCHENKO JUMP IN ARTISTIC GYMNASTICS

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Abstract *

Objectives. The main purpose of this work is to improve Yurchenko's jump on 12-year gymnastics so that performance improves by getting higher scores than those previously obtained in competitions. Applying exercise systems for the development of lower limb force, lower train corbet speed and arm expansion - adapted and modified, in conditions of difficulty or in a easy way, will reduce penalties.

Methods of research. The study was conducted on 4 gymnasts of 12 years old during 2 years.Due to the particularities of training at this level, we did not consider it appropriate to set up a control group, analyzing in this regard the progress made by gymnasts in general and individually.The jumps performed in three national official competitions were analyzed, in terms of the time taken during each jump phase, the angles formed during execution, but also on the final and execution notes.The images were processed with an online editing program - https://pixlr.com/express/. The data recorded by the time measurement of the competition's jump phases were achieved with the Hudl Technique Elite program at a video rendering capacity of 60 FPS. During the experiment the subjects were tested in 3 stages

Results. The time taken during each jump phase improved on every test, the angles formed during execution also improved so that the jump phases became more accurately that conducted to better execution notes in the third national competition.

Conclusions. Operating systems have shown that at least 5 months after the start of the experiment, it has been beneficial to improve the final note. This improvement seems to be due to the leap corresponding to Flight II.

Key words: artistic gymnastics, Yurchenko jump, spring table.

Introduction

Artistic gymnastics uses technical elements that, by improving physical, mental and technical qualities, lead to high performance in competitions.A requirement of increasing sport performance is the use of as many exercises and new installations in the method of acquiring the elements, these exercises aiming at a quick and correct acquisition of the movement.Learning and improving jumping requires intensive and long-lasting work, which must include both acrobatic and physical training, while ensuring a harmonious development and aesthetic.

In the competitive year 2015, the Juniors II of the CSS1 Constanta after the Individual National Contest, qualified only 1 athlete on vault in the finals on the apparatus.The jump performed by gymnasts was Yurchenko grouped.It is important to work especially on jumping to improve the second part of the Yurchenkoelement - flight two by choosing efficient drive systems.In order to improve Yurchenko's two-jump flight, going from jump-climbing to pike jump and then straight, we chose action systems targeting one another: the attack, the round off, the backward flick, and the exit of the table.Yurchenkojump is part of group 4 of jumps with flick-flacroundoff with or without return (270) in flight I jump back with or without longitudinal return in flight II.The values of this jump are given by the complexity of the jump performed at the table exit.

We do believe that by applying operating systems - to develop lower limb force, corbet speed-adapted and modified, under conditions of hardening or sparing, will reduce penalties for Yurchenko jump.

Methods

The experiment was conducted during 2 years of competition, in which we watched the evolution of four sportive juniors II (age = 12.4 years) during the 6th National Championship.

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Received 16 march 2018 / Accepted 8 may 2018
* the abstract was published in the 18th I.S.C. "Perspectives in Physical Education and Sport" - Ovidius University of Constanta, May 17-19, 2018, Romania

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Tests (Initial, Intermediate, Final):
- Lower limb force - Long jump from place and height jump to the wall (cm).
- Abdominal force –pikes (maximum number of repetitions).
- Mobility and strength in speed of the back muscles - bridge and extensions (numbers in 30sec)
- Arms force - traction in the arms. Maximum number of reps;
- Lower limb force - one leg squats (left/right) without support (maximum number of reps)

Operating systems
1. Gymnast is leaning against the workout table in a 30 degree vertical position and vigorously opens the shoulders by hitting the jumping arms.The speed of opening the shoulders is very important to achieve a shorter execution time between round off and flick.
2. Initial position - sitting, back flick with palms on the elastic trampoline, landing in the standing position with arms up.This exercise tracks the angle of the arms in the shoulder joint, the position where the palm enter into the net, the strong corbet of the lower limbs, to achieve an effective elevation at the exit from the table and the speed at which it is achieved.
3. This exercise is a complement to the previous exercise, making it easy to achieve a correct position at the table as well as a short time to the table's impulse.
4. The fourth exercise follows the position that the body of the gymnast performs at the end of the round off and the angle it forms with respect to the trampoline.
5. Exercise five is a leap instead of flick. Especially follows the speed of corbet of the lower train following the end of the round off.
6. The athletes execute round off / flick / backward salto straight back with landing through the sponge cube.Through this exercise, the gymnasts' work to improve and achieve a strong corbet at basin joint level with lower limbs at the exit of the table.
7. Round off/ straight salto on the sponge cube (50cm) tied with lean stretch back landing outside the mattress. Athletes continue to work for the lower limb corbet, but under difficult conditions, due to the two linked jumps
8. Round off / flick with hands on the training table, landing on a cube of 50cm, flick back with landing outside the cube.
9.Round off, flick with hands on training table, landing on cube 50cm straight salto, landing outside the cube.
10. The athletes execute the Yurchenko jump, landing on the high installation.

Results and discussion

Table 1. Anthropometric data

Gymnasts N = 4	Initial Test	Final Test
Weight (kg)	31.7 ± 4.4*	35.6 ± 6.5
Height (cm)	139.9 ± 5.7*	145.3 ± 6.5
Chest perimeter (cm)	77.5 ± 3.4	79.5 ± 5.2
Chest perimeter inspiration (cm)	82.2 ± 4.5*	84.7 ± 5.7
Chest perimeter expiration (cm)	73.7 ± 2.9	76.0 ± 4.9
Chest elasticity	8.5± 2.6	8.7 ± 0.9

The jump in place was statistically different at 2 months from the end (post 8 months) and the intermediate test (post 5 months) was different from the final but also from the initial testing.The same statistical differences are observed when the high jump is analyzed.

Squats on the right leg were statistically different at 2 months from the end (post 8 months), intermediate testing (post 5 months) was different from the final, these differences being also found in the left leg squats in the tests performed at 2 months and 5 months of final testing. The number of squats on the left leg is increasing on average by 4 executions between the initial and the final test and the squats on the right leg increased to the final test on average by 4.75 executions.

The pull ups are statistically different after the initial testing against the final test, but also after the intermediate testing against the final test.

On trunk extensions, initial testing was statistically different from the final

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Analyzing the results obtained at the bridge, at 5 months and 8 months increased compared to the initial 2 months test, but these increases are statistically insignificant.

Yurchenko analysis

By analyzing the moment of attack execution (round off), we can say that the subjects developed an impulse speed that allowed them to control this step, fact reflected in the average time increase of 0.20 seconds in final testing against the initial test.This shows that the subjects have better control over the transition between velocity and round off speed.This transition is important because a high speed on the round off is decisive for an appropriate lock of the gymnast's trunk at the entrance to the table.Blocking in round off helps lift the center of gravity so the gymnast can hit the trampoline in the correct position.

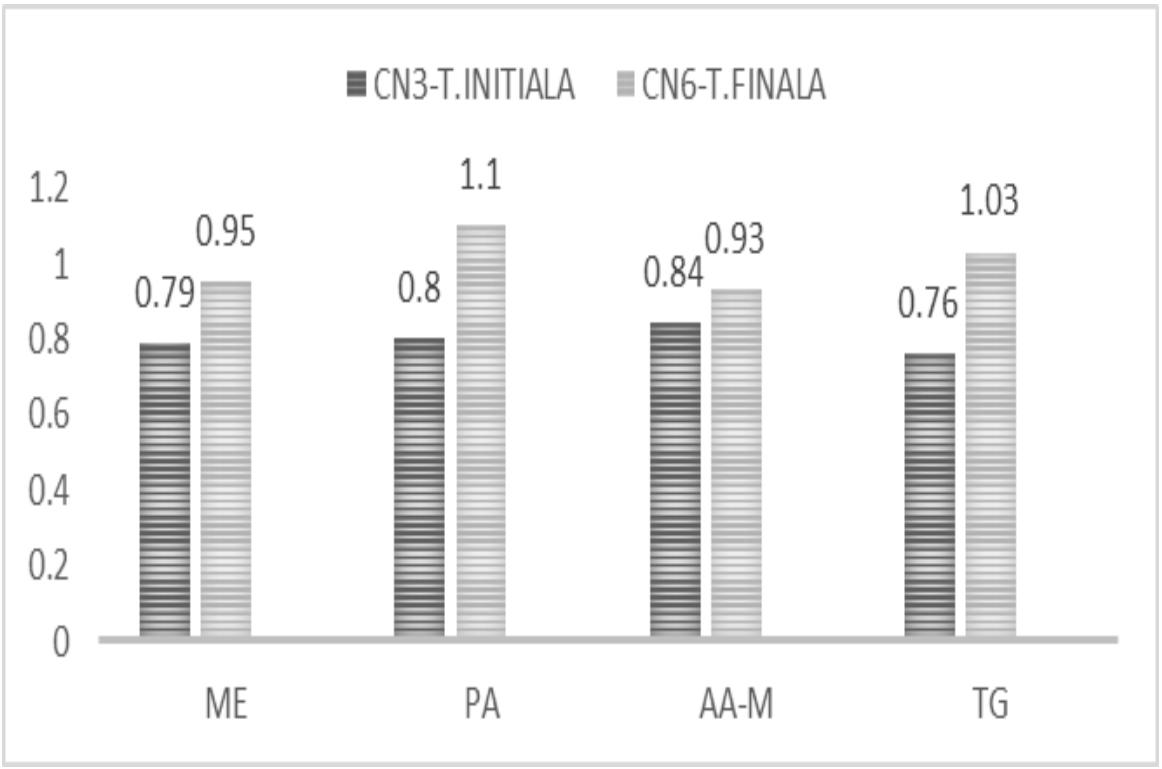

Figure no.1 – Time for round off (seconds)

Physical development in the lower limbs contributed to the improvement of these two phases, our gymnasts achieving superior results in squat executions on each leg.Thisaspect is also reflected in long jumping test where the explosive force developed had an important role in the impact of the feet with the ground at the beginning and end of the attack but also in the leg corbet for the roundoff execution.Progress in the high jump test was reflected in the impact with the trampoline by developing the force.

The body's angle at the trampoline is calculated in specialized studiesaround 60° (Penitente, G., 2014). At our gymnasts the values of this angle were around 59°.Also in these studies, this angle increases when legs leave the 96° the trampoline to maximize ascending vertical speed. Angle values made by our gymnasts in the final test executions are around 93°.

As far as the first flight is concerned, its execution time has decreased and one of the reasons is that the subjects have approached a correct position of the take-off angles of the trampoline after the round off.In the literature, flight times (from take-off from the trampoline to table contact) are reported between 0.12 - 0.22 seconds (Cuk,I.,Karacsony, I.,

2004). The average time of our athletes in the first flight to the final test is 0.17 sec.The aggressiveness with which the exit from the trampoline was performed was a factor contributing to this time, and the backward flick with the rapid opening of the shoulder angles allowed the gymnast to contact the table fast.

The average time of our athletes during contact with the final test final table was 0.19 seconds. compared to 0.20 seconds, data reported in a boys executed study and published in the Science of Gymnastics Journal (2011) by Atiković and Smajlović. One obvious fact is that by analyzing the time of the first flight and the time obtained during contact with the table in the final test, the shoulder angle was in normal parameters and the force applied to the table is the result of the force accumulated in the moves from the previous stages of the jump.All this allowed a good entry into flight two.

If we relate to the times obtained, it can be very easily observed that the time made in contact with the table influenced the time of flight two.Our gymnasts had an average of 0.75 seconds on average, followed by an insignificant decrease, at 0.73 s. in final testing, compared to 0.72 s. reported in a study showing an average Yurchenko jumping performed by to senior gymnasts (Uzunov, 2010).Thus our athletes are approaching these values, which shows that the previous stages of the jump, by the obtained values, contributed to the accomplishment of the flight two with straight jump, in optimal conditions for this age.

Applying simple linear regression, the time of flight 2 directly influences the final grade at contest 5.This demonstrates the importance of a reduced flight time in the first flight.Rapid opening of the shoulder angle and backward flick allows the gymnast to contact the table quickly. Being a short time between tests, we cannot say that age has an influence on improving this jump.Thus, to see how we can improve the timeof flight 2, and using multiple regression, we have demonstrated that squats on the right foot are the ones that most influence.

All four gymnasts run the round off on the left foot, the right foot being the one who corbet (performs the beating back up). Thus we can emphasize the importance of the corbet in the subsequent execution of all the stages of the Yurchenko jump.The stronger the beat, the faster the center of gravity is. Thus, we can achieve a proper lock on the trunk of the gymnast when contacting the trampoline.This will result in a kickback of the trampoline that will ensure optimum conditions for the next stages. The role of corbet becomes stronger due to the development of lower limb force, squats on a leg having the role of muscle development.The lower the muscles of the lower limbs, the greater the dynamic or isotonic force of the winning type. An important role in the development of strength is the multiplication of muscle fibers. The most intriguing in the anaerobic force are type II muscle fibers.The more they are developed, the more muscle can develop a higher explosive force. This is seen in the strengthening of the leg that becomes stronger.Such a corbett helps to overturn the center of gravity, which can eliminate the braking forces in contact with the ground and can put the gymnast in a situation of turning a good quality arm into the rondad.In this way, we can achieve the shorter contact times with the trampoline and the correct alignment of the body and a near-vertical take-off angle maximizes the vertical speed of the center of gravity. This implies that the center of gravity will have an ascending trajectory while the gymnast is overturning.

A high vertical velocity of the center of gravity when leaving the table is considered to be the most important variable for reaching a high level in Flight Two. The successful execution of the rejection phase is characterized by: a high vertical velocity at the outlet of the table, a short contact time with the table, an appropriate angle of attack of the body against the table, the correct alignment of the body and coordination of all actions during contact with table and out of the table.

As a result of the data obtained in the three national competitions, it can be seen that the scores of all subjects increased during the experiment, compared to the non-experimental grade (NC3). On a subject of the four, the note from the last championship, was awarded for apike jump, compared to the first two championships in which the jumps were executed with a straight salto.

We can highlight the fact that NC5 was the best execution contest, with an increase of 0.81 points on average compared to the NC 3. As at the last contest the execution notes were on average lower than NC5 by 0.13 points, but rising from the initial test by an average of 0.67 points.An explanation of this concerns is the duration of macrocycles. The macrocycle at the end of which NC5 took place consisted of 21 weeks compared to 15 weeks for NC 6. The test of the intermediate test took place after a preparatory period, two precompetitive periods and a competitive period midway through this macrocycle National Championship of Sports Schools.Thus gymnasts had a longer specific training time and, most importantly, a national competition for intermediate testing towards final testing. The NC6 took place after a preparatory and pre-competitive period, after a restoration period and a transition period in which the preparation took place on the beach.Beach training consisted of running and non-gymnastic games.

Also NC 5 was an emotion-free competition, being a team-only competition where our gymnasts had already competed for four years together. At this contest, a single jump was performed against the individual contest where two jumps were made, one for the individual standings and the second for the finals on the apparatus. At this competition two of our sports have entered the finals on the machines and the third was a reserve.

Conclusions

Operating systems have shown that at least 5 month safter the start of the experiment, it has been beneficial to improve the final note.

This improvement seems to be due to the straight sal to corresponding to flight II.

Practically to improve flight II, it is possible to work on lower limb for cewhich would lead to a more efficient Yurchenko jump and obtaining a better final score as Uzunov (2010) and Naundorf, F., Brehmer, S et al (2008) fiind out.

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