

Improving technical preparedness of cheerleader-flyers

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Abstract

Purpose. The purpose of this study was the author's program to improve technical readiness to the level of acrobatic skill cheerleader-flyers of the second year of training at the stage of preliminary basic training.

Methods. Research methods: analysis of scientific and methodical literature, analysis of program-normative documents, control testing, generalization, systematization, methods of mathematical statistics. Participated in 50 cheerleading athletes (girls) aged 10-11 years of Sports Club «Angels» (Kiev, Ukraine), Higher School of Cheerleading (Odessa, Ukraine) and All-Ukrainian Sports Club «Triumph» (Dnipro, Ukraine), who take part in competitions in the nomination «Cheer All Female» and in the competitive composition perform the function of cheerleader-flyers. During the study, group-A (n=24) and group-B (n=26) were formed. Participants of all groups took part in a control test to determine the level of acrobatic training. Then the author's program for 10 months was introduced into the group-B cheerleader-flyer training. At the end of the year after the implementation of the program, the participants were submitted to the same data collection. **Results.** Level acrobatic skill cheerleader-flyers of the second year of training at the stage of preliminary basic training in group-A and group-B was at the same level. The range of points for control tests in group-A and group-B ranged from 3.13 score to 9.25 score. Group-B participants showed a high level of acrobatic training in 10 control tests and have a significant increase in performance Wilcoxon signed-rank test at $\alpha < 0.01$. In group-A, a significant increase Wilcoxon signed-rank test at $\alpha < 0.05$. **Conclusion.** The results of the present study indicate that the implementation of the author's program у тренування group-B for 10 months contributed to the improvement of technical skills of acrobatic training. Author's program provided three levels (Level I – Beginner, Level II – Intermediate, Level III – Basic) of technical training, which are aimed at solving a specific goal and objectives of training and the use of training methods. Planning of the author's program was carried out according to two cyclic (milked) structure of annual preparation and certain mesocycles: I cycle - I preparatory period (involving and basic mesocycles) and I competitive period (basic and competitive mesocycles); II cycle - II preparatory period (recovery, basic and control-preparatory mesocycles), II competition period (pre-competition and competition mesocycles) and transition period (recovery mesocycles). During the macrocycle in the preparatory and competitive periods, 196 trainings were held, which were planned 4-5 times a week for 120 minutes. The amount of technical training was - 60-65%, of which 30-35% of acrobatic training.

Keywords: author's program, technical skills, acrobatic training, stage of preliminary basic training, nomination «Cheer All Female», sportswomen of 10-11 years.

Introduction

In complex coordination sports, such as cheerleading, competitive results are achieved through the subjective assessment of judges for impeccable technical skills in performing competitive exercises. Competitive composition of cheerleaders is performed to musical accompaniment with high intensity, complex coordination, acrobatic and gymnastic elements. According to the International (2017), European (2017) and National (2020) rules of cheerleading competitions, grades are given by technique (expression, arm motion, dance, jumps, tumbling, partner stunts, and pyramids), difficulty (overall difficulty, speed / transition), overall evaluation (synchronization, overall evaluation, perfection). Therefore, technical training in the training of cheerleaders takes a leading place and dominates over others (Krekotina T.M., Bezryadina N.L., 2014; Nesterova O.Ya. 2016; Beketova A.N. 2017; Dolbysheva N.G., Mikhailichenko A.G. 2019; Moffatt A. Potter A., 2020). The results of a survey of coaches and courts in cheerleading in Ukraine confirm this theory (Mykhaylichenko A., 2018).

Scientists Z. Naglak (1999), V.N. Platonov (2015), H. Sozański, J. Sadowskiego, J. Czerwińskiego (2015), C.N. Bubka, V.N. Platonov (2018), note that technical training provides the formation of skills to perform competitive actions that would allow athletes to most effectively use their capabilities in competitions, as well as would steadily improve technical skills in the process of many years of sports.

In accordance «On the organization of educational and training work of children's and youth sports schools» (2015), «Regulations on Children's and Youth Sports School» and «Regulations on the Olympic Training Center» (2020) and «Additional general education program in the field of physical culture and sports in cheerleading» cheerleaders aged 10-11 train in the groups of the second year of training of the basic preliminary training stage. Yu.K. Gaverdovsky (2014), T.M. Krekotina, N.L. Bezryadina (2014), O.Ya. Nesterova (2016) and H. Sozańskiego, J. Sadowskiego, J. Czerwińskiego (2015) note that at this stage of training basic skills in the technique of performing jumps, dance exercises, and directly acrobatic elements are formed. Therefore, O.M. Khudolii (2020) indicates the need to develop a program in modeling young gymnasts training in the process motor learning skill, V.N. Baloban (2010) development of macromethods of training in acrobatic exercises, namely the logical-structural scheme of its implementation in the system of sports training, taking into account the biological feedback, the sequence of training, the transfer of motor skills.

In addition, scientists E. Cherepov, G. Kalugina, D. Sevostianov, L. Smirnova (2020), the rules of the competition provide for the athletes to master technically complex elements, which require basic physical qualities, especially coordination abilities. N. Dolbysheva et al. (2017, 2020) emphasize that the improvement of technical skills should be based on the implementation of the principles of sports training.

The amount of technical training of cheerleading athletes consists of the quality and complexity of "basic movements of cheerleaders", movements, types of jumps, flyer positions, acrobatic elements. The most important is acrobatic training, as the result of the competition depends on the criteria obtained for the performance of acrobatic elements, which are evaluated on a 10-point system. In addition, acrobatic training is aimed at improving acrobatic elements, promotes the development of physical, move and moral and volitional qualities (Pleshakova E.V., Shapar E.A., Rozhkov V.Yu., 2018).

In our opinion, taking into account scientific pedagogical theories and the basics of sports training, in particular the training and improvement of acrobatic techniques, it is necessary to implement a logical-structural approach, which should include successive interrelated stages. The purpose of the study was to develop, implement an author's program of technical training in the training of female cheerleaders 10-11 years and determine its impact on the level of acrobatic skills.

Material and methods

Participants

The pedagogical study was attended by 50 cheerleaders (girls) aged 10-11 years of Sports Club «Angels» (Kiev, Ukraine), Higher School of Cheerleading (Odessa, Ukraine) and All-Ukrainian Sports Club «Triumph» (Dnipro, Ukraine), who take part in competitions in the nomination «Cheer All Female» and in the competitive composition perform the function of cheerleader-flyers. Athletes were included in the groups of initial training of the second year of training according to the organization of the training process in Ukraine (2015, 2020). In the course of the study, group-A (n = 24) and group-B (n = 26) were formed. The author's program is implemented in the training of group-B cheerleaders. All participants (parents) agreed to participate in this study.

Procedures

The study was conducted using methods: analysis of scientific and methodological literature, analysis of program and regulatory documents, control testing, generalization, systematization, methods of mathematical statistics. Determination of the level of technical (acrobatic) readiness of cheerleaders was carried out by control tests, which are mandatory for the competitive composition: «Forward Roll», «Backward Roll», «Handstand», «Cartwheel», «Round Off», «Cartwheel», «Front Limber», «Front Walkover», «Back Walkover», «Prompt Front Walkover» (Zinchenko I.O., Lutsenko L.S., 2013; Nesterova O.Ya., 2016). The level of acrobatic training of flyer cheerleaders was carried out at the beginning and end of the second year of training of the preliminary basic training stage after the introduction of the author's training program to increase the level of acrobatic training of cheerleader athletes. Assessment of acrobatic training of cheerleader-flyers was carried out by experts on a 10-point system that meets the rules of cheerleading competitions (2017, 2020) and preparedness levels (0-2 score - low level, 3-4 score - below average level, 5-6 score - average level, 7-8 score - above average level, 9-10 score - high level) (Zinchenko I.O., Lutsenko L.S., 2013). The experts (n = 12) were coaches of the first and highest category and judges of the first and National categories (according to the categories of Ukraine).

Statistical analysis

The investigated material was processed using the methods of mathematical statistics on a personal computer using the software «Statistica 13.3» and the software application MS Excel (2010).

The main indicators of mathematical statistics were: \bar{x} - mean, SD - standard deviation, CV - coefficient of variation, % - percentage increase in the result. To confirm the hypothesis about the effective influence of the author's program on the level of acrobatic training of cheerleader-flyers were used: t_{score} - Student's *t*-test (between group-A and group-B at the beginning of the training year, to determine the homogeneity of groups) and Wilcoxon signed-rank test - non-parametric statistical hypothesis test (at the intra-group level group-A and group-B), the level of significance was taken at $\alpha < 0,05-0,01$. The degree of agreement of experts was calculated by the Kendall concordance coefficient, which is the average rank correlation and varies in the range $0 < W < 1$ (evaluation criterion is $W \geq W_{gr}$. (0,5-1) - examination took place, and the degree of agreement of experts exists).

Informed consent

Informed consent has been obtained from all individuals included in this study.

Ethical approval

The research related to human use has been complied with all the relevant national regulations, institutional policies and in accordance the tenets of the Helsinki Declaration, and has been approved by the authors' institutional review board or equivalent committee.

Results

To develop the author's program to improve technical (acrobatic) training, a control test was conducted to assess the performance of acrobatic elements of cheerleader-flyers at the beginning of the second year of training of the preliminary basic training, the results are representative because the Kendall concordance coefficient was 0.95. Analysis of the results (Table 1) shows no significant differences between group-A and group-B for t_{score} – Student's t -test (at $\alpha > 0.05$). When performing acrobatic skills in groups-A and B was determined: below average in the control tests «Prompt Front Walkover»; intermediate level – «Handstand», «Round Off», «Cartwheel», «Front Limber», «Front Walkover» and «Back Walkover»; above the average level – «Backward Roll», «Cartwheel», high level – «Forward Roll».

Table 1. Indicators of acrobatic readiness of cheerleader-flyers

| Control tests | Statistic data | | | | α |
|------------------------------|------------------|------|------------------|------|----------|
| | Group-A (n=24) | | Group-B (n=26) | | |
| | $\bar{x} \pm SD$ | CV | $\bar{x} \pm SD$ | CV | |
| Forward Roll, score | 9.25±0.85 | 9.2 | 9.08±0.74 | 8.2 | > 0.05 |
| Backward Roll, score | 8.46±1.25 | 14.8 | 8.46±1.24 | 14.7 | > 0.05 |
| Handstand, score | 5.04±1.78 | 35.3 | 5.42±1.53 | 28.2 | > 0.05 |
| Cartwheel, score | 7.71±1.33 | 17.3 | 7.65±1.29 | 16.9 | > 0.05 |
| Round Off, score | 5.17±1.27 | 24.7 | 5.69±1.41 | 24.7 | > 0.05 |
| Backbend, score | 6.58±1.14 | 17.3 | 6.73±0.92 | 13.7 | > 0.05 |
| Front Limber, score | 5.50±1.29 | 23.4 | 6.00±1.20 | 20.0 | > 0.05 |
| Front Walkover, score | 4.79±1.93 | 40.4 | 5.19±1.50 | 28.8 | > 0.05 |
| Back Walkover, score | 4.79±2.19 | 45.6 | 5.19±2.32 | 44.6 | > 0.05 |
| Prompt Front Walkover, score | 3.13±2.46 | 78.6 | 3.65±2.38 | 65.2 | > 0.05 |

\bar{x} – mean, SD – standard deviation, CV – coefficient of variation, p – significant difference, α – t_{score} – Student's t -test

The results of control testing of the level of technical readiness after 10 months of training (at the end of the second year of training of the preliminary basic training stage) indicate acrobatic exercises in group-A from 4.79 score to 9.25 score, in group-B from 7.50 score to 9.62 score (Table 2). In group-B the level of technical skills reached the level of «above average» (from 7.50 score to 8.65 score) and «high» (from 9.15 score to 9.15 score), in group-A technical skills remained almost at the initial level. Correspondence of results for Wilcoxon signed-rank test found a significant increase in technical skills in group-B at $\alpha < 0.01$, and group-A - at $\alpha < 0.05$.

Table 2. Indicators of acrobatic readiness of cheerleader-flyers of the group-A and group-B before and after the introduction of the author's methodology (at the intra- group level)

| Control tests | Statistic data | Group-A (n=24) | | Group-B (n=26) | |
|------------------------------|------------------|----------------|------------|----------------|-------------|
| | | before | after | before | after |
| Forward roll, score | $\bar{x} \pm SD$ | 9.25±0.85 | 9.42±0.72* | 9.08±0.74 | 9.62±0.50** |
| Backward roll, score | $\bar{x} \pm SD$ | 8.46±1.25 | 8.92±0.72* | 8.46±1.24 | 9.15±0.92** |
| Handstand, score | $\bar{x} \pm SD$ | 5.04±1.78 | 6.04±1.30* | 5.42±1.53 | 8.42±1.47** |
| Cartwheel, score | $\bar{x} \pm SD$ | 7.71±1.33 | 8.50±0.93* | 7.65±1.29 | 9.35±1.13** |
| Round Off, score | $\bar{x} \pm SD$ | 5.17±1.27 | 5.75±1.26* | 5.69±1.41 | 8.08±1.29** |
| Backbend, score | $\bar{x} \pm SD$ | 6.58±1.14 | 7.00±0.93* | 6.73±0.92 | 8.65±1.32** |
| Front Limber, score | $\bar{x} \pm SD$ | 5.50±1.29 | 6.13±1.15* | 6.00±1.20 | 8.15±1.38** |
| Front Walkover, score | $\bar{x} \pm SD$ | 4.79±1.93 | 5.58±1.21* | 5.19±1.50 | 8.31±1.01** |
| Back Walkover, score | $\bar{x} \pm SD$ | 4.79±2.19 | 5.25±1.87* | 5.19±2.32 | 7.92±1.20** |
| Prompt Front Walkover, score | $\bar{x} \pm SD$ | 3.13±2.46 | 3.88±2.40* | 3.65±2.38 | 7.50±1.27** |

\bar{x} – mean; SD – standard deviation; p – significant difference; *, * - the level of significance $\alpha < 0,05$, ** - the level of significance $\alpha < 0,01$

The level of acrobatic training at the beginning of the year of training varied from below average to high, and at the end the results changed, that are representative because the Kendall concordance coefficient was 0.91:

- control tests «Prompt Front Walkover» in group-B reached above average (7.5 score), in group-A the performance of this test increased, but remained below average (3.88 score).
 - control tests «Back Walkover», «Front Walkover», «Front Limber», «Round Off» and «Handstand» in group-B were performed better and moved from the average level to the level above the average (7.92 score, 8, 31 score, 8.15 score, 8.08 score and 8.42 score respectively), in group-A the indicators remained at the average level (5.25 score, 5.58 score, 6.13 score, 5.75 score and 6.04 points respectively).
 - control tests «Cartwheel» in group-B indicators increased from above average to high level (8.65 points), and in group-A indicators remained at above average level (7 points);
 - the level of control tests «Cartwheel» and «Backward Roll» in both groups improved equally and moved to a higher level, in group-A - 9.15 score and 9.35 score, respectively, in group-B - 8.5 score and 8.92 score respectively;
 - control test «Forward Roll» in both groups remained at a high level, in group-B the arithmetic mean score - 9.62 score, in group-A - 9.42 score. This is due to the fact that this acrobatic skill is the easiest in terms of difficulty.

Changes in the percentage of acrobatic training indicators in group-A ranged from 1.8% to 24.0% and group-B ranged from 5.9% to 105.3%. The technical skill of performing acrobatic skills group-A and group-B had significant changes in the performance of «Handstand», «Front Walkover», «Back Walkover» and «Prompt Front Walkover» (Figure 1).

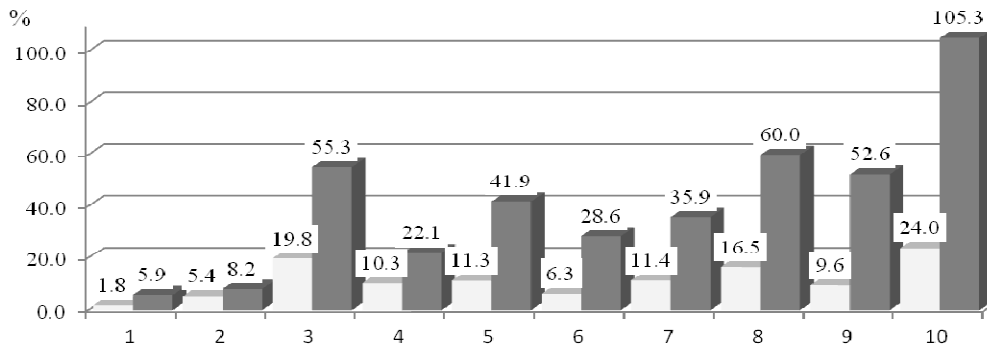


Figure 1. Increase in percentage points (%): 1 – «Forward Roll», 2 – «Backward Roll», 3 – «Handstand», 4 – «Cartwheel», 5 – «Round Off», 6 – «Cartwheel», 7 – «Front Limber», 8 – «Front Walkover», 9 – «Back Walkover»; 10 – «Prompt Front Walkover»; □ - group-A, ■ - group-B

Coefficients of variation indicate a slight discrepancy at the beginning of the year of training levels in acrobatic skills «Forward Roll», «Backward Roll», «cartwheel», «Cartwheel» and «Front Limber» and «Round Off», which ranged from 8.2% to 24.7 %. We emphasize that the coefficients of variation in the control tests «Handstand», «Front Walkover», «Back Walkover» and «Prompt Front Walkover» ranged from 28.8% to 78.6%, which indicates a significant discrepancy and the level of preparedness when performing acrobatic skills is different (Table 2, Figure 2 - A). At the end of the year of training, the coefficients of variation tend to decrease. Thus, in group-A the difference (range) ranged from 8.2% to 65.2% and group-B ranged from 5.2% to 17.5% (Figure 2 - B).

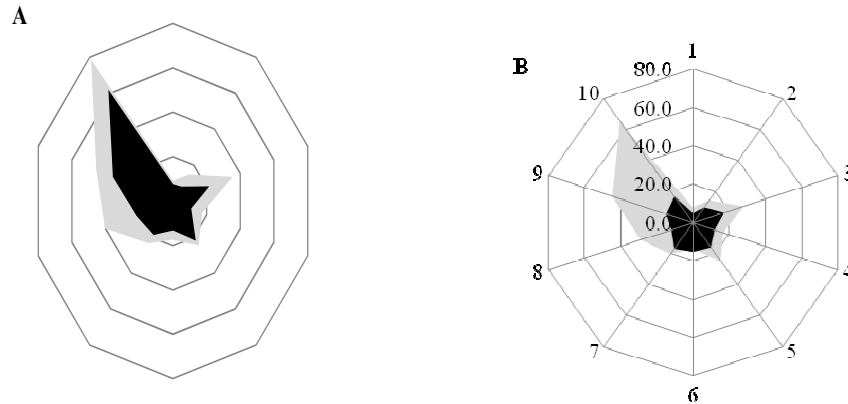


Figure 2. Coefficient of variation group-A and group-B at the beginning and end of the training year: 1 – «Forward Roll», 2 – «Backward Roll», 3 – «Handstand», 4 – «Cartwheel», 5 – «Round Off», 6 – «Cartwheel», 7 – «Front Limber», 8 – «Front Walkover», 9 – «Back Walkover»; 10 – «Prompt Front Walkover »; □ - group-A, ■ - group-B

Discussion

In the system of training cheerleaders there are different approaches to improving the individual components of technical training (jumping, acrobatic and dance elements, building pyramids, staging compositions, etc.). However, the analysis of scientific and sports literature showed that despite the fact that there is enough scientific work to improve individual components of the training system in complex sports, not enough attention is paid to the study and improvement of training systems for cheerleaders.

It has been established that at the stage of preliminary basic training of athletes-cheerleaders learn acrobatic technical skills, which form the basis of the study of more complex techniques of performing acrobatic exercises or performing them in combination. Therefore, given the low level of technical (acrobatic) training of cheerleaders at the beginning of the second year of training at the stage of preliminary basic training of leading teams of Ukraine, we were faced with the question of developing an author's program to improve it. The author's program has a comprehensive approach, which contains useful information for both athletes and practicing cheerleading coaches.

The development of the author's program of technical training of cheerleaders, which included acrobatic training, at the stage of preliminary basic training of the second year of training was based on the basic provisions of the theory and methods of sports training (Platonov V.N., 2015; Sozańskiego H., Sadowskiego J., Czerwińskiego J., 2015; Bubka C.N., Platonov V.M., 2018), features of the system of training gymnasts (Gaverdovsky Yu.K., 2014), basics of technical training and its components in complex coordination sports (Khudolii O.M., Karpenets T., Ivashchenko O., 2015; Khudolii O.M., 2019; Dolbysheva N., Kidon V., Kovalenko N., Holoviichuk Ir., Koshcheyev Al., Chuhlovina V., 2020), specifics of training and improving acrobatic skills in cheerleading training (Webb R., Headridge P., 2015; Boloban V., 2017; Torosyan N.E., 2019; Lutsenko L.S., Zinchenko I.A., 2020).

Author's program N. Dolbysheva and A. Mykhaylichenko (2019) provided three levels of technical training, which are aimed at solving a specific goal and objectives of training and the use of training methods (Figure 3). The program was implemented in group-B training.

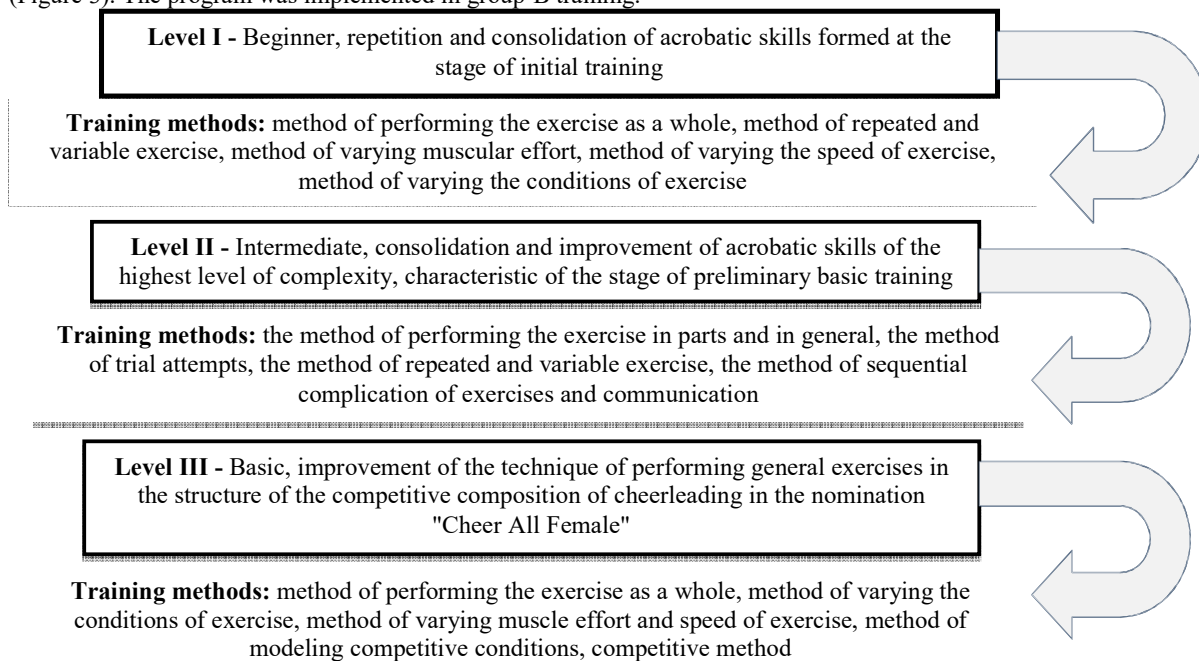


Figure 3. The structure of the author's program to improve the acrobatic training of cheerleader-flyers

Planning of the author's program was carried out according to two cyclic (milked) structure of annual preparation and certain mesocycles (Dolbysheva N., Mykhaylichenko A., 2019; Buzoverya A.G., 2020):

- I cycle - I preparatory period (involving and basic mesocycles) and I competitive period (basic and competitive mesocycles);

- II cycle - II preparatory period (recovery, basic and control-preparatory mesocycles), II competition period (pre-competition and competition mesocycles) and transition period (recovery mesocycles).

During the macrocycle in the preparatory and competitive periods, 196 trainings were held, which were planned 4-5 times a week for 120 minutes. The amount of technical training was - 60-65%, of which 30-35% of acrobatic training.

Important from the point of view of scientific discussion is the problem of selection of physical exercises for acrobatic training, our method provides blocks of acrobatic exercises (AE): for repetition and consolidation

were developed five blocks AE_{1-5} ; for consolidation and improvement of elements of the highest level of complexity, ten blocks AE_{1-10} and ten blocks of gymnastic connections GC_{1-10} ; to improve the technique of performing competitive exercises in the structure of the competitive composition, separate blocks of exercises were used, which were performed in the process of modeling competitive conditions (complicated or easy) typical for cheerleading competitions in the nomination «Cheer All Female».

The authors note that the planning of acrobatic exercises in blocks in accordance with the tasks of the stages of technical training is effective. A study conducted at the end of the year of training on technical (acrobatic) training group-B shows a significant increase in performance when performing acrobatic skills and significant differences at $\alpha < 0.01$. It is logical to increase the indicators in group-A, but they have no significant differences, and significant differences amounted to at $\alpha < 0.05$. In group-B in most cases there is a homogeneity of indicators, which indicates the same level of preparedness. In group-A there are significant differences in training in some control tests: «Handstand», «Round Off», «Front Walkover», «Back Walkover», «Prompt Front Walkover», as the coefficients of variation were 28.2%, 24.7%, 28.8 %, 44.6% and 65.2% respectively. Such a discrepancy in performance negatively affects the synchronous and technical performance of acrobatic exercises in the process of competitive composition.

Thus, the study allowed supplementing the features of the use of tools and methods for acrobatic training of cheerleaders. Confirm the data of scientists on the need to implement different approaches to improving the technical skills of athletes. For the first time the author's program on technical (acrobatic) training of young cheerleaders at the stage of preliminary basic training in the nomination "Cheer All Female" with the use of blocks of exercises in accordance with the tasks of the stages of technical training was scientifically substantiated.

Conclusion

1. Cheerleading as a sport has become Olympic sport, so the training system for cheerleaders needs to be improved and requires coaches to take new approaches to organizing and conducting the training process. Theoretical analysis of scientific and sports literature has shown that ensuring a high level of sportsmanship of cheerleaders is carried out on the basis of technical training directly at the stage of preliminary basic training. Given the above, there is a need to develop an author's program for technical training of female athletes-cheerleaders 10-11 years, who in the process of competitive composition perform the function of cheerleader-flyer, taking into account pedagogical theories of learning and basics of improving technical skills.

2. The author's program was introduced into the training of the annual training cycle, which had a two-cycle (dual) macrostructure, which provided for the planning of three levels of technical (acrobatic) training of cheerleaders-flyers, defining the purpose and methods of training and application blocks of acrobatic exercises. The amount of acrobatic training was - 30-35%, with 60-65% of the technical training of cheerleaders.

3. The study of the level of technical (acrobatic) training of cheerleaders-flyers was determined by selected control tests to assess the performance of acrobatic elements «Forward Roll», «Backward Roll», «Handstand», «Cartwheel», «Round Off», «Cartwheel», «Front Limber», «Front Walkover», «Back Walkover», «Prompt Front Walkover». The level of technical training of cheerleader-flyers group-A and group-B at the beginning of the year of training was the same and had no significant differences in for Wilcoxon signed-rank test at $\alpha > 0.05$. Analysis of the results after the implementation of the author's program shows that the level of technical (acrobatic) readiness of female cheerleaders in group-B significantly improved and had significant differences in Wilcoxon signed-rank test at $\alpha < 0.01$. Growth indicators acrobatic training in group-A ranged from 1.8% to 24.0% and group-B ranged from 5.9% to 105.3%. The coefficients of variation in the early years of training in a group-A (35.3% -78.6%) and group-B (28.2% -65.2%) indicate a significant difference preparedness Cheerleaders-flyers in the performance of acrobatic skill - «Handstand», «Front Walkover», «Front Walkover», «Back Walkover», «Prompt Front Walkover», after training, the coefficients of variation tend to decline in group-A range was from 8.2% to 65.2% and group-B ranged from 5.2% to 17.5%. Coefficients of variation of group-B show almost the same level of acrobatic training.

4. Thus, the planning of the author's program for technical training of athletes engaged in cheerleading and performing the function of cheerleader-flyer in the competitive composition, contributed to the improvement of acrobatic training, which provides a basis for its practical implementation in the system of sports training of cheerleaders at the preliminary basic training.

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Conflict of interest

Authors state no conflict of interest.

References

- «On the organization of educational and training work of children's and youth sports schools» (2015). Order of the Ministry of Youth and Sports of Ukraine dated 17.01.2015 №67. Available from: URL: <https://zakon.rada.gov.ua/laws/show/z0119-15> [in Ukrainian].
- Baloban, V.N., (2010) Macromethods of teaching acrobatic exercises difficult to coordinate. *Pedagogy, psychology and medico-biological problems of physical education and sports*, № 6, pp. 14-24. Available from: URL: <https://www.sportpedagogy.org.ua/html/journal/2010-06/10bvnedc.pdf>. [in Russian].
- Beketova, A.N., (2017) *Cheerleading. Guidelines for the discipline "physical education"*. Khar'kov. 19 c. [in Russian].
- Boloban, V., (2017) Modern technologies of motor skills and abilities formation in the process of teaching complex coordination sports exercises. *Nauka v olimpijskom sporte*. № 4, pp. 45-55. Available from: URL: https://sportnauka.org.ua/wp-content/uploads/nvos/magazines/NvOS_2017_4.pdf [in Russian].
- Bubka, S.N., Platonov, V.M., (2018) *The system of Olympic training: the basics of management*. Kyiv: Persha drukarnia. 624 p. [in Russian].
- Buzoverya, A.G., (2020). *Improving the level of technical preparedness of young cheerleaders at the stage of preliminary basic training*. The dissertation on getting of a scientific degree of the candidate of sciences in physical training and sports (doctor of philosophy) on a specialty 24.00.01 «Olympic and professional sports». - Prydniprovsk State Academy of Physical Culture and Sports, Dnipro. 244 p. [in Ukrainian].
- Cherepov, E., Kalugina, G., Sevostianov, D., Smirnova, L., (2020). Development of coordination abilities in cheerleaders at the stage of initial preparation. *Journal of Physical Education and Sport*, Vol.20 (2), pp. 666 – 671. DOI:10.7752/jpes.2020.02097
- Dolbysheva, N., Kidon, V., (2017). Basic regularities of improvement of technical readiness of sportswomen who are engaged in aesthetic gymnastics at the stage of specialized basic training. *MolodIzhnyi naukoviy vIisnik ShIdnoEvropeyskogo natsIonalnogo unIversitetu ImeniI LesI UkraYinki. FIzichna kultura I sport*, № 27, pp. 194-205. [in Ukrainian].
- Dolbysheva, N., Kidon, V., Kovalenko, N., Holoviichuk, Ir., Koshcheyev, Al., Chuhlovina, V., (2020). Improvement of technical skills of 14-16 years old athletes who are engaged in aesthetic group gymnastics. *Journal of Physical Education and Sport*, Vol.20 (2), pp. 554-563. DOI: 10.7752/jpes.2020.02082
- Dolbysheva, N.G., Mikhailichenko, A.G., (2019). Methods of improving the technical training of cheerleaders at the stage of preliminary basic training. *Naukovyi chasopys NPU imeni M.P. Drahomanova. «Seriiia pedahohichni nauky»*, CXXXII(142), p. 79-92. DOI: 10.31392/NZ-npu-142.2019.09 [in Ukrainian].
- European cheerleading association@ Rules & Regulations*, (2017). Available from: URL: <https://cheerleading.org.ua/images/documents/sport/ECA-2017-Rules-Final.pdf>
- Gavardovsky, Yu.K. (ed.), (2014). *Theory and methodology of artistic gymnastics*. Moscow: Soviet sport, 2014, T.1., 368 p. [in Russian].
- IFC Competition Guidelines 2017 (three) twists*, (2017). Available from: URL: <https://cheerleading.org.ua/images/documents/sport/IFC-CWC-Competition-Guidelines-2017-Final.pdf>
- Khudolii, O.M., (2019). Research Program: Modeling of Young Gymnasts' Training Process. *Teoriã ta Metodika Fizičnogo Vihovannã*, 19 (4), pp. 168-178. DOI:10.17309/tmfv.2019.4.02
- Khudolii O., Karpenets T., Ivashchenko, O., (2015). Modeling of the process of teaching gymnastic exercises at the stage of preliminary basic training. *Visnyk Prykarpatskoho universytetu. Fyzichna kultura*, 22, pp. 141-147. Available from: URL: <file:///C:/Users/%D0%9E%D0%9F%D0%A1/Downloads/47673010.pdf> [in Ukrainian].
- Krekotina, T.M., Bezryadina, N.L., (2014). *Charlideng*. Available from: URL: <https://zpo.ucoz.ua/Programu /Fizkylt sport/cherlideng.pdf> [in Ukrainian].
- Lutsenko, L.S., Zinchenko, I.A., (2010). Acrobatic preparation in the training process of sportsmen-cheerleading on the stage of the specialized base preparation. *Fyzicheskoe vospytanye studentov*, № 2, pp. 105-110. [in Russian].
- Moffatt, A., Potter, A., *The Cheerleading Book: The Young Athlete's Guide*. Firefly Books. 2020. 144 p.
- Mykhaylichenko, A., (2018). Technical training in the educational and training process of young cheerleaders at the stage of preliminary basic training. *Sportyvnyi visnyk Prydniprovia*, № 1, pp. 55-59. [in Ukrainian].
- Naglak Z., (1999). *Methodology of training an athlete*. Wrocław: Publishing House of the University of Physical Education in Wrocław, 1999. 191 p. [in Polish]
- Nesterova, O.Ya., (2016). *Additional general education program in the field of physical culture and sports in cheerleading*. Clearly. [in Ukrainian].
- Platonov, V.N. (ed.), (2015). *The system of training athletes in Olympic sports. General theory and its practical applications*. Kiyev: Olimpiyskaya literature, T 1,2. [in Russian].
- Pleshakova, E.V., Shapar, E.A., Rozhkov, V.Yu., (2018). Features of cheerleading classes at the stage of initial training. *Naukovyi chasopys NPU imeni M.P. Drahomanova. Seriiia № 11 «Naukovo-pedahohichni problemy fizychnoi kultury / Fyzichna kultura i sport»*, 2 (96), pp. 58-62. [in Russian].

- Resolution on Amendments to the «Regulations on Children's and Youth Sports School» and «Regulations on the Olympic Training Center»,* (2020) of November 25, 2020 № 1159. Available from: URL: <https://zakon.rada.gov.ua/laws/show/1159-2020-%D0%BF#n12> [in Ukrainian].
- Rules for cheerleading and cheerleading competitions,* (2020). All-Ukrainian Federation of Cheerleading and Cheerleading. [in Ukrainian].
- Sozański, H., Sadowski, J., Czerwiński, J., (2015). *Fundamentals of the theory and technology of sports training.* Warsaw - Biała Podlaska: Available from: URL: <https://docplayer.pl/18171825-Podstawy-teorii-i-technologie-treningu-sportowego.html> [in Polish]
- Torosyan, N.E., (2019). *The work program of the additional general education program. «Acrobatics and cheerleading for the 2019-2020 academic year».* Saint-Petersburg. [in Russian].
- Webb, R., Headridge, P., (2015). *101 Cheerleading Drills Perfect.* Coaches Choice, 177 p.
- Zinchenko, I.O., Lutsenko, L.S. (2013). *Cheerleeng "DANCE" (updated): Exemplary program for sports clubs and sports sections of higher education institutions (stage of specialized basic training).* Kharkiv: Nat. University «Jurid. Acad. Of Ukraine named after Yaroslav the Wise». [in Ukrainian].