METHOD OF ESTIMATION OF TECHNICAL PREPAREDNESS LEVEL OF BASEBALLS AGED 12-14 YEARS

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Annotation. The method of estimation of level of technical preparedness is developed for young baseballs. The scale of estimation of level of technical preparedness of sportsmen is formed on the method of sigmantion rejections. In an experiment took part 100 boys in age 12-14 years. The test of the program «Aquafina MLB Pitch was utillized, Hit & Run». The maximally attained indexes are certain on separate baseball skills. The level of development of technical preparedness is exposed after an experiment on the program: a test of «pitch» is 450 marks, a test of «hit» is 402 marks, a test of «run» is a 361 mark, indexes of general marks are 1043 marks. The comparative analysis of level of technical preparedness of baseballs of control and experimental groups is conducted. Authenticity of distinctions is proved between control and experimental groups on the followings criteria of technical preparedness: throw, blow at run.
Keywords: technical, preparedness, estimation, level, baseballs.

Introduction

Nowadays, baseball is one of the most modern kinds of outdoor games of the 21st century, which only starts to be implemented in the countries of Eastern Europe and has not gained sufficient acceptance among their populations. But in such countries as the USA, Japan, Korea, Cuba, Venezuela, Dominican Republic, Mexico the games of leading club and combined teams gather large audience of fans on stadiums, even larger than football matches in Europe. In Ukraine baseball is one of the youngest kinds of sports games. Little quantity of teams results in escalation of competitive fighting, especially among children's teams and this requires improvement of young baseballers' training system. The managing of baseballers' training is based on a number of factors which make its structural foundation. It implies planning, organization, control, prognostication, programming, evaluation and analysis of indicators, corrections and taking of managing decisions. Coming from the enumerated, we can say that exactly testing s one o the main factors of pedagogical control and the quality of its fulfillment influences, to a large extent, on the further improvement of one or the other side of a baseballer's preparedness: technical, tactic, physical, psychological and etc. Not disparaging the significance of other characteristics of preparedness and fully understanding the importance of complex approaches to testing problems' solution in the system of pedagogical control over baseballers' preparedness level, we consider that exactly technical preparedness determines the most of the quality of young baseballers' training. The problems of technical preparedness in sports games were studied in scientific and methodological works of different authors [3, 12]. The authors of these works showed that estimation of young sportsmen's technical preparedness level can be used as an additional method of estimation of tactic and technique actions in training and competitive activity [4, 5, 7].

Leading specialists in the theory of sports note that technical preparedness is the element which integrates key components of preparedness and directly affects the efficiency of competitive activity [8, 9]. That is why it is evident that improvement on this base of technical activity management estimation system will permit to raise the level of competitive activity efficiency. In baseball the level of technical workmanship can not be compensated by other components of preparedness [11, 13]. That is why efficiency of sports training process depends on the efficiency of technical preparedness level estimation [10]. Unfortunately, as on to day in our country there is insufficient quantity of special methodologies for estimation of this side of preparedness with regard to baseball. All said above proves that it is necessary to develop the methodology for estimation of baseball technical preparedness level and makes the presented works an urgent one.

The researches were carried out as per the plans of scientific and research works of Tavricheskiy National University, named after V.I. Vernadskiy.

Purpose, tasks of the work, material and methods.

The purpose of the research is development of methodology of technical preparedness estimation of young baseballers.

The tasks of the research:

1. determination of maximal indicators, obtained in different baseball skills.
2. Creation of scale for estimation of baseballers' technical preparedness level.
3. Comparative analysis of baseballers' technical preparedness level before and after experiment.

To achieve the purpose of the research we took American program «Aquafina MLB Pitch, Hit & Run» as the base. It was created in 1996 by chief baseball league and represents competitions in different baseball skills like accuracy of a throw at a certain distance, hit range test on a base, running from base to base. This program gives opportunity for 7-14 years old children to compete in base ball and softball by individual technical skills. The program

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is characterized by the number of gained points for every technical element and it determines the place, taken by a sportsman in these competitions.

Brief characteristics of program «Aquafina MLB Pitch, Hit & Run»:

Test "pitch" (service)

The task is to determine the accuracy of throw into "strike area" at distance of 45 feet (13.71 m), see fig.1. Estimation by table 1.

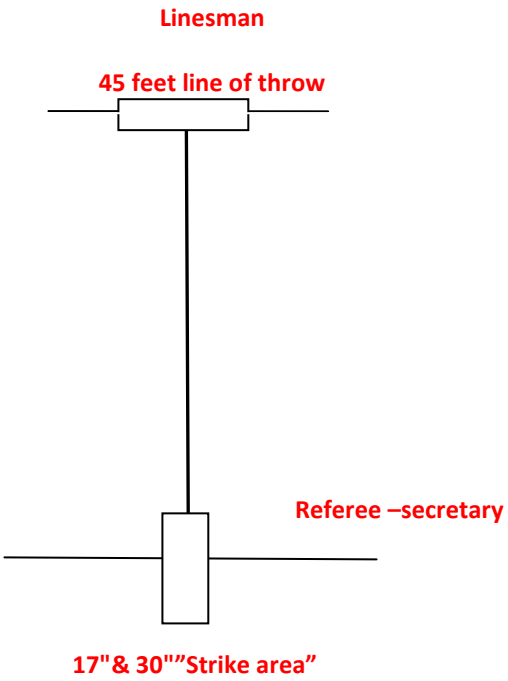

Fig.1 Diagram of test "Pitch" fulfillment

Table 1.

Estimation of service accuracy

0 = 50
1 = 75
2 = 150
3 = 225
4 = 300
5 = 375

Test "hit"

The purpose is the determination of a player's capability to execute distant stationary ball hit from a base, in direction from "home" area to central "outfield", see fig.2. During measuring both distance and accuracy shall be considered.

Table 2.

Estimation of hit range

<50	=50	91=182	133=266	175=350	217=434	259=518
50	=100	92=184	134=268	176=352	218=436	260=520
51	=102	93=186	135=270	177=354	219=438	261=522
52	=104	94=188	136=272	178=356	220=440	262=524
53	=106	95=190	137=274	179=358	221=442	263=526
54	=108	96=192	138=276	180=360	222=444	264=528
55	=110	97=194	139=278	181=362	223=446	265=530
56	=112	98=196	140=280	182=364	224=448	266=532
57	=114	99=198	141=282	183=366	225=450	267=534
58	=116	100=200	142=284	184=368	226=452	268=536

59	=118	101=202	143=286	185=370	227=454	269=538
60	=120	102=204	144=288	186=372	228=456	270=540
61	=122	103=206	145=290	187=374	229=458	271=542
62	=124	104=208	146=292	188=376	230=460	272=544
63	=126	105=210	147=294	189=378	231=462	273=546
64	=128	106=212	148=296	190=380	232=464	274=548
65	=130	107=214	149=298	191=382	233=466	275=550
66	=132	108=216	150=300	192=384	234=468	ADD 2 points
67	=134	109=218	151=302	193=386	235=470	
68	=136	110=220	152=304	194=388	236=472	for each foot
69	=138	111=222	153=306	195=390	237=474	over 275 feet
70	=140	112=224	154=308	196=392	238=476	
71	=142	113=226	155=31O	197=394	239=478	
72	=144	114=228	156=312	198=396	240=480	
73	=146	115=230	157=314	199=398	241=482	
74	=148	116=232	158=316	200=400	242=484	
75	=150	117=234	159=318	201=402	243=486	
76	=152	118=236	160=320	202=404	244=488	
77	=154	119=238	161=322	203=406	245=490	
78	=156	120=240	162=324	204=408	246=492	
79	=158	121=242	163=326	205=410	247=494	
80	=160	122=244	164=328	206=412	248=496	
81	=162	123=246	165=330	207=414	249=498	
82	=164	124=248	166=332	208=416	250=500	
83	=166	125=250	167=334	209=418	251=502	
84	=168	126=252	168=336	210=420	252=504	
85	=170	127=254	169=338	211=422	253=506	
86	=172	128=256	170=340	212=424	254=508	
87	=174	129=258	171=342	213=426	255=510	
88	=176	130=260	172=344	214=428	256=512	
89	=178	131=262	173=346	215=430	257=514	
90	=180	132=264	174=348	216=432	258=516	

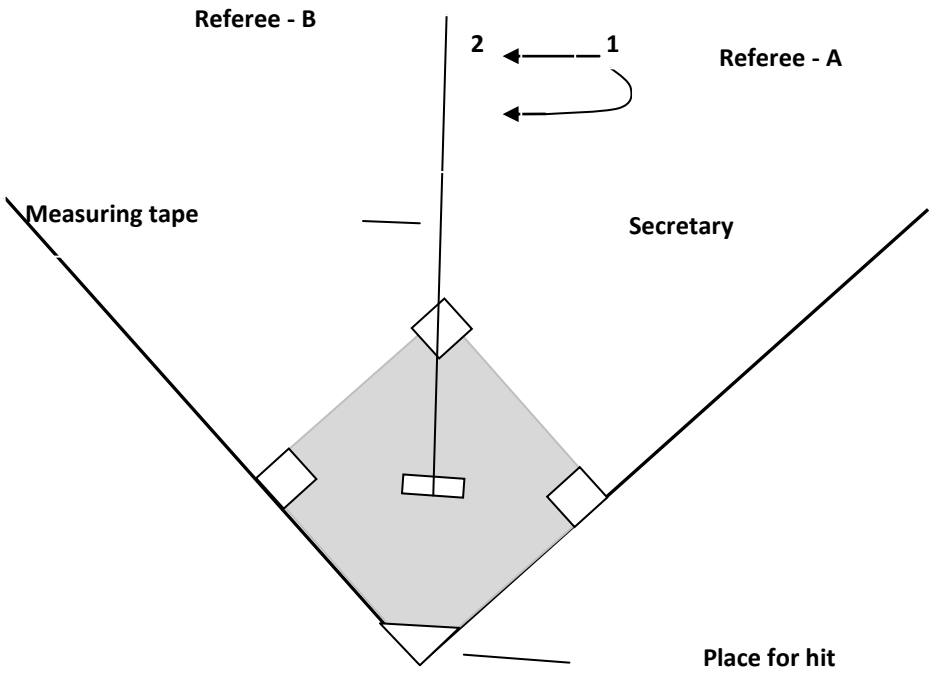

Fig 2. Diagram of "Hit" test

Test "Run"

The purpose is to register players' running speed from "base" to "base" from the second "base" line, with touching of the third base pad and across the "home" area, see fig 3. The tested shall cover 160 feet (48.76 m) distance. Estimation by table 3.

100 baseballers (12-14 years old) were the tested in pedagogical experiment.

During 3 months of the pedagogical experiment the baseballers of experimental group (n=50) were trained as per technology and methodology, which were developed by D.V. Agapov & D.V. Syshko [1, 2].

The baseballers of control group were trained by common methodology as per the program of training.

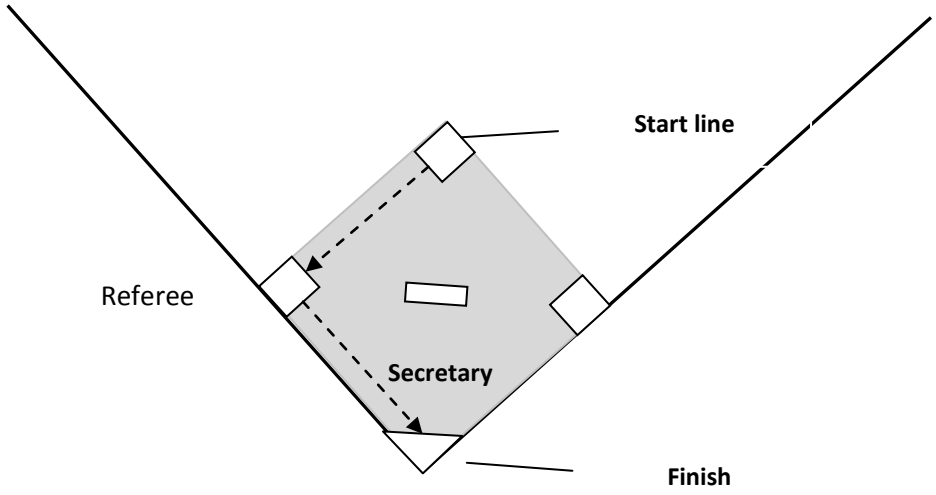

Fig.3. Diagram of test "Run".

Table 3.

Estimation of run speed

>11.00	=	50	10.42	=	108	9.83	=	167	9.24	=	226	8.65	=	265	8.06	=	344	7.47 = 403					
11.00	=	50	10.41	=	109	9.82	=	168	9.23	=	227	8.64	=	266	8.05	=	345	7.46 = 404					
10.99	=	51	10.40	=	110	9.81	=	169	922	=	228	8.63	=	267	8.04	=	346	7.45 = 405					
10.98	=	52	10.39	=	111	9.80	=	170	9.21	=	229	8.62	=	268	8.03	=	347	7.44 = 406					
10.97	=	53	10.38	=	11 2	9.79	=	171	9.20	=	230	8.61	=	269	8.02	=	348	7.43 = 407					
10.96	=	54	10.37	=	11 3	9.78	=	172	9.19	=	231	8.60-	=	290	6.01	=	349	7.42 = 408					
10.95	=	55	10.36	=	114	9.77	=	173	9.18	=	232	8.59	=	291	6.00	=	350	7.41 = 409					
10.94	=	56	10.35	=	115	9 76	=	174	9 17	=	233	8.58	=	292	7.99	=	351	7.40 = 410					
10.93	=	57	1034	=	116	9.75	=	175	9.16	=	234	8.57-	=	293	7.98	=	352	7.39 = 411					
10.92	=	58	10.33	=	117	9.74	=	176	9.15	=	235	8.56	=	294	7.97	=	353	7.38 = 412					
10.91	=	59	10.32	=	118	9.73	=	177	9.14	=	236	8.55	=	295	7.96	=	354	7.37 = 413					
10.90	=	60	10.31	=	119	9.72	=	178	9.13	=	237	8.64	=	296	7.95	=	355	7.36 = 414					
10.89	=	61	10.30	=	120	9.71	=	179	9.12	=	238	8.53	=	297	7.94	=	356	7.35 = 415					
10.88	=	62	10.29	=	121	9.70	=	180	9.11	=	239	8.62	=	298	7.93	=	357	7.34 = 416					
10.07	=	63	10.28	=	122	9.69	=	181	9.10	=	240	8.51	=	299	7.92	=	358	7.33 = 417					
10.86	=	64	10.27	=	123	9.68	=	182	9.09	=	- 241	8.50	=	300	7.91	=	359	7.32 = 418					
10.05	=	65	10.26	=	124	9.67	=	183	9.08	=	242	8.49:	=	301	7.90	=	360	7.31=419					
10.84	=	66	10.25	=	125	9.66	=	184	9.07	=	- 243	8.48-	=	302	7.89	=	361	7.30 = 420					
10.83	=	67	10.24	=	12B	9.85	=	185	9 06	=	_ 244	8.47	=	303	7 88	=	382	7.29 = 421					
10.82	=	68	10.23	=	127	9.84	=	186	9.05	=	245	8.46	=	304	7.87	=	363	7.28 = 422					
10.81	=	69	10.22	=	128	9.63	=	187	9.04	=	246	8.45	=	305	7.86	=	364	7.27 = 423					
10.80	=	70	10.21	=	129	9.62	=	188	9.03	=	247	8.44	=	306	7.85	=	365	7.26 = 424					
10.79	=	71	10.20	=	130	9.61	=	189	9.02	=	248	8.43	=	307	7.84	=	366	7.25 = 425					
10.78	=	72	10.19	=	131	9.60	=	190	9.01	=	249	8.42	=	308	7.83	=	367	7.24 = 426					
10.77	=	73	10.18	=	132	9.59	=	191	9.00	=	250	8.41	=	309	7.82	=	368	7.23 = 427					
10.76	=	74	10.17	=	133	9.58	=	192	8.99	=	251	8.40	=	310	7.81	=	369	7.22 = 428					
10.75	=	75	10.16	=	134	9.57	=	193	8.98	=	252	8.39	=	311	7.80	=	370	7.21 = 429					
10.74	=	76	10.15	=	135	9.56	=	194	8.97	=	253	8.38	=	312	7.79	=	371	7.20 = 430					
10.73	=	77	1014	=	138	9.55	=	195	8.96	=	254	8.37	=	313	7.78	=	372	7.19 = 431					
10.72	=	78	10.13	=	137	9.54	=	196	8.95	=	_ 255	836-	=	314	7.77	=	373	7.18 = 432					
10.71	=	79	10.12	=	138	9.53	=	197	8.94	=	256	8.35«	=	315	7.76	=	374	7 17= 433					
10.70	=	80	10.11	=	139	9.52	=	198	8.93	=	257	0.34	=	316	7.75	=	375	7.16 = 434					

10.69	=	61	10.10	=	140	9.51	=	199	8.92	=	258	0.33	=	317	7.74	=	376	7.15 = 435		
10.66	=	82	10.09	=	141	9.50	=	200	8.91	=	259	8.32	=	318	7.73	=	377	7.14 = 436		
10.67	=	63	10.08	=	142	9.49	=	201	8.90	=	260	8.31-	=	319	7.72	=	378	7.13 = 437		
10.66	=	64	10.07	=	143	9.48	=	202	8.89	=	261	8.30	=	320	7.71	=	379	7.12 = 438		
10.68	=	65	10.06	=	144	9.47	=	203	8.88	=	262	8-29-	=	321	7.70	=	380	7.11 = 439		
10.64	=	66	10.05	=	145	9.46	=	204	8.87	=	263	8.28	=	322	7.69	=	381	7.10 = 440		
10.63	=	67	10.04	=	146	9.45	=	205	8.86	=	264	827	=	323	7.68	=	382	7 09 = 441		
10.62	=	66	10.03	=	147	9.44	=	206	8.85	=	265	8.26-	=	324	7.67	=	383	7.08 = 442		
10.61	=	69	10.02	=	148	9.43	=	207	8.84	=	266	8.25	=	325	7.66	=	384	7.07 = 443		
10.60	=	90	10.01	=	149	9.42	=	208	8.83	=	267	8.24	=	326	7.65	=	385	7.06 = 444		
10.69	=	91	10.00	=	150	9.41	=	209	8.82	=	268	8.23-	=	327	7.64	=	386	7.05 = 445		
10.56	=	92	9.99	=	151	9.40	=	210	8.81	=	269	8.22	=	328	7.63	=	387	7.04 = 446		
10.57	=	93	9.98	=	152	9.39	=	211	8.80	=	270	8.21	=	329	7.62	=	388	7.03 - 447		
10.56	=	94	9.97	=	153	9.38	=	212	8.79	=	271	8.20	=	330	7.61	=	389	7.02 = 448		
10.55	=	95	9.96	=	154	9.37	=	213	6.78	=	272	8.19	=	331	7.60	=	390	7.01 = 449		
10.54	=	96	9.95	=	155	9.36	=	214	8.77	=	273	8.18	=	332	7.59	=	391	7.00 = 450		
10.53	=	97	994	=	156	9.35	=	215	8.76	=	274	8.17	=	333	7.58	=	392			
10.52	=	98	9.93	=	157	9.34	=	21 G	8.75	=	275	8.16	=	334	7.57	=	393			
10.51	=	99	9.92	=	158	9.33	=	217	8.74	=	276	8.15	=	335	7.56	=	394	Add 1 point for		
10.50	=	100	9.91	=	159	9.32	=	218	8.73	=	277	8.14	=	336	7.55	=	395	each hundredth		
10.49	=	101	9.90	=	160	9.31	=	219	8.72	=	278	8.13	=	337	7.54	=	396	of a second		
10.46	=	102	9.89	=	161	9.30	=	220	8.71	=	279	8.12-	=	338	7.53	=	397	under 7.00		
10.47	=	103	9.86	=	162	9.29	=	221	8.70	=	200	8.11	=	339	7.52	=	396			
10.46	=	104	9.87	=	163	9.28	=	222	8.69	=	261	8.10	=	340	7.51	=	399			
10.45	=	105	9.66	=	164	9.27	=	223	8.68	=	282	8.09	=	341	7.60	=	400			
10.44	=	106	9.85	=	165	9.26	=	224	8.67	=	283	8.08	=	342	7.49	=	401			
10.43	=	107	9.84	=	166	9.25	=	225	8.66	=	284	8.07	=	343	7.48	=	402			

Results of the research.

Considering the tasks of the research we analyzed the best results of «Aquafina MLB Pitch, Hit & Run» program among winners and prize winners (n=60). The analysis included determination of maximum point quantity which was gained by 12-14 years old baseballers in different states and children's leagues of the USA in 2006-2007 both: by every of technical skill criterion and in total (throw, hit an run). Here are the resulting indicators: test "pitch" presented 450 points, test "hit" presented 402 points, test "run" -361 points, total points presented 1043 points.

Next, on the base of the obtained results, we developed estimation scale for every criterion by method of sigma-deviation [6].

Estimating technical preparedness level in **"Pitch",** with criterion less than 75 points, we determine **lower level** of technical preparedness. Criterion from 75 to 225 points means **middle level** of technical preparedness, criterion from 225 to 375 points means **high level** of technical preparedness and indicators from 375 to 450 points mean **very high level** of technical preparedness (see table 4).

Table 4.

Determination of technical preparedness level by "Pitch" criterion

Criterion «Pitch»	Technical preparedness level
Less than 75 points	Low level
From75 to 225 points	Middle level
From 225 to 375 points	High level
From 375 to 450 points	Very high level

Estimating technical preparedness level in **"Hit",** with criterion less than 100 points, we determine **lower level** of technical preparedness. Criterion from 100 to 250 points means **middle level** of technical preparedness, criterion from 250 to 410 points means **high level** of technical preparedness and indicators exceeding 450 points mean **very high level** of technical preparedness (see table 5).

Table 5

Determination of technical preparedness level by "Hit" criterion

Criterion «Hit»	Technical preparedness level
Less than 100 points	Low level
From 100 to 250 points	Middle level

From 250 to 410 points	High level
Exceeding 450	Very high level

Estimating technical preparedness level in **"Run",** with criterion less than 103 points, we determine **lower level** of technical preparedness. Criterion from 103 to 239 points means **middle level** of technical preparedness, criterion from 239 to 375 points means **high level** of technical preparedness and indicators exceeding 375 points mean **very high level** of technical preparedness (see table 6).

Table 6

Determination of technical preparedness level by "Run" criterion

Criterion «Run»	Technical preparedness level
Less than 103 points	Low level
From 103 to 239 points	Middle level
From 239 to 375 points	High level
Exceeding 375	Very high level

Estimation of technical preparedness level by all criteria in sum with criterion value less than 251 points, we determine **lower level** of technical preparedness. Criterion from 251 to 643 points means **middle level** of technical preparedness, criterion from 643 to 1035 points means **high level** of technical preparedness and indicators exceeding 1035 points mean **very high level** of technical preparedness (see table 7).

Table 7.

Determination of technical preparedness level by the sum of criteria "Pitch, Hit & Run"

Criteria «Pitch, Hit & Run»	Technical preparedness level
Less than 251 points	Low level
From 251 to 643 points	Middle level
From 643 to 1035 points	High level
Exceeding 1035	Very high level

Then, technical preparedness level of experimental group baseballers (n=50) and control one (n=50) before and after pedagogical experiment which was pointed at raising of technical preparedness level [1, 2].

Results of technical preparedness indicators of control group baseballers before and after experiment, which are given in figure 1, attest low level of throw and run; middle level of hits and all total points of all technical preparedness criteria, whose indicators' changes are not authentic.

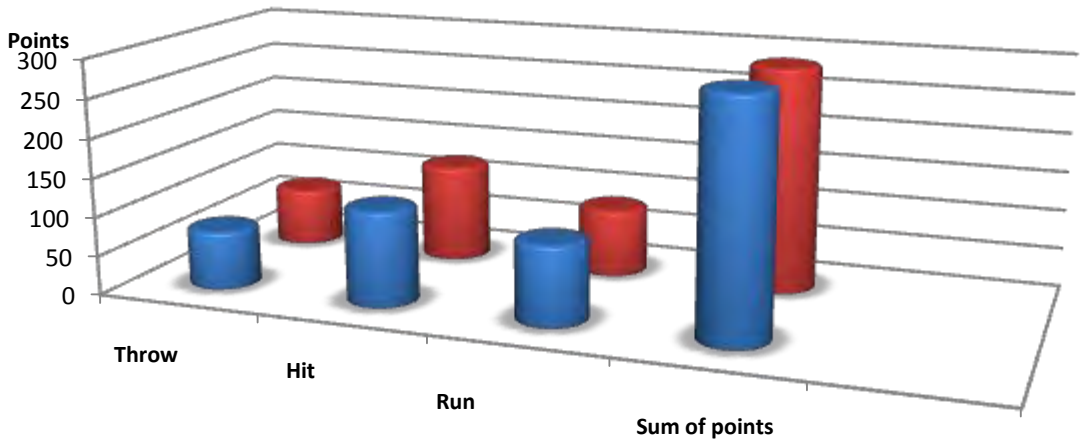

Fig. 1. Technical preparedness level of control group baseballers (n=50) before and after experiment.

Notes: **- before experiment,** **- after experiment**

Studying of technical preparedness level of experimental group baseballers before and after experiment showed essential changes of indicators which reflect the level of technical skillfulness (see fig. 2). Thus, throw results before

and after experiment are 75 and 375 points correspondingly (p<0,001), that complies with the growth of indicators of technical preparedness from low to high level (see table 1); hit results are 168 and 316 points (p<0,001), that attests the growth of indicators of technical preparedness from middle to high level (see table 2); technical preparedness level in running, being equal to 87 and 308 points before and after experiment correspondingly, and being proved authentically and by the data of table 3, reflects the transfer from low to high level of technical preparedness for the period of experiment. As far as the level of technical preparedness by points sum concerns, we can observe significant increase from 333 to 999 points, i.e. three times rise, (see table 4) and it is the transfer from middle to high level of baseballers' technical skillfulness.

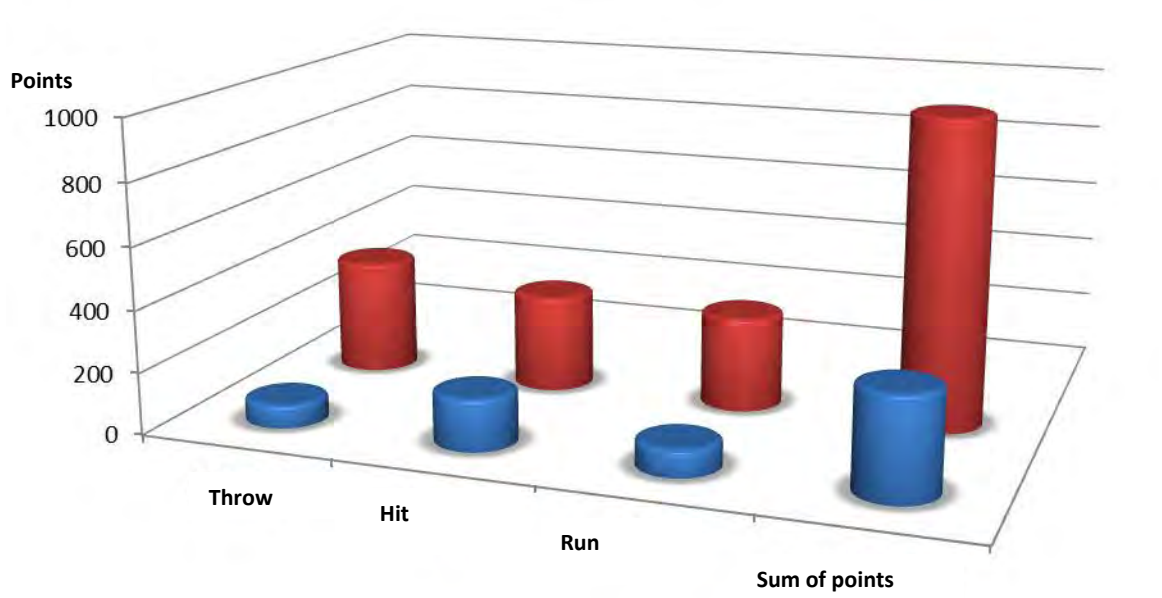

Fig. 2. Technical preparedness level of experimental group baseballers (n=50) before and after experiment.

Notes: **- before experiment,** **- after experiment**

Before the start of pedagogical experiment control and experimental groups did not differ authentically by technical preparedness indicators, but ater experiment, control and experimental groups became different authentically by such criteria of technical preparedness as throw (p<0,001), hit (p<0,001), run (p<0,001).

Summary:

1. Maximal achieved indicators of some baseball skills have been determined on the base of analysis of the best results of competitions by program Aquafina MLB Pitch, Hit & Run» among winners and prize winners in 2006-2007. Thus "Pitch" presented 450 points, test "hit" presented 402 points, test "run" – 361 points and indicators of summed points were 1043 points.
2. Basing on the system of estimation of skills, reflecting preparedness by Aquafina MLB Pitch, Hit & Run» program, the scale of baseball skills level estimation has been developed for baseballers of 12-14 years old.
3. Comparative analysis of technical preparedness levels of control and experimental groups before and after experiment has been carried out. Significant advantage of experimental group in comparison with control one has been revealed after technical preparedness experiment with the control group and it has been authentically proved (p<0,001).
4. The obtained results give foundation to recommend the improved methodology for estimation of young baseballers' technical preparedness level.

Further researches are offered to be conducted in direction of development technical preparedness estimation methodology for softball.

References:

1. Agapov D.V., Syshko D.V. *Pedagogika, psihologia ta mediko-biologicni problemi fizicnogo vihovanna i sportu* [Pedagogics, psychology, medical-biological problems of physical training and sports], 2009, vol.4, pp. 3-6.
2. Agapov D.V., Syshko D.V., Pavlenko V.B. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2012, vol.1, pp. 3-7.
3. Venger V. M. *Struktura i diagnostika special'noj fizicheskoj podgotovlennosti bejsbolistov* [Structure and diagnostics of the special physical preparedness of baseball players], Cand. Diss., Kiev, 2002, 188 p.

4. Doroshenko E.Iu., Shalfieiev P.O. *Pedagogika, psihologia ta mediko-biologicni problemi fizicnogo vihovanna i sportu* [Pedagogics, psychology, medical-biological problems of physical training and sports], 2012, vol.4, pp. 63-67.
5. Kozina Zh.L. *Teoretiko – metodicheskie osnovy individualizacii uchebno-trenirovochnogo processa sportsmenov v igrovykh vidakh sporta* [Theoretical and methodical bases of individualization of educational training process of sportsmen in the playing types of sport], Dokt. Diss., Kiev, 2010, 45 p.
6. Krucevich T.Iu. Metodichni rekomendaciyi dlia viznachennia fizichnoyi pidgotovlenosti shkoliariv metodom indeksiv [Methodical recommendations for determination of physical preparedness of schoolchildren by the method of indexes], Kiev, Scientific World, 2006, p. 5
7. Maksimenko I.G. *Teoretiko-metodichni osnovi bagatorichnoyi pidgotovki iunikh sportsmeniv u sportivnikh igrakh* [Theoretical and methodical bases of long-term preparation of young sportsmen in sporting games], Dokt. Diss., Kiev, 2010, 44 p.
8. Matveev L.P. *Osnovy obshchej teorii sporta i sistemy podgotovki sportsmenov* [Bases of general theory of sport and system of preparation of sportsmen], Kiev, Olympic Literature, 2002, 319 p.
9. Platonov V.N. *Obshchaia teoriia podgotovki v Olimpijskom sporte* [A general theory of preparation in Olympic sport], Kiev, Olympic Literature, 1997, 340 p.
10. Platonov V.N. *Sistema podgotovki sportsmenov v olimpijskom sporte* [The system of preparation of sportsmen in Olympic sport], Kiev, Olympic Literature, 2004, 808 p.
11. Jerry Kindall, John Winkin. *The Baseball Coaching Bible*. Human Kinetics. 2000, 384 p.
12. Bob Bennett. *The baseball drill book*. Human Kinetics, 2004, 311 p.
13. Schupak Marty. *Youth baseball drill*. Human Kinetics, 2010, 184 p.

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