PHYSICAL CONDITION LEVEL OF JUNIOR ICE HOCKEY PLAYERS – DIFFERENCES BETWEEN LEAGUE AND NATIONAL TEAM

SÝKORA JOZEF – BRŰNN DAVID – PUPIŠ MARTIN
Department of Physical Education and Sports, Faculty of Arts, Matej Bel University in Banská Bystrica, Slovakia

ABSTRACT

Every single sport game has a specific scouting system, which is crucial for choosing best possible players with the highest potential for future success. The main purpose of this study was to compare fitness level of Slovak national U18 ice hockey team with Slovak league youth team and to determine whether there are big differences in maximal and explosive strength between them or not. Two samples (19 players each) were intentionally choosed according age criterion and participated in pre season testing in Squat jump test, Counter-movement jump test, Heavy back squat and Benchpress maximum. Myotest Pro and Fitrodyne devices had been used. National U18 team players achieved significant better score in Squat jump ($p = 0.0001$, $\eta^2 = 0.55$), Counter-movement jump ($p = 0.001$, $\eta^2 = 0.3$) and Benchpress max. ($p = 0.004$, $\eta^2 = 0.23$). There were no significant differences in Back squat max. test, however large effect size was achieved ($p = 0.17$, $r = 0.52$). National U18 team players are stronger, when it comes about maximal and explosive strength parameters than same age Slovak league team players. Results might serve as a prerequisities for joining the national team supported by high level performance during ice hockey game.

Key words: ice hockey, physical condition level, league team, national team, junior players

INTRODUCTION

Nowadays, the professional sport is becoming too much competitive and every single detail creates a huge difference in final performance. Sport is every day more challenging and it demands enormous stress on physical aspect of athletes performance, therefore we must really organize wisely strength and conditioning training since early years of players careers. William (2004) is also writing about importance of conditioning, which is the key element for success in any Hockey League. Not surprisingly, several articles have described the components of ice hockey conditioning programs supported by scientific clarification However, if we want to know what direction of conditioning we should follow, we need to test our athletes or players. All NHL strength & conditioning coaches recommend testing athletes. It is useful because it identifies team and individual strengths and weaknesses. We also find out areas that need to be improved, or we see the efficiency of the program (Harmann, 2000). As Albert (1998) and Cox (1992), we tested only anaerobic system based skills because of primarily anaerobic character of ice hockey. We agree with Hedlund (2017), who examined player's fitness level and performance, compared them with teams by which they were choosed and found a correlation between NFL Scouting and later team´s success in the NFL. Potteiger et. al. (2010) examined in his study relationships between laboratory tests and on-ice skating performance in men's ice hockey athletes. He found out, that laboratory testing of select variables can predict skating performance in ice hockey athletes. For us it means, that there is some relationship between general conditioning test and on-ice performance. Eventhough this correlation is linked to skating only,

this component is essential in ice-hockey and makes the difference. This case was also objective of the Behm (2005) study, where he determined the relationship between specific performance measures and hockey skating speed. Thirty competitive secondary school and junior hockey players were timed for skating speed. Off-ice measures included a 36.9 m sprint, squat jump, drop jump, 1 repetition maximum leg press, flexibility and balance ratio. This author found significant correlation between skating performance and balance test. Burr et. al. (2008) determined predictors of potentially successfull NHL players. These authors were finding relationship of physical fitness test results and ice hockey playing potential in elite-level ice hockey players. They concluded that physical fitness measurements and anthropometric data are definitely valuable for helping to predict ice hockey playing potential.

AIM

The main purpose of this study was to figure out if there are any differences in physical condition level between national team junior ice hockey players and slovak league youth team ice hockey players therefore to identify if there are physical prerequisites for joining national team.

METHODS

Our intentionally choosed sample consisted of 38 same age proffesional ice hockey players from whose 19 players are part of slovak national ice hockey team U18 (Age 16.32 ± 0.82) and 19 players are part of slovak junior league ice hockey team HC ´05 Banská Bystrica (Age 16.74 ± 0.45). Both groups participated

on preseason testing of fitness abilities and this research was targeted mostly on strength parameters such as explosive strength tests and maximal strength tests. Both groups participated on Myotest squat jump test where height parameter was monitored and same it was in counter movement jump test. These two test were indicators of explosive strength. For maximal strength of upper body Benchpress test diagnostic series was used monitored via Fitrodyne device and for maximal strength of lower body Weighted squat test was used monitored via Fitrodyne device as well. Myotest is 2D accelerometer with a 500Hz frequency sensoring ability. Fitrodyne is device working on a principle of registration location, speed of movement and known weight of the barbell. For data evaluation we used Tables and Figures due to better interpretation. Statistical methods such as Mann-Whitney U-test or F-test for 2 independent sample and effect size were calculated for comparing 2 samples. For data interpretation causal and relation analysis was used, synthesis, induction and deduction, where our effort was oriented on create practical conclusions for sport and ice-hockey. During data evaluating we used quantitative methods such as percentage, central tendency variables (aritmetic mean, standard deviation), For statistical significance and effect size calculation Microsoft Excel and SPSS software had been used.

RESULTS AND DISCUSSION

For results calculation we used SPSS v19 software and Microsoft Excel software. First of all, we calculated if our data has normal distribution. Only max. Squat test both groups had a normal distributed data so we could used F-test for 2 independent samples for calculating whether there is significant difference in max. Squat score between youth team of Banská Bystrica and U18 slovak team players. We also calculated effect size for practical relevance. Results are presented in **Figure 1.**

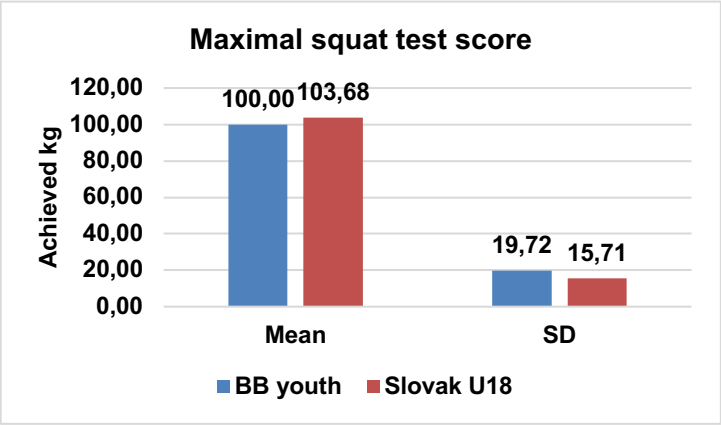

Figure 1 Maximal squat score of teams

In **Figure 1** you can see that Slovak U18 players achieved not significant better score with high effect size ($p = 0.17$, $r = 0.52$) in maximal squat test.

Another compared variables were explosive strength parameters. Since there were not normal distribution of data in these tests, Mann-Whitney U-test non-parametric method was used supported by effect size calculation.

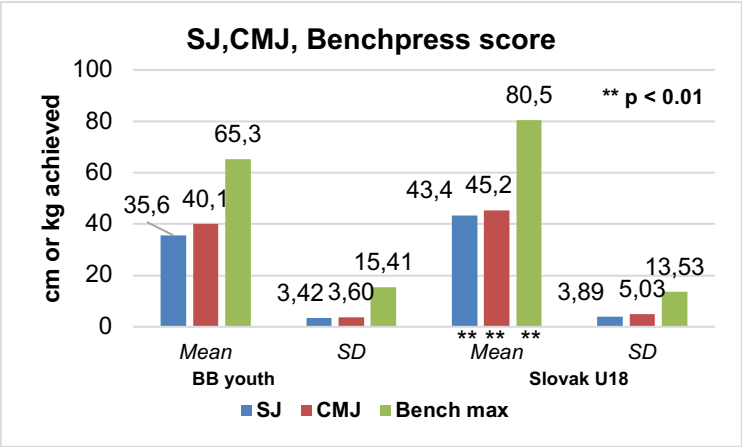

Figure 2 SJ, CMJ and Benchpress team comparison

In **Figure 2** there are presented results of others tests. In SJ test, Slovak U18 team achieved significantly better score than BB youth team with high effect size ($p = 0.0001$, $\eta^2 = 0.55$). In CMJ test, results were very similar but medium effect size was achieved. Still Slovak U18 was significantly better ($p = 0.001$, $\eta^2 = 0.3$). Finally in maximal Benchpress test Slovak U18 team achieved significantly better score as well ($p = 0.004$, $\eta^2 = 0.23$). It seems, that Slovak U18 test is better physicaly prepared and it might be the factor why players are members of the team.

CONCLUSION

In every sport it seems, that athletes in best teams are a little bit higher level than others in lower leagues. Our research showed, that Slovak national U18 team players are significantly stronger, when it comes about maximal and explosive strength comparison than same age players from Slovak league team. This finding is confirming basic idea, that more prepared players are performing better and this difference is often deciding about winner or loser during ice hockey match. Although it is not a condition, in most of the top leagues like NHL etc. players are intentionally choosed by scouts according specific tests scores, which are indicative for correct prediction of future player´s potential. We have now clearer perception about what is current level of slovak league young player and what might be prerequisites for becoming succesfull member of Slovak national U18 team.

REFERENCES

1. ALBERT, F. Dynamic track training for ice hockey. In *Strength Conditioning Journal.* 20:65–73. 1998.
2. BEHM, D. B. et. al. Relationship between hockey skating speed and selected performance measures. In *Journal of Strength and Conditioning Research*. 2005, 19(2), 326-331
3. BURR, J. F. et. al. 2008. Relation of physical fitness test results and hockey playing potential in elite-level ice hockey players. *In Journal of Strength and Conditioning Research*. 22(5)/1535–1543. Available from: https://www.researchgate.net/publication/224766684_Relation_of_physical_fitness_test_results_and_hockey_playing_potential_in_elite-level_ice_hockey_players

4. COX, M.H., D.S. MILES, T.J. VERDE, AND E.C. RHODES. Applied physiology of ice hockey. In *Sports Medicine.* 19:184–201.
5. HARMANN, E., AND C. PANDORF. 2000. Principles of test selection and administration. In: *Essentials of Strength Training and Con- ditioning.* T.W. Baechle and R.W. Earle, eds. Champaign, IL: Human Kinetics, 2000. pp. 275–286.
6. HEDUND, D.P. 2017. Performance of future elite players at the NFL Scouting Combine. In *The Journal of Strength and Conditioning Research*. September 2017. Available from: https://www.researchgate.net/publication/319949343_Performance_of_future_elite_players_at_the_NFL_Scouting_Combine
7. POTTEIGER, J. et. al. 2010. Relationship Between Body Composition, Leg Strength, Anaerobic Power, and On-Ice Skating Performance in Division I Men's Hockey Athletes. In *Journal of Strength & Conditioning Research*: July 2010 - Volume 24 - Issue 7 - pp 1755-1762. Available from: http://journals.lww.com/nsca-jscr/Abstract/2010/07000/Relationship_Between_Body_Composition,_Leg.9.aspx
8. WILLIAM P.E. – CARROLL, M. – SIMENZ, J. 2004. STRENGTH AND CONDITIONING PRACTICES OF NATIONAL HOCKEY LEAGUE STRENGTH AND CONDITIONING COACHES. *In Journal of Strength and Conditioning Research*, 2004, 18(4), 889–897

APPENDICES

APPENDIX A BB youth team score sheet

	BB youth team			
	SJ	CMJ	Squat max	Bench max
P1	39,5	38,5	80	70
P2	32,5	36,4	80	80
P3	38,1	46	80	80
P4	36,8	39,5	80	100
P5	42,3	44,9	70	90
P6	33,5	38,5	120	50
P7	39,1	43	110	80
P8	36,4	37,8	100	70
P9	33,2	40,2	110	100
P10	33,2	39,9	130	80
P11	31,6	36,8	130	70
P12	34,1	38,5	80	80
P13	31,6	35,4	130	80
P14	41,6	49,4	80	90
P15	32,2	40,5	110	110
P16	35,8	41,3	100	70
P17	34,8	39,5	110	80
P18	31,6	35,8	110	80
P19	38,1	39,5	90	70
Mean	35,58	40,07	100,00	80,53
SD	3,42	3,60	19,72	13,53

APPENDIX B U18 slovak team score sheet

	U18 slovak team			
	SJ	CMJ	Squat max	Bench max
P1	44,8	45,6	90	50
P2	44,6	47,8	120	40
P3	48,1	47,7	110	50
P4	46	40,1	120	40
P5	40,1	39,8	120	50
P6	48,1	48,6	110	70
P7	45,1	58,5	120	80
P8	39,1	41,5	80	70
P9	38,8	42,3	120	70
P10	47	51,2	100	70
P11	38,6	44,2	90	80
P12	39,9	47,1	90	40
P13	44,1	42,7	80	80
P14	46,4	43,4	100	70
P15	45,9	51	120	70
P16	37,7	37,6	110	70
P17	50,2	45,9	120	90
P18	42	43,5	80	80
P19	38,9	39,6	90	70
Mean	43,44	45,16	103,68	65,26
SD	3,89	5,03	15,71	15,41