

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/345312984>

HAMSTRING –THE MOST COMMON INJURY IN FOOTBALL. IS SLOVAK FORTUNA LEAGUE TEAM BETTER THAN PREMIER LEAGUE TEAM IN HAMSTRING STRENGTH?

Conference Paper · April 2019

CITATIONS

0

3 authors, including:



David Brůnn

Univerzita Mateja Bela v Banskej Bystrici

14 PUBLICATIONS 1 CITATION

[SEE PROFILE](#)



Jozef Sýkora

Univerzita Mateja Bela v Banskej Bystrici

8 PUBLICATIONS 1 CITATION

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



I am working on the HIIT and its impact to the cross-country skiing double poling performance [View project](#)



Injury prevention in sport [View project](#)

HAMSTRING – THE MOST COMMON INJURY IN FOOTBALL. IS SLOVAK FORTUNA LEAGUE TEAM BETTER THAN PREMIER LEAGUE TEAM IN HAMSTRING STRENGTH?

David BRŮNN, Jozef SÝKORA, Roman ŠVANTNER

Department of Physical Education and Sports, Faculty of Arts, Matej Bel University in Banská Bystrica, Slovakia

Supervisor: doc. PaedDr. Martin Pupiš, PhD

ABSTRACT

Importance of hamstring strength and mutual influence between strength and hamstring injuries is a big phenomenon nowadays. Main purpose of our study was to compare the average Premier League hamstring strength score with Slovak Fortuna League team and consider differences in hamstring strength level among the mentioned leagues as well as come up with benchmark for coaches about how much force is needed to be produced in muscles. Our research sample consisted of 25 probands from Fortuna League club ŽP Šport Podbrezová, which we were comparing with average number of Premier League teams (Vald Performance, 2015). We used NordBord device from Vald Performance for testing and we were also evaluating the final hamstring strength in Newtons. The results showed that Slovak team had both results better than average of Premier League teams. It means higher hamstring strength score about 2.67 N (0.65 %), smaller laterality about 2.78 N (28.08 %). Our results also showed that the strongest Premier League team had in average about 43.33 N (9.52%) stronger hamstrings than ŽP Šport Podbrezová and the weakest Premier League team had about 53.67 N (14.99 %) lower hamstring strength than players from ŽP Šport Podbrezová.

We found out that ŽP Šport Podbrezová would have been among the best teams in Premier League hamstring strength ranking, what is great message for Slovak football and strength coaches. In addition we recommend the benchmark 410 N hamstring force production ability and lower limb difference under 10 %, what is required for playing on the highest level with low risk of injury.

Key words: Hamstring strength, football, injury

INTRODUCTION

Injuries in football are one of the biggest threats for players, coaches, football managers and also for club owners.

After Premier League season 2016/2017, there were lost 20576 days due to all types of injuries. Total number of significant injuries was 614 and 180 437 380 pounds wage bills were payed to injured players. Specifically the amount of hamstring injuries raised to the number 150, with 4165 missed training and game days, which were followed by knee injuries (119 injuries, 3396 days missed), ankle injuries (101 injuries, 2650 days missed), illness (72 illnesses, 459 days missed), groin strains (60 strains, 1336 days missed) and at

the end of the most common injury list were calf injuries (40 injuries, 510 days missed) (Coates, 2017).

Hamstring injuries ended up on the first place out of all injuries in Premier League (12%). In average it means 5 injuries for one club, 15 missed games, or 90 days without game or serious training. For example in NFL there were 180 hamstring injuries per season. Next interesting fact is, that males has 64 % higher chance to hamstring injuries than females. Also the chance to hamstring injury return is in average 16 % in european soccer leagues (Brukner et. al, 2016).

Hägglund et al. (2009), Ekstrand et al. (2011), Woods et al. (2004) found out, that hamstring strain injuries (HSI) are the most common cause of lost playing and training in elite soccer, what makes approximately 37 % of all muscle strain injuries. This findings are also confirming the research of Coates (2017). In addition, these HSIs mostly occur in the biceps femoris long head (Hägglund et al. 2009, Ekstrand et al. 2011, Woods et al. 2004).

Despite a massive scientific effort over the past few years, strength coach's interventions and expectations, the number of HSIs in elite soccer has still not dramatically declined (Ekstrand et al. 2013). It is known that increasing age and injury history have been shown to increase the risk of a future HSI in elite soccer (Arnason et al. 2004, Hägglund et al. 2006, Engebretsen et al. 2010). Recently greater attention has been focused to modifiable risk factors as a broad range of interventions, strength training, corrective exercising etc. (Bahr, Holme, 2003, Opar et al., 2015, Croisier, 2008). These risk factors we can assess by isokinetically measured eccentric knee flexor strength (Croisier, 2008) and muscle imbalances (between right and left hamstring, quadriceps and hamstring strength ratios).

Timmins et al., (2015) in the 2014-2015 A-League (professional Australian football league) realized preseason and season tests, which showed correlation between hamstring strength and risk of hamstring strain injuries in football. Players, whose eccentric strength (in the Nordic Hamstring test, measured on NordBord system) was under 337 N of force at the end of the 2014-15 preseason, had on average 4.4 times bigger chance to have a hamstring strain injury in the upcoming season. Their research also showed that eccentric hamstring strength could overcome also unmodifiable risk factors as age and previous injury. Previous hamstring injury is increasing the risk of return about 16 % as says Brukner et. al (2016). Specifically, players scoring over 500 N on each leg showed indistinguishable levels of hamstring injury risk (Timmins, et al., 2015).

The aim of this study was to compare hamstring strength between Premier League standards and Slovak Fortuna League team.

METHODS

Subjects

Our sample consisted of 25 elite Slovak Fortuna League team players from ŽP Šport Podbrezová, which we compared with sample of 649 professional Premier League football players after 2017/2018 season.

Study design

Our measurements took a part during december 2018 in FitFactory Nemce, where athletes participated on Nordic Hamstring strength test. For Nordic Hamstring strength assesment we used NordBord Hamstring testing system. This system evaluates the average and maximal force (by applying force to the ankle hooks to two force cells) which can be generate primary by athletes's hamstrings in Newtons [N], we can also see torque [Nm] and percentual limb difference. In our report, references to „strength“ refer to the average of left

and right leg maximal strength. Our athletes performed 2 tries of maximal eccentric effort with both limbs at the same time. Before this specific test athletes used their standard „pre-strength training“ warm up. Between these two tries athletes had 1 min of break. Premier League athletes were tested 6 times over the course of the 2017/2018 preseason.

Statistical analysis

In this study we used synthesis, induction and deduction for elicit the conclusions utilizable for sport's use. During executing and obtaining results we used quantitative methods, mostly percentage and central tendency methods such as arithmetic mean, via Microsoft Office Excel 2016 software.

RESULTS

According to our analysis we can see, that average hamstring strength in Premier League 2017/2018 was 409 N (Vald Performance, 2015). Slovak Fortuna League players from ŽP Šport Podbrezová had in average 411.67 N (0.65% difference).

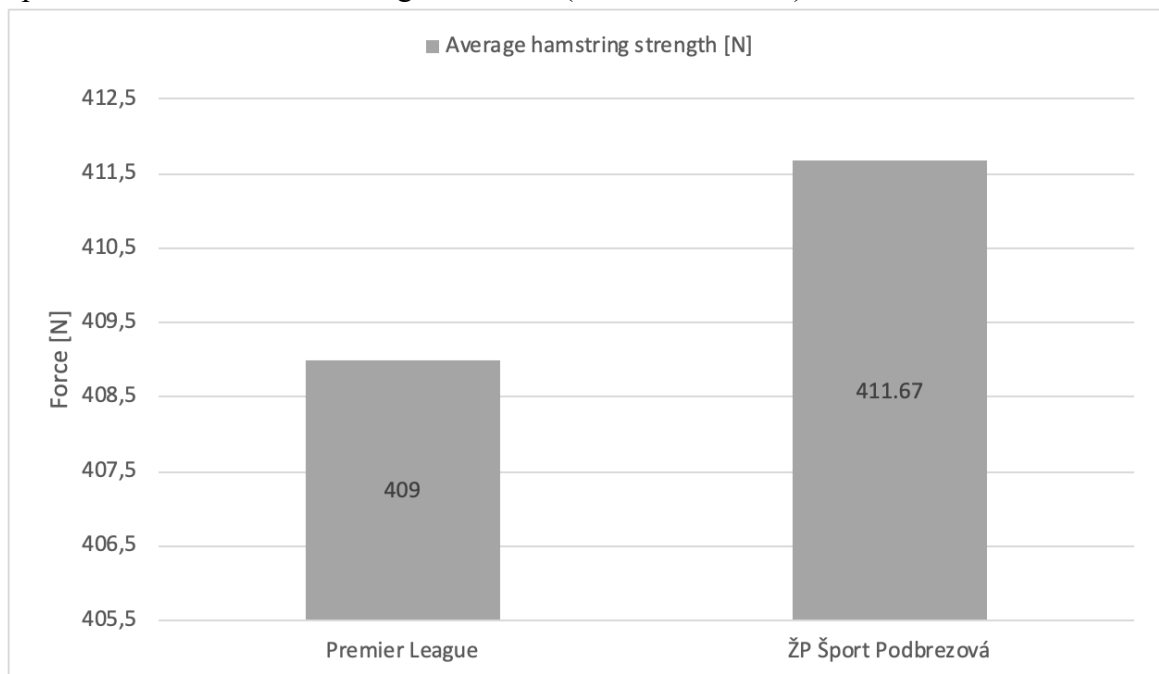


Fig. 1 Average hamstring strength in Premier League and Fortuna League club

In Figure n. 1 we can see, that Slovak Fortuna League club was in terms of hamstring strength above the level of Premier League average hamstring strength.

The average hamstring strength difference (between right and left leg) was in Fortuna League team 7.12 % and 9.9 % (Vald Performance, 2015) in Premier League teams.

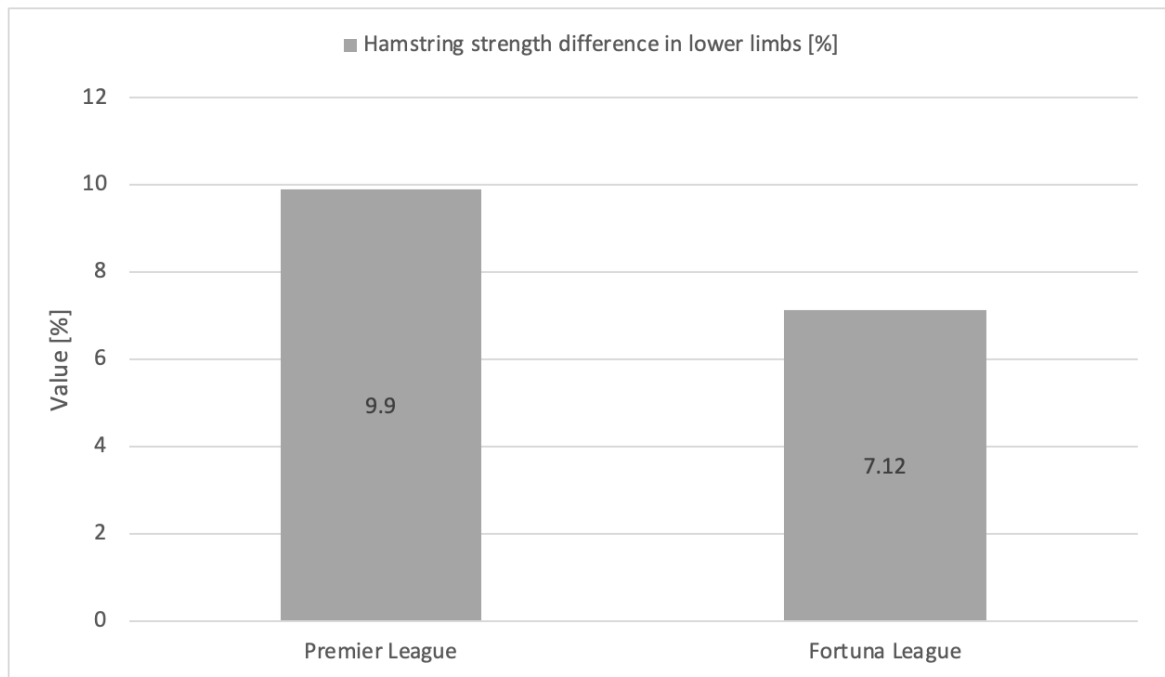


Fig. 2 Hamstring strength difference between right and left leg

Not only the average strength, but also hamstring strength difference between lower limbs was lower in Fortuna League club ŽP Šport Podbrezová (28.08%). To lower the risk of hamstring injuries in the team, each athlete should have laterality less than 10 % (Vald Performance 2015).

For the contrast we are adding also the strongest and weakest team in terms of hamstring strength score.

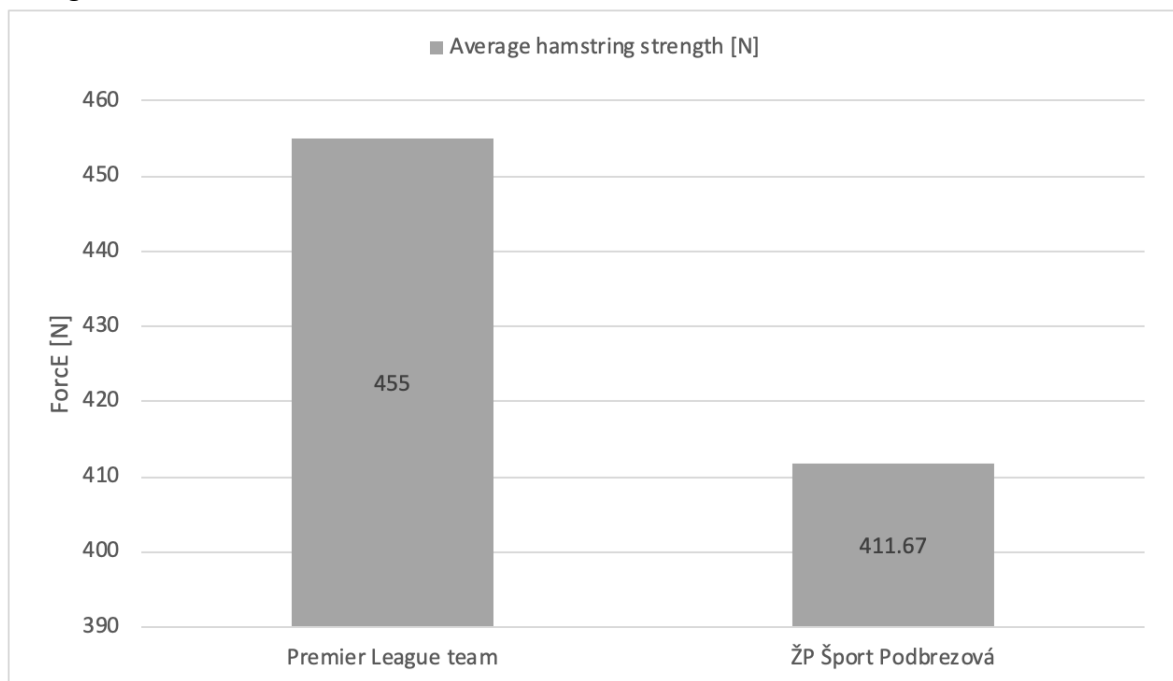


Fig. 3 The Best Premier League team (hamstring strength) in comparison with Futuna League club.

As far as the Premier League average hamstring strength level is below Slovak Fortuna League club, the best Premier League team (in terms of hamstring strength) (Vald Performance, 2015) had about 43.33 (N) (9.52 %) higher score, that our sample from ŽP Šport Podbrezová.

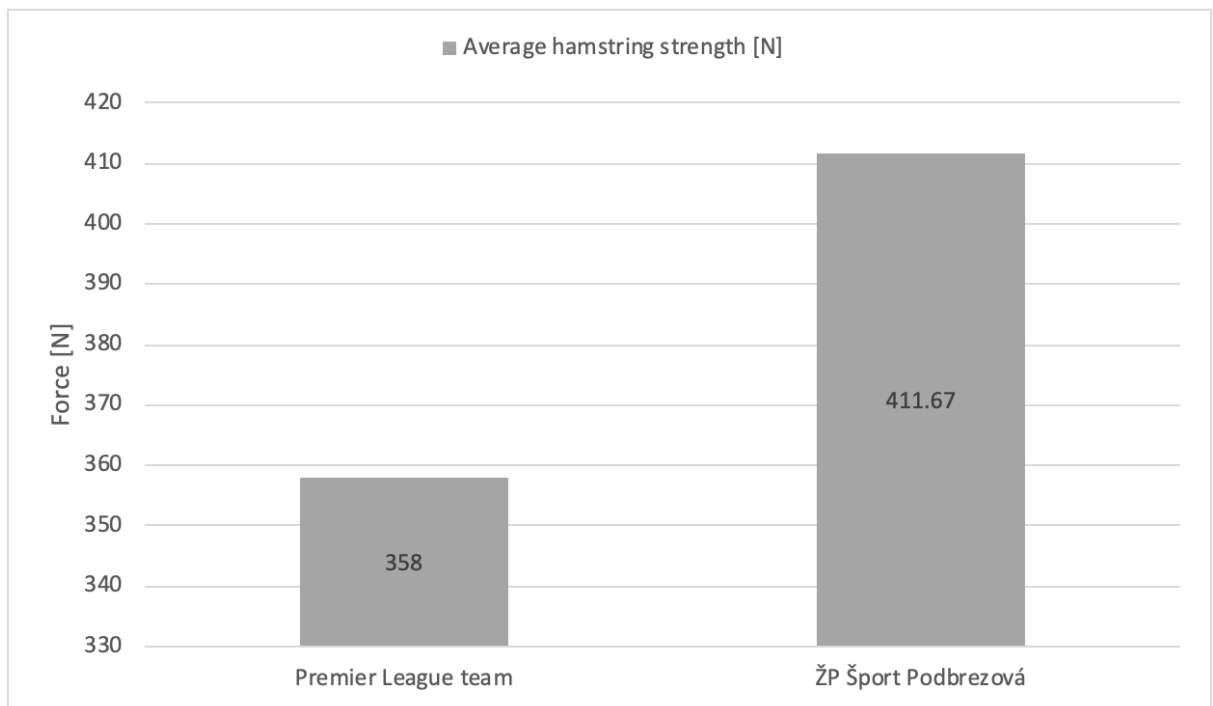


Fig. 4 The weakest Premier League team (hamstring strength) in comparison with Fortuna League club

At the end we can also see the same difference between the weakest Premier League team (Vald Performance, 2015) and ŽP Šport Podbrezová (53.67 N, 14.99 %).

Important fact to mention is the importance of having less than 10 % strength difference between right and left hamstring to perform on highest level with low risk of injury (Vald Performance, 2015). For the same reason players should generate more than 410 N with both legs.

DISCUSSION

In our pilot research we were comparing the average hamstring strength and strength differences between right and left leg in all Premier League teams and Slovak Fortuna League team ŽP Šport Podbrezová.

We were comparing the data from Vald Performance (2015) and we obtained very surprising results. These showed, that Slovak Fortuna League team had higher average hamstring strength score (2.67 N) and smaller laterality about (2.78 N), than Premier League average. Our results also showed, that the strongest Premier League team had in average about 43.33 N stronger hamstrings than ŽP Šport Podbrezová and the weakest Premier League team had about 53.67 N less hamstring strength than players from ŽP Šport Podbrezová. We also found, that our Fortuna League club would have ended up on fourth place in terms of hamstring strength in Premier League what is also very unexpected finding. These findings mean, that our Fortuna League team is in terms of hamstring strength ready to play on the highest level of world football. Because we were also constructing the strength

and conditioning program for ŽP Šport Podbrezová, these findings are giving us positive feedback of our work.

In addition we brought up the benchmark 410 N and laterality under 10 % (Vald Performance, 2015) for hamstrings ready to play the highest level of football. It means, that if our players can produce more than 410 N and have laterality under 10 %, we are about to have lower the risk of HSIs.

In Slovakia there is only 1 NordBord device so far, so we are not able to compare our results with another Slovak Fortuna League teams.

Our research added value to the Vald Performance (2015) research, because we had datas from lower level of football and created trend for next correlations and benchmarks.

For the future research it would be interesting to have datas from every single Slovak Fortuna League team to create the same average as the Premier League has. It would be also interesting to compare the highest Czech league with our Fortuna League.

CONCLUSION

In our research we were expecting, that in terms of hamstring strength, Slovak Fortuna League team can not be better than most of the Premier League teams. We were wrong.

In a sport community there are a lot of assumptions about importance of hamstring strength in football and relation between hamstring strength and injuries. This problem is big and we first decided to find out, if we are strong enough for the highest level of football.

Vald Performance (2015) collected data from all teams in Premier League and they found out, that there was the average hamstring strength 409 N. In our Fortuna League team the average hamstring strength was 411.67 N, with lower laterality about 2.78 % than Premier League average. It says that in terms of strength, we are ready for the highest level of football.

Our work can be big contribution for Slovak football coaches, managers and club owners. It can provide great insight to the strength and conditioning world for coaches and give them new context.

It is important to note, that it is common in English Premier League to use NordBord device as a part of training process, where they can use a real time feed-back of data for evaluation inter-reps or inter-sets fatigue etc. In Slovakia is only one NordBord, what is maybe the only one limitation of our work. On the other side, in our next work, we would like to bring information, correlations and datas from Slovak national football U16, U17 and U18 team. We also want to compare the hamstring strength of the teams from the Slovak highest and second league.

References

- Arnason, A., Sigurdsson, S. B., Gudmundsson, A. et al. (2004). Risk factors for injuries in football. *American Journal of Sports Medicine*, 321 Suppl:5S–16S. doi: 10.1177/0363546503258912
- Bahr, R., Holme, I. (2003). Risk factors for sports injuries—a methodological approach. *British Journal of Sports Medicine*, 37:384–92. doi: 10.1136/bjsm.37.5.384
- Brukner, P. (2015) Hamstring injuries: prevention and treatment-an update. In *British Journal of Sports Medicine*, 49:1241-1244. doi:10.1136/bjsports-2014-094427
- Coates, C. (2017, May 22.). English Premier League Injury Analysis: 2016/2017 Season. Retrieved from <https://www.physioroom.com/info/english-premier-league-injury-analysis-201617-season/>

- Croisier, J.L., Ganteaume, S., Binet, J. et al. (2008). Strength imbalances and prevention of hamstring injury in professional soccer players: a prospective study. *American Journal of Sports Medicine*, 36:1469–75. doi: 10.1177/036354650831764
- Ekstrand, J., Häggglund, M., Kristenson, K., et al. (2013). Fewer ligament injuries but no preventive effect on muscle injuries and severe injuries: an 11-year follow-up of the UEFA Champions League injury study. *British Journal of Sports Medicine*, 47:732–7. doi:10.1136/bjsports-2013-092394
- Ekstrand, J., Häggglund, M., Walden, M. (2011). Injury incidence and injury patterns in professional football: the UEFA injury study. *British Journal of Sports Medicine*, 45:553–8. doi: 10.1136/bjsm.2009.060582
- Engebretsen, A. H., Myklebust, G., Holme, I. et al. (2010). Intrinsic risk factors for hamstring injuries among male soccer players: a prospective cohort study. *American Journal of Sports Medicine*, 38:1147–53. doi:10.1177/0363546509358381
- Häggglund, M., Walden, M., Ekstrand, J. (2009). Injuries among male and female elite football players. *Scandinavian Journal of Medicine & Science in Sports*, 19:819–27. doi: 10.1111/j.1600-0838.2008.00861.x
- Häggglund, M., Walden, M., Ekstrand, J. (2006). Previous injury as a risk factor for injury in elite football: a prospective study over two consecutive seasons. *British Journal of Sports Medicine*, 40:767–72. doi:10.1136/bjsm.2006.026609
- Timmins, R., Bourne, M., Shield, A. J., Williams, M. D., Lorenzen, CH., Opar, D. (2015). Short biceps femoris fascicles and eccentric knee flexor weakness increase the risk of hamstring injury in elite football (soccer): a prospective cohort study. *British Journal of Sports Medicine*, 50:1524–1535. doi:10.1136/bjsports-2015-095362
- Opar, D., Williams, M. Timmins, R. et al. (2015). Eccentric hamstring strength and hamstring injury risk in Australian Footballers. *Medicine & Science in Sports & Exercise*, 47:857–65. doi:10.1249/MSS.0000000000000465
- Woods, C., Hawins, R. D., Maltby, S. et al. (2004). The Football Association Medical Research Programme: an audit of injuries in professional football—analysis of hamstring injuries. *British Journal of Sports Medicine*, 38:36–41. doi:10.1136/bjsm.2002.002352