

Est.  
1841

YORK  
ST JOHN  
UNIVERSITY

Harper, Damian, Forsdyke, Dale ORCID  
logoORCID: <https://orcid.org/0000-0003-4283-4356> and Thomas,  
Comyns (2017) Eccentric hamstring strength: Influence on leg  
stiffness and reactive strength in elite female youth soccer players.  
Journal of Sports Science, 35 (Sup3). s65.

Downloaded from: <https://ray.yorks.ac.uk/id/eprint/2668/>

The version presented here may differ from the published version or version of record. If  
you intend to cite from the work you are advised to consult the publisher's version:

<http://www.tandfonline.com/doi/full/10.1080/02640414.2017.1378421>

Research at York St John (RaY) is an institutional repository. It supports the principles of  
open access by making the research outputs of the University available in digital form.  
Copyright of the items stored in RaY reside with the authors and/or other copyright  
owners. Users may access full text items free of charge, and may download a copy for  
private study or non-commercial research. For further reuse terms, see licence terms  
governing individual outputs. [Institutional Repository Policy Statement](#)

# RaY

Research at the University of York St John

For more information please contact RaY at [ray@yorks.ac.uk](mailto:ray@yorks.ac.uk)

## Important notes:

Only abstracts submitted using this template will be considered.

Please do **NOT** enter author and affiliation details on this form. You will be able to enter this information online when you submit the abstract.

Please do **NOT** write outside the boxes. Any text or images outside the boxes will be deleted.

Please do **NOT** alter this form by deleting parts of it or adding new boxes. Simply enter your information into the boxes. The form will be automatically processed – if you alter it your submission will not be processed correctly.

Save this file in **.doc or .docx** format.

**Abstract title:**

Eccentric hamstring strength: Influence on leg stiffness and reactive strength in elite female youth soccer players

**Abstract** [max 400 words, containing no tables or figures, sub-headings or paragraph breaks]:

(Your abstract must use Normal style and must fit into the box. Please do not enter author or affiliation details).

---

There is strong evidence that eccentric hamstring strength can be increased through high compliance with the Nordic hamstring exercise (NHE), leading to substantial injury rate reduction (of up to 51%) in soccer players (Al Attar, Soomro, Sinclair, Pappas & Sanders, 2017, *Sports Medicine*, 47, 907-916). Leg stiffness and reactive strength have important performance and injury implications, however there is a paucity of research that has investigated how eccentric hamstring strength in the NHE may influence these metrics particularly in female and youth populations. Therefore, the aim of this study was to examine the influence of eccentric hamstring strength on measures of leg stiffness and reactive strength in elite female youth soccer players. Following institutional ethical approval eighteen players (age:  $14.5 \pm 1.1$  years; stature:  $1.58 \pm 0.06$  m; body mass:  $49.7 \pm 7.6$  kg) were assessed for: (1) eccentric hamstring strength during the NHE measured using load cells attached to the ankle straps on the Hamstring Solo Elite (NJ Doherty Solutions, Ireland) and (2) leg stiffness (Dalleau, Belli, Viale, Lacour & Bourdin, 2004, *International Journal of Sports Medicine*, 25, 170-176) and reactive strength index (RSI) calculated from the average of the best 5 in a series of 10 maximal repeated bilateral hops (10/5 repeated jump test (RJT), Harper, Hobbs & Moore, 2011, *BASES Student Conference*). Players were grouped according to average peak eccentric hamstring force (N) of both legs ( $> 228$  N: ECC<sub>high</sub>;  $< 228$  N: ECC<sub>low</sub>). Differences in leg stiffness and RSI between groups were analysed using magnitude-based inferences (Hopkins, 2007, *Sportscience*, 11, 16-20). Differences in jump height and leg stiffness obtained during the 10/5 RJT were *unclear* between ECC<sub>low</sub> and ECC<sub>high</sub>, whereas *likely* lower ground contact times (GCT) and higher RSI were found in players with ECC<sub>high</sub> (GCT,  $0.19 \pm 0.02$  s; RSI,  $1.34 \pm 0.27$ ) compared to ECC<sub>low</sub> (GCT,  $0.21 \pm 0.03$  s; RSI,  $1.14 \pm 0.22$ ). In addition to reducing injury rates higher eccentric hamstring strength in the NHE can enhance reactive strength qualities mainly by reducing the time on the ground in which jump height is obtained. These findings have important implications for soccer performance in which the production of force during very short ground contact times is repeatedly required.