10. Ramskov D, Barton C, Nielsen RO, Rasmussen S. High eccentric hip abduction strength reduces the risk of developing patellofemoral pain among novice runners initiating a self-structured running program: a 1-year observational study. *J Orthop Sports Phys Ther*. 2015;45:153–161.
11. Myer GD, Ford KR, Di Stasi SL, et al. High knee abduction moments are common risk factors for patellofemoral pain (PFP) and anterior cruciate ligament (ACL) injury in girls: is PFP itself a predictor for subsequent ACL injury? *Br J Sports Med*. 2015;49:118–122.
12. Holden S, Boreham C, Doherty C, Delahunt E. Two-dimensional knee valgus displacement as a predictor of patellofemoral pain in adolescent females. *Scand J Med Sci Sports*. 2015;27:188–194.
13. Maclachlan LR, Collins NJ, Matthews MLG, Hodges PW, Vicenzino B. The psychological features of patellofemoral pain: a systematic review. *Br J Sports Med*. 2017;51:732–742.

João Barboza da Silva Neto[a,b,*], Thiago Yukio Fukuda[c]

[a] *Instituto Trata – Joelho e Quadril, São Paulo, SP, Brazil*
[b] *Faculdade de Medicina do ABC, Santo André, SP, Brazil*
[c] *Centro Universitário São Camilo, São Paulo, SP, Brazil*

* Corresponding author.
E-mail: joaobarboza01@gmail.com (J.B. Neto).

https://doi.org/10.1016/j.bjpt.2018.05.001
1413-3555/

Response the letter to the editor for the masterclass: Do hip muscle weakness and dynamic knee valgus matter for the clinical evaluation and decision-making process in patients with patellofemoral pain?

We would like to thank you for the opportunity to continue this discussion based upon the opinions and interpretations of Neto and Fukuda[1] about our recently published Masterclass, which discusses some gaps regarding the management of patients with patellofemoral pain (PFP).[2]

In their letter to the editor, the authors questioned our manuscript concerning our emphasis on muscle strengthening in patients with PFP. They stated that we referred ''extensively to the discussion of the 'egg-or-chicken' theory, i.e., theorizing the cause or effect of anterior knee pain instead of how to achieve muscle strengthening in patients with PFP''.

We disagree with their statement and it seems to us that the authors have not correctly interpreted the objectives of our paper. As mentioned in the masterclass and by Neto and Fukuda,[1,3] it is widely known that strengthening hip and knee muscles provides favorable outcomes in patients with PFP. Based on this perspective, an extensive approach concerning this topic would be unnecessary and redundant at this stage given our knowledge on the topic.

Besides, it is known that PFP is a multifactorial condition with a high incidence and prevalence,[4] and still with a clearly unfavorable long-term prognosis.[5] Therefore, the main objective of the masterclass was not to discuss what is already consensual,[6] but rather to initiate a discussion about the current management in which this condition has been historically interpreted. Gaps have been highlighted that still exist concerning current professional understanding of isolated biomechanics and sometimes over-simplistic approaches adopted by many practitioners, especially physical therapists, when treating patients with PFP. We know that, due to the scarce number of longitudinal studies, we have little support or active discussions regarding the mechanisms of the cause and effect of PFP. However, we believe that by discussing the inconsistent understanding of this condition can serve to motivate clinicians to approach their patients in a more individual manner, and alert researchers to broaden their research objectives regarding this topic.

The authors of the letter also ''would like to highlight that the studies cited by the authors in this masterclass do not show a direct relationship between muscle strengthening and correction of dynamic valgus; nevertheless, this fact does not invalidate this therapeutic approach in clinical decision-making''. We agree that it does not invalidate the use of this approach in the treatment of patients with PFP, but again, it seems that Neto and Fukuda[1] misinterpreted our paper. First of all, the masterclass did not disqualify the use of hip and knee muscle strengthening in the treatment of this condition. We highlighted the need to understand that clinical improvement of patients submitted to this approach may not be due only to kinematic changes,[7] as concluded by many clinicians and researchers, including one of the authors of the letter.[8] This leads us to question the importance of this issue.

The authors also highlighted some mechanical variables that are considered risk factors for the development of PFP in very specific populations; therefore, the present studies can only be interpreted as reflective of new female runners[9] and teenagers.[10,11] In our point of view, this statement only confirms the discussion initiated in the masterclass that these patients can have a distinct set of factors related to PFP and, thus, deserve to be evaluated and treated individually because a ''one size fits all'' approach is unlikely to work effectively with different samples of patients with PFP.

Finally, the sentence ''biopsychosocial approach in patients with PFP still cannot be considered a therapeutic tool to be implemented in the treatment of a primarily biomechanical condition, due to the fact that the influences of this type of intervention have not been tested in high-quality clinical trials'' contradicts the current consensus regarding PFP,[12] and assumes that this condition is a complex interaction between anatomical, biomechanical,

DOI of original article: https://doi.org/10.1016/j.bjpt.2018.05.001.

psychosocial, and behavioral factors, and that pain realization in patients is not simply nociceptive. It is known that patients with persistent PFP, in most cases, demonstrate non-pathomechanical pain and impaired conditioned pain modulation.[13] Furthermore, PFP occurs due to alterations in psychological factors such as catastrophization and kinesiophobia, especially in more severe cases.[14] This highlights, once again, the need for an individualized patient approach with the objective of identifying non-mechanical and potentially modifiable factors related to pain.

In this context, after a rehabilitation program, some authors have already demonstrated that clinical improvement of pain and disability in patients with PFP show a strong relationship to modulation factors such as catastrophization,[15] kinesiophobia[15] and fear avoidance.[16] Likewise, a treatment program involving non-mechanical co-interventions like pain education, demonstrates similar outcomes when compared to exercise and retraining of movements.[17]

We agree that we need more clinical trials that test the effect of other psychosocial approaches in these patients. On the other hand, a large amount of evidence shows that the clinical improvement of patients with PFP has a direct relationship to the control of non-mechanical conditions. Therefore, we maintain our position that we already have enough support to adopt strategies that rely on modulation of these factors. Lastly, we believe patients with PFP can benefit from management strategies that include interventions that have the objective to treat physical and nonphysical aspects. This can be the approach in which to improve the results acquired through only biomechanical, or only psychosocial treatments.

References

1. Neto JB, Fakuda TY. Letter to editor in chief: Do hip muscle weakness and dynamic knee valgus matter for the clinical evaluation and decision making process in patients with patellofemoral pain? *Braz J Phys Ther*. 2018;22:431–432.
2. Rabelo NDA, Lucareli PRG. Do hip muscle weakness and dynamic knee valgus matter for the clinical evaluation and decision-making process in patients with patellofemoral pain? *Braz J Phys Ther*. 2018;22:105–109.
3. Nascimento LR, Teixeira-Salmela LF, Souza RB, Resende RA. Hip and knee strengthening is more effective than knee strengthening alone for reducing pain and improving activity in individuals with patellofemoral pain: a systematic review with meta-analysis. *J Orthop Sports Phys Ther*. 2018;48:19–31.
4. Smith BE, Selfe J, Thacker D, et al. Incidence and prevalence of patellofemoral pain: a systematic review and meta-analysis. *PLOS ONE*. 2018;13:1–18.
5. Lankhorst NE, Middelkoop M, Crossley KM, et al. Factors that predict a poor outcome 5–8 years after the diagnosis of patellofemoral pain: a multicentre observational analysis. *Br J Sports Med*. 2016;50:881–886.
6. Crossley KM, van Middelkoop M, Callaghan MJ, Collins NJ, Rathleff MS, Barton CJ. 2016 Patellofemoral pain consensus statement from the 4th International Patellofemoral Pain Research Retreat, Manchester. Part 2: recommended physical interventions (exercise, taping, bracing, foot orthoses and combined interventions). *Br J Sports Med*. 2016;50:844–852.
7. Rabelo NDA, Costa LOP, de Lima BM, et al. Adding motor control training to muscle strengthening did not substantially improve the effects on clinical or kinematic outcomes in women with patellofemoral pain: a randomised controlled trial. *Gait Posture*. 2017;58:280–286.
8. Fukuda TY, Melo WP, Zaffalon BM, et al. Hip posterolateral musculature strengthening in sedentary women with patellofemoral pain syndrome: a randomized controlled clinical trial with 1-year follow-up. *J Orthop Sports Phys Ther*. 2012;42:823–830.
9. Ramskov D, Barton D, Nielsen RO, Rasmussen S. High eccentric hip abduction strength reduces the risk of developing patellofemoral pain among novice runners initiating a self-structured running program: a 1-year observational study. *J Orthop Sports Phys Ther*. 2015;45:153–161.
10. Myer GD, Ford KR, Di Stasi SL, Foss KDB, Micheli LJ, Hewett TE. High knee abduction moments are common risk factors for patellofemoral pain (PFP) and anterior cruciate ligament (ACL) injury in girls: is PFP itself a predictor for subsequent ACL injury? *Br J Sports Med*. 2015;49:118–122.
11. Holden S, Boreham C, Doherty C, Delahunt E. Two-dimensional knee valgus displacement as a predictor of patellofemoral pain in adolescent females. *Scand J Med Sci Sports*. 2017;27:188–194.
12. Powers CM, Witvrouw E, Davis IS, Crossley KM. Evidence-based framework for a pathomechanical model of patellofemoral pain: 2017 patellofemoral pain consensus statement from the 4th International Patellofemoral Pain Research Retreat, Manchester, UK: part 3. *Br J Sports Med*. 2017;51:1713–1723.
13. Rathleff MS, Petersen KK, Arendt-Nielsen L, Thorborg K, Graven-Nielsen T. Impaired conditioned pain modulation in young female adults with long-standing patellofemoral pain: a single blinded cross-sectional study. *Pain Med Malden Mass*. 2016;17:980–988.
14. Maclachlan LR, Matthews M, Hodges PW, Collins NJ, Vicenzino B. The psychological features of patellofemoral pain: a cross-sectional study. *Scand J Pain*. 2017;51:732–742.
15. Doménech J, Sanchis-Alfonso V, Espejo B. Changes in catastrophizing and kinesiophobia are predictive of changes in disability and pain after treatment in patients with anterior knee pain. *Knee Surg Sports Traumatol Arthrosc*. 2014;22:2295–2300.
16. Piva SR, Fitzgerald GK, Wisniewski S, Delitto A. Predictors of pain and function outcome after rehabilitation in patients with patellofemoral pain syndrome. *J Rehabil Med*. 2009;41:604–612.
17. Esculier JF, Bouyer LJ, Dubois B, et al. Is combining gait retraining or an exercise programme with education better than education alone in treating runners with patellofemoral pain? A randomised clinical trial. *Br J Sports Med*. 2018;52:659–666.

Nayra Deise dos Anjos Rabelo,
Paulo Roberto Garcia Lucareli*

Human Motion Analysis Laboratory, Rehabilitation Science Department, Universidade Nove de Julho (UNINOVE), São Paulo, SP, Brazil

*Corresponding author at: UNINOVE, Rua Vergueiro, 235, São Paulo, SP, Brazil.
E-mails: plucareli@hotmail.com, paulolucareli@uninove.br (P.R. Lucareli).

https://doi.org/10.1016/j.bjpt.2018.05.002
1413-3555/