

LETTERS TO THE EDITOR

Incorrect use of proprioceptive neuromuscular facilitation-techniques and principles, a response to: Proprioceptive neuromuscular facilitation training improves pain-related and balance outcomes in working-age patients with chronic low back pain: a randomized controlled trial



First we like to compliment the authors on their efforts for addressing the issue to determine the long term effects of PNF-training in patients with chronic low back pain.¹ Nevertheless we need to address some remarks and comments in the hope the authors can clarify and provide some further details.

In the method the PNF training protocol is described as: “modified from the studies of Areedomwong et al.”² This study in turn is describing the method as “modified from the studies of Kofotolis and Kellis³ and Voight et al.”⁴ The description is illustrated with photos, the Figures 1a, b and c. The illustrations and the description of the techniques are not synchronized.

Described by the authors is in week 1: “...to alternate isometric contractions.” Isometric is defined as: “tension built up in a muscle, but the muscle neither shortens nor lengthens”.⁵ Hence no movement is intended during this technique: “Rhythmic Stabilization”, in which a grip on both sides is required to address also the antagonists without movement.⁶⁻⁸ The description in the text and the picture connects more to a grip variation fitting to the technique “Stabilizing reversal” in which one needs a change of hands to facilitate the alternating muscle activation of agonists and antagonists.⁶

Week 2 is described as: “...alternating concentric and eccentric contractions of trunk agonistic muscles . . .” this means that there is a consistent resistance for the agonists, in this case either the flexors or the extensors. Concentric contractions are defined as contractions in which the muscle generates force as it shortens and eccentric contractions, in which the muscle generates force as it lengthens.⁵

The whole description in the text fits to the technique “combinations of isotonic”, in which there is no change of the therapist hands to the antagonist, since the objective is to facilitate only the agonists in an intra-muscular coordination of shortening and lengthening without relaxation in between.^{6,9}

In the figures 1-b, there is clearly no eccentric stimulus recognizable. The two pictures in figures 1-b rather illustrate the technique of “dynamic reversals”, in which alternating isotonic (concentric) contractions are performed addressing the agonist and antagonist in alternation to enhance the inter-muscular coordination of these two groups of muscles.⁶

In figure 1-c, the illustration of the chop and lift would require a specific manual facilitation which is missing. The PNF-concept clearly describes a goal oriented use of basic principles of facilitations such as, manual contact with a lumbrical grip, traction and/or approximation to achieve an irradiation into the target pattern from the trunk to reinforce the addressed muscles.^{6,10,11}

The appropriate use of these principles and procedures for facilitation is totally missing. The same mistakes occur in the publication of Areedomwong et al.² and of Kofotolis and Kellis.³ The publication of Voight et al.⁴ is not describing a protocol for a specified indication,⁴ but represents merely an opinion article about biomechanical and neurophysiological explanations of the chop and lift procedure. A critical view on the description and illustrations from Voight et al.⁴ is required since they are clearly different from those originally described by Knott and Voss¹² and later by Voss et al.,¹³ or Adler et al.⁶

Incomplete and improper use of the PNF-concept is frequently recognized and has been addressed.¹¹ The PNF-concept has been defined as a comprehensive rehabilitation approach focusing on a motor learning effect.¹¹ This comprehensive approach is defined by a specific use of basic principles & procedures for facilitation while using specific techniques to address specified treatment objectives.^{6,14} Furthermore the reference of Adler et al.⁶ is used. This reference is a manual in “how to do” and is one of the instruction books advocated by the international PNF association (IPNFA) (IPNFA.org/PNF-literature/PNF-text books).

Comparing the description from Areedomwong et al.,² from Kofotolis and Kellis³ and from Voight et al.⁴ with those from Adler et al.,⁶ demonstrates the flaws in the performances used in the first three publications.

We would recommend all researchers addressing the use of components from the PNF-concept to use adequate PNF-

techniques and facilitations as defined and described by Knott and Voss¹² and their successors, Adler et al.⁶ and the IPNFA.¹⁴

Statement on conflict of interest

In relation to the letter to the editor:

Incorrect use of PNF-techniques and principles, a response to:

Areudomwong P, Buttagat V. (2018)

Proprioceptive neuromuscular facilitation training improves pain-related and balance outcomes in working-age patients with chronic low back pain: a randomized controlled trial. *Braz J Phys Ther.* 2018, <https://doi.org/10.1016/j.bjpt.2018.10.005>

We, the authors state:

All three authors are involved in post graduate training in the PNF-Concept as IPNFA instructors.

Disclosure of a conflict of interest

All three authors are members of the International PNF Association (IPNFA[®]).

The IPNFA has the following interest in the subject matter discussed in the letter to the editor.

- To maintain continuity and standards in the instruction of PNF techniques
- To promote research into PNF theory and practice
- To identify further developments in the PNF concept
- None of the three authors received any funding nor (financial) compensation for the submitted work.

To ensure that developments in neurophysiology and other related fields (ICF, Neuroplasticity, etc.) are incorporated into PNF clinical practice

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Fred Smedes^{a,*}, Seungsub Shin^b,
Leandro Giacometti da Silva^c

^a School of Health, Physical Therapy, University of Applied Sciences, Enschede, The Netherlands

^b Department of Physical Therapy, Dream Rehab. Hospital, Songpa-gu, Seoul, South Korea

^c Department of Physical Therapy, Universidade Luterana do Brasil, Canoas, RS, Brazil

* Corresponding author at: Post-box 70.000, 7500 KB Enschede, The Netherlands.

E-mail: f.smedes@saxion.nl (F. Smedes).

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