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February 2019

# Newsletter IPNFA<sup>®</sup> research committee

NEW NEW NEW NEW  
Korean PNF journal:  
**PNF and Movement** see page 9

With the aid of various involved IPNFA members, the research committee believes we can present a broad scope of interesting topics and issues on PNF and on monitoring intervention outcomes.

In the past we have seen publication where PNF approaches were described and illustrated with questionable accuracy. We wrote a response on the said publication (Areeudomwong P et al. 2017), but the publishing journal did not accept letters to the editor. Now there was a similar article from Areeudomwong and colleagues published in another journal, and this journal accepted our comments (see further on page 1, 2 and 3)

Getting evidence into practice seems so simple but still remains hard. That is in short one of the key messages from a presentation by Prof Nancy Salbach from Canada, attended by Elke Braun. A free online solution for monitoring gait qualities is offered to the professional field (see for further details on page 7)

I wish a joyful reading. Fred.

Staying alert on evidence  
and keeping up a critical eye  
on PNF descriptions



**Areeudomwong P, Buttagat V. Proprioceptive Neuromuscular Facilitation training improves pain-related and balance outcomes in working-age patients with chronic low back pain: a randomized controlled trial** *Brazilian Journal of Physical Therapy* (2018) <http://dx.doi.org/10.1016/j.bjpt.2018.10.005>.

**Background:** Proprioceptive neuromuscular facilitation training and general trunk exercises have been applied to treat chronic low back pain patients. However, there is currently little study to support the use of one treated intervention over the other to improve clinical outcomes and balance ability.

**Objective:** To examine the effects of proprioceptive neuromuscular facilitation training on pain intensity, disability and static balance ability in working-age patients with chronic low back pain.

**Methods:** Forty-four chronic low back pain participants aged 18---50 years were randomized either to a three-week proprioceptive neuromuscular facilitation training or to a control group receiving general trunk exercises. Pain intensity, disability and static balance ability were measured before and after the three-week intervention.

**Results:** The proprioceptive neuromuscular facilitation training intervention showed a statistically significantly greater reduction in pain intensity and improved functional disability than the controls at three weeks (between-group difference: pain intensity 1.22 score, 95% CI: 0.58 to 1.88,  $p < 0.001$ ; disability 2.23 score, 95% CI: 1.22 to 3.24,  $p < 0.001$ ). The proprioceptive neuromuscular facilitation training intervention also had statistically better parameters of static balance ability than the control group (between-group difference: ellipse sway area during eye opened and closed conditions 129.09 mm<sup>2</sup>, 95% CI: 64.93 to 175.25,  $p < 0.01$  and 336.27 mm<sup>2</sup>, 95% CI: 109.67 to 562.87,  $p < 0.05$ , respectively; the centre of pressure velocity during eye opened and eye closed conditions 6.68 mm/s, 95% CI: 4.41 to 8.95,  $p < 0.01$  and 6.77 mm/s, 95% CI: 4.01 to 9.54,  $p < 0.01$ , respectively).

**Conclusion:** The three-week proprioceptive neuromuscular facilitation training provides better pain intensity, disability and static balance ability than general trunk exercises for working-age individuals with chronic low back pain but the effects do not reach the clinical meaningful level. The therapists should consider carefully when making recommendations regarding these interventions, taking into account effectiveness and costs

Smedes F, Shin S, Giacometti da Silva L.

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

Areeudomwong P, Buttakat 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.**

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 CLBP.

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 Areeudomwong et al. (2017)”. This study in turn is describing the method as “modified from the studies of Kofotolis and Kellis (2006) and Voight (2008)”. 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” (Marieb, 2013). 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 (Adler, 2014; O’Sullivan, 1999; Sullivan, 1995). 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. (Adler, 2014)

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 (Marieb, 2013). 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 (Adler, 2014; Sardaru, 2013).

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 (Adler, 2014).

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. (Adler, 2014; Johnson, 2002; Smedes, 2016)

The appropriate use of these principles and procedures for facilitation is totally missing. The same mistakes occur in the publication of Kofotolis and Kellis (2006) and Areeudomwong et al.(2017). The publication of Voight (2008) is not describing a protocol for a specified indication, 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 (2008) is required since they are clearly different from those originally described by Knott and Voss (1968) and later by Voss, Jonta and Meyers (1985) or Adler (2014).

Incomplete and improper use of the PNF-concept is frequently recognized and has been addressed (Smedes, 2016). The PNF-concept has been defined as a comprehensive rehabilitation approach focusing on a motor learning effect (Smedes, 2016).

This comprehensive approach is defined by a specific use of basic principles & procedures for facilitation while using specific techniques to address specified treatment objectives (Adler, 2014; IPNFA) Furthermore the reference of Adler, Beckers and Buck (2014) 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 Areudomwong (2017), from Kofotolis & Kellis (2006) and from Voight (2008) with those from Adler, Beckers and Buck (2014), 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 Voss and their successors, Adler, Beckers and Buck and the IPNFA (Smedes, 2016).

Published as a letter to the editor in: Brazilian Journal of Physical Therapy 2019

DOI: <https://doi.org/10.1016/j.bjpt.2019.02.001>

### **Response to the letter to the editor: Incorrect use of PNF-techniques and principles, a response to: Areudomwong P, Buttagat V. Braz JPhys Ther. 2018**

We would like to sincerely thank you for the opportunity to extensively discuss based on the comments of Smedes et al.<sup>1</sup> regarding to our recently published article,<sup>2</sup> which examined the effects of PNF training including techniques on rhythmic stabilization, combination of isotonic, chop and lift in working-age people who suffering from chronic low back pain. In that letter to editor, the authors have been commented on our publication that the performed PNF techniques have been deviated from the original methods which proposed by Knott and Voss,<sup>3</sup> and Adler et al.<sup>4</sup> Furthermore, the figure describes each technique which illustrated was not matched with the text what we wrote. The authors stated that the description and figure of rhythmic stabilization in our article should be stabilizing reversal because of Figure 1a demonstrated a grip variation. At this point, when we considered Figure 1, it is clearly defined for demonstrating rhythmic stabilization without a grip variation. The figure showed rhythmic stabilization to facilitate co-contraction of both trunk flexors and extensors. The description of rhythmic stabilization technique in our article was shortened due to the word limitation of the journal of publication, the concept of this technique and hand grip placement were not altered from the original that established by Adler et al.<sup>4</sup> In our experiment, the therapist informed the patients to resist agonists isometrically using one hand. When the patients responded ultimately, another hand was started to resist antagonists without movement as the resistance changes by commanding the patient “stay still, match the therapist again in the front or the back”. We do agree with the comments on Figure 1b for the unclear situation on eccentric contraction facilitation. Indeed, we did that in our treatment session but did not put the figure into the manuscript because of the number of figure has been limited by the journal of publication. In brief, after complete concentric stimulations of trunk flexors and extensors at the end of a desired range of motion, the therapist applied resistance for trunk flexors or extensors in eccentric fashion and asked the patients to move slowly to the starting position without relaxation between the different types of muscle activations and the hands remain on the same surface. For figure 1c, the chop and lift used in our study were based on dynamic reversals to facilitate the controlled movements. We disagree with the comments on our study for the incorrect using of PNF-techniques and mistaking principles. We strictly followed the PNF-concept for promote trunk stabilization and controlled trunk mobility that proposed problems of chronic low back pain.<sup>4-9</sup> Manual contact via lumbrical grip, visual cue and approximation, and traction were also used for stimulating desired responses. Finally, we would like to thanks the authors for giving us the opportunity to describe and provide more information of our study to the readers who are interested in PNF techniques for applying to their treatments for eliminating the suffering of chronic low back pain patients. DOI: <https://doi.org/10.1016/j.bipt.2019.02.001>

The members of the research committee search the web in an annual frequency for new materials and publications that might increase our understanding for the specific use of the PNF-Concept. One of the key features from our PNF-Philosophy is: the use of MOTOR LEARNING principles. We like to present here two abstracts, **the first** one concerns an investigation among physiotherapist in the encountered difficulties for implementation of ML principles. **The second** abstract provides a framework to make the implementation of ML easier for physiotherapists. We invite you to check the full text for yourself.

Atun-Einy O, Kafri M (2018): **Implementation of motor learning principles in physical therapy practice: Survey of physical therapists' perceptions and reported implementation**, Physiotherapy Theory and Practice, DOI: <https://doi.org/10.1080/09593985.2018.1456585>

#### ABSTRACT

**Introduction:** The field of motor learning (ML) plays a pivotal role in physical therapy (PT), and its implementation has been shown to improve intervention outcomes. The objective of this study was to assess physical therapists' ML-related self-efficacy, self-reported implementation, and environmental workplace factors. An additional aim was to report the psychometric properties of a questionnaire that was developed to assess the above-mentioned constructs. **Methods:** An observational, cross-sectional survey was completed by 289 physical therapists (average age: 38.7 (9.7), with 11.3 (9.7) years of experience and 74% female). Construct validity, internal consistency, and test-retest reliability were tested. The main outcome measures were the scores of the three scales of the questionnaire, referring to self-efficacy in ML, implementation of ML principles, and workplace environment features.

**Results:** The questionnaire had sound psychometric qualities. Respondents perceived ML as an integral part of PT. ML-related self-efficacy and implementation of ML principles were moderate (2.95/5 (0.7) and 3.04/5 (0.8), respectively). PT practice had a significant effect on ML-related self-efficacy ( $p = 0.035$ ) and implementation ( $p = 0.0031$ ). Respondents who had undergone ML training in their graduate program reported higher ML-related self-efficacy ( $p = 0.007$ ). Respondents who had postgraduate training in ML reported significantly more extensive implementation ( $p = 0.024$ ). Lack of knowledge and lack of time were perceived as the major barriers to implementation. **Conclusions:** Level of self-efficacy might be insufficient to support the systematic implementation of ML principles in practice. Addressing impeding individual- and organizational-level factors might facilitate ML self-efficacy and implementation. Postgraduate education facilitates ML implementation.

Kleynen M, Beurskens A, Olijve H, KamphuisJ, Braun S. (2018): **Application of motor learning in neurorehabilitation: a framework for health-care professionals**, Physiotherapy Theory and Practice, DOI: <https://doi.org/10.1080/09593985.2018.1483987>

#### ABSTRACT

Learning motor skills is an essential part of most rehabilitation processes. Facilitating and supporting motor learning is particularly challenging in neurological rehabilitation: patients who suffer from neurological diseases experience both physical limitations and difficulties of cognition and communication that affect and/or complicate the motor learning process. Therapists (e.g. physiotherapists and occupational therapists) who work in neurorehabilitation are therefore continuously searching for the best way to facilitate patients during these intensive learning processes. To support therapists in the application of motor learning, a framework was developed, integrating knowledge from the literature and the opinions and experiences of international experts. This article presents the framework, illustrated by cases from daily practice. The framework may assist therapists working in neurorehabilitation in making choices, implementing motor learning in routine practice, and supporting communication of knowledge and experiences about motor learning with colleagues and students. The article discusses the framework and offers suggestions and conditions given for its use in daily practice.



## REVIEW ARTICLE

Emer Gunning, MSc, Marcin K. Uszynski, PhD

# Effectiveness of the Proprioceptive Neuromuscular Facilitation Method on Gait Parameters in Patients With Stroke: A Systematic Review

Archives of Physical Medicine and Rehabilitation, 2019

<https://doi.org/10.1016/j.apmr.2018.11.020>

**Objective:** To review the current evidence for the effectiveness of proprioceptive neuromuscular facilitation (PNF) techniques on gait parameters in patients with stroke.

**Data Sources:** The electronic platforms of CINAHL, MEDLINE, PubMed, and the Physiotherapy Evidence Database were searched using the relevant search terms.

**Study Selection:** Intervention studies that had gait parameters as an outcome and in which PNF techniques were used in a poststroke population were reviewed. The studies were reviewed by both authors and a consensus was reached. The literature search identified 84 studies. Following screening, there were 5 studies that met the inclusion criteria for this review.

**Data Extraction:** Data were extracted from the studies by both authors and independently reviewed. Methodological quality was assessed with the Physiotherapy Evidence Database scale of randomized controlled trials and with the Quality Assessment Tool for Quantitative Studies for nonrandomized controlled trials.

**Data Synthesis:** Treatment using the PNF method led to a statistically significant improvement in gait outcome measures in patients with stroke in all the studies. Three of the studies also found that groups treated with PNF techniques had a significantly greater improvement in outcome measures than groups that received routine physiotherapy treatment.

**Conclusions:** Although some limitations were identified in the methodological quality of the studies, current research suggests that PNF is an effective treatment for the improvement of gait parameters in patients with stroke. Further research is needed to build a robust evidence base in this area.

Archives of Physical Medicine and Rehabilitation 2019;-- <https://doi.org/10.1016/j.apmr.2018.11.020>

## The People Need Fun corner ☺

These One-Liners Come Straight from the Doctors' Notes (see <https://www.aimseducation.edu/blog/ridiculously-funny-medical-jokes/>)

- On the second day the knee was better and on the third day it disappeared.
- The patient has been depressed since she began seeing me in 1993.
- Discharge status: Alive, but without my permission.
- Skin: somewhat pale, but present.
- Patient has two teenage children, but no other abnormalities.
- The patient was in his usual state of good health until his airplane ran out of fuel and crashed.
- The patient refused autopsy.
- She is numb from her toes down.
- She has no rigors or shaking chills, but her husband states she was hot in bed last night.

*For those who were not able to attend the last IPNFA meeting, here a short review on our stay in Croatia, hosted by Gordana Poscic and Sinisa Poznic.*

## REPORT FROM THE IPNFA ANNUAL MEETING IN 2018

IPNFA annual meeting took place from 11th - 13th October 2018 in a beautiful, touristic and congress town Opatija which is situated in the northwest part of Croatia, just before the entrance to the peninsula Istria. 44 instructors, 13 assistants and 3 associated members participated the event.

The meeting started on 11th October with the instructor day. Carsten Schaefer and Shozo Katsunami presented Tipps and guidelines how to do the patient treatment demonstration. Benedikt Boemer followed with the Assessment, testing and treatment of the Upper motor neuron syndrome. Dominiek Beckers had a presentation and a short workshop about

Proposals of grip variations in the gait training. Elke Braun presented a wonderful lecture about A new motor learning approach „Optimal“ from the author Gabrielle Wulf et al. She got a big applause. After the lunch, Fred Smedes proposed to instructors and assistants what kind of scientific study is easy to write and less time consuming. His topic was Lowering the barriers for the single case study. Sebastian Walczyk continued as a moderator of the group work of Finding effective pre/post tests on activity level. Education committee presented additional changes of the part of the common script concerning mats and gait. Carsten Schaefer presented different didactical ways of teaching. At the end, instructors request list as possible topics for the next meeting in 2019 was brought up.



Participants of the IPNFA AGM, Opatija, Croatia , 2018



IPNFA meeting hotel in Opatija, Croatia, on the left

Second day of the meeting, 12th October, was a business day where different proposals was discussed and voted out for changing some rules and regulations of the IPNFA. Every committee presented their annual activities. IPNFA marketing and use of social medias was brought up. More about the business day IPNFA members can read in minutes of the meeting. Very nice traditional dinner was organized in the evening time with a good food and music.





Hosts: Gordana Pošćić, Siniša Poznić

Third day of the meeting, 13th October, was a conference day - an open day for all interested colleagues and associates in the PNF concept. Majority of presenters were IPNFA instructors and assistants except one domestic lecturer that was a Bobath therapist. Dominiek Beckers started with the lecture about PNF facilitation of fall training and standing up from the floor. Jose Vicente Martins showed how Traumatic brachial plexus injury, following nerve transfer surgery, can be treated with PNF concept. Zdenka Šefman presented a very nice case study of severe Traumatic brain injury treated with PNF concept. She made a nice connection to the ICF. Sanjica Vlašić, a Bobath therapist from Croatia, presented a case study of a hemiballistic patient, a very rare and hard treatable hyperkinetic disorder. An orthopaedic topic was brought up from Byungki Lee with a topic Improvement of the mouth opening of the patient with

temporomandibular joint disorder using PNF: A case report. After the lunch, Monica Cilento showed a Treini method - an intensive training methodology, developed in Brazil, focusing on the rehabilitation of patients with central nervous system injury, aiming to improve posture, body movement and functionality. The method integrates PNF with other approaches. Tomasz Maicki presented Analysis of a muscular activity measured by EMG during applying irradiation within bilateral lower extremity pattern in hook lying position. After presentations, Petra Bastlova, a PNF therapist from Czech Republic, had a poster presentation about Acute effects of two different types of stretching of hamstrings and triceps surae muscles on postural control. For the end of the day two workshops was organized. Carsten Schaefer taught a workshop about two PNF techniques which are easy to learn, beneficially to apply - Stabilizing Reversals and Replication. The aim of the workshop was to introduce colleagues which are potentially interested in the PNF concept in some PNF techniques. Second workshop was given by Benedikt Bömer and was an ice cream on the cake for the end of the day.



Traditional dinner

He gave a very interesting workshop about Assessment and treatment approach with the Upper Motor Neuron Syndrom. „Spasticity is not the main problem after a lesion in the CNS“.

The **People** **Need** **Fun** corner ☺ / repetition without repetition / memorizing medical terms  
See: <https://www.aimseducation.edu/blog/ridiculously-funny-medical-jokes/>

Artery:	The study of fine paintings	Outpatient:	A person who has fainted
Bacteria:	Back door to cafeteria	Pelvis:	Second cousin to Elvis
Catscan:	Searching for kitty	Post Operative:	A letter carrier
Genes:	Blue denim slacks	Red Blood Count:	Dracula
Medical Staff:	A doctor's cane	Secretion:	Hiding something
Morbid:	A higher offer than I bid	Terminal Illness:	Getting sick at the airport.
Nitrates:	Cheaper than day rates	Triple Bypass:	Better than a quarterback sneak

Our colleague Elke Braun attended a presentation from Mrs. Prof Nancy Salbach from Canada issuing the difficulties to get evidence into practice. Therefore she and her team developed an app for more easy implementing standard testing and making adequate interpretation of those measurements. For more detailed information see <http://www.iwalkassess.com/>

On this website one can download a PDF guideline and assess the app within a toolkit.  
"The iWalk Toolkit was designed to promote an evidence-informed approach to using the 10-metre walk test and the 6-minute walk test post-stroke."  
A short intro is provided here.

## A **GUIDE** to an Evidence-Informed Approach to Using the **10-METRE** and **6-MINUTE WALK TESTS POST-STROKE**

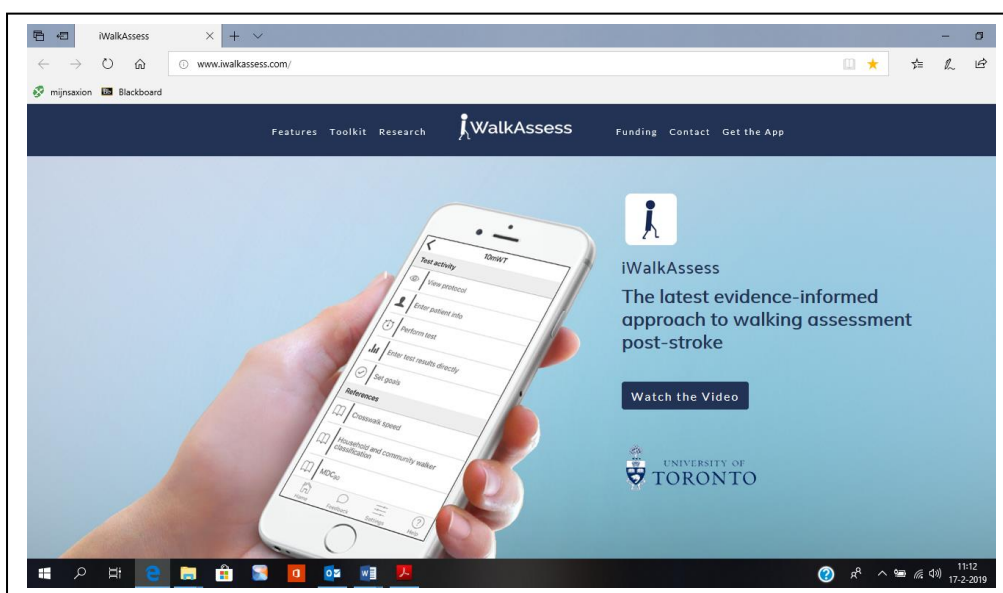
### Why is the iWalk Toolkit Needed?

The *Canadian Stroke Best Practice Recommendations*<sup>7</sup> state that standardized, valid assessment tools should be used to evaluate functional activity limitations such as walking. Fewer than 50% of physical therapists, however, report using standardized measures of walking during initial assessment or to monitor change in walking of people post-stroke.<sup>8</sup> Also, 40% of physical therapists are unaware of available measures of walking ability post-stroke and 80% desire recommendations on which measures to use.<sup>8</sup> The 10-metre walk test (10mWT) and 6-minute walk test (6MWT) are highly recommended to evaluate walking across care settings and levels of acuity post-stroke based on psychometric evidence and clinical utility.<sup>9</sup> A clinical toolkit that facilitates use of the 10mWT and the 6MWT post-stroke and incorporates the extensive available research evidence supporting these tests, however, is not available.

### What is the Purpose of the iWalk Toolkit?

The iWalk toolkit is designed to help physical therapists and other health providers to:

- ☐ Administer the 10mWT and the 6MWT with people post-stroke;
- ☐ Interpret test performance using available research evidence;
- ☐ Educate patients about test performance and set goals for each test; and
- ☐ Select treatments with potential to improve walking speed and distance.



### What are the Components of the iWalk Toolkit?

The iWalk toolkit has three components:

1. iWalk Guide (PDF)
2. iWalk Videos
3. iWalkAssess App



## PNF contribution in a PT conference

### The conference in Warsaw, Poland, 6.10.2018

The conference "Physiotherapy in Oncology and Neurology" took place in Warsaw at the beginning of October 2018. Over 160 physiotherapists from all over Poland took part in the lecture session and workshops.

Several lectures concerned the PNF method. The program included such topics as ***"PNF in the treatment of spinal cord tumors and brachial plexus injuries - cases from everyday practice"***

and

***"Selected aspects of the PNF concept in physiotherapy of patients in palliative care"***.

The possibility of using the ***PNF orofacial stimulation in patients after craniofacial surgery*** has also been presented.



Agnieszka Stepień and Kuba Marcinko

in a **P**ositive **N**ew **F**isioterapia  
at the conference active  
Demonstrating the wide and  
comprehensive nature of the  
PNF-Concept.

The **PNF** corner: 😊, 😊; 😊!!!



I saw this sticker on a car, "long live the sick leave"

### Journal of PNF and Movement

'PNF and Movement' (PNF & Mov) is the official journal of the Korea Proprioceptive Neuromuscular Facilitation Association (KPNFA) published 3 times per year.

[http://www.pnfjournal.or.kr/main.html?pg=n\\_w](http://www.pnfjournal.or.kr/main.html?pg=n_w)