

### Letter to The Editor

**In connection with the publication in Bali Med J 2016, Volume 5, Number 2: 25-29, entitled "Intra-Arterial Heparin Flushing Increases Manual Muscle Test – Medical Research Councils (MMT-MRC) Score in Chronic Ischemic Stroke Patient "**

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In connection with the publication in Bali Med J 2016, Volume 5, Number 2: 25-29, entitled "Intra-Arterial Heparin Flushing Increases Manual Muscle Test – Medical Research Councils (MMT-MRC) Score in Chronic Ischemic Stroke Patient ", herewith, please allow us to do reviews of the study discussion. By assessing the discussion, it can be proved whether there are references that support the results of study.

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The reviews are as follow:

1. In this study, motor strength of the subjects was measured with MMT-MRC scoring system. The reason given by the authors was that, this method can measure the strength of muscle effectively in stroke patients (ref 30 = Gregson, 2000), as well as can assess paralysis that occurs in the peripheral nerve lesions (ref 6 = Paternostro-Sluga, 2008). Related to the MMT, the authors cited ref 34 (Muhammad, 2014) which stated that MMT is a reliable diagnostic tool to measure muscle weakness in stroke patients.
  - a. The conclusion of Gregson's article was as follows: "The Medical Research Council scale was reliable in the tested muscle groups. The modified Ashworth scale demonstrated reliability in all tested muscle groups except the ankle plantar flexors. If reliable measurement of tone in the ankle is required for specific purpose". See:  
<http://ageing.oxfordjournals.org/content/29/3/223.full.pdf>  
<http://ageing.oxfordjournals.org/content/29/3/223.full.pdf>
  - b. The conclusion of Paternostro was as follows: "Medical Research Council and modified Medical Research Council scales are measurements with substantial inter-rater and intra-rater reliability in evaluating forearm muscles". See:  
[https://www.researchgate.net/publication/23484750\\_Paternostro-Sluga\\_T\\_Grim-Stieger\\_M\\_Posch\\_M\\_et\\_al\\_Reliability\\_and\\_validity\\_of\\_the\\_Medical\\_Research\\_Council\\_MRC\\_scale\\_and\\_a\\_modified\\_scale\\_for\\_testing\\_muscle\\_strength\\_in\\_patients\\_with\\_radial\\_palsy](https://www.researchgate.net/publication/23484750_Paternostro-Sluga_T_Grim-Stieger_M_Posch_M_et_al_Reliability_and_validity_of_the_Medical_Research_Council_MRC_scale_and_a_modified_scale_for_testing_muscle_strength_in_patients_with_radial_palsy)
  - c. The conclusion of Muhammad's study was MMT has a very good reliability. It is easy to administer and can be used on a very large population. See:  
<http://www.google.com/search?ie=UTF-8&oe=UTF-8&sourceid=navclient&gfn=1&q=Muhammad+2014.+Reability+of+Manual+Muscle+Test+Examination+of+Stroke+Patient+in+SardjitoHospital.+Department+of+Neurology.+Gadjah+Mada>

- d. When read more detail the 3 references mentioned above, none reference stated that the motor function improvement of chronic ischemic stroke can occur due to the IAHF therapy.
2. The authors showed that this study had found the increase scores of MMT significantly after IAHF therapy. They also stated that the IAHF therapy can induces motor cortex function, thereby increasing muscle strength. For this reason, the authors explained at length 3 references, ref 31 (Schwerin, 2013), 32 (Silva-Coto, 2014) and 33 (Guggenmos, 2013).
    - a. Schwerin's article was a review of *The Anatomy of Movement*. It discussed the followings: behavior involved motor function; principal cortical domains of the motor system; the motor homunculus in primary motor cortex; cortical control of skeletal muscles, etc. See: <http://brainconnection.brainhq.com/2013/03/05/the-anatomy-of-movement>
    - b. The Silva-Couto's article was about Muscle atrophy, voluntary activation disturbances, and low serum concentrations of IGF-1 and IGFBP-3 are associated with weakness in people with chronic stroke. The conclusion was "Low serum concentrations of IGF-1 and IGFBP-3, deficits in neuromuscular performance, selective muscle atrophy, and decreased agonist muscle activation were found in the group with chronic hemi paresis post stroke. Both hemorrhagic and ischemic stroke were considered, and the data reflect a chronic post stroke population with good function". See: <http://www.ncbi.nlm.nih.gov/pubmed/24578521>
    - c. The Guggenmos's article was a review of Restoration of function after brain damage using a neural prosthesis. The article concluded that the repair of motors (muscles) caused by stroke, can occur after implantation of microelectrodes in the cerebral cortex. See: <http://www.ncbi.nlm.nih.gov/pubmed/24324155>
    - d. When read more detail the 3 references mentioned above, the claim of authors that the motor function improvement of chronic ischemic stroke after the IAHF therapy, was not proven. There was no reference that explained it.
  3. In the remaining references, there also was nothing of reference to support the study result.
  4. The authors concluded that, IAHF treatment can significantly improve muscle strength. So far IAHF was suggested to be a new potential stroke therapy with good prognostic outcome and wider time window.

#### **Conclusion of our reviews:**

Based on all references mentioned previously, it is concluded that this study has a very weak scientific basis. No references which support the study result, that IAHF can improve motor functions in patients with chronic ischemic stroke.

Thank you very much for the attention.