

# Monipuolinen ja motivoiva taitoharjoittelu - Kyllä keho tietää

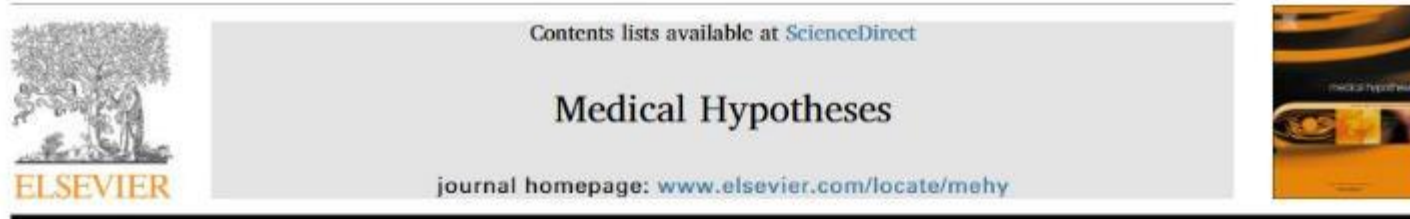


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Sami Kalaja

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Liikunnan työelämäprofessori EduFutura

# Taitojen oppiminen on parasta aivojumppaa



## Motor repertoire and gray matter plasticity: Is there a link?

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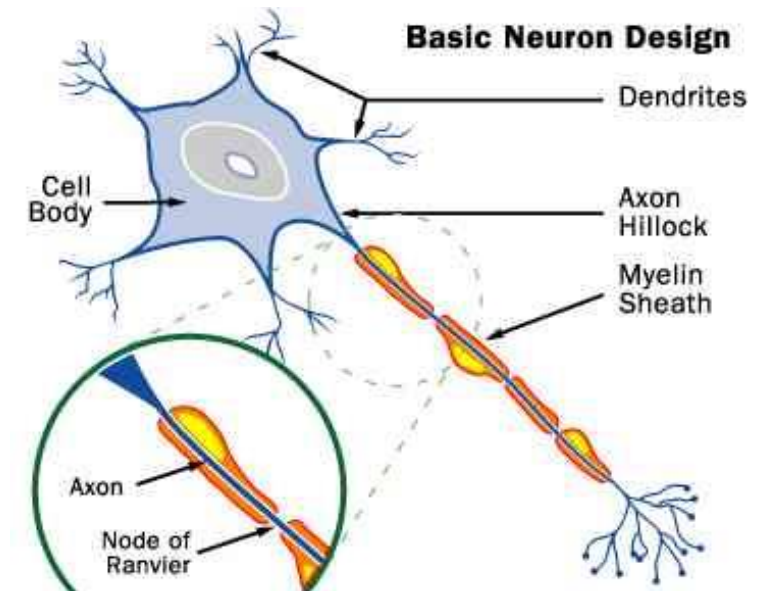


### ARTICLE INFO

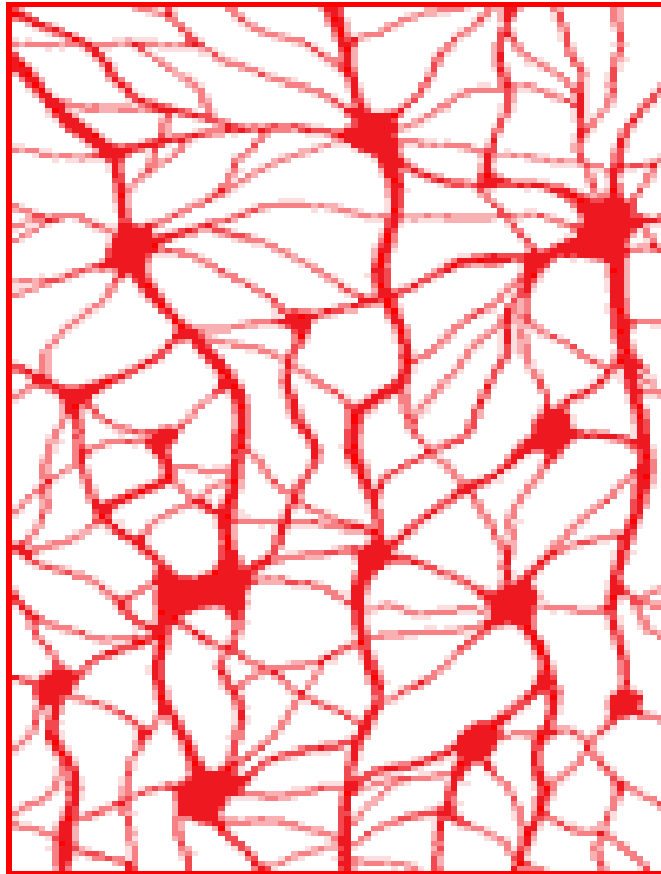
**Keywords:**  
Neural plasticity  
Motor learning  
Motor control  
Physical fitness  
Plasticity mechanisms

### ABSTRACT

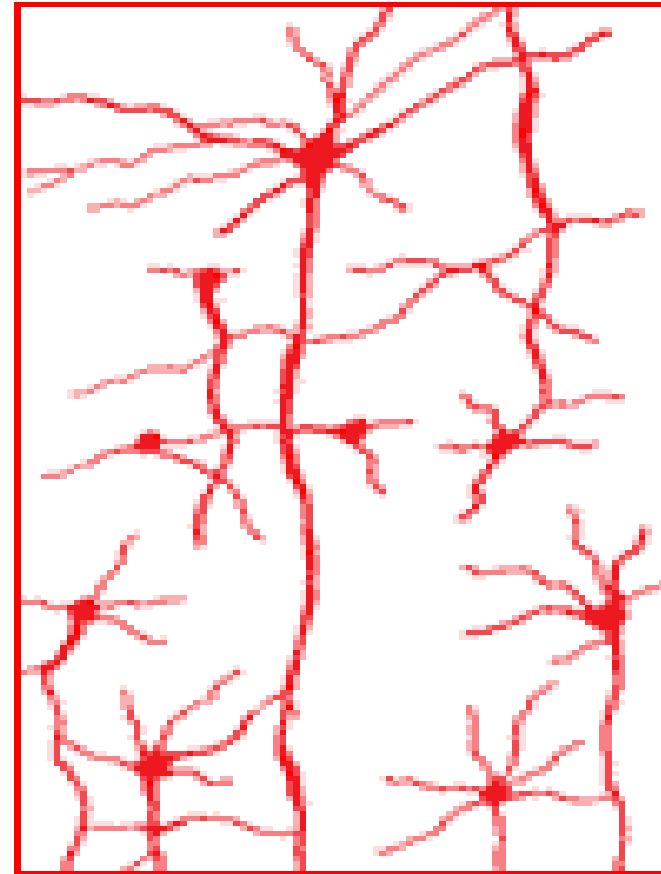
There is a considerable amount of evidence sustaining that aerobic exercise causes positive modifications in gray matter density (GMD), especially in the hippocampus and anterior cingulate cortex. However, recent experimental researches with motor learning paradigms are consistently showing that increasing cardiorespiratory capacity is not the only mechanism able to promote positive outcomes in GMD with exercise. In the present study, we present a theoretical suggestion that expanding one's motor repertoire is another primary mechanism related to the increases in GMD. Motor repertoire can be understood as the number of movement possibilities and motor skills that can be performed by a person. Supporting our suggestion, professional athletes present higher GMD than controls, and experimental protocols repeatedly observe positive changes in GMD following motor learning. The relationship between physical inactivity, amputation, and lower GMD values also gives further support for the hypothesis. Follow-up studies monitoring GMD before and after training programs that stimulate new motor skill learning are essential to confirm this proposition. The brain regions related to sensory processing of the motor tasks and the cortical areas related to motor control (e.g., primary motor cortex, supplementary motor area) are probably the ones most affected by plastic changes. If the hypothesis turns out to be reliable, dancing, gymnastics, and other movement-rich activities are thoroughly encouraged for this purpose. Therefore, this approach might be used to attenuate GMD loss related to aging or another condition, such as Parkinson's and Alzheimer's.



# Työ tekijänsä kiittää

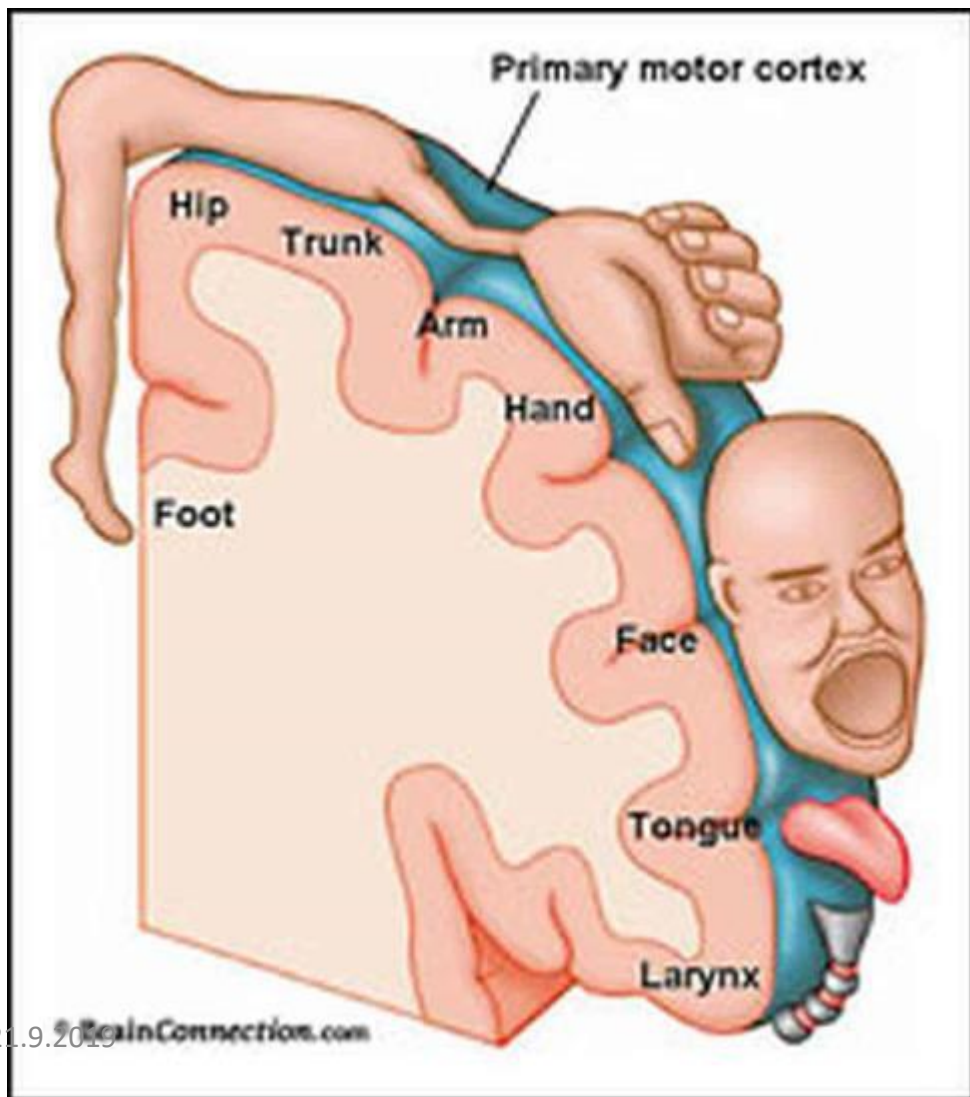


section of a  
stimulated brain



section of a  
unstimulated brain

# Sitä saa mitä tilaa



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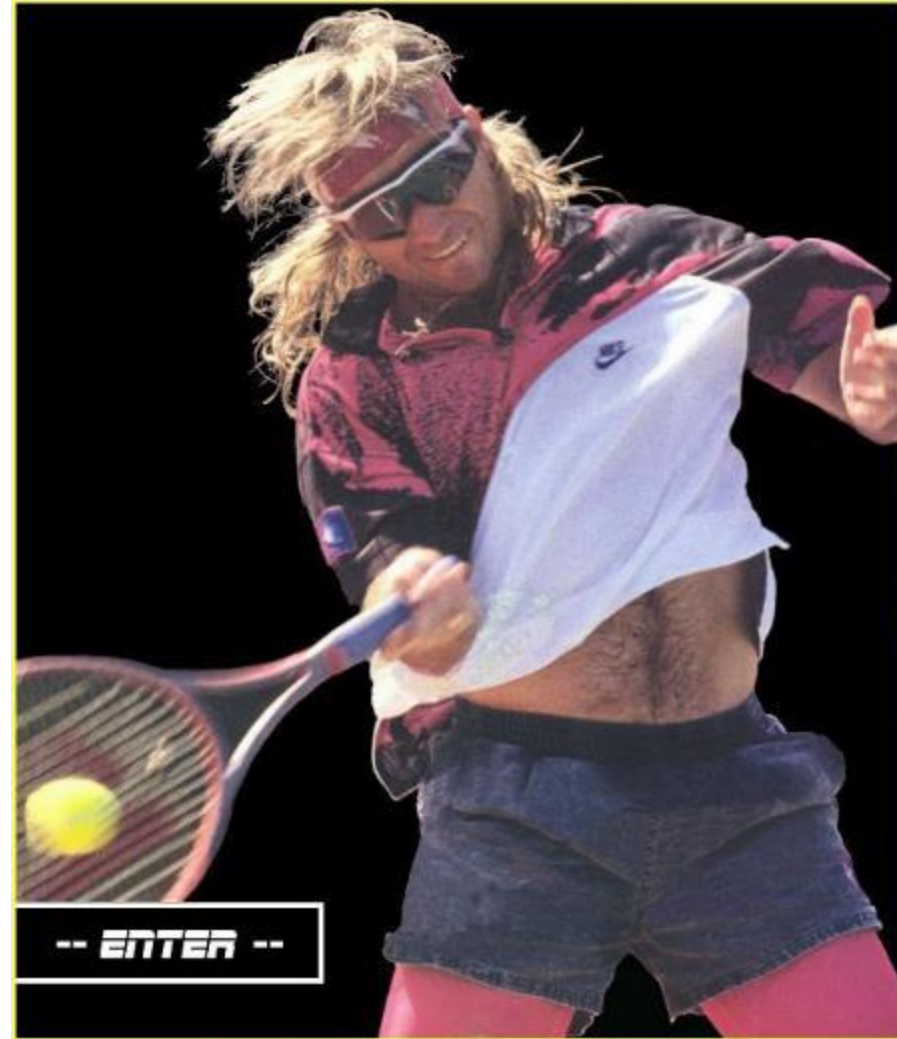
*Kukaan ei voi astua kahdesti samaan virtaan, sillä sen enempää astuja kuin virtakaan ei ole sama*



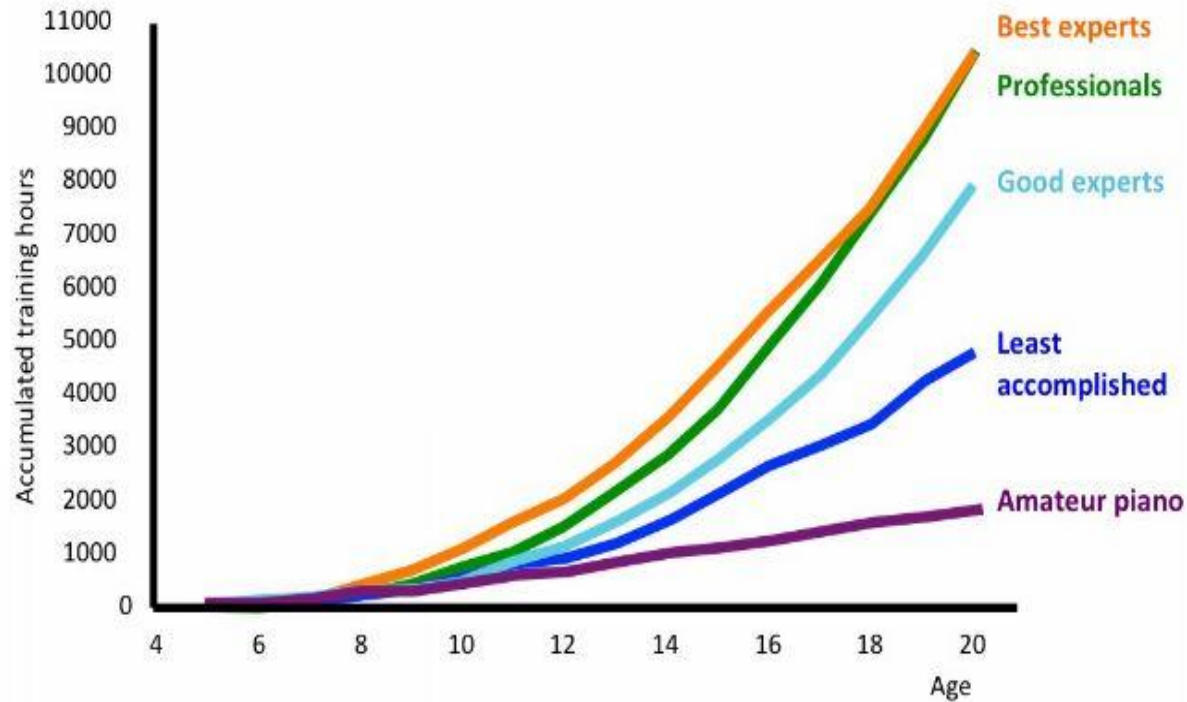
# Kyllä keho tietää



# Ei kukaan ole seppä syntyessään



# Ahkeruus on ilomme



**"The development of expert performance will be primarily constrained by individuals' engagement in deliberate practice and the quality of the available training resources" - Ericsson et al 2009**

- Liikesuorituksen alkeismallin oppiminen  
= 3 000 yritystä
- Hyvä koordinaatiomalli  
= 20 000 yritystä
- Automaattinen, muuttuvissa olosuhteissa hyödynnettävä malli  
= 100 000 yritystä



# Onko järkee vai ei?



# Lite bättre

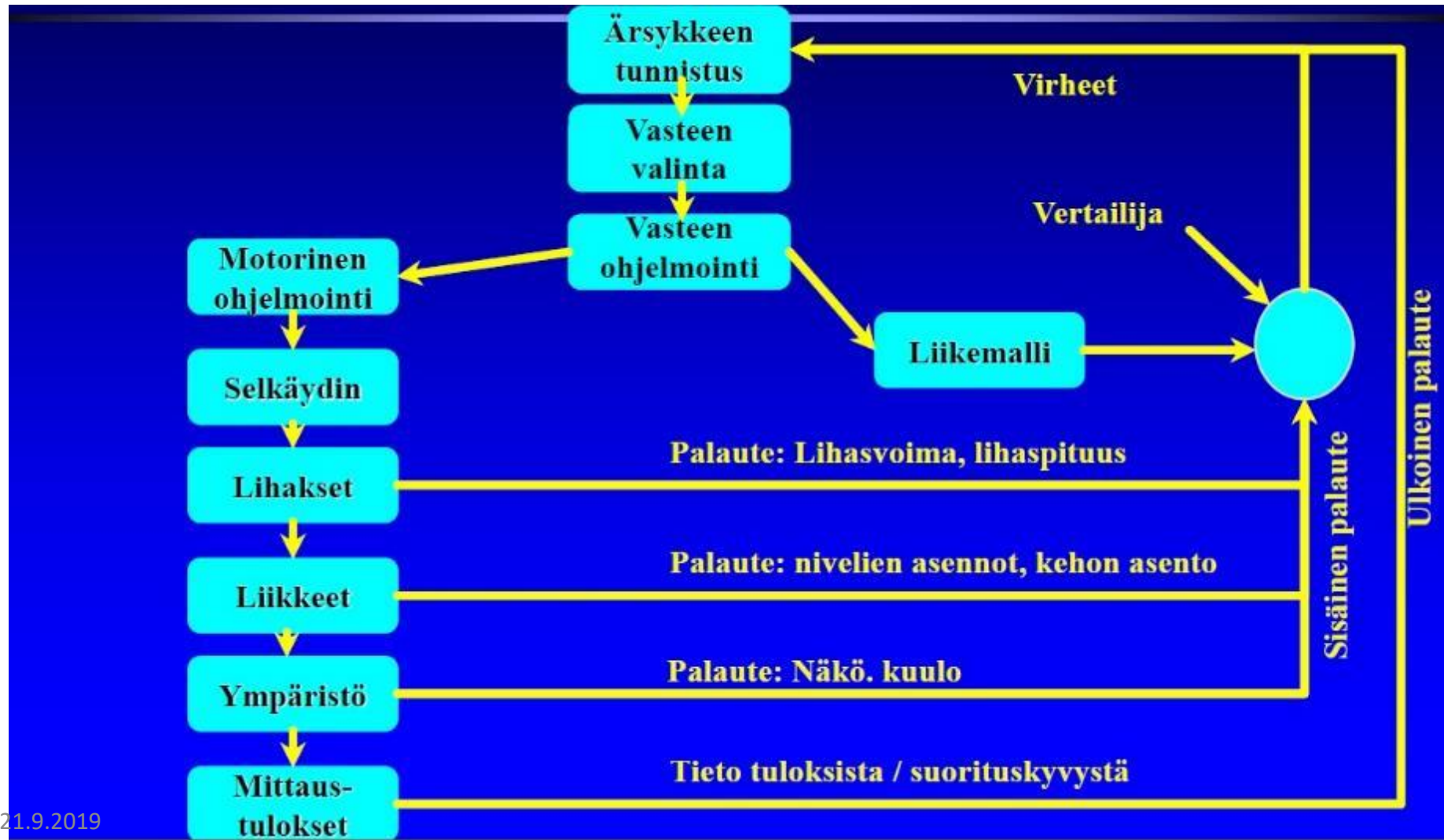


# Unohtaminen auttaa muistamaan



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# Suoralta ei voi oikaista



# Taitava liikkuja näkee ympäristön omalla tavallaan

