

Supplementary Information

Title: Variability of trunk muscle synergies underlying the multidirectional movements and stability trunk motor tasks in healthy individuals

Hiroki Saito^{1,2}, Hikaru Yokoyama^{3*}, Atsushi Sasaki^{4, 6}, Kazuya Matsushita⁵, Kimitaka Nakazawa¹

¹ Graduate School of Arts and Sciences, Department of Life Sciences, The University of Tokyo, Tokyo, Japan

² Department of Physical Therapy, Tokyo University of Technology, Tokyo, Japan

³ Institute of Engineering, Tokyo University of Agriculture and Technology, Tokyo, Japan

⁴ Graduate School of Engineering Science, Department of Mechanical Science and Bioengineering, Osaka University,

⁵ Aobadai Takeda orthopedic, Tokyo, Japan

⁶ Japan Society for the Promotion of Science, Tokyo, Japan

Correspondence to: Hikaru Yokoyama

Institute of Engineering, Tokyo University of Agriculture and Technology, Tokyo, Japan

Email: h-yokoyama@go.tuat.ac.jp

Supplementary Table 1. Full descriptions of 11 trunk movement and stability motor tasks.

Task numbers	Tasks	Position	Conditions
1	Rocking Backward (RB)	Quadruped	A transfer of the buttock backwards ("rocking") keeping low back in neutral until knees reach approximately 130 degrees of flexion and a return.
2	Rocking Forward (RF)	Quadruped	A transfer of the buttock forward ("rocking") keeping low back in neutral until knees reach 0 degree of hip extension and a return.
3	Cross Extension right (Cert)	Quadruped	A raise of a right arm and a left leg straight out and a return.
4	Cross Extension left (Celt)	Quadruped	A raise of a left arm and a right leg straight out and a return.
5	Cat and Dog (CAD)	Quadruped	A round of back and drop a chin to a chest (cat) and a lift of head up and an arch of back down toward a floor (dog) and a return.
6	Forward bend (FB)	Standing	A bend of trunk forward as far as possible and a return.

7	Side bend right (SBrt)	Standing	A bend of trunk to the right side as far as possible and a return.
8	Side bend left (SBlT)	Standing	A bend of trunk to the left side as far as possible and a return.
9	Backward bend (BB)	Standing	A bend of trunk backward as far as possible and a return with arms raised.
10	Rotation right (ROTrt)	Standing	A rotation of trunk to the right side as far as possible and a return.
11	Rotation left (ROTlt)	Standing	A rotation of trunk to the left side as far as possible and a return.