

### O49: Assessment Of Kinetic Parameters In Physically Competent Women With Jumping Mechanography

Y Dionysiou<sup>1,2</sup>, G Michas<sup>1</sup>, A Galanos<sup>1</sup>, GP Lyriris<sup>1</sup>, N Papaioannou<sup>1</sup>

1. Laboratory for Research of the Musculoskeletal System, University of Athens, KAT Hospital, Kifissia, Greece

2. Rehabilitation Department, Rhodes General Hospital, Rhodes Island, Greece

*idiony@otenet.gr*

**Aim:** In the study of muscle performance, movement has to be described in terms of velocity and acceleration. Force (N) causes acceleration and each movement is the action of force along a distance in a certain time, has therefore measured as power (P). The purpose of this study was to analyze parameters of locomotor system in Greek women .

**Material and Method:** One hundred seventy six healthy women aged 20-79 years (yrs) were included in the study. Women were separated according to age decade in 6 groups: group 1 (n=12): 20-29yrs, group 2 (n=14): 30-39yrs, group 3 (n=33): 40-49 yrs, group 4 (n=59): 50-59 yrs, group 5 (n=31): 60-69 yrs and group 6 (n=27): 70-79 yrs. None of them was taken any antiosteoporotic drug or calcium/vitD supplements. For the measurement of objective parameters of movement we used the mechanography system in Leonardo platform (Novotec, Pforzheim, Germany). This system measures forces (N) applied to the plate over time, calculates through acceleration the vertical velocity (m/sec) of centre of gravity and using force and velocity it calculates power (Watt) of vertical movements. Jumping was performed as counter-movement jump (i.e., brief squat before the jump) with freely moving arms. After explaining in all participants the process, they jumped on the platform (two leg jump). Subjects with velocity <0,04m/sec couldn't follow the methodology of the examination and were excluded. We calculated the new value Helios Fitness Index (HEL.F.I.) based on the previous work of M Runge in the German population. A HEL.F.I. value of 100% corresponds to the average value of the Greek healthy women of our material of the same age according to power/body weight parameter.

**Results:** The anthropometric values and the kinetic parameters of the study population are presented in the following table.

age decades data	20-29 (n=12)	30-39 (n=14)	40-49 (n=33)	50-59 (n=59)	60-69 (n=31)	70-79 (n=27)	p-value
Weight Kg	58±9	61±9	63±10	66±7	68±12	67± 10	0.011
Height cm	165±0.07	167± 0.05	164±0.06	162±0.05	161±0.05	160±0.05	0.0001
BMI Kg/m <sup>2</sup>	21.4± 3.41	21.88±2.84	23.56± 3.47	25 ±3.13	26.13± 4.62	26± 3.6	0.0001
jump height m	0.29±0.08	0.23±0.09	0.23±0.08	0.19±0.07	0.16±0.06	0.15±0.07	0.001
Velocity m/sec	2.1±0.41	1.76±0.38	1.69±0.39	1.55±0.38	1.32±0.23	1.2±0.32	0.001
Force max rel N	2.3±0.19	2.18±0.22	2±0.32	1.94±0.27	1.86±0.31	1.71±0.20	0.05
Power Watt	2.1±0.5	1.72±0.69	1.68±0.42	1.48±0.43	1.25±0.33	1±0.33	0.0001
Power/Weight NxKg/m <sup>2</sup>	37.2±8.8	29.19±7.52	27±8	23.6±7	18.84±4.8	16.4±5.4	0.0001
HEL.F.I. %	83.18	80.14	67.48	66.07	62	61.69	0.001

**Discussion:** All kinetic parameters were gradually statistically decreased during ageing. The results suggest that in women a decline in the kinetic parameters is expected. Possible reasons are changes in body composition, reduction of skeletal mass and tendons properties. Jumping mechanography gives to the clinician additional informations about locomotor system.