



## Exercise Biochemistry Review

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### Ageing effect of muscular athletic capability in knee joints over healthy woman aged 45 - 64 years

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**Objective** It is important to evaluate the effect of age on muscular athletic capability in knee joints over healthy woman aged 45 to 64. The research could provide female ageing effect on muscular athletic capability for elderly persons, aiming to promote the relative research on exercise improvement and Women's health.

**Methods** A total of 126 volunteers were selected. The knee muscle strength indexes were tested on side-to-side using self-developed digital isometric muscle function test system. Main indexes include muscle strength, muscle explosive force and muscle endurance on side-to-side. The age groups are classified with 5 years intervals recommended by WHO. The statistics of trend, correlation network, ANOVA and PCA were employed to distinguish the aging effects. All test were implemented in R platform (version 3.3.3).

**Results (1)** muscle strength showed obvious differences between left and right; the relative higher explosive force occurred with extensor muscles on the left showing the significant changing point at 100 ms after 50; the muscle endurance and fatigue index showed side differences after 60. **(2)** muscle strength trend showed “down then up” characteristics with the slightly ahead of 55 on the right side as well as muscle endurance indexes. **(3)** indexes between explosive force variables showed strong significant difference ( $p < 0.001$ ) while muscle fatigue indexes showed side differences; muscle strength in flexor muscles displayed significant correlations with explosive force variables on the right but opposite in extensor muscles on the left. **(4)** the huge difference occurred in extensor groups especially the comparison between minimum and maximum groups. **(5)** the main influences on knee muscular athletic capability include explosive force variables as well as muscle fatigue index.

**Conclusions** Both ageing effect and side effect are observed in muscular athletic capability in knee joints over healthy woman aged 45 - 64 years. After 55, the related variables showed decrease trend indicating the potential decreased muscular athletic capability. In both flexor and extensor muscles, strength variables displayed significant side differences, showing high explosive force in flexor muscles on the right side. The crucial age 50 and 55 became the turning points for knee muscular athletic capability especially with explosive forces.