

# THE EFFECT OF PILATES ON FALLS PREVENTION IN



## A COHORT OF HEALTHY OLDER ADULTS



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### Introduction

Falls and difficulty in walking are among the most dangerous consequences of poor balance. In addition, falls are responsible for 70% of accidental deaths in people over 75 years of age [1]. Falls present a significant social, medical and economic burden to the public health services. The cost of falls is anticipated to increase every year to an estimated US\$240 billion by the year 2040 [2]. The aim of this study is to determine the effectiveness of Pilates exercises on falls in a healthy older adult population over a period of six weeks. The following measures were examined: spatial-temporal parameters of gait: velocity, double support time, stance time, swing time and stride length, and stabilometry: antero-posterior (AP) and medial-lateral (ML) sway, mobility, fear of falling and physical activity.

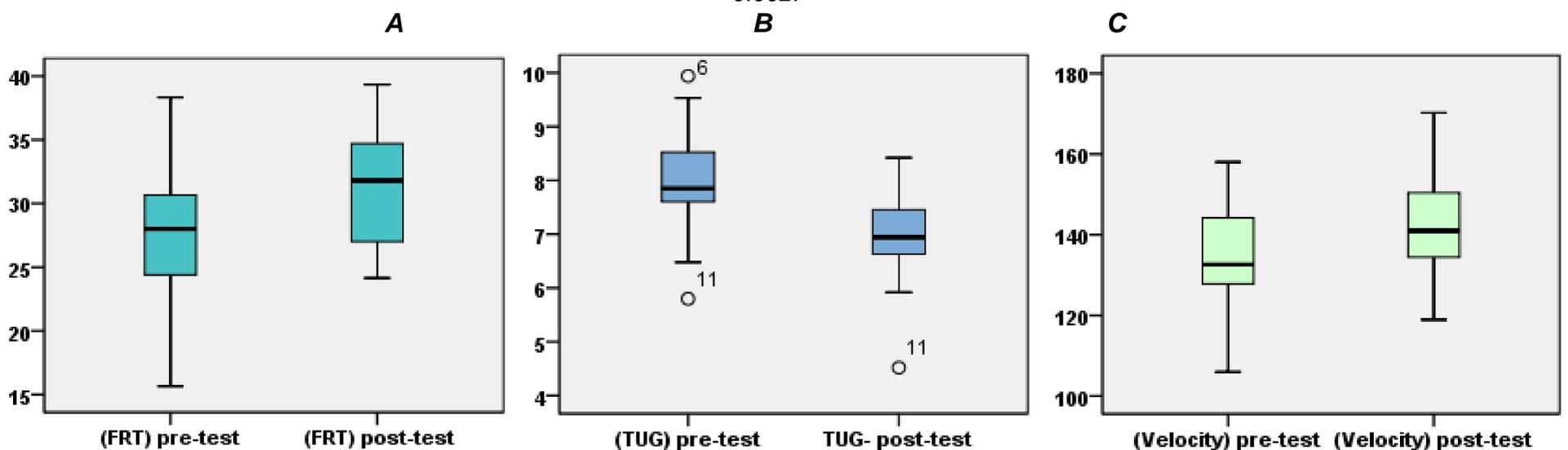
### Methods

An initial screening test of global cognitive function, the Montreal Cognitive Assessment (MOCA), was employed to determine eligibility for participation in the study. Participants were assessed using the following fall-predictor variable measures: the 16 item Falls Efficacy Scale International (FES-16), the International Physical Activity Questionnaire (IPAQ), the Functional Reach Test (FRT), the Timed Up and Go (TUG), the GaitRITE system, Platform FOOTWORKpro pre-and post the Pilates intervention.

### Statistical Analysis

Repeated measures ANOVA analysed with time as within subject factor was used to test for differences between pre- and post-test scores, adjusting for the effect of Pilates; one factor each two levels; FRT (cm), TUG (sec), FES-16, IPAQ (MET), BIAP/ML bipedal (cm) and Velocity (cm/sec). Doubly-multivariate analysed, two factors each two levels; AP, R/L (cm), ML, R/L (cm), Stride Length (cm), Swing Time (sec), Stance Time (sec) and Double Support Time (sec).

**Figure:** A) Functional Reach test (FRT) increased B) Time Up and Go test (TUG) decreased and C) Velocity (Gait) increased. The figures show improvement between pre- and post-test after six weeks of Pilates. (A),  $p > 0,001$  and (B),  $p > 0,001$  and the gait velocity shows less significance (C),  $p = 0.002$ .



**Table:** Repeated measures within subjects variables (time) and between subject factor (for whether a person had prior experience of Pilates)

Response	Estimated marginal means after adjusted for Pilates – Time (pre/post)
FRT (cm)	27.441, 31.593
TUG (sec)	7.895, 6.937
FES-16	23.845, 22.451
IPAQ (MET)	3373.898, 3994.179
<b>Platform/balance</b>	
AP bipedal (cm)	5179.757, 4969.197
ML bipedal (cm)	4614.408, 2971.766
AP single (cm)	6247.564, 6386.285
ML single (cm)	6890.778, 6325.944
<b>Gait variables</b>	
Velocity (cm/sec)	136.542, 142.190
Stride Length (cm)	139.076, 147.908
Swing Time (sec)	325.457, 318.857
Stance Time (sec)	607.410, 550.336
Double Support Time (sec)	217.396, 229.082

### Results

Results for 27 participants were analysed. Mean age=70.4, SD (4.5). Statistically significant differences were identified between pre and post scores in the following domains; The Time Up and Go and Functional Reach tests showed  $p$ -value $<0.001$ , velocity,  $p=0.002$  and the ML sway bipedal,  $p$ -value=0.032.

There is statistical evidence that the Pre scores exceed the post scores on average in the population Time Up and Go, AP-ML bipedal and AP unipedal sway, Swing Time, Stance Time and FES-16.

The population mean Post test score is larger than the corresponding population mean for Pre, in Velocity, Stride Length, Double Support Time, Functional Reach Test, physical activity and ML unipedal sway, after adjusting for Pilates.

### Conclusion

The results of this exploratory study (n=27) suggest that a 6-week pilates intervention may have a positive effect on certain fall-predictor variables including functional mobility (FRT, TUG), parameters of gait (velocity) and stabilometry (ML sway bipedal). Pilates may be an effective intervention in falls prevention however, further high quality clinical trials with larger sample sizes are warranted to ascertain the effectiveness of pilates on falls prevention in an older cohort.

### References

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