P. BET, P.C. CASTRO, M.A. PONTI. Screening fall risk with acceleration data. Gerontechnology 2018;17(Suppl):190s; https://doi.org/10.4017/gt.2018.17.s.185.00 **Purpose** Prevention of falls is a crucial factor in preserving the independence and autonomy of older adults. Falls can be considered a public health problem due to their high incidence and the severity of their consequences[1] and, therefore, falls pose an important matter of investigation. Among the approaches for fall prevention, wearable sensors are currently considered a viable option[2], for example, to discriminate between fallers and non-fallers, with a previous study showing an Area Under the Roc Curve (AUC) of 0.84[3]. However, there is still a gap in the literature on the analysis of such data, in particular for prediction of future falls, to be adopted for health care and prevention[4]. The objective of this study is to investigate patterns, obtained from an acceleration sensor, which could trace the risk of future falls in the elderly through variations in the Timed Up and Go (TUG) test. **Methods** 73 non-faller community-dwelling elderly and participants of the University of the Third Age in São Carlos, SP, Brazil (representative sample with error=5% and power=90%), performed three variations of the TUG: (a) regular, (b) dual task motor, and (c) dual task cognitive, wearing an accelerometer in front of their center of mass. After collecting the data, each volunteer received a call at the end of 3 months to check for occurrences of falls. From the fusion of the accelerometer signal axes (X, Y and Z), obtained during the realization of the TUGs, 5 variables based on the signal frequency were computed to investigate the gait characteristics which would allow to differentiate the elderly who had a fall in the 3 months from monitoring compared to those who did not. The following frequency features were investigated: PSE (sum of the entropies of the frequencies), PSP (peaks of the frequency amplitude), PSPF (frequencies, in Hz, related to the peaks found) in three variants: PSPF1, PSPF2 and PSPF3 (which are the relative to the three first frequency amplitude peaks). A *t*-test was employed to compare the variables according to the groups: faller in 3 months and non-faller (*Table 1*). **Results & Discussion** The average age of the sample was 70 years, 56% females. Among those, 7 elderly reported having suffered falls in the period of 3 months after the realization of the TUGs. According to the accelerometer-based frequency features, the second frequency peak, i.e., the PSPF2, showed a significant difference between the groups (t = -2.26, p = 0.027). We believe our result contributes by encouraging future studies, in which the sample is accompanied for prospective occurrence of future falls, in order to identify patterns that are able to predict the risk of future falls.

References

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Address: Federal University of Sao Carlos, BR;
E: patriciabet95@gmail.com

Table 1. Test T of the features extracted from the signal after the fusion of the accelerometer axes.

	Non-fallers	***Fallers***	***p-value***
n	*66*	*7*	
PSE	*4457109.48±6500959,32*	*3944992.08±4049667.75*	*0.841*
PSP	*103133.87±149288.00*	*67462.70±76254.98*	*0.541*
PSPF 1	*9.11±1.65*	*10±1.20*	*0.174*
PSPF 2	*10.32±5.49*	*5.43±3.96*	*0.027**
PSPF 3	*11.45±7.90*	*7.43±4.40*	*0.195*