

A. CORREIA MARTINS, J. SILVA, A. SANTOS, J. MADUREIRA, C. ALCOBIA, L. FERREIRA, P. MENDES, C. TONELO, C. SILVA, D. BALTAZAR, I. SOUSA. **A case-based study of metrics derived from instrumented fall risk assessment tests.** *Gerontechnology* 2016;15(suppl):106s; doi:10.4017/gt.2016.15.s.752.00 **Purpose** National Institute for Health and Care Excellence (NICE) has recently published quality standards for assessment of fall risk and preventing further falls¹. According to the standards, multifactorial fall risk assessments should include: identification of falls history, analysis of gait, balance, mobility and muscle strength, among other factors. Despite being based on subjective analysis or simple timing and not being multifactorial, physiotherapists and physicians quite often use these tests as reference scales to differentiate between lower and higher risk of falling. Instrumented TUG (Timed Up and Go test) has been recently reported to provide important additional information to the overall score². The objective of this study is to explore a case-based approach of fall risk assessment to identify the most relevant and informative risk factors that in combination could better define a person risk profile. **Method** A multifactorial assessment of fall risk through questionnaires, standard functional tests, tests instrumented with inertial sensors and pressure platforms has been studied within a group aged 55-80 years old. Different fall risk factors and fall risk assessment methods were analyzed in a case-based descriptive study. **Results & Discussion** Subjects at higher risk of falling were identified based on their detailed profiles. A set of features were obtained from the instrumented standard tests differing significantly between subjects presenting higher or lower fall risk. Therefore, instrumenting conventional tests with wearables containing inertial sensors and pressure platforms gives more detailed and quantitative insights. This information can be used to better define and tailor fall prevention exercises and to improve the follow-up of the evolution of the subject.

References

1. National Institute for Health and Care Excellence (NICE). Falls in older people Quality standard; 2015; www.nice.org.uk/guidance/qs86; retrieved February 11, 2016
2. Salarian A, Horak FB, Zampieri C, Carlson-Kuhta P, Nutt JG, Aminian K. iTUG, a Sensitive and Reliable Measure of Mobility. *IEEE Transactions on Neural Systems and Rehabilitation Engineering* 2010;18(3):303-310; doi:10.1109/TNSRE.2010.2047606

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Table 1: Personal information and fall risk assessment tests results for the study group at T 0; bold print= metric values above the thresholds indicative of fall risk; italic print=intermediate levels of risk, for the tests in which these levels are defined; FES=Timetti Falls Efficacy Scale ; POMA=Timetti Performance Oriented Mobility Assessment; TUG=Timed Up and Go test

Person ID	Gender	Age, years	Previous falls	Fear of falling	FES score	POMA	TUG normal pace, s	TUG fast pace, s	Speed 10-m test, m/s	Step test	Force platform, %
1	F	80	No	Yes	13	26	14	8	1.5	18	58
2	M	69	No	Yes	27	25	16	9	1.4	10	12
3	F	79	Yes	Yes	100	9	40	28	0.5	8	0
4	F	68	Yes	Yes	67	23	14	9	1.2	11	12
5	F	65	Yes	Yes	87	7	41	29	0.5	9	10
6	F	67	Yes	Yes	0	24	9	8	1.4	12	25
7	F	80	No	No	20	20	20	12	1.1	7	10
8	F	62	Yes	No	23	25	9	6	1.8	8	13
9	F	74	No	Yes	0	26	12	9	1.3	12	30
10	F	73	Yes	No	20	24	11	8	1.7	12	3