

厚生労働科学研究費補助金（循環器疾患・糖尿病等生活習慣病対策総合研究事業）
令和元年度 分担研究報告書

エビデンスに基づいたロコモティブシンドロームの対策における簡便な確認・介入方法
の確立と普及啓発体制の構築に資する研究

Potential Benefits of Stand-up Tests to Screen Early Mobility Decline in Assistive-Care Beneficiaries

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Purpose/Hypothesis: In light of a government-initiated campaign to support an aging demographic, Japanese medical associations have placed a strong emphasis on healthy aging and endorsed a new stand-alone diagnosis of 'Locomotive Syndrome (LS). This new concept recognizes mobility problems as its own diagnosis, regardless of the underlying pathology. The Stand up Test (SUT), is used to diagnose LS. LS diagnosis are highly correlated with gold-standard tests like Timed Up and Go (TUG) and gait speed in independent community dwellers. However, there is limited information as to whether SUT correlated with gold-standard tests in those with mild disabilities. The aim of this study was twofold to:1) determine if SUT was correlated with gold-standard tests in assistive-care beneficiaries in Japan, 2) determine if the prevalence of LS stages differed between those at different disability levels as defined by the Japanese disability classification.

Subjects: 79 independent Japanese community dwellers with assistive-care beneficiaries for minor issues/assistance (Age: 81±8 years). The government-define disability classification was applied to receive assistive-beneficiaries Levels 1-4 for Independent community dwellers <5 is define as non-independent while the level 7 is the most severe. This classification is a key component of the Japanese criteria for receiving government assistance for healthcare. Exclusion criteria: Individuals with substantial mobility deficits are classified above Level 4 Person with cognitive impairments(<21 on the Mini-Mental State Exam). **Materials/Methods:** The SUT, TUG, gait speed, 30s Chair Rise Test (30sCRT), handgrip and quadriceps strength were assessed. Spearman's Correlation were used to examine the relation between LS tests and other tests. X-test was used to examine the prevalence of LS stages between Level 1-4. **Results:** SUT was significantly correlated with all reference tests (30sCRT: rho=0.55, Gait speed:rho=-0.44, TUG:rho=-0.52) as well as quadriceps strength (rho=0.40) and handgrip (rho=0.23). 91% of individuals with Level 4 disability had LS Stage 2 and this was significantly greater than the other levels; Level 1 (50%), Level 2 (65%), and Level 3 (50%). **Conclusions :** Our results indicated that the SUT could detect different mobility levels in different disability levels in a similar way as the reference tests, were correlated with muscle strength, and differentiated individuals with Level 4 disability from lower levels. **Clinical Relevance :** The SUT seem adequately sensitive for evaluating subtle mobility decline in the assistive-care beneficiaries with mild disability, and may be beneficial as an early screening tool.

A . Purpose/Hypothesis

As a government-initiated campaign for successful aging, Japanese Orthopedic Association has endorsed a new stand-alone diagnosis called 'Locomotive Syndrome (LS)'.¹ This new concept recognizes mobility decline as its own diagnosis, regardless of the underlying pathology. The Stand up Test (SUT) is one of LS tests. This test is correlated to age-related mobility decline in independent community dwellers and significantly correlated to disability levels for those who receive assistive care (Figure 1).^{2,3} The SUT is significantly correlated with conventional tests (e.g. TUG and gait speed) in independent community dwellers; however, it is not clear if the SUT can serve as a

surrogate functional measure for individuals receiving long-term care. Therefore, the aim of this study was to examine the clinical utility for SUT in individuals receiving long-term supportive care. The ultimate objective of our project is to provide insight into the feasibility of using the SUT to quantify mobility decline for older individuals in assistive care facilities.

Purpose : The aim of this study was twofold to: 1) Examine correlation between the results of LS tests and conventional tests in assistive-care beneficiaries in Japan . 2) Determine the prevalence of LS stages among different disability levels as defined by the Japanese disability classification.

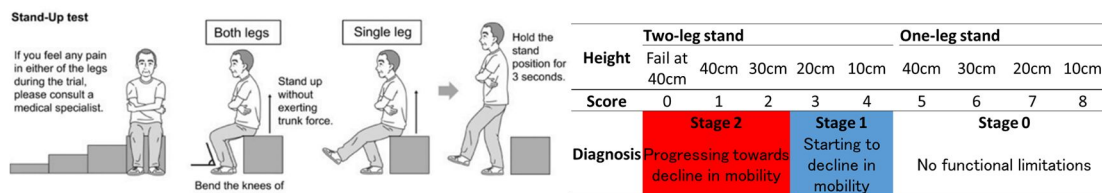


Figure 1: SUT Method and Diagnosis

B . Methods

Subjects: 79 independent Japanese community dwellers who were assistive-care beneficiaries for minor issues/assistance (Age: 81±8 years old, woman: n=52). Individuals who are capable of community ambulation independently or with supervision (Figure 2&3). The distribution of Disability levels are: Level 1 n=8 , Level 2 n=20 , Level 3 n=26 , Level 4 n=25. Individuals without cognitive impairments, defined as <21 on the Mini-Mental State Exam were excluded

Testing Procedures: Muscle Strength during Maximum Voluntary Isometric Contractions: Handgrip (T.K.K.5401, Takei Scientific Instruments Co, Japan). Quadriceps Femoris (μ TasF-1, ANIMA Co, Japan): Knee Flexion at 90 degree (Normalized by body weight (WBI)) Functional Outcome Measures: Fast Gait Speed (5m pathway) , Timed Up and Go , 30s Chair Rise Test

Statistical Analysis: Shapiro-Wilk Test was used to determine the data distribution ($p < 0.001$). Spearman's Correlation Coefficients were calculated to examine the relation between

LS tests and conventional tests. A X^2 test was used to examine the prevalence of LS stages between Level 1-4. IBM SPSS version 25.0 Statistics Software (SPSS, Chicago, IL, USA) was used for all statistical analysis.

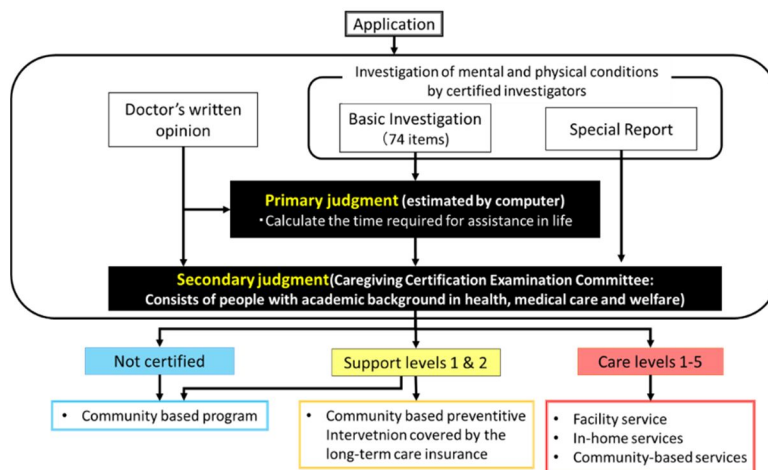


Figure 2: Procedure for Use of Long-term Care Services⁴

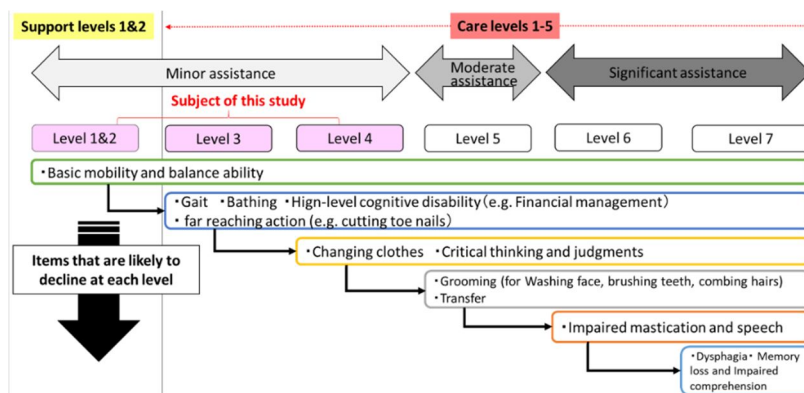


Figure 3: Japanese Classification for Disability (JCD)



Figure 4: Muscle Strength Measurement

Results

SUT was significantly correlated with all reference tests (30sCRT: rho=0.55[p<0.001], Gait speed:rho=0.44[p<0.001], TUG:rho=-0.52 [p<0.001]) as well as quadriceps strength (rho=0.40[p<0.001]) and handgrip

(rho=0.23[p=0.043]). 91% of individuals with Level 4 disability had LS Stage 2 and this was significantly greater than the other levels; Level 1 (50%), Level 2 (65%), and Level 3 (50%).

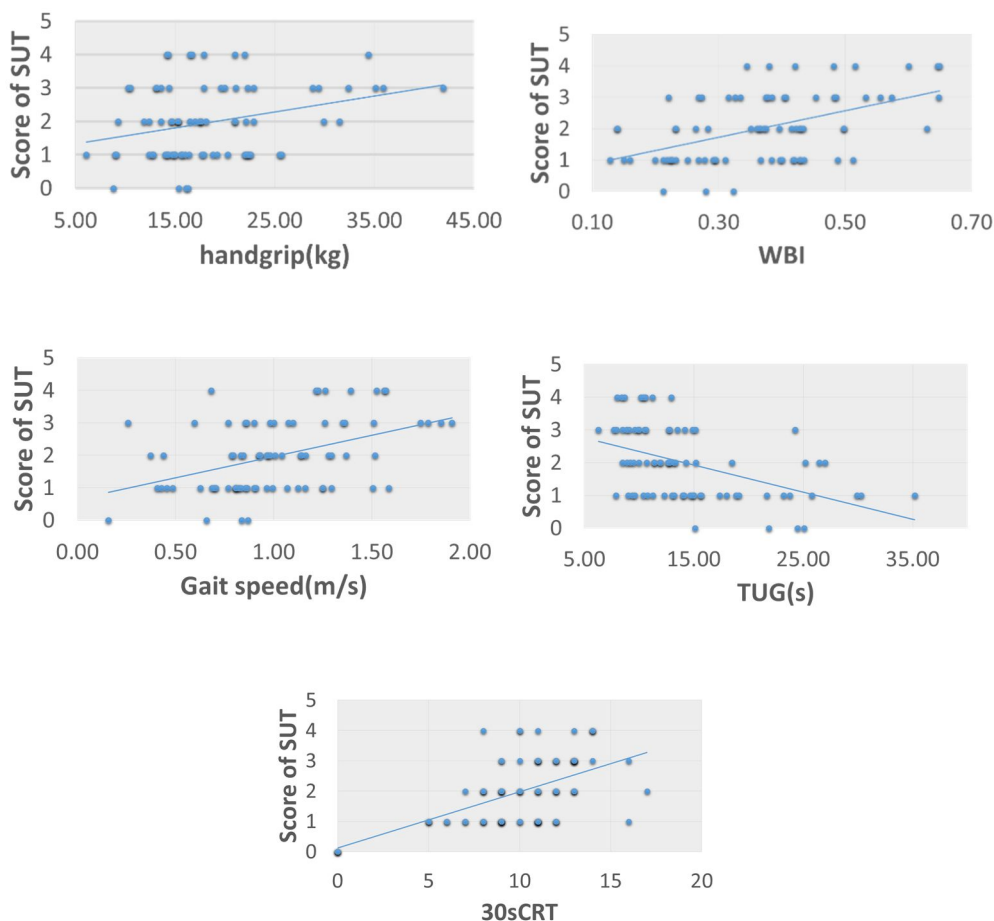
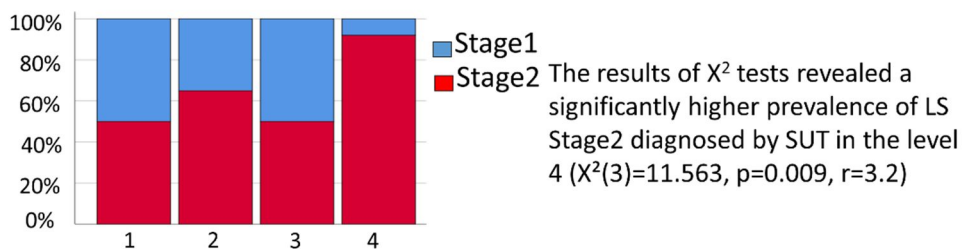


Figure 5: The Correlations between SUT and the Conventional Tests



The results of χ^2 tests revealed a significantly higher prevalence of LS Stage2 diagnosed by SUT in the level 4 ($\chi^2(3)=11.563, p=0.009, r=3.2$)

Figure 6: The prevalence of LS stages between 1-4

D . Conclusion

Our results indicated that the SUT scores were significantly correlated with muscle strength, and mobility measured by the conventional tests. The proportion of LS stages was significantly different in individuals at JCD Level 4. The SUT has potentials to assess subtle mobility decline in the assistive-care beneficiaries with mild disability, and may be beneficial as an early screening tool, yet further investigations are needed.

E . Clinical Relevance

The SUT seem adequately sensitive for evaluating subtle mobility decline in the assistive-care beneficiaries with mild disability, and may be beneficial as an early screening tool.

F . 研究発表

1. 論文発表

準備中

2. 学会発表

発表済み (CSM 2020)

G . 知的財産権の出願・登録状況

1. 特許取得

該当なし

2. 実用新案登録

該当なし

3.その他

該当なし

References

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