FIRST VERSION OF AN INSTRUMENT DEVELOPED TO IDENTIFY THE BIOMECHANICAL CHARACTERISTICS AND STRATEGIES ADOPTED BY SUBJECTS WITH HEMIPARESIS FOLLOWING STROKE DURING THE TIMED "UP AND GO" TEST: CONTENT VALIDATION AND RELIABILITY

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INTRODUCTION

The Timed "Up and Go" (TUG) test is easy, quick and pratical [1] and is comprised of most of the categories related to mobility of the International Classification of Function, Disability and Health, which are affected in subjects with hemiparesis due to stroke [1,2]. In addition, the TUG test has adequate psychometric properties with stroke subjects [3]. Although all the advantages established for the TUG to assess functional mobility of stroke subjects [1,2,3], the only developed outcome is the time spent to perform the test [1]. Considering the well established changes of some biomechanical characteristics and strategies adopted by hemiparetic subjects during the performance of important activities related to basic mobility, as evaluated by the TUG test, it is necessary to develop a reliable and valid measure that would allow the systematic evaluation of these changes and strategies. Therefore, the aim of this study was to develop a clinically-oriented instrument to identify biomechanical characteristics and strategies adopted by hemiparetic subjects during the performance of the TUG test and to investigate the content validity and reliability of the instrument to establish the first version.

METHODS

The study was developed in three phases following the steps described by Benson and Clark [4] and Davis [5]. In the first phase, the previous version of the instrument was elaborated considering the extensive and systematic analyses of three different sources of information: The literature, the opinion of 14 rehabilitation professionals, and the exhaustive observations of the videotaped performance in the TUG test by 22 hemiparetic subjects and 22 healthy subjects matched by age, gender, and physical activity levels. To obtain the variability of the performance, both groups of subjects were divided into three subgroups: slow (n=7), moderate (n=8), and fast (n=7) performance in the TUG test.

In the second phase, the content validity of the instrument was investigated by an expert panel, which was composed of well-known professionals involved in motor and functional rehabilitation of stroke subjects with many publications in refereed journals and conference proceedings. The experts judged the consistency with the conceptual definitions, the representativeness/relevance to the domain of interest, the relevance to clinical interpretations, and the clarity and comprehensiveness of the items and of the overall instrument. The content validity was established according to the traditional subjective process and to the recently proposed content validity index to evaluate the level of agreement between the experts at the item levels and at the scale-level by calculating the modified kappa coefficient (α<0.05) [6].

In the third phase, the intra- and inter-rater reliability was investigated by two independent examiners who evaluated the TUG performance of 12 stroke subjects twice, four weeks apart. To obtain the variability of the performance, the stroke subjects were divided into three subgroups: slow (n=4), moderate (n=4), and fast (n=4) performance in the TUG. The levels of agreement between raters and evaluation were obtained according to the Kappa statistics (α<0.05).

RESULTS AND DISCUSSION

The first phase resulted in a 24 item instrument and each item had three response categories. Based upon the recommendations of Benson and Clark [4] and Davis [5], the number of items developed for the preliminary version of an instrument should exceed the desired final instrument length by 1.5 to 2.0 times. Creating excessive items should assure a sufficient number of items in the pool after testing. Therefore, this previous version of the instrument had 24 items: five related to the sit-to-stand, task, eight to gait, five to turning, and six to the stand-to-sit task. The second phase resulted in a 21 item instrument with adequate content validity. According to the modified Kappa statistics, the levels of agreement between the expert panel members ranged from 0.72 to 1.00 for those 21 items. In the third phase, out of the 21 items, 19 showed significant intra- and inter-rater reliability (Kappa of $0.36 \leq k \leq 1.00$; $p \leq 0.04$).

CONCLUSIONS

After following all of these phases, the first version of the instrument was established with the 19 items showing adequate content validity and reliability: Four related to the sit-to-stand, seven to gait, four to turning, and four to the stand-to-sit. This first version of the instrument showed to be a reliable and valid measurement to allow for the systematic evaluation of the biomechanical characteristics and strategies of subjects with hemiparesis due to stroke during the TUG test. However, before the instrument can be employed in clinical and research settings, it is necessary to establish its criterion and construct validity, which will be conducted during the next phases.

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