Functional and Physiological Changes associated with Posture and Postural Stability in Aging

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ABSTRACT
As more individuals live longer, it becomes more and more important to determine the extent and mechanisms by which we can improve health, functional capacity, quality of life and independence of living alone in the population of elders. The current research of aging has analysed with the use of modern technologies the value of numerous variables that influence the manner we age, as biological systems that affect the process of aging. A factor called functional independence is of great importance in the quality of life of elderly. Functional independence may be defined as the ability to conduct activities of daily living without difficulty. This factor tends to be diminished in advanced aging, for a variety of reasons including physiologic and psychologic changes. The present study reviews and discusses the process of physiological aging in association with changes of posture and Postural Stability in the elderly.

Keywords:
Aging, posture, falls, frail elderly, postural stability

INTRODUCTION
On the simplest level, physical age seems easy to define. It is the chronological time something has existed, or the number of elapsed standard time units between birth and a date of observation. On this level, age and time are synonymous. Spirduso (1995) used the term aging to refer to a process or group of processes occurring in living organisms that with the passage of time lead to a loss of adaptability, functional impairment, and eventually death. Aging occurs with the relentless march of time, but relatively few people actually die because of old age. Most die because the body loses the capacity to withstand physical or environmental stressors. Accompanying to normal aging, however, is a loss in reserve capacity and redundancy, which reduces the ability to adapt quickly and effectively. In the present paper we will briefly review the theories of involution, closely related to aging and refer to the functional decline measurements we use to describe the aging impact on the posture and postural stability.

Theories of physiological involution
Genetic theories
Genetic theories explain the entire process of aging, from birth to death, as programmed by genes, where age-related events such as puberty and menopause are programmed into each cell. These theories suggest that one or more genes determine cellular aging within the nucleus of the cell or that certain genes are expressed or repressed during the normal developmental process of living. An early genetic theory proposed that cells began aging when errors occurred during somatic mutations, chromosomal rearrangements, or transcription of genetic material. However another version of this theory has been proposed more recently: that DNA mutations of the mitochondria build up during an individual’s lifetime thus causing aging. One of the most well known expressions of a genetically based theory was formulated by Hayflick in 1977 (Hayflick Limit). It states that cells will divide and reproduce themselves only for a limited number of times and that this number is genetically programmed. The argument against this theory holds that the long, gradual process of aging is not at all similar to the growth spurts observed in youth. According to Spirduso, this argument cannot be considered as a strong one, since growth spurt in youth and rapidity of decrease of the functional system of the elderly, after a certain line to which everything seems normal, are equal.

Damage theories
Damage theories are based on the concept of chemical reactions, that occur naturally in the body, and begin to produce a number of irreversible defects in molecules. Small but daily chemical damages may occur from the air breathed, the food or the substances eaten/inhaled, tobacco smoking, or from products of the body’s own metabolism. If the chemical damage could be minimized, the aging process could be slowed and people would live longer. According to this theory, the aging per se may be viewed as a disease. Spirduso has also described a prominent example of the damage theory (Cross Linkage theory) in the fact that some highly reactive cellular components made up from atoms or molecules have chemically active sites that can link to the DNA helix within the cell. When one of these crosslinking agents attaches to a strand of DNA, the body’s defense mechanism cuts out the piece of cor-