

Somatosensory

The somatosensory system is composed of neurons that make the conscious perception of touch, pressure, pain, temperature, position, movement, and vibration possible.

WHAT DOES THE RESEARCH SAY?

Proprioceptive Somatosensation; Age related anatomical, physiological and clinical changes

Muscle Spindle Changes	Articular Receptor Changes	Clinical Proprioception
Increased capsular thickness	↓ in all joint receptor types in coracoacromioclavicular ligaments in patients undergoing shoulder arthroscopy	↓ JPS in the great toe
↓ number of intrafusal fibers		↓ JPS ankle in weight bearing and non-weight bearing
↓ spindle diameter in deltoid and extensor digitorum brevis muscles; no changes in quadriceps femoris or biceps muscles		↓ JPS in the knee in partial weight bearing but not full weight bearing
↓ number of total intrafusal fibers and chain fibers in biceps muscle; no changes in the number of bag fibers		↓ JPS in older adults with knee osteoarthritis
Modifications in myosin heavy chain content		No changes in hip JPS
Alterations in distal sensory axons		

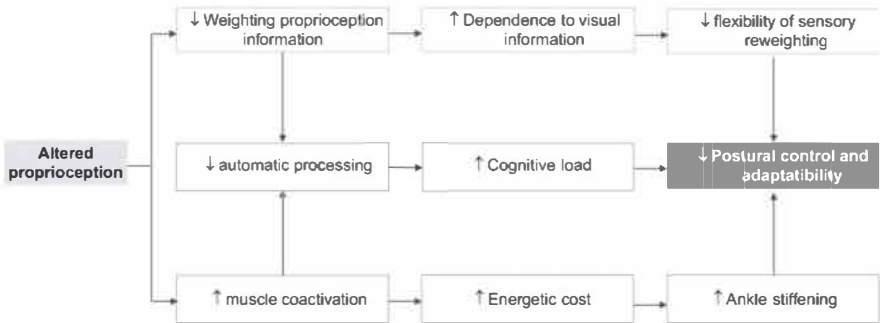
Scott W Shaffer, Anne L Harrison, Aging of the Somatosensory System: A Translational Perspective, Physical Therapy, Volume 87, Issue 2, 1 February 2007, Pages 193–207,

THE IMPACT OF ALTERED LEG PROPRIOCEPTION ON POSTURAL CONTROL:

- greater body sway and excursions of the center of pressure
- a decrease in the relevance of the proprioceptive signal for postural control
- an increase in antagonist coactivation
- a greater reliance on visual information
- less automatic control of upright standing.

Henry et al 2019

HOW IMPAIRED LEG PROPRIOCEPTION CHANGES POSTURAL CONTROL IN OLDER ADULTS



Reproduced from the article: Henry, M et al.Age-related changes in leg proprioception: implications for postural control . J Neurophysiol. 2019 Aug 1; 122(2): 525–538

Proprioceptive and vibration sense in the lower limbs have been shown to be significantly correlated with falls.

Poorer ankle proprioception performance (higher threshold to discern movement) was also associated with less favorable gait characteristics—specifically slower gait speed, shorter stride length, smaller hip and ankle ROM, higher knee energy absorption, and lower ankle energy generation—all of which were also associated with impaired balance.