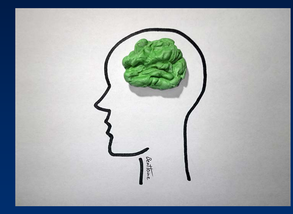
Chewing Speed Appears Resistant to Age-Related Neuromotor Decline

Brittany Samulski, DPT[1], Jessica Prebor, MS, CCC-SLP[1], Steven Morrison, PhD[1]
[1]Department of Kinesiology and Rehabilitation, School of Physical Therapy and Athletic Training, Old Dominion University



Introduction

- A general slowing of motor function is a typical part of the aging process.
- A decreased ability to exploit speed in movement strategies is due to gradual structural changes in nerve and muscle tissues as people age.
- ***Aim:*** *To examine whether chewing rates demonstrate a level of decline similar to other motor tasks.*

Methods

Participants:
15 Healthy Young Adults ((27.7±4.8 years)
15 Healthy Older Adults (63±4.7 years)

General Protocol:
Participants were asked to chew at a specified rate and perform concurrent task at a preferred rate.
The four chewing conditions were:
1) No chewing (control)
2) Chewing at a slow rate (1Hz)
3) Chewing at a preferred rate
4) Chewing at a fast rate (2Hz)

Equipment used:
- Tri-axial accelerometers on the cheek, low back and heel
- Surface electromyography (EMG) of the masseter
- A 20-foot pressure-sensitive walkway to measure gait parameters.

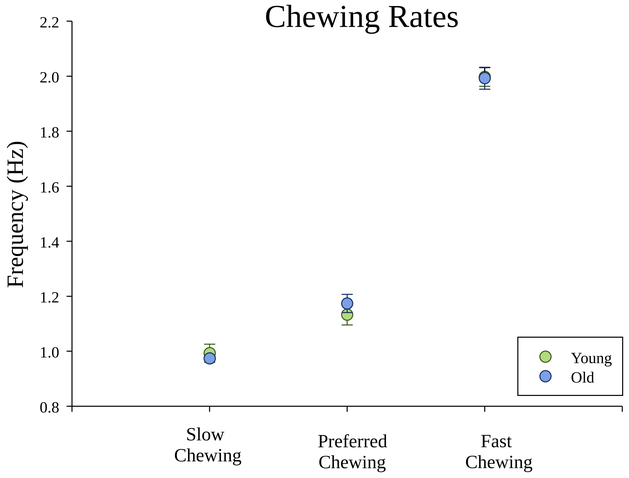
Discussion

- Results reveal that older adults demonstrate a gross slowing of movement apart from chewing speed which appears to be preserved with aging.
- Masticatory muscles receive ipsilateral and contralateral inputs from the motor cortices, whereas limb muscles receive mainly unilateral innervation from the contralateral cortex.
- The neural redundancy may preserve chewing rate despite age-related degradation of the system.

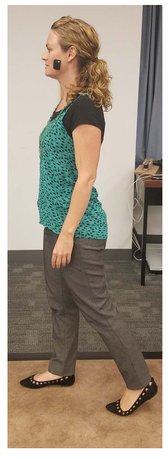
Results

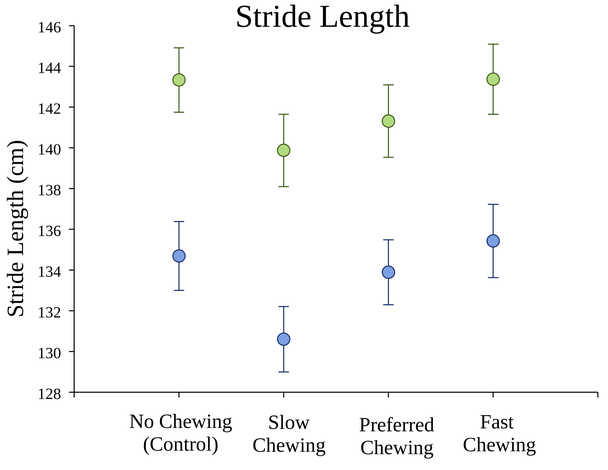
- Chewing speed did not differ between age groups across all conditions.
- Walking speed was slower for older adults across all conditions.
- Older adults consistently exhibited longer path lengths than younger adults during static standing.
- Simple reaction time was longer, indicating slower responses, for the older adults for all conditions.
- Preferred finger tapping speed was slower during the chewing condition for all ages. An age-related difference in finger tapping speed was enhanced during fast finger tapping.

Chewing

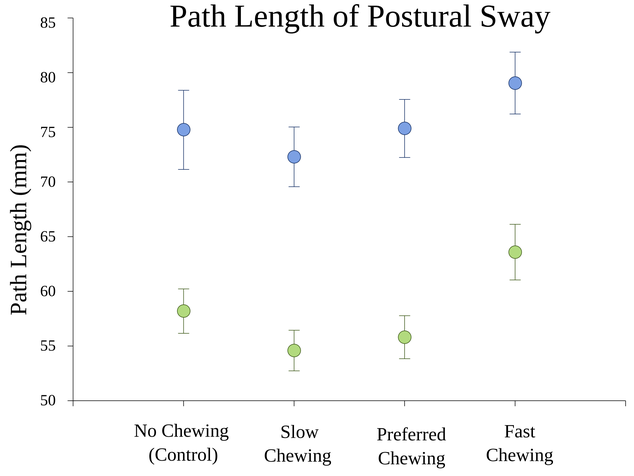


Gait

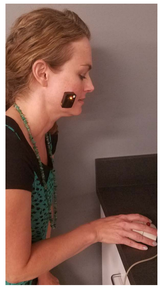


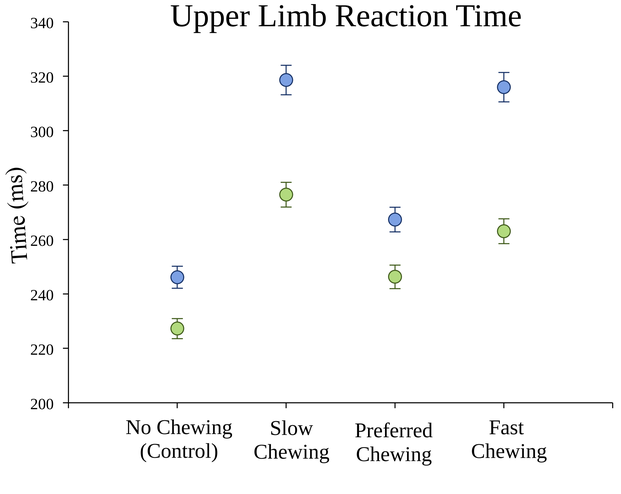


Postural Sway



Reaction Time





Finger Tapping