

Impact of Age and Position on Severity of Gender-specific Sleep Disordered Breathing

Daniel Levendowski, Chris Berka, Djordje Popovic, Tim Zavora, Daniela Scarfeo, Philip Westbrook

Advanced Brain Monitoring, Inc.

Introduction: A previous report found a significant correlation between differences in gender specific length of the pharyngeal airway and obstructive sleep apnea (OSA) severity [1]. This study investigates the impact of age on gender-specific positional and non-positional OSA.

Methods: A retrospective analysis was conducted on sleep study data (minimum 3 hours of valid recording time) obtained from 529 males and 203 females who had underwent a sleep study with an ARES Unicorder and were either between the age of 30 – 45 years (young) or 55 – 70 years (old). The demographic, anthropomorphic, prevalence of co-morbidities, and distribution of patients by referral type, stratified by gender and age group is presented in Table 1. The group/gender BMI and neck sizes matched without removal of any cases. Variables for analysis included: overall, supine and non-supine AHI values with 10-sec cessation in airflow for apneas, hypopneas with a 4% desaturation (AHI), hypopneas with a 1% desaturation and accompanying arousal indicator (RDI), percent-time SpO₂ < 90%, and %-time snoring < 30 dB.

	Males			Females		
	Young 30 – 45 yrs	Old 55 – 70 yrs	p <	Young 30 – 45 yrs	Old 55 – 70 yrs	p <
Demographic and anthropomorphic						
Sample size, n	261	268	N/A	98	105	N/A
Age (years ± SE)	39 + 2.4	61 + 3.7	N/A	39 + 0.4	61 + 0.4	N/A
BMI (kg/m ² ± SE)	31 + 1.9	31 + 1.9	NS	34 + 1.0	32 + 0.7	NS
Neck Size (cm ± SE)	44 + 2.7	43 + 2.6	NS	38 + 0.9	39 + 0.4	NS
Prevalence of Self-Reported Co-morbidities						
High Blood Pressure, n (%)	54 (20.8)	148 (55.2)	0.00001	28 (28.6)	58 (54.7)	0.001
Heart Disease, n (%)	6 (2.3)	48 (17.9)	0.00001	2 (2.0)	10 (9.4)	0.05
Diabetes, n (%)	14 (5.4)	45 (16.9)	0.00001	9 (9.2)	17 (16.0)	NS
Depression, n (%)	40 (18.1)	33 (14.9)	NS	21 (24.4)	26 (28.6)	NS
Sleep Apnea, n (%)	77 (29.6)	87 (32.5)	NS	16 (16.3)	40 (37.7)	0.001
Source of referrals						
Perioperative screening (%)	10.0%	19.4%	< 0.01	41.8%	41.0%	NS
OSA Research studies (%)	52.9%	60.4%	NS	30.6%	43.8%	NS
Sleep lab-sleep studies (%)	37.2%	20.1%	0.00001	27.6%	15.2%	0.05

Results: As compared to the younger group, older males had significantly greater AHI and RDI values overall (Figure 1.a.), and in both the supine and non-supine positions (p<0.01). There were no differences in %-time snoring or SpO₂<90%. The Epworth scores were lower for older men (Figure 2). The prevalence of high blood pressure, heart disease and diabetes was significantly greater in older males as compared to the younger group.

For the females there was no difference in the AHI and RDI values overall and in the non-supine position. Only the supine AHI and RDI values were significant (p<0.05). The prevalence of high blood pressure and previous diagnosis of OSA hypertension were noted in older females. The older females snored more often during the night (Figure 3).

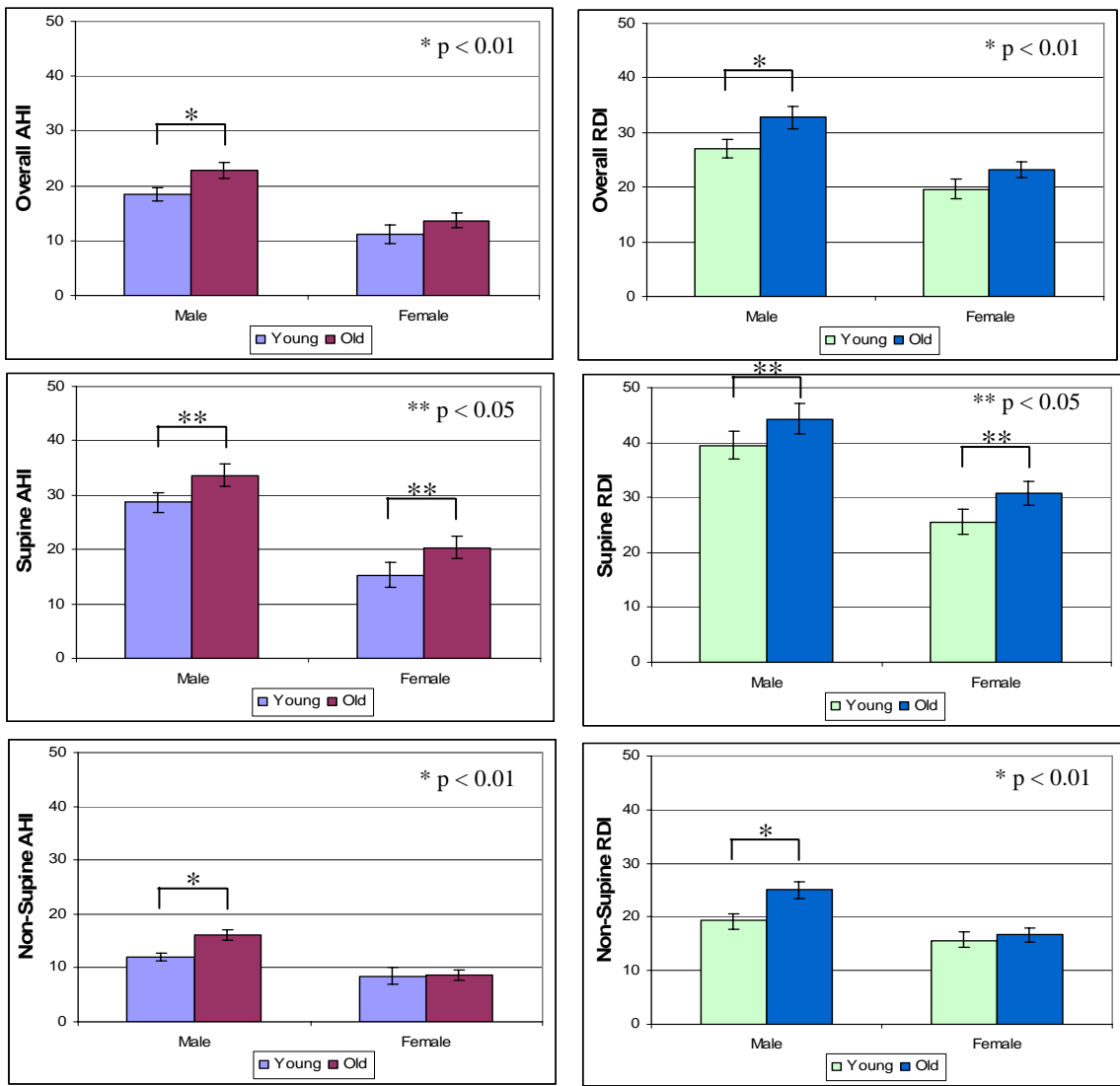


Figure 1. Comparison of a) AHI and b) RDI severity stratified by gender and position.

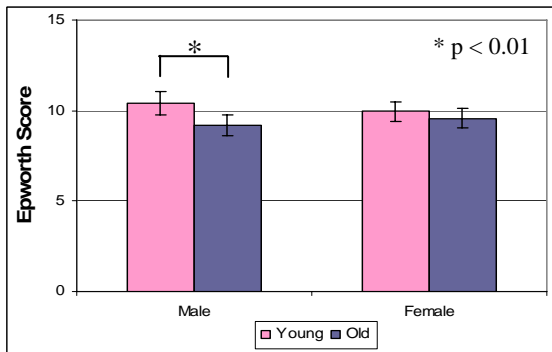


Figure 2. Comparison of Epworth Scores

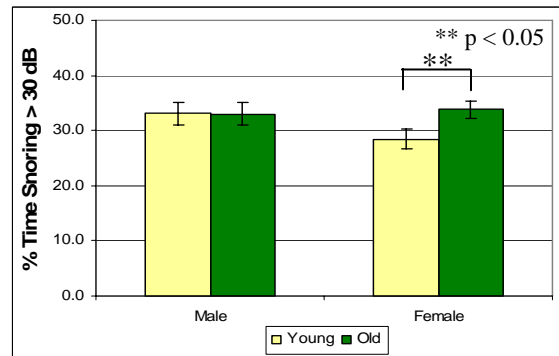


Figure 3. Comparison of percent time snoring > 30 dB

Conclusions: In males, obstructive sleep apnea severity increases with age in all positions; older females are only susceptible to increased sleep apnea/hypopnea severity in the supine position. Older females snore as loudly as younger and older males. This study suggests that the length of the pharyngeal airway may impact changes in OSA severity but not snoring as one ages. The increased incidence of daytime somnolence in younger males may impact referrals for a sleep study at a younger age.

Reference: Segal Y, Malhotra A, Pillar G., Upper airway length may be associated with the severity of obstructive sleep apnea syndrome. *Sleep Breath* (2008) 12(4): 311-316.