Tooth Wear in Patients Undergoing Sleep Studies: A Blinded Observational Study

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INTRODUCTION

Obstructive sleep apnea (OSA) is associated with an increased risk of many health problems, such as atrial fibrillation, depression, congestive heart failure, stroke, hypertension, coronary artery disease and diabetes.[1] It has been estimated that 82-95% of the population with OSA remain undiagnosed and therefore go without treatment.[2, 3] Screening tools and clinical markers are needed from a variety of providers to determine patients at risk for OSA.

OBJECTIVES

The primary objective of this study is to assess if the severity of tooth wear in US service members is associated with the severity of OSA (as measured by the Apnea-Hypopnea Index) in patients who have already undergone a sleep study.

Secondary objectives include adjusting the primary objective for potential confounding factors, such as demographics, comorbidities, diet and current treatments for those patients already with diagnosed OSA.

MATERIALS AND METHODS

This is an ambidirectional observational cohort. Participants were identified as retrospectively having undergone a sleep study and then tooth wear data was prospectively collected at patients' annual dental exam. The participants also completed an anonymous questionnaire to determine correlations with possible confounding factors.

The investigator was blinded as to what the patient's diagnosis/AHI score was before their annual exam and participation in the study. All participants presented to the dental clinic within 3 months of having their overnight polysomnogram.

Anterior tooth wear was scored according to the Smith and Knight tooth wear index.[4]

Smith and Knight's simplified scoring criteria

Score	Description
0	No visible wear
1	Wear confined to enamel, no wear into dentin
2	Dentin just visible or dentin exposed for less than a third of the surface
3	Dentin exposure greater than a third of the surface
4	Exposure of pulp or secondary dentin

CLINICAL OUTCOMES

A total of 109 individuals were recruited for this study. Excluded from the analyses were two individuals lacking AHI data, leaving only 107 participants to be included in the analyses. As expected in a military population, the majority of participants were male (n = 97; 90.7%). The average age of the sample was 36yrs (SD = 7). Participants with elevated AHI were found to be older than the control group with an AHI under 5 (median = 34, SD = 7; and median = 37, SD = 7 respectively), P = 0.03.

Respondent Characteristics

Characteristic	n	AHI <5 %	AHI >5 %
Gender			
Male	97	35.1	64.9
Female	10	70.0	30
BMI			
Underweight	0	-	-
Normal weight	22	68.2	31.8
Overweight	53	30.2	69.8
Obese	31	29.0	71.0
		M (SD)	M (SD)
Sleep, hrs	107	5 (1)	5 (1)
Stress level	107	6 (2)	6 (2)

Consumption Frequency, %

Item	Daily	Weekly	Monthly	Rarely or Never
Cigarettes	2.8	0.9	0.0	96.3
Vaping	3.7	1.9	0.0	94.4
Chewing Tobacco	10.3	3.7	2.8	83.2
Beer	3.7	27.1	20.6	48.6
Wine	0.9	14.0	13.1	72.0
Liquor	0.0	17.8	23.4	58.9
Coffee	57.0	6.5	9.3	27.1
Diet Soda	5.6	8.4	3.7	82.2
Non-diet Soda	4.7	10.3	11.2	73.8
Sweet Tea	3.7	11.2	15.9	69.2
Unsweet Tea	0.0	4.7	15.9	79.4
Juice	7.5	23.4	19.6	49.5
Energy Drinks	10.3	14.0	10.3	65.4
Caffeine Pills	0.9	0.9	0.9	97.2
Candy	1.9	20.6	21.5	56.1
Sugary Foods	9.3	29.9	19.6	41.1
Acidic Fruits	3.7	14.0	18.7	63.6

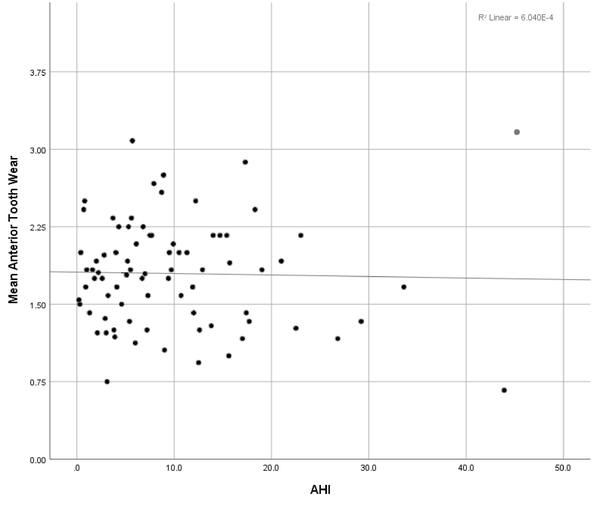
No significant differences in wear were found between participants with AHI <5 and those with AHI ≥5 for any of the teeth examined (all P > 0.05). Overall, both groups had tooth wear scores of 2 (IQR 1). Similarly, no differences in tooth wear were found between participants based on their BMI classification, self reported medical conditions or consumption data (all P > 0.05).

Self Reported Medical Conditions, %

Frequency Assessment	GERD	Acid Reflux	Anxiety	PTSD	Frequent Headaches	TMD
Yes, and I am currently being treated for it	9.3	11.2	31.8	25.2	40.2	6.5
Yes, but I am not currently being treated for it	0.0	3.7	8.4	8.4	14.0	5.6
No, but I think I might have it	6.5	13.1	15.0	15.0	5.6	11.2
No, and I don't think I have it	78.5	65.4	41.1	42.1	38.3	58.9
I don't know	5.6	6.5	3.7	9.3	1.9	17.8

Median Tooth Wear by Group, Mdn (IQR)

Location	AHI <5, %	AHI >5, %
T6 - T11	2 (1)	2 (1)
T22 - T27	2 (1)	2 (1)
T19 and T30	2 (1)	2 (1)











DISCUSSION

Bruxism is more frequently observed in depressed, anxious and emotionally stressed individuals.[5] These participants had already undergone a sleep study. All had a reason for undergoing the sleep study in the first place. This could range from poor sleep quality to history of traumatic brain injury (TBI) or other medical reason. Military personnel are at a high risk of exposure to potentially traumatic events. As such, this makes them an "at risk group" who are vulnerable to suffering from psychological distress and mental health problems including depression, family violence, substance abuse, and post-traumatic stress disorder (PTSD), all of which are problems for the military services and a threat to occupational functionality.[6] This population could be at higher risk for tooth wear than the general population.

A suggested format for a future study could be screening patients based off tooth wear and then sending them for a sleep study.

CONCLUSION

Sleep is a complicated entity with many possible confounding factors. There is no correlation between AHI and tooth wear in the selected military cohort. Dentists should screen patients for possible medical and dental conditions whenever tooth wear is detected. Further research is needed to determine if tooth wear could be used as a potential identifier of patients at risk for OSA.

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