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Alleged Daytime Somnolence in a Professional Driver: Approaching the Fitness for Duty Determination

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In September 2006, a task force from the American College of Occupational and Environmental Medicine, the American College of Chest Physicians and the National Sleep Foundation published consensus recommendations for screening and evaluating Obstructive Sleep Apnea (OSA) in commercial motor vehicle (CMV) operators.[1] OSA is a common and serious sleep disorder associated with daytime psychomotor impairment, as well as an increased risk of cardiovascular disease. This article illustrates the use of the task force's recommendations to guide the fitness for duty evaluation of a school bus driver referred due to alleged daytime somnolence, his subsequent treatment and safe return to work.

A 55-year-old bus driver with 12 years of experience rear-ended another school bus. Just before the incident, students reported the driver's head was resting on the steering wheel. While stopped and picking up additional passengers, he apparently fell asleep. Once all the students were on board, they yelled at the driver to move the bus. He suddenly hit the gas pedal causing a collision with another bus that was parked in front of him. The employer suspended the driver and placed him on paid leave. His company also referred him for a fitness for duty evaluation 2 weeks after the accident.

The potential causes of excessive daytime sleepiness are diverse including insufficient sleep at night (sleep deprivation), OSA, circadian rhythm disorders (eg, shift work or jet lag), idiopathic hypersomnolence, narcolepsy, periodic limb movement disorder, depression, ingestion of psychoactive medications or substances, certain abnormal metabolic states, and head injury.[2] In most cases, however, a careful history and physical examination considerably narrow and focus the differential diagnosis.

During the occupational medical evaluation, the driver denied the use of medication, any significant past medical history, substance use or excess daytime sleepiness. His Epworth Sleepiness Scale (ESS) was 3 (normal ≤10). Nevertheless, during the investigation by the employer, students reported that the driver frequently dozed off at red lights and bus stops. Additionally, when specifically queried, the driver admitted that his spouse complained about his nighttime snoring.

Physical examination was most remarkable for his anthropometric measurements, including a height of 1.82 m (5 feet 11 inches), weight 123 kg (271 lb), Body mass index (BMI) of 38 kg/m^2, and neck circumference of 45.7 cm (18 inches). His blood pressure was 156/102 mm Hg and remained elevated in the stage 2 range on several measurements. His oropharynx revealed tissue crowding with narrowing of the airway. Breath alcohol and urine toxicology screens were negative.

The reports of on-duty somnolence and a sleeping partner's complaint about loud snoring coupled with obesity, a large neck and elevated blood pressure make the diagnosis of OSA highly probable. All of the above, as well as the driver's age (over 50-years old) are significantly associated with OSA. Among Israeli truck drivers with BMI >32, 77.7% had polysomnography-confirmed OSA and excess daytime sleepiness (EDS).[3] Another important consideration is that marked obesity even in the absence of OSA is independently associated with EDS.[4]

The occupational physician recognizing the high probability of OSA analyzed the driver's case according to the Screening Recommendations from the Task Force's guidelines summarized in the Table 1.

This driver had a constellation of findings that would have warranted an "in-service" evaluation (ISE—driver not removed from duty) for a sleep disorder with a maximum driving certification of 3 months even if this had simply been a routine periodic examination. These included a suggestive sleep history (snoring), BMI ≥35 kg/m^2, neck circumference

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TABLE 1
Screening Recommendation for Commercial Drivers With Possible or Probable Sleep Apnea

Medically Qualified to Drive Commercial Vehicles If Driver Meets Either of the Following	ISE Recommended If Driver Falls Into Any One of the Following Five Major Categories (3 mo Maximum Certification)	Out-of-Service Immediate Evaluation Recommended If Driver Meets Any One of the Following Factors
1. No positive findings or any of the numbered in-service evaluation factors 2. Diagnosis of OSA with CPAP compliance documented	1. Sleep history suggestive of OSA (snoring, excessive daytime sleepiness, witnessed apneas) 2. Two or more of the following: a) BMI $\geq$35 kg/m^2 b) Neck circumference greater than 17 inches in men, 16 inches in women c) Hypertension (new, uncontrolled, or unable to control with less than two medications) 3. ESS $>$10 4. Previously diagnosed sleep disorder; compliance claimed, but no recent medical visits or compliance data available for immediate review (must be reviewed within 3-mo period); if found not to be compliant, should be removed from service (includes surgical treatment) 5. AHI $>$5 but $<$30 in a prior sleep study or polysomnogram and no excessive daytime somnolence (ESS $<$11), no motor vehicle accidents, no hypertension requiring two or more agents to control	1. Observed unexplained excessive daytime sleepiness (sleeping in examination or waiting room) or confessed excessive sleepiness 2. Motor vehicle accident (run off road, at-fault, rear-end collision) likely related to sleep disturbance, unless evaluated for sleep disorder in the interim 3. ESS $\geq$16 or FOSQ $<$18 4. Previously diagnosed sleep disorder: a) Noncompliant (CPAP treatment not tolerated) b) No recent follow-up (within recommended time frame) c) Any surgical approach with no objective follow-up 5. AHI $>$30

ISE indicates in-service evaluation; AHI, apnea-hypopnea index; BMI, body mass index; CPAP, continuous positive airway pressure; ESS, Epworth Sleepiness Scale; FOSQ, Functional Outcomes of Sleep Questionnaire; OSA, obstructive sleep apnea.
Reproduced from Ref. 1, with permission.

$>$17 inches and untreated elevated blood pressure (Table 1, middle column). Nevertheless, based upon specific witnessed events—observed episodes of on-duty somnolence and a motor vehicle accident likely related to sleep disturbance—an immediate "out-of-service" (driver removed from duty) sleep evaluation was indicated (Table 1, right column).

The occupational physician informed the company that the driver should not be considered fit for duty until he completed further medical evaluation. The driver and his primary care physician were informed of the examination findings, provided a copy of the OSA guidelines,[1] and instructed to obtain a sleep study to rule out OSA.

A full night polysomnography was performed 1 week after the fitness for duty examination in an accredited sleep laboratory. It showed an overall apnea-hypopnea index (AHI) of 73 events per hour (normal $<$5) and significant associated episodes of oxygen desaturation (nadir SpO_2 of 69% and 28% of sleep time with SpO_2 less than 90%).

OSA is generally defined as sleep-disordered breathing associated with daytime impairment, most often excessive sleepiness.[5] Formally, the diagnosis of OSA requires an AHI of 5 or greater in association with sequelae (eg, hypertension, excessive daytime sleepiness, ischemic heart disease, mood disorders etc), or an AHI $\geq$15; and the absence of any other current sleep, medical, or neurological disorder, medication use or substance abuse disorder that accounts for the clinical signs and symptoms. Unquestionably, based on all of the findings, this driver has a definitive diagnosis of OSA. Moreover, his OSA is severe as defined by an AHI $\geq$30 or greater than 12% of sleep time with a SpO_2 $<$90%. Both hypoxemia and sleep fragmentation and loss are correlated with cognitive impairment.

Several studies have associated OSA with an increased risk of motor vehicle crashes (MVCs).[6] Nevertheless, research has not yet determined

the best predictor of MVCs: the severity of OSA graded by AHI[7] or the degree of EDS.[8] Unfortunately, EDS is difficult to quantify, especially in an occupational setting where there is a strong incentive to deny symptoms to gain or maintain driving certification. This is illustrated by the driver in this vignette who denied symptoms and reported a low ESS despite witnessed on-duty somnolence. Moreover, in the Israeli experience, the majority of obese drivers had OSA as well as impaired vigilance by objective means, but these drivers' subjective reports of EDS were uniformly negative.[3] There is no question in the present case that treatment is indicated based on objectively confirmed pathophysiology.

Four weeks later, a continuous positive airway pressure (CPAP) titration was done and the AHI was reduced to 6.7 per hour with an average SpO_2 reading of 97% and nadir of 92%. A 9-day compliance reading was done after 2 weeks. CPAP usage averaged 6 hours and 58 minutes per night and was consistently greater than 4 hours.

CPAP is the first-line treatment of OSA and significantly reduces the risk of OSA related MVCs.[9] With treatment, the AHI should ideally be less than 5, but at least less than 10,[1] beyond which a significant increase in MVCs has been reported.[7] In this case, the AHI dropped from over 70 to less than 7. Of course, OSA is a chronic disorder and long-term compliance is important, especially here, considering that the driver's passengers are children. The objective recordings of his everyday CPAP use for the majority of the night are reassuring. Given his overall global improvement in AHI and oxygenation, he has satisfied the minimum criteria for driver recertification with respect to OSA. Nevertheless, as confirmed on subsequent visits, he has an associated comorbidity, uncontrolled hypertension, that must also be managed before returning to duty.

Concomitantly, the driver was evaluated by his primary care physician for his elevated blood pressure. Olmesartan 40 mg in combination with hydrochlorothiazide 12.5 mg (Benicar HCT) daily was prescribed, he lost 13 lb and a subsequent blood pressure reading was significantly improved at 132/90 mm Hg.

Although the driver's blood pressure is not yet at goal level, he can be certified temporarily based on the Cardiovascular Advisory Panel Guidelines for the Medical Examination of Commercial Motor Vehicle Drivers (2002). Additionally, we can expect that with continued CPAP treatment and antihypertensive medication, his blood pressure control will further improve. OSA is also adversely associated with the metabolic syndrome and weight gain.[10] The driver's spontaneous weight loss may be an indication of improving hormonal balance in response to improved sleep quality and quantity.

After multidisciplinary evaluation and adequate management of OSA and hypertension, the driver was medically certified for 3 months and able to return to work as a school bus operator 3 months after his accident and initial fitness for duty evaluation. At follow-up, he will need to show continued compliance with OSA treatment and improved blood pressure control.

In this presentation, we have highlighted a common clinical problem and the practical utility of the Joint Task Force Recommendations for identifying OSA and guiding the return to work strategy. Many employers, drivers, and some physicians will question the necessity and fairness of forcing "asymptomatic drivers" to be screened for OSA based on BMI, neck size, and blood pressure. Nevertheless, we can extrapolate that if the guidelines had been applied to this driver's preaccident medical certification as a school bus operator, his OSA could have been identified earlier. Thus, the accident might have been prevented, the school children's risk would have been reduced sooner, and lost work time and income for the driver avoided. Nonetheless, in this case, serious medical conditions were identified and improved through the interaction of strict fitness for duty criteria and the driver's desire to maintain his job. Perhaps most important from an occupational safety standpoint, the risk of subsequent MVCs is arguably lower. This case demonstrates that the proper application of occupational medical guidelines can improve worker health as well as public safety.

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