Abstract
As a clinician with expertise in craniofacial anatomy who spends the majority of each day peering into patients’ airways, the dentist is ideally positioned to screen patients who may be at risk for the deadly condition of obstructive sleep apnea (OSA). This article provides an overview of this common condition including definitions, prevalence, and comorbidities that often accompany or result from this disorder. An overview of the signs and symptoms that often accompany OSA are provided. A written screening exam, the Berlin Scale, is explained. Using this information, the dentist is encouraged to refer at-risk patients to a sleep specialist for further evaluation and possible treatment. Dentists wishing to actively participate in treatment of these patients are encouraged to seek advanced training in a multi-day dental sleep medicine course.

Educational Objectives:
After completing this article, the reader should be able to:
1. Understand that obstructive sleep apnea (OSA) is a common problem with serious medical consequences.
2. Understand the medical definition of apnea, hypopnea and the ranking of the severity of the patient’s OSA based on the common AHI index.
3. Recognize the common comorbidities associated with OSA and appreciate the possible connection between OSA and a patient’s medical history.
4. Appreciate that OSA has been demonstrated to be a significant contributor to early death.
5. Understand that the tongue is a significant factor in OSA and that tongue size and morphology can help predict those who may be at risk for OSA.
6. Appreciate that the Berlin Scale is a useful screening exam can be a useful tool to predict those who should be referred for more definitive testing for OSA.
7. Appreciate that, when fabricated by a properly trained dentist, an oral appliance can have a significant impact on treating those patients suffering from OSA.

Author Profile
Mark Reber DDS, MS, is a private practice dentist in Monterey, Calif. He lectures on the dental treatment of obstructive sleep apnea, and feels strongly that dentists should be proactive in screening and treating these patients. Dr. Reber provides a marketing medium for dentists to “wake up” their local physicians to the magnitude of this common problem and to position themselves as the dental sleep apnea expert to the physicians and patients in their local community. He will be happy to provide a copy of the Berlin Scale to screen patients for OSA to any dentist who requests one. He can be reached at 831-449-9999, at ThePhysiciansUpdate@gmail.com, or through his website at ThePhysiciansUpdate.com.

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Mark Reber, DDS, MS, has no potential conflicts of interest to disclose.
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Abstract
The dental profession should be in the forefront of diagnosis and clinical treatment of Sleep Apnea. This article completely describes the insidious nature of this malady. Sleep apnea has been shown to be a modifiable risk factor to many of the largest contributors to death in the U.S. population. It goes on to describe often unnoticed clinical symptoms that can be easily recognized by the dental team members when they know what to look for. The dentist does not necessarily have to treat the patient for sleep apnea but if they see telltale symptoms, they should certainly urgently refer the patient to a sleep physician for treatment. This is a potentially life-saving referral for the dental patient. Air way problems are thoroughly presented and co morbidity factors are described. A screening process for the dental office is presented along with a section on treatment modalities.

The title sounds a bit like an Agatha Christie novel, doesn’t it? Even the plotline sounds a bit like a mystery writer dreamed it up — an unknown and unsuspected killer silently and secretly kills countless victims, most of whom are blindly unaware that they are at risk until it is too late. Surrounding the victims are people who could help them and should warn them, if only they knew that the victims were at risk. But the silent killer is patient ... secretly stalking its victims and extracting a toll each night until it is too late.

Wouldn’t it be wonderful if this were all just a work of fiction? The sad fact is, obstructive sleep apnea (OSA) is a very real “killer in the night.” For most victims, death doesn’t come swiftly one night with a sudden heart attack (though that also eventually happens to many victims), but rather their death often follows a long-running battle with a myriad of comorbidities that they endure for many years, and they do not know the real source of their initial problem (Reber, 2012). Some clinicians indicate that untreated OSA can be responsible for taking a decade or more off of someone’s life expectancy.

As a dentist, you have the chance to play a vital role in identifying and treating this deadly killer in the night. Indeed, given the knowledge that we have in 2013, you have an obligation to identify the patients at risk, in part because the extraoral and intraoral signs and symptoms that accompany this condition are so easy to see, once you know what you’re looking for. While you certainly have the option not to treat this condition (just like you have the option not to treat root canals or restore implants), you have the moral obligation to recognize this deadly disorder, make the patient aware of your suspicions, and make an appropriate referral for evaluation and treatment.

Sleep Apnea — Defined
Many of us are already somewhat familiar with obstructive sleep apnea, but for clarity’s sake, let’s define the problem. In its truest sense, “apnea” is a cessation of breathing; in this context, an apneic episode is defined as the cessation of breathing for 10 seconds or longer. There are three types of sleep apnea — central apnea, obstructive apnea, and mixed apnea. Central sleep apnea results when the brain temporarily fails to stimulate the patient to breathe. Obstructive sleep apnea occurs when the respiratory path is temporarily blocked and airflow is not possible, in spite of actual respiratory effort. Mixed apnea occurs when the patient suffers from both types of apnea. Obstructive sleep apnea is by far the most common, accounting for over 80% of all apneas.

Hypopnea is an accompanying sleep breathing disorder that has been harder to precisely define (Reuhland, et al., 2009). But it can generally be thought of as a shallow breath or a short, quick “gasp” of breath rather than a full inspiration. Both obstructive sleep apnea and hypopnea are caused by recurrent episodes of upper airway collapse, usually when the tongue occludes the airway.

One of the most common ways to assess the severity of a patient’s apnea is with the apnea/hypopnea index, or AHI. This index provides the average number of apneic and hypopneic episodes that occur each hour as a patient sleeps. A person who suffered 35 apnea episodes and 35 hypopnea episodes in seven hours of sleep would have an AHI of 10 \( \left[ \frac{35+35}{7} = 10 \right] \). The scale of severity ranges and their corresponding figures can be seen in Table 1. From this table you can see that a patient with an AHI of 10 would be classified as having “mild” sleep apnea.

### Table 1

<table>
<thead>
<tr>
<th># events/hour</th>
<th>Classification</th>
</tr>
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<tbody>
<tr>
<td>0-4</td>
<td>Normal</td>
</tr>
<tr>
<td>5-15</td>
<td>Mild sleep apnea</td>
</tr>
<tr>
<td>16-30</td>
<td>Moderate sleep apnea</td>
</tr>
<tr>
<td>&gt;31</td>
<td>Severe sleep apnea</td>
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</table>

A person with an AHI of 60, to meet the minimum definition, would pause breathing for at least 10 seconds, an average of once every minute. Unfortunately, this cessation of breathing is often much longer than that. It is not unusual for these patients
to pause breathing for 30 seconds, 50 seconds, or even well over a minute. Obviously, the oxygen starvation that this patient experiences for six to eight hours each night … night after night, year after year … takes its toll on the body in many different ways. Unfortunately these victims suffer in the shadows, as OSAs remains vastly underdiagnosed.

Prevalence
While many clinicians are aware of what sleep apnea is, most of them are unaware of how prevalent the problem truly is. Authorities estimate that OSA afflicts over 18 million Americans (National Sleep Foundation, 2012). Unfortunately, physicians are not diagnosing those suffering with this condition. Authorities estimate that as many as 80% to 90% of sleep apnea patients are undiagnosed.

Scientifically, we know that it is underdiagnosed based on a myriad of journal articles that have long been telling us so (Hallowell, et al., 2007). Anecdotally, we see it over and over again in our own practices. After screening patients and finding them to be at high risk for sleep apnea, the most common question patients ask is, “Why didn’t my doctor tell me about this?” This is a question for which there is no good answer. Patients continue to visit their physicians and dentists — experts who should be alerting them — but who often don’t have the knowledge or awareness of the condition or, perhaps even more sadly, just don’t take the time to screen for it in their patients at risk.

This is especially tragic because the life-threatening dangers of OSA are well documented and continue to grow. The list of accompanying comorbidities is long and the symptoms varied.

Dangers and comorbidities
Sleep apnea has been shown to be a modifiable risk factor to many of the largest contributors to death in the U.S. population (Table 2). There is no question that obstructive sleep apnea is related to heart attack (Shahar, et al., 2001), stroke (Mohsenin, 2001), diabetes (Pillar & Shehadeh, 2008), impotence in men (Taskin, et al., 2009) (Zias, Bezwada, Gilman, & Chronou, 2009), excessive daytime sleepiness (Chasens, Weaver, Maslin, Pack, & Dinges, 2002), increased risk of motor vehicle accidents (Tregear, Reston, Schoelles, & Phillips, 2009) (Mulgrew, et al., 2008), and weight gain (Pillar & Shehadeh, 2008). Most recently, OSA has also been linked to cancer (Nieto, et al., 2012) (Redline & Quan, 2012).

Perhaps one of the most sobering of sleep studies is a well-respected follow-up to the Wisconsin Sleep Cohort. Eighteen years after the original study, researchers went back to look at the 1,522 participants of their original study to determine how they had fared in the intervening years. What they learned was dramatic. Ultimately, researchers discovered that patients who had severe sleep apnea in the initial study suffered a 500% increase of all-cause death compared to those without sleep apnea or who were actively treating their apnea (Young, et al., 2008)! Sleep apnea is obviously not a condition to be ignored.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of death</th>
<th>Known to be related to or complicated by OSA?</th>
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<tr>
<td>#1</td>
<td>Heart disease, heart attack</td>
<td>Yes</td>
</tr>
<tr>
<td>#2</td>
<td>Cancer</td>
<td>Yes</td>
</tr>
<tr>
<td>#3</td>
<td>Lower respiratory disease</td>
<td>Yes</td>
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<td>#4</td>
<td>Stroke</td>
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<td>#5</td>
<td>Accidents</td>
<td>Yes²</td>
</tr>
<tr>
<td>#6</td>
<td>Alzheimer's Disease</td>
<td>Possible</td>
</tr>
<tr>
<td>#7</td>
<td>Diabetes</td>
<td>Yes</td>
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Signs and symptoms
So, having established that obstructive sleep apnea is a dangerous condition with life threatening consequences, what can be done about it? First of all, it is important to realize that OSA is a treatable condition. Studies show that patients who undergo successful treatment of this condition do not suffer the life altering consequences of those who do not undergo treatment. This makes it important to quickly and easily identify those at risk, advise them of the risk, and then move them to appropriate treatment.

As a dentist, you spend your entire workday looking into the mouths of patients. This affords you a unique opportunity to look at the airway as part of your normal work routine. Are there hints, signs, and symptoms that have been “under our radar,” and thus we have been “allowing” our patients to continue to put their lives at risk each night? In a word — yes. The good news is that this can change tomorrow morning with your first patient.

As we begin our search to find those patients struggling to breathe each night, our exploration should actually begin outside of the mouth. Let’s begin by looking at our medical histories. Are we asking the right questions?

Snoring: One of the most common symptoms of a patient suffering with OSA is a very audible one that can often be heard throughout the house. Does your medical history include a question about snoring? It should. And you should go a step further. If you suspect a patient has OSA, you should verbally ask them if they snore. I am surprised that many patients routinely check “NO” to this question on my medical history, but when verbally asked if they snore, they somehow take the question more seriously and often respond affirmatively, or say that they don’t know. I find this to be the case particularly with women, who do not like to admit that they snore.

Snoring occurs when the lumen size of the airway is decreased. As the body’s muscles relax and the mandible drops backwards, the airway is decreased dramatically in many patients. This decreased airway causes the velocity of the airflow to increase — much like putting your thumb over the end of the hose to make water squirt further as it moves out of the hose faster. This increased air velocity causes the surrounding soft tissues to vibrate, and this tissue vibration causes the sound that we
call snoring. It is this increased air speed that contributes to sleep apnea in and of itself. As the airflow moves faster, the air pressure decreases. This pressure decrease has a suction effect that actually draws the tongue backward to block or “cork” the airway. This is sleep apnea.

While it is true that snoring does not necessarily mean that a particular individual has OSA as much as a person who also struggles with their weight. This stereotype is, for the most part, true, but therein lays the danger. If we live and die by this stereotype, we blindly proceed through our day missing so much else of what is right there in front of us. While it is true that 60% to 70% of OSA patients are overweight, that also means that 30% to 40% of them are not. We need to use our clinical skills to find these patients as well.

BMI — Perhaps there is no greater stereotype of a person who struggles with OSA as much as a person who also struggles with their weight. This stereotype is, for the most part, true, but therein lays the danger. If we live and die by this stereotype, we blindly proceed through our day missing so much else of what is right there in front of us. While it is true that 60% to 70% of OSA patients are overweight, that also means that 30% to 40% of them are not. We need to use our clinical skills to find these patients as well.

Technically, a person’s BMI is their weight in kilograms divided by their height in meters squared (kg/m\(^2\)). Any computer or smartphone will quickly provide you with a BMI calculator to help you determine your patient’s BMI. If a person has a BMI greater than 25, they are considered to be overweight; if their BMI is greater than 30, they are considered to be obese. With a BMI greater than 30, they are also considered to be at greater risk for OSA. I think we can all agree that America’s waistline is growing and that the obesity epidemic has become, well, super-sized. A recent study indicated that over one third of Americans are obese (Flegal, Carroll, Kit, & Ogden, 2012). Sleep apnea is not a problem that is going away anytime soon.

Blood pressure — Daytime hypertension is closely associated with OSA (Pedrosa, et al., 2011). This symptom is so closely associated with OSA that some researchers have suggested that a heavy snorer who is also hypertensive should be referred for an overnight polysomnogram (PSG), just based on these two factors alone. While this might sound overly reactionary to some, closer thought shows this NOT to be the case, as we will see in the “Screening” section below.

Diabetes — The physiology of OSA tends to make the body’s cells more resistant to insulin. This can predispose a patient with OSA to contracting diabetes. With this in mind, you should look at your diabetic patients with a jaded eye until your screening exam (see below) shows that your diabetic patient is at low risk for OSA.

Age — OSA is a progressive problem. As we age, gravity takes its toll on all of our muscles and tissues and the muscles and tissues of the airway are no different. What this means is that if you are a heavy snorer in your 20s, you can probably look forward to struggling with OSA in your 40s or 50s. And while anyone can have sleep apnea, it is a much bigger problem for “mature” adults. Statistics also tell us that over half of all patients over the age of 50 who snore have some degree of OSA.

Increased neck size — Male patients with a neck circumference larger than 17 inches and females with a neck circumference larger than 16 inches are much more likely to have OSA based on this sign alone.

Morning headaches — Morning headaches are common in some apnea patients. This headache is due to the high carbon dioxide levels that accompany sleep apnea. These headaches disappear soon after awakening as normal breathing resumes.

Excessive daytime sleepiness — If a patient reports on their medical history that they are always tired or fatigued, OSA should pop to the top of your differential diagnosis. A patient with OSA has a seven-fold increased risk for drowsy driving and becoming involved in an automobile accident.

Intraoral

OSA often leaves its own set of calling cards in a patient’s mouth … at least for someone who can recognize them. Some of the more common ones include:

Large tongue volume — We typically think of a patient’s tongue as a static organ that doesn’t change much. Not true. As a patient gains weight, the tongue can increase in volume by a third or more. Tongue volume has been strongly linked to a patient’s BMI (Nashi, Kang, Barkdull, Lucas, & Davidson, 2007). Increased tongue size affects both the oral airway and the pharyngeal airway.

The Mallampati Classification, initially thought to assess soft palate length to help anesthesiologists assess intubation difficulty, has actually been found to better assess tongue volume. The Mallampati Score is assessed as the patient sits upright and maximally extends his/her tongue without phonation. The “score” is arrived at based on the visible structures at the back of the throat. If the entire uvula and the tonsilar pillars are seen, the patient has a Mallampati Score of 1. If most of the uvula is seen, the patient has a Mallampati Score of 2. If only the base of the uvula is seen, the patient has a Mallampati Score of 3. If only the soft palate is visible, the patient has a Mallampati Score of 4 (see Fig. 1). Each increase in the Mallampati Score results in a doubling of the risk of OSA. Thus a patient with a Mallampati Score of 2 has twice the risk of OSA vs. a patient with a Mallampati score of 1. Do the math and you will see that a Mallampati Score of 4 carries eight times the risk of OSA compared to a patient with a Mallampati Score of 1.

Figure 1. The patient on the left has a Mallampati Score of 1. The patient on the right has a Mallampati Score of 4 with early tongue scalloping.

A scalloped tongue — Picture if you will a very large car trying to park in a very small garage. Obviously some compromises have to be made, usually with tell-tale signs of damage to both the car and garage. A patient with a scalloped tongue is showing evidence that either their car (i.e., the tongue) is too
big, or their garage (the mouth) is too small. With a large tongue relative to the size of the mouth, the patient will usually have an airway problem. With their mouth closed, the tongue has to go somewhere. Most often, the tongue retracts into the airway and reduces the effective lumen size (see Fig. 2). As a patient struggles to maintain or enlarge their airway, they unconsciously move their tongue forward. The tongue, pressed firmly against the teeth, is embedded with their shape and announces to you the lack of room in the mouth. Sometimes scalloping is obvious, but sometimes early scalloping is more discreet, as seen in Fig. 1.

Figure 2. In this cone beam CT image, it is obvious that the area of minimal airway volume is immediately posterior to the tongue. A mandibular advancement device (MAD) will bring both the mandible and tongue forward, thereby improving the available airway space in this usually constricted area.

Narrow, constricted maxilla and/or mandible — Once again, we have the “large car/small garage” problem. A patient with a very constricted maxilla and a normal sized or large tongue is going to experience airway problems, as the tongue moves into the airway to find room. Some of these airways can be very crowded already and are easily overpowered by a tongue moving backwards, looking for space (see Fig. 3). This should speak volumes to dentists who see children with this problem. Early intervention in your office or referral to an orthodontist can have an effect that can literally add years to these patients’ lives by averting what would otherwise be a life-threatening problem in adulthood. It may be a bit dramatic but not removed from truth to state that referral to the orthodontist — for some patients — can have profound and even lifesaving benefits that they will realize as adults.

Chipped, worn anterior teeth — One of the most common oral appliances used in treating OSA is the mandibular advancement device (MAD). This appliance opens that airway by advancing the mandible to simultaneously bring the tongue forward and open the airway lumen. In their effort to breathe easier, some patients unconsciously advance their own mandible because they find they can breathe better. This habitual protrusive movement will often chip, fracture, and wear the anterior teeth as the upper and lower jaw move past each other. Sometimes these patients have almost no wear on their posterior teeth, while their anterior teeth are severely damaged.

Screening
So what do you do if you suspect, based on the above signs and symptoms, that your patient may have obstructive sleep apnea? Is there a way to go beyond your suspicions and help screen these patients, especially if you are somewhat new to sleep apnea? Fortunately, there is.

One screening exam to determine if a person is at high risk for OSA is the Berlin Scale. This is a very predictive written exam that takes two to three minutes for the patient to complete and a few seconds for the dental team to score. This simple test looks at several symptom areas that the OSA patient may have — the volume and frequency of snoring, the degree of tiredness the patient self-reports, blood pressure, and BMI. Simply stated, if the patient “flunks” two or more different areas of this test, they are deemed to be at “high risk” for OSA and should be referred to a sleep specialist for evaluation and possible confirmatory testing. For example, according to the parameters of the Berlin Scale, a patient who snores loudly and has high blood pressure is deemed to be at “high risk” for sleep apnea and should be referred for evaluation by a sleep specialist.

Treatment
Traditional treatment of OSA with continuous positive air pressure (CPAP) is very successful, if the patient can tolerate it. Some patients tolerate it very well. Unfortunately, many more do not. Depending on the studies you read, patient compliance with CPAP ranges from 17% to 55% (Weaver & Grunstein, 2008). The rest of the patients give up and are left to suffer and struggle with the various comorbidities outlined above. In 2006, the medical community acknowledged that they need help treating these patients and asked for assistance from organized dentistry (Kushida, et al., 2006).
In 2013, literally dozens of dental appliances are available for treating obstructive sleep apnea, many of which (though not all) work very well. The previously mentioned MAD is one of the most effective appliances. This has been shown to work very well in the hands of a properly trained dentist, but therein lies the key — training. Before you start treating patients, prudence dictates that you take a multi-day clinical course to learn how to deal with the many facets of sleep medicine, dental sleep medicine, and oral appliance therapy. The risks are too great to just “wing it” and cross your fingers. Unfortunately, some of our dental colleagues have done just that, giving the reputation of oral appliance therapy a black eye among some members of the medical community. In the hands of a well-trained dentist, oral appliances have been shown to be very successful in treating this deadly condition. Your knowledgeable referral or treatment can be a blessing to the countless patients in your community who unknowingly battle this life-threatening condition every night.

Dentists need to recognize their role and responsibility in airway evaluation and management. We need to examine our patients’ airways with at least as much attention as we examine their teeth and gums. Let’s remember — we are talking about matters of life and death here.

For the sake of your patients’ lives, are you ready to step forward to help stop this Killer in the Night?

References

Obstructive sleep apnea and cephalometric roentgenograms. The role of anatomic upper airway abnormalities in the definition of abnormal breathing during sleep. CHEST, 1199-1205.

Footnotes
1 This class includes the chronic obstructive pulmonary diseases (COPD) such as emphysema and chronic bronchitis.
2 Drivers who have OSA are at a seven-fold increased risk of motor vehicle accidents. Other accidents at work and at home are also more frequent.

Author Profile
Mark Reber DDS, MS, is a private practice dentist in Monterey, Calif. He lectures on the dental treatment of obstructive sleep apnea, and feels strongly that dentists should be proactive in screening and treating these patients. Dr. Reber provides a marketing medium for dentists to “wake up” their local physicians to the magnitude of this common problem and to position themselves as the dental sleep apnea expert to the physicians and patients in their local community. He will be happy to provide a copy of the Berlin Scale to screen patients for OSA to any dentist who requests one. He can be reached at 831-449-9999, at ThePhysiciansUpdate@gmail.com, or through his website at ThePhysiciansUpdate.com.

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Questions

1. What is sleep apnea?
   a. Cessation of breathing 10 seconds or longer
   b. Chest pains
   c. Shortness of breath
   d. All of the above

2. What is a type of sleep apnea?
   a. Central apnea
   b. Obstructive apnea
   c. Mixed apnea
   d. All of the above

3. What is central apnea?
   a. Results when the patient wakes up from sleeping every hour.
   b. When the patient sleeps soundly all night
   c. Results when the brain temporarily fails to stimulate the patient to breathe.
   d. None of the above

4. What is obstructive apnea?
   a. When the respiratory path is clear and airflow is possible.
   b. When the patient has chipped teeth.
   c. When the respiratory path is temporarily blocked and airflow is not possible.
   d. None of the above

5. What is the estimated percentage of undiagnosed sleep apnea patients?
   a. 10 – 20%
   b. 40 – 50%
   c. 60 – 70%
   d. 80 – 90%

6. Is obstructive sleep apnea treatable in men and women?
   a. Yes
   b. No
   c. Only in Men
   d. Only in Women

7. What is the most common symptom of a patient suffering with obstructive sleep apnea?
   a. Dry mouth
   b. Snoring
   c. Bad breathe
   d. None of the above

8. What headaches types are associated with obstructive sleep apnea?
   a. Night headaches that wake you from sleeping
   b. Morning headaches that disappear soon after awakening and normal breathing resumes
   c. Afternoon headaches from lack of sleep
   d. Migraine headaches

9. What percentage of snoring patients over 50 years old have some degree of obstructive sleep apnea?
   a. 10%
   b. 25%
   c. 50%
   d. 100%

10. Which of the following can often be seen in a patient with obstructive sleep apnea?
    a. Large tongue volume
    b. A scalloped tongue
    c. Narrow, constricted maxilla and/or mandible.
    d. All of the above

11. What is the most common dental treatment for obstructive sleep apnea?
    a. A mandibular advancement device
    b. A maxillary night guard
    c. Braces to straighten the teeth.
    d. None of the above

12. Which is more common in a patient with obstructive sleep apnea?
    a. Underweight
    b. Perfect weight
    c. Over weight
    d. None of the above

13. Are any of the following known to be related to or complicated by obstructive sleep apnea?
    a. Heart disease, heart attack
    b. Cancer
    c. Stroke
    d. All of the above

Notes
**Educational Objectives**

1. Understand that obstructive sleep apnea (OSA) is a common problem with serious medical consequences.
2. Understand the medical definition of apnea, hypopnea and the ranking of the severity of the patient’s OSA based on the common AHI index.
3. Recognize the common comorbidities associated with OSA and appreciate the possible connection between OSA and a patient’s medical history.
4. Appreciate that OSA has been demonstrated to be a significant contributor to early death.
5. Understand that the tongue is a significant factor in OSA and that tongue size and morphology can help predict those who may be at risk for OSA.
6. Appreciate that the Berlin Scale is a useful screening exam can be a useful tool to predict those who should be referred for more definitive testing for OSA.
7. Appreciate that, when fabricated by a properly trained dentist, an oral appliance can have a significant impact on treating those patients suffering from OSA.

**Course Evaluation**

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<td>Yes</td>
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Please evaluate this course by responding to the following statements, using a scale of Excellent (5) to Poor (0).

1. Were the individual course objectives met?
2. To what extent were the course objectives accomplished overall?
3. Please rate your personal mastery of the course objectives.
4. How would you rate the objectives and educational methods?
5. How do you rate the author’s grasp of the topic?
6. Please rate the instructor’s effectiveness.
7. Was the overall administration of the course effective?
8. Please rate the usefulness and clinical applicability of this course.
9. Please rate the usefulness of the supplemental webliography.
10. Do you feel that the references were adequate?
11. Would you participate in a similar program on a different topic?
12. If any of the continuing education questions were unclear or ambiguous, please list them.
13. Was there any subject matter you found confusing? Please describe.
14. How long did it take you to complete this course?
15. What additional continuing dental education topics would you like to see?

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- Requirements for successful completion of the course and to obtain dental continuing education credits: 1) Read the entire course. 2) Complete answer sheets in either pen or pencil. 4) Mark only one answer for each question. 5) A score of 70% on this test will earn you 1 CE credit. 6) Complete the Course Evaluation below. 7) Make check payable to PennWell Corp. For Questions Call 216.398.7822

**Academy of Dental Therapeutics and Stomatology, A Division of PennWell Corp.**

P.O. Box 116, Chesterland, OH 44026
or fax to: (440) 845-3447

Customer Service 216.398.7822

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**ANSWER SHEET**

**The Killer in the Night**

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|---|---|---|
| **Educational Objectives** | 1. Understand that obstructive sleep apnea (OSA) is a common problem with serious medical consequences. 2. Understand the medical definition of apnea, hypopnea and the ranking of the severity of the patient’s OSA based on the common AHI index. 3. Recognize the common comorbidities associated with OSA and appreciate the possible connection between OSA and a patient’s medical history. 4. Appreciate that OSA has been demonstrated to be a significant contributor to early death. 5. Understand that the tongue is a significant factor in OSA and that tongue size and morphology can help predict those who may be at risk for OSA. 6. Appreciate that the Berlin Scale is a useful screening exam can be a useful tool to predict those who should be referred for more definitive testing for OSA. 7. Appreciate that, when fabricated by a properly trained dentist, an oral appliance can have a significant impact on treating those patients suffering from OSA. **Course Evaluation** | 1. Were the individual course objectives met? 2. To what extent were the course objectives accomplished overall? 3. Please rate your personal mastery of the course objectives. 4. How would you rate the objectives and educational methods? 5. How do you rate the author’s grasp of the topic? 6. Please rate the instructor’s effectiveness. 7. Was the overall administration of the course effective? 8. Please rate the usefulness and clinical applicability of this course. 9. Please rate the usefulness of the supplemental webliography. 10. Do you feel that the references were adequate? 11. Would you participate in a similar program on a different topic? 12. If any of the continuing education questions were unclear or ambiguous, please list them. 13. Was there any subject matter you found confusing? Please describe. 14. How long did it take you to complete this course? 15. What additional continuing dental education topics would you like to see? |

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**PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.**

**PROVIDER INFORMATION**

For immediate results, go to www.ineedce.com to take tests online. Answer sheets can be faxed with credit card payment to (440) 845-3447, (216) 398-7922, or (216) 255-6619.

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**KILLERJAN13DE**

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