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PUBLISHED: **DECEMBER 2024**

EXPIRES: **JANUARY 2028**

### ABSTRACT

Dental professionals can play a central role in the early detection and intervention of polysubstance abuse in their patients. Physicians often overlook the oral indications of, and miss the correlation between, oral health and substance abuse if they fail to look in a patient's mouth. Dentists and hygienists, with their specialized training in oral medicine, have a unique opportunity to identify drug use and addiction issues through direct observation of oral tissues, symptoms, and disease. In today's world, with multisubstance addiction coinciding with the opioid crisis in America, there is a necessity for extended training in substance use and abuse recognition for dental professionals. Additional training will equip dentists and hygienists with the necessary tools to contribute more effectively to their patients' overall health and well-being. This course will guide dental practitioners in the identification of polysubstance signs and symptoms, thereby facilitating the early detection of polysubstance abuse. Further, it will outline the oral manifestations associated with various substances of abuse. Finally, it will suggest courses of action and referrals for patients who have multisubstance addiction and problems.

### EDUCATIONAL OBJECTIVES

At the conclusion of this educational activity, participants will be able to:

1. Discuss the role of drug addiction in dental health and disease
2. Describe the relationship between polysubstance use and informed consent for dental procedures
3. List the adverse drug reactions with dental pharmacology and polysubstance use
4. Improve patient care with logical choices for pain control prescriptions
5. Describe the implications for dentistry and other health-care professions



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# Recognizing polysubstance abuse in dental patients

A PEER-REVIEWED ARTICLE | by Eric Bornstein, DMD

The US is currently awash in prescription and illegal drugs, with more than 120,000 people a year dying due to drug overdose.<sup>1</sup> Two-thirds of these overdose deaths involve some type of opioid as a causative factor, combined with methamphetamine and cocaine.<sup>2,3</sup> The combination of potent opioids and stimulants in the same delivery mechanism is known on the street as a “goofball” or “speedball.”<sup>4</sup> The National Institutes of Health (NIH) recently reported that more Americans now use marijuana and hallucinogens than at any time in prior recorded history.<sup>5</sup>

Every dental professional will likely interact with a segment of the population who abuse alcohol, stimulants, opioids, and certain legal and illegal DEA-classified addictive drugs, either separately or in combination.<sup>6</sup> It is, therefore, incumbent on dentists and staff to be able to identify drug abuse patterns to protect themselves as well as their patients in these circumstances.<sup>7,8</sup> Some patients may present with self-inflicted dental trauma,<sup>9</sup> ambiguous complaints of pain,<sup>10</sup> allergies to “selected” pain medications,<sup>11</sup> and “suggestions” for what pain medications should

be prescribed.<sup>12</sup> These drug-seeking behaviors in the context of routine pain management of a dental patient can be challenging to discern in specific individuals.

In a patient with drug addiction, a seemingly ordinary prescription for pain or anxiolysis can trigger further abuse or even overdose when mixed with other drugs the patient may already possess legally or illegally.<sup>13</sup> Many easily obtainable addictive drugs will not show up on a prescription drug monitoring program. These drugs can be tetrahydrocannabinol (THC), synthetic THC, dextromethorphan, kratom (alternative opioid), and salvia (alternative psychedelic).<sup>14</sup> As drug use and culture in America become more normalized and legal, it gives patients the false imprimatur of safety without the benefit of actual medical and pharmacologic knowledge.<sup>15</sup> It is incumbent upon dental professionals to recognize these patient issues and plan accordingly for procedures and postoperative pain control so as not to further exacerbate patient drug usage and conditions.

### Commonly abused substances

Drugs, in the context of addiction, are substances that have the potential to alter a person's thinking and judgment. The use of addictive substances inevitably leads to health risks, such as dependence, impaired driving, infectious disease, adverse effects on pregnancy, and child-rearing concerns.<sup>16</sup> Substance abuse can occur with prescription medications,<sup>17</sup> over-the-counter medications,<sup>18</sup> illegal drugs,<sup>19</sup> and widely utilized common substances, such as caffeine,<sup>20</sup> nicotine,<sup>21</sup> and alcohol.<sup>22</sup> The most frequently abused categories of drugs include alcohol, benzodiazepines, opiates, nonbenzodiazepine somnolents, and

stimulants.<sup>23</sup>

Each class of substance or drug has its own potential for misuse and addiction. For example, THC, a neurotransmitter inhibitor on the presynaptic neuron, can lead to distorted perceptions, impaired coordination, and difficulty with thinking, problem-solving, learning, and memory.<sup>24,25</sup> Alcohol, a postsynaptic neurotransmitter inhibitor,<sup>26</sup> will manifest problems as consumption becomes increasingly important and takes priority over everything else of consequence, including a person's job, friends, and family.<sup>27</sup> Cocaine, a potent central nervous system stimulant,<sup>28</sup> can lead to addiction, severe health problems, and death.<sup>29,30</sup> Once detox has been completed and medical stabilization achieved, many drug and substance addictions can then be effectively addressed with behavioral-based therapies. However, the habitual use of the drug needs to be managed first.<sup>31</sup>

### Polysubstance abuse

*Polysubstance abuse* refers to the deliberate or unintentional combining of substances.<sup>32</sup> With polysubstance use, a person consumes two or more potentially addictive drugs simultaneously or within a short period of time of each other,<sup>33</sup> intentionally or unintentionally.<sup>34</sup> Deliberate polysubstance use occurs when a patient takes a drug to increase or decrease the effects of a different drug or desires to experience the effects of the drugs in combination.<sup>35</sup> This can occur with the purposeful consumption of opioids and stimulants simultaneously.<sup>36</sup> It can also occur with the practice known as "candy-flipping," which is the simultaneous consumption of LSD and ecstasy.<sup>37</sup> *Unintentional polysubstance use* is defined as the

consumption of black-market drugs that were mixed or cut with other substances, such as fentanyl, without the user's knowledge.<sup>38,39</sup>

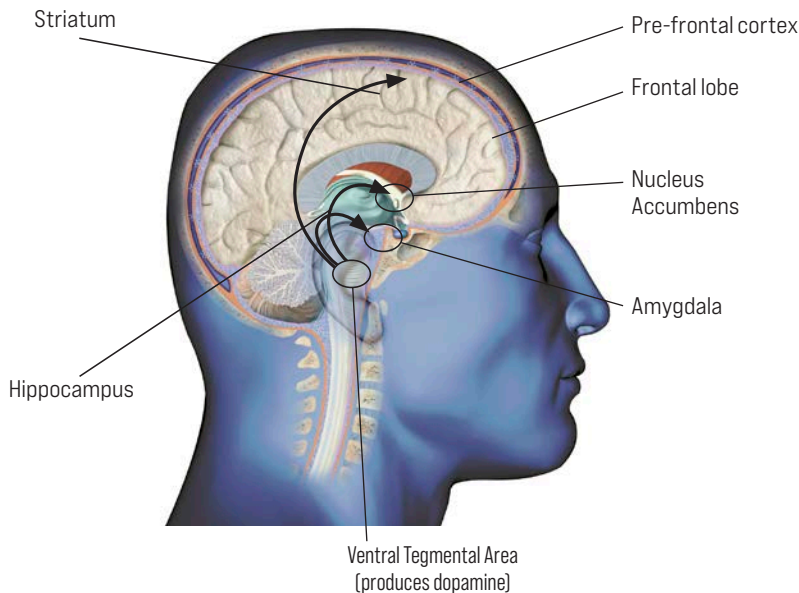
Signs that a patient may be struggling with polysubstance abuse include mood swings,<sup>40</sup> changes in behavior,<sup>41</sup> intoxication,<sup>42</sup> overdose,<sup>43</sup> falling behind or neglecting personal and professional responsibilities,<sup>44</sup> difficulty maintaining relationships,<sup>45</sup> legal and financial trouble,<sup>46</sup> health problems, and engaging in drug-seeking behavior.<sup>47</sup> A patient who is suffering from addiction to multiple substances may present with cravings and urges to use, tolerance, or needing to mix or use more significant amounts of substances to achieve desired effects. They may also exhibit symptoms of withdrawal after stopping use, such as anxiety, depression, and isolation.<sup>48</sup> Combining drugs is always risky, regardless of intent, because the impact may be more potent and unpredictable than a single drug alone, and possibly deadly.<sup>49</sup>

### Understanding the brain's reward system and anatomy

The science of addiction is a complex field that has evolved significantly over the past century. It was once believed that individuals with an addiction were morally flawed and lacking in willpower.<sup>50</sup> Today, modern medicine understands that addiction is a complex psychological and physical disorder that affects the brain and changes behavior. The definitions of dependence and addiction have recently been updated to incorporate more nuances based on a patient's actions while consuming a drug.<sup>51</sup>

**Addiction**, or compulsive drug use despite harmful consequences, is characterized by an inability to stop using a drug; failure to meet work, social, or family obligations;

### Dopamine Reward System of the Brain



**FIGURE 1:** Dopamine reward system of the brain

and sometimes (depending on the drug), tolerance and withdrawal. The latter reflects physical dependence in which the body adapts to the drug, requiring more of it to achieve a particular effect (tolerance) and eliciting drug-specific physical or mental symptoms if drug use is abruptly ceased (withdrawal).

**Physical dependence** can happen with the chronic use of many drugs—including many prescription drugs—even if taken as instructed. Thus, physical dependence in and of itself does not constitute addiction, but it often accompanies addiction and will lead to withdrawal. This distinction can be difficult to discern, particularly with prescribed pain medications, for which the need for increasing dosages can represent tolerance or a worsening underlying problem, as opposed to the beginning of substance use or addiction.

A group of neural structures, which we refer to as the brain’s reward system, is in charge of incentive salience (i.e., motivation, wanting, or desire), primarily positive associative

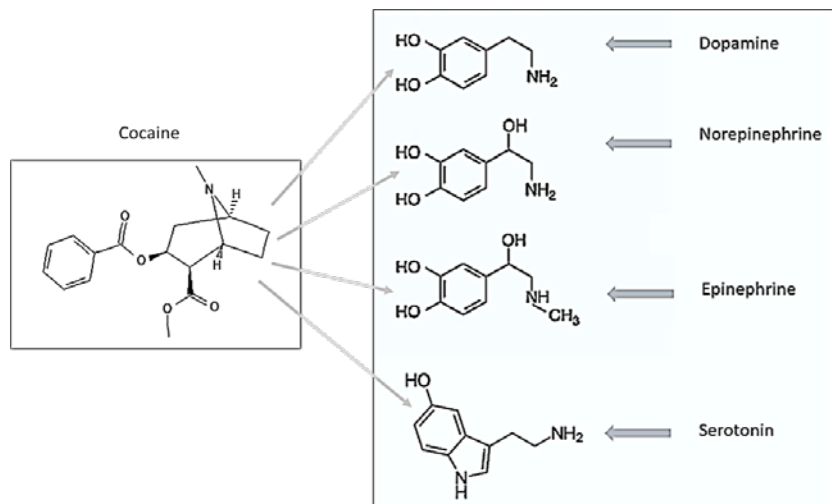
learning, and classical conditioning for a reward.<sup>52</sup> The reward system functions to determine the stimulus in positively valenced emotions, mostly involving pleasure as a core component.<sup>53</sup> A reward from drug use is based on the positive feeling desired by an individual, which reinforces the behavior of utilizing the drug again.<sup>54</sup>

The reward system relies on the neurotransmitter dopamine, which plays a central role in the brain’s

reward system.<sup>55</sup> Dopamine neurons in the ventral tegmental area (VTA) are activated by rewarding experiences such as food, sex, and social interaction, and these neurons send projections to the nucleus accumbens (NAc) and the prefrontal cortex (PFC)<sup>56</sup> (figure 1). When these neurons are activated, they release dopamine into limbic areas of the brain, leading to feelings of pleasure and satisfaction.<sup>57</sup> This dopamine release reinforces the behavior that led to the reward, making it more likely to occur in the future.<sup>58</sup>

Dopamine is released from the ventral tegmental area.<sup>59</sup> The nucleus accumbens contains dopamine-sensitive cells. Activation with dopamine will cause feelings of pleasure.<sup>60</sup> The amygdala and hippocampus both play a role in memory and whether the (dopamine) experience is desirable.<sup>61</sup> The prefrontal cortex coordinates the information and determines an individual’s behavior.<sup>62</sup>

Many addictive drugs, such as cocaine, amphetamines, and opioids, directly or indirectly increase dopamine levels in the brain’s reward system. Cocaine, for instance, inhibits the reuptake of dopamine, epinephrine, norepinephrine, and serotonin, leading to an accumulation



**FIGURE 2:** Cocaine’s effect on the reward system of the brain

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of these neurotransmitters in the synapses and an intensification of the reward signal (figure 2).<sup>63</sup>

Over time and with continued use, the brain adapts to high dopamine levels by reducing the sensitivity of dopamine receptors<sup>64</sup> or reducing the amount of dopamine produced.<sup>65</sup> This leads to tolerance, where the individual needs to take more of the drug to achieve a similar effect, and withdrawal symptoms when the drug is discontinued. This cycle of tolerance and withdrawal can lead to addiction, as the individual may take the drug not for pleasure, but to avoid the discomfort of withdrawal.<sup>66</sup>

### How addiction develops and persists

Drug addiction is a multifaceted and complex disease that affects the brain's reward, pleasure, memory, and motivation systems. It develops and persists through several stages, each characterized by specific behaviors and physiological changes.

**Stage one** is the initial use of a substance. The reasons for initiating use can range from curiosity to peer pressure to a patient being given a prescription.<sup>67,68</sup>

**Stage two** is the beginning of abuse of a substance. During this stage, the individual begins to use the drug or substance more frequently. Drug use may start to interfere with daily activities and responsibilities.<sup>69-71</sup>

**Stage three** is tolerance. Over time, the brain becomes desensitized to the drug, requiring larger doses to achieve the same effect. This is due to the drug's impact on the brain's key reward neurotransmitter, dopamine.<sup>72,73</sup>

**Stage four** is dependence. At this stage, the individual may experience withdrawal symptoms when not using the drug. These symptoms can be both physical and psychological, leading to an intense craving for

the drug.<sup>74,75</sup>

**Stage five** is addiction. Addiction is characterized by an inability to stop using the drug despite adverse consequences.<sup>76</sup> The individual may engage in risky behaviors to obtain the drug and may continue using it even when aware of the harm it is

causing.<sup>77,78</sup>

**The last stage** is relapse. Even after periods of abstinence, the individual may return to drug use, often due to triggers or stressors. This stage is considered a part of the addiction cycle rather than a failure of recovery.<sup>79,80</sup>

**TABLE 1: Negative oral impacts from polysubstance abuse**

Drug-induced negative oral health impact	Cause of negative oral health impact
Xerostomia <sup>86</sup>	Substance misuse can lead to dry mouth. Excessive or prolonged xerostomia will cause caries, fungal infections, and periodontal disease. <sup>87</sup>
Tooth discoloration and staining <sup>88</sup>	Substances such as tobacco, marijuana, and methamphetamine <sup>89</sup>
Tooth erosion <sup>90</sup>	Exposure to acidic substances such as cocaine, methamphetamine, and vomit (from alcohol-induced nausea) <sup>91</sup>
Bruxism <sup>92</sup>	Temporomandibular joint (TMJ) disorders, headaches, and facial pain <sup>93</sup>
Dental caries <sup>94</sup>	Nutritional deficits, absence of dental cleanings, xerostomia, acidic oral environment, oral microbiome alterations <sup>95</sup>
Periodontal disease <sup>96</sup>	Excessive periodontopathic bacteria in dental plaque causing an inflammatory response, leading to the damage of gingiva, periodontal ligament, and alveolar bone <sup>97</sup>
Oral infections and sores <sup>98</sup>	Poor oral hygiene, reduced immunity, and irritation from smoking or snorting drugs <sup>99</sup>
Halitosis <sup>88</sup>	Xerostomia, poor oral hygiene, infections, and tobacco use <sup>100</sup>
Dysgeusia and dysosmia <sup>101</sup>	Altered taste and smell can be caused by xerostomia, infections, tobacco use, and damage to the nerves in the nose and mouth from snorting drugs. <sup>102</sup>
Tooth loss <sup>103</sup>	Severe tooth decay, erosion, periodontal disease, infections, and trauma <sup>104</sup>

**TABLE 2: Signs of polysubstance abuse**

Signs of polysubstance abuse	Manifestations of polysubstance abuse
Mood swings <sup>105</sup>	Rapid and extreme changes in mood can be a sign of substance abuse.
Changes in behavior <sup>106</sup>	Unusual or erratic behavior may indicate substance misuse.
Intoxication <sup>107</sup>	Signs of intoxication include slurred speech, unsteady movement, or impaired coordination.
Overdose symptoms <sup>108,109</sup>	Symptoms such as unconsciousness, respiratory depression, or seizures could indicate an overdose.
Neglect of personal and professional responsibilities <sup>110</sup>	Falling behind at work or school or neglecting household duties
Difficulty maintaining relationships <sup>111</sup>	Strained relationships with family and friends due to substance use
Legal and financial trouble <sup>112,113</sup>	Legal issues or financial difficulties related to substance use
Physical and mental health problems <sup>114,115</sup>	Physical health issues include weight loss, poor nutrition, or skin sores.
Increased dental issues <sup>116</sup>	Increased caries and carious lesions, a decreased response to local anesthetics, and being prone to oral infections
Drug-seeking behavior <sup>117</sup>	Frequently requesting prescriptions, often with excuses about lost or stolen medication

This self-reinforcing cycle of drug use, coupled with the brain's increasing tolerance to dopamine, fuels the cycle of abuse and addiction.<sup>81</sup>

A patient's social environment also plays a significant role in addiction and influences addiction risk.<sup>82</sup> If a patient uses addictive drugs as an adolescent, they are more likely to develop lifetime addiction.<sup>83</sup> It is important to note that addiction is a chronic disease, similar to diabetes or cardiovascular disease, and it requires long-term management.<sup>84</sup> Treatment options include behavioral therapies, medication, and support groups. Each individual's path to recovery may be different, and what works for one person may not work for another. Therefore, personalized treatment plans are crucial for effective recovery.<sup>85</sup>

### Polysubstance abuse and oral health

Polysubstance abuse causes significant negative impacts on oral health. Table 1 shows some key points:

- Identifying physical and behavioral signs of polysubstance abuse
- There are multiple signs of polysubstance abuse that can be present in a dental patient. These are listed in Table 2.

### Confidentiality and ethical considerations

There are significant confidentiality and ethical considerations when treating a patient with polysubstance abuse and addiction. The first and overriding issue is with patient autonomy.<sup>118,119</sup> A dental professional has a duty to respect the patient's right to self-determination. This right involves informing the patient of the proposed treatment and any reasonable alternatives while allowing the patient experiencing substance use disorder to be involved

in dental treatment decisions.<sup>120,121</sup> Also, all dental personnel are mandated to safeguard the confidentiality of patient records. Any information shared by the patient about substance abuse or addiction should be kept confidential unless there is a legal obligation to disclose it.<sup>122</sup>

Dentists also have an ethical obligation to do no harm. This obligation includes ensuring that the dental therapy and any intra- or postprocedure prescriptions do not exacerbate the patient's substance abuse issues.<sup>123</sup> Dentists and hygienists also have the associated duty of beneficence to act in the best interests of their patients. This duty includes identifying and reporting signs of abuse and neglect, consistent with the dentist's legal obligations. Many times, these issues are part of a patient's daily life with addiction problems and will come in conflict with confidentiality concerns.<sup>124,125</sup>

Finally, dental professionals are ethically bound to prioritize their patients' needs and interests. This includes HIPAA, and refusal of treatment when making decisions.<sup>126</sup>

### Modifications to dental treatment plans

As a result of polysubstance abuse, dental professionals need to be prepared to potentially alter treatment plans to accommodate such a patient.<sup>127</sup> Five possible examples are listed below.

- A multidisciplinary approach may be necessary when pain control is needed. Frequent communication with the patient's physician and pharmacist should be maintained to prevent polypharmacy, drug interactions, and overdosing.<sup>128</sup>
- Modification of pain management will frequently be necessary to avoid exacerbating the patient's

substance abuse problem. This would involve utilizing nonopioid analgesics and corticosteroids while coordinating with the patient's physician to manage pain.<sup>129</sup>

- Dentists must identify chemically dependent patients and understand what substances they are taking. Each substance carries its own risk from a polypharmacy and morbidity perspective.<sup>130</sup>
- Address the most pressing oral health issues in an order that may conflict with a patient's desires. For example, xerostomia, dental caries, periodontal disease, infections, and oral lesions need to come before esthetic concerns.<sup>131</sup>
- Provide adequate referral to specialists.

These five simple modifications will help to provide safe and effective dental care to patients with polysubstance abuse and addiction problems.<sup>132</sup>

Also of concern with substance abuse patients is ensuring informed consent. Informed consent is crucial to dental patient care, allowing patients to fully comprehend their diagnosis and make well-informed choices about their treatment options.<sup>133</sup> For informed consent to be granted, the patient must be mentally and psychologically stable and free from impairment when making a decision.<sup>134</sup>

Given that the majority of abused substances are psychoactive and can cause mental impairment and psychomotor deficits, the issue of obtaining informed consent while under their influence has become a significant concern. Standard informed consent from a legal perspective includes patient understanding and documentation of the diagnosis, treatment steps, benefits of the proposed therapy, risks involved, and any limitations.<sup>133</sup>

It has long been recognized that alcohol intoxication renders a patient unable to comprehend crucial information provided by a physician. Consequently, an intoxicated patient's consent or refusal of treatment lacks the essential elements of "informed" and "conscious declaration of will," which lawyers deem necessary for validity. There is a significant lack of clear and definitive guidelines on how physicians should proceed in such situations.<sup>135</sup>

The same reasoning applies to any substance causing a psychomotor deficit. On this issue, in 2018, Anderson and McNair stated the following concerning opioid intoxication: "The decision-making capacity (DMC) of individuals who abuse opioids has been called into question based on both the short-term effects of intoxication and withdrawal and the potential cognitive consequences of long-term drug use."<sup>136</sup> Therefore, a patient under the influence of any mind-altering substance presenting for dental treatment poses significant challenges.<sup>137</sup>

The following basic rules of medical therapy should be considered in these circumstances:

- Emergency situations: In emergencies where immediate treatment is necessary to prevent serious harm or death, physicians are generally allowed to proceed with treatment under the presumption that a reasonable person would consent to such care.<sup>138</sup>
- Surrogate decision-maker: If the situation is not immediately life-threatening, the physician should seek consent from a legally authorized surrogate, such as a family member or legal guardian.<sup>139</sup>
- Best interest of the patient: Physicians must always act in the patient's best interest, providing

necessary care while respecting the patient's rights and dignity.<sup>140</sup>

## Referral and resources

Dental professionals can refer patients with substance abuse issues to physicians or clinicians who specialize in addiction treatment. Listed are three ways that this can be accomplished:

- Encourage patients to see their primary physician. Dental professionals can encourage patients to visit their primary physician for substance abuse treatment. The physician can then refer the patient to an addiction treatment specialist if necessary.<sup>141</sup>
- Make a referral to an addiction treatment specialist. Dental professionals can make a referral to an addiction treatment specialist themselves. The American Society of Addiction Medicine (ASAM) is a good resource for finding addiction treatment specialists.<sup>142</sup>
- Refer patients to a local behavioral health provider. Dental professionals can refer patients to a local psychologist or therapist who can work with them to overcome their addiction.<sup>143</sup>

## Conclusion

Dental professionals play a vital role in identifying and treating patients with polysubstance abuse issues. This course has provided additional knowledge and training necessary to recognize the signs of substance use, treat dental concerns, and provide substance cessation information to these patients. Substance use disorders are a national concern, and dental professionals must be aware of the indications of substance use for their own treatment plans and to refer patients to the appropriate resources for treatment.

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## QUESTIONS

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- Which of the following is a goal of early intervention for dealing with substance use?
  - Equipping dentists and hygienists with the necessary tools to contribute more effectively to their patients' overall health and well-being
  - Ensuring immediate addiction treatment
  - Focusing on severe substance use disorders
  - Treating patients during the recovery phase
- Why should dental professionals inquire about patients' substance use history?
  - To encourage substance use
  - To identify doctor-shopping behavior
  - To secure narcotic analgesic prescriptions
  - To be able to suggest courses of action and referrals for patients who have multisubstance addiction and problems
- What percentage of overdose deaths in the US involve some type of opioid as a causative factor, combined with methamphetamine and cocaine?
  - 25%
  - 50%
  - 66%
  - 10%
- The National Institutes of Health recently reported that more Americans now use \_\_\_ than at any time in prior recorded history.
  - Nicotine and dextromethorphan
  - Caffeine and diphenhydramine
  - Marijuana and hallucinogens
  - Cocaine and ephedrine
- Drug-seeking behaviors in the context of routine pain management of a dental patient can be:
  - Challenging to discern in specific individuals
  - Easy to discern in individuals
  - More problematic in men
  - More problematic in women
- Which drugs may not be reliably detected by standard prescription drug monitoring programs?
  - Tetrahydrocannabinol (THC), synthetic THC, dextromethorphan, kratom, and salvia
  - Oxycodone
  - Benzodiazepines
  - Hydrocodone
- Why is it crucial for dental professionals to recognize patient issues related to polysubstance use?
  - To enhance the esthetic outcomes of dental procedures
  - To not further exacerbate patient drug usage and conditions
  - To increase patient satisfaction with postoperative pain management
  - To minimize the need for follow-up appointments
- Substance abuse can occur with which medications?
  - Prescription medications
  - Over-the-counter medications
  - Illegal drugs
  - All of the above
- How does THC primarily act on neurotransmission in the brain?
  - By enhancing the release of neurotransmitters
  - By blocking the effects of specific neurotransmitters
  - By inhibiting the release of neurotransmitters
  - By increasing the sensitivity of postsynaptic receptors
- What is the primary psychoactive ingredient in marijuana responsible for its effects on neurotransmission?
  - CBD (cannabidiol)
  - THC (tetrahydrocannabinol)
  - CBN (cannabinol)
  - CBG (cannabigerol)
- Which of the following describes alcohol abuse?
  - Consumption becomes increasingly important and takes priority over everything else of consequence, including a person's job, friends, and family.
  - A person keeps important obligations at work, school, or home.
  - A person develops increased tolerance to the substance or withdrawal symptoms when not used.
  - A person experiences greater creativity and production at work.
- What is the definition of polysubstance abuse?
  - The exclusive use of alcohol and tobacco together
  - The use of a single drug in high doses
  - Deliberate or unintentional combining of substances
  - The misuse of prescription medications
- What makes polysubstance abuse dangerous?
  - It leads to rapid tolerance development.
  - It often results in severe withdrawal symptoms.
  - The impact from combination may be more potent and unpredictable than a single drug alone and possibly deadly.
  - Polysubstance abuse primarily affects only one neurotransmitter system.
- What symptoms might a person dealing with polysubstance use experience?
  - Increased appetite and weight gain
  - Improved cognitive function and memory
  - Enhanced energy levels and alertness
  - Mood swings, changes in behavior, intoxication
- What changes might indicate polysubstance abuse?
  - Increased social interactions and engagement
  - Falling behind or neglecting personal and professional responsibilities
  - Enhanced productivity at work or school
  - Heightened interest in hobbies and activities
- What is the definition of addiction?
  - A complex psychological and physical disorder that affects the brain and changes behavior
  - A temporary condition caused by substance use
  - A behavioral pattern that only affects social interactions
  - A choice made by individuals to use substances

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17. Which of the following accurately describes addiction?

- A. A condition that only affects physical health
- B. A treatable disease with no long-term impact
- C. Compulsive drug use despite harmful consequences, characterized by an inability to stop using a drug
- D. A temporary behavioral phase

18. What is the definition of physical drug dependence?

- A. A condition where individuals choose to use drugs despite adverse consequences
- B. A reversible state caused by chronic drug use
- C. A reliance on a substance to function daily
- D. The appearance of withdrawal symptoms upon abrupt drug discontinuation

19. Which of the following accurately describes physical drug dependence?

- A. It is a temporary state caused by drug use.
- B. Increasing dosages can represent tolerance or a worsening underlying problem, as opposed to the beginning of substance use or addiction.
- C. It occurs only with illicit substances.
- D. It is unrelated to withdrawal symptoms.

20. A group of neural structures, referred to as the brain's reward system, is in charge of:

- A. Incentive salience, primarily positive associative learning and classical conditioning for a reward
- B. Pain thresholds
- C. Sleep
- D. Resistance to infection

21. Which neurotransmitter does the reward system rely on?

- A. Serotonin
- B. Epinephrine
- C. Dopamine
- D. Insulin

22. Dopamine neurons in the ventral tegmental area are activated by rewarding experiences such as:

- A. Food
- B. Sex and social interaction
- C. Drugs
- D. All of the above

23. An example of a drug-induced negative oral health impact is:

- A. Xerostomia
- B. Bruxism
- C. Caries
- D. All of the above

24. What is the most significant confidentiality consideration when treating a patient with polysubstance abuse and addiction?

- A. Where they live
- B. Where they go to school
- C. Autonomy
- D. Their occupation

25. A dental professional has a duty to respect the patient's:

- A. Right to be subjugated
- B. Right to self-determination
- C. Right to break the law
- D. Right to abuse dental staff

26. Dentists have an ethical obligation to do no harm. This obligation includes ensuring that the dental therapy and any intra- or postprocedure prescriptions do not:

- A. Exacerbate the patient's substance abuse issues
- B. Inhibit the patient's substance abuse issues
- C. Make the patient's substance abuse issues more expensive
- D. Give the patient adequate analgesia

27. Dental professionals are ethically bound to:

- A. Assist patients in finding drugs
- B. Contact local law enforcement about a patient's addiction
- C. Berate the patient about their addiction
- D. Prioritize their patients' needs and interests

28. As a result of polysubstance abuse, dental professionals need to be prepared to potentially alter treatment plans to accommodate such a patient. A possible example is:

- A. Take a multidisciplinary approach to pain control
- B. Refuse to prescribe pain control medication
- C. Tell the patient to deal with the pain
- D. Refuse to discuss pain control with the patient

29. In a patient experiencing substance use disorder, frequent communication with the patient's physician and pharmacist should be maintained to:

- A. Make sure the patient can get refills quickly
- B. Prevent a patient from filling a prescription
- C. Let as many people as possible know about the patient's addiction
- D. Prevent polypharmacy, drug interactions, and overdosing

30. Modification of pain management in a substance abuse patient is:

- A. Never necessary
- B. Always necessary
- C. Frequently necessary to avoid exacerbating the patient's substance abuse problem
- D. Never discussed

## Recognizing polysubstance abuse in dental patients

NAME:	TITLE:	SPECIALTY:	
ADDRESS:	EMAIL:	AGD MEMBER ID (IF APPLIES):	
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### EDUCATIONAL OBJECTIVES

1. Discuss the role of drug addiction in dental health and disease
2. Describe the relationship between polysubstance use and informed consent for dental procedures
3. List the adverse drug reactions with dental pharmacology and polysubstance use
4. Improve patient care with logical choices for pain control prescriptions
5. Describe the implications for dentistry and other health-care professions

### COURSE EVALUATION

1. Were the individual course objectives met?

Objective #1: Yes No	Objective #3: Yes No	Objective #5: Yes No
Objective #2: Yes No	Objective #4: Yes No	

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.

- |  |   |   |   |   |     |    |
|--|---|---|---|---|-----|----|
| 2. To what extent were the course objectives accomplished overall?       | 5 | 4 | 3 | 2 | 1   | 0  |
| 3. Please rate your personal mastery of the course objectives.           | 5 | 4 | 3 | 2 | 1   | 0  |
| 4. How would you rate the objectives and educational methods?            | 5 | 4 | 3 | 2 | 1   | 0  |
| 5. How do you rate the author's grasp of the topic?                      | 5 | 4 | 3 | 2 | 1   | 0  |
| 6. Please rate the author's effectiveness.                               | 5 | 4 | 3 | 2 | 1   | 0  |
| 7. Was the overall administration of the course effective?               | 5 | 4 | 3 | 2 | 1   | 0  |
| 8. Please rate the usefulness and clinical applicability of this course. | 5 | 4 | 3 | 2 | 1   | 0  |
| 9. Please rate the usefulness of the references.                         | 5 | 4 | 3 | 2 | 1   | 0  |
| 10. Do you feel that the references were adequate?                       |   |   |   |   | Yes | No |
| 11. Would you take a similar course on a different topic?                |   |   |   |   | Yes | No |

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 dental continuing education topics would you like to see?

\_\_\_\_\_

\_\_\_\_\_

Mail/fax completed answer sheet to:

**Endeavor Business Media**

Attn: Dental Division; 7666 E. 61st St. Suite 230, Tulsa, OK 74133  
Fax: (918) 831-9804

Payment of \$69 is enclosed (this course can be completed online for \$39. Scan the QR code or go to [dentalacademyofce.com](http://dentalacademyofce.com) to take advantage of the lower rate).

**Make check payable to Endeavor Business Media**

If paying by credit card, please complete the following:

MC  Visa  AmEx  Discover

Acct. number: \_\_\_\_\_

Exp. date: \_\_\_\_\_ CVC #: \_\_\_\_\_

Billing address: \_\_\_\_\_

\_\_\_\_\_

Charges on your statement will show up as Endeavor.

- |                     |                     |
|---------------------|---------------------|
| 1. (A) (B) (C) (D)  | 16. (A) (B) (C) (D) |
| 2. (A) (B) (C) (D)  | 17. (A) (B) (C) (D) |
| 3. (A) (B) (C) (D)  | 18. (A) (B) (C) (D) |
| 4. (A) (B) (C) (D)  | 19. (A) (B) (C) (D) |
| 5. (A) (B) (C) (D)  | 20. (A) (B) (C) (D) |
| 6. (A) (B) (C) (D)  | 21. (A) (B) (C) (D) |
| 7. (A) (B) (C) (D)  | 22. (A) (B) (C) (D) |
| 8. (A) (B) (C) (D)  | 23. (A) (B) (C) (D) |
| 9. (A) (B) (C) (D)  | 24. (A) (B) (C) (D) |
| 10. (A) (B) (C) (D) | 25. (A) (B) (C) (D) |
| 11. (A) (B) (C) (D) | 26. (A) (B) (C) (D) |
| 12. (A) (B) (C) (D) | 27. (A) (B) (C) (D) |
| 13. (A) (B) (C) (D) | 28. (A) (B) (C) (D) |
| 14. (A) (B) (C) (D) | 29. (A) (B) (C) (D) |
| 15. (A) (B) (C) (D) | 30. (A) (B) (C) (D) |

CUSTOMER SERVICE: (800) 633-1681

**EXAM INSTRUCTIONS.** All questions have only one answer. If mailed or faxed, grading of this examination is done manually. Participants will receive confirmation of passing by receipt of a Verification of Participation form. The form will be mailed within two weeks after receipt of an examination.

**COURSE EVALUATION AND FEEDBACK.** We encourage participant feedback. Complete the evaluation above and e-mail additional feedback to Rachel McIntyre ([rmcintyre@endeavorb2b.com](mailto:rmcintyre@endeavorb2b.com)) and Laura Winfield-Roy ([lwinfield@endeavorb2b.com](mailto:lwinfield@endeavorb2b.com)).

**COURSE CREDITS AND COST.** All participants scoring 70% or higher on the examination will receive a verification form for three (3) continuing education (CE) credits. Participants are urged to contact their state dental boards for CE requirements. The cost for courses ranges from \$20 to \$110.

**CANCELLATION AND REFUND POLICY.** Participants who are not 100% satisfied can request a refund by contacting Endeavor Business Media in writing.

**RECORD KEEPING.** Endeavor Business Media maintains records of your successful completion of any exam for a minimum of six years. Please contact our offices for a copy of your CE credits report. This report, which will list all credits earned to date, will be generated and mailed to you within five business days of receipt.

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