

# INDOC



# Inland Northwest Dental Conference

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## **Cannabinoids, Illicit Drugs and the Dental Patient** **Part 2: Illicit Drugs and Dental Concerns**

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### **Our Clinician:**



**Dr. Mark Donaldson BSP, RPH, PHARMD, FASHP, FACHE** received his baccalaureate degree from the University of British Columbia and his Doctorate in Clinical Pharmacy from the University of Washington. He completed a residency at Vancouver General Hospital, and has practiced as a clinical pharmacy specialist, clinical coordinator and director of pharmacy services at many healthcare organizations in both Canada and the United States. He resides in Whitefish, Montana and is currently the Associate Principal of Pharmacy Advisory Solutions for Vizient.

Dr. Donaldson is a Clinical Professor in the Department of Pharmacy at the University of Montana in Missoula, and Clinical Associate Professor in the School of Dentistry at the Oregon Health & Sciences University in Portland, Oregon. He has a special interest in dental pharmacology and has lectured internationally to both dental and medical practitioners. He has spent the last 25 years focusing on dental pharmacology and dental therapeutics, and is a leader in the field.

Dr. Donaldson has published numerous peer-reviewed works and textbook chapters. He currently serves on the Editorial Board for the Journal of the American Dental Association, is board certified in healthcare management and is the Past-President of the American College of Healthcare Executives' Montana Chapter. Dr. Donaldson was named as the 2014 recipient of the Bowl of Hygeia for the state of Montana and is the 2016 recipient of the Dr. Thaddeus V. Weclaw Award. This award is conferred upon an individual who has made outstanding contributions to the art and science of dentistry and/or enhanced the principles and ideals of the Academy of General Dentistry. This year, Dr. Donaldson was conferred by the Canadian Dental Association (CDA) in Ottawa with the, "Special Friend of Canadian Dentistry Award for 2019." This award is given to an individual outside of the dental profession in appreciation for exemplary support or service to Canadian dentistry and/or to the profession as a whole.

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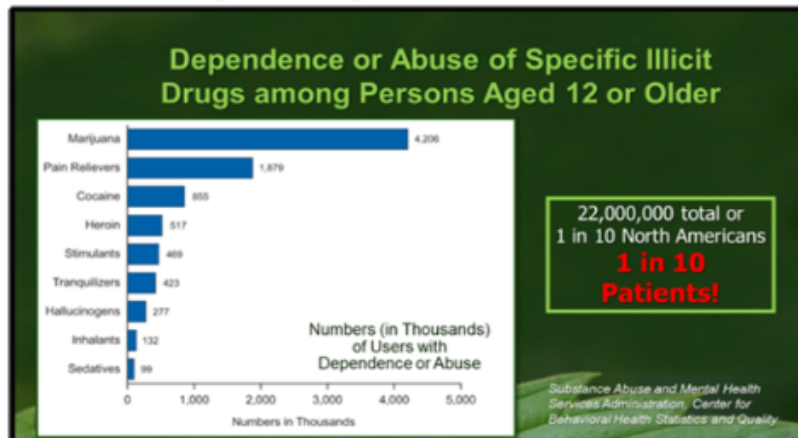
April 12, 2024

Spokane, WA

# Medical Cannabinoids, Illicit Drugs and Dentistry

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## What is the scope of the “problem”?



Reasons noted for refusing to reveal information on a health history form	
Unimportant information	17%
Privacy	62%
Afraid of refusal of treatment	7%
Other	14%

McDaniel TF, Miller D, Jones R, Davis M. Assessing patient willingness to reveal health history information. *J Am Dent Assoc.* 1995;126(3):375-9.

- 23% of respondents would be reluctant to note current drug abuse on a medical history questionnaire!

**In the United States, thirty-eight states and the District of Columbia currently have passed laws broadly legalizing marijuana in some form (as of April 2024).** The District of Columbia and 11 states -- Alaska, California, Colorado, Illinois, Maine, Massachusetts, Michigan, Nevada, Oregon, Vermont and Washington -- have adopted the most expansive laws legalizing marijuana for recreational use. Most other states allow for limited use of medical marijuana under certain circumstances. Some medical marijuana laws are broader than others, with types of medical conditions that allow for treatment varying from state to state. Louisiana, West Virginia and a few other states allow only for cannabis-infused products, such as oils or pills. **In Washington State, as of December 6, 2012, the Uniform Controlled Substances Act is in force (RCW 69.50). The Cannabis Patient Protection Act went into effect July 1, 2016 (RCW 69.51A).**

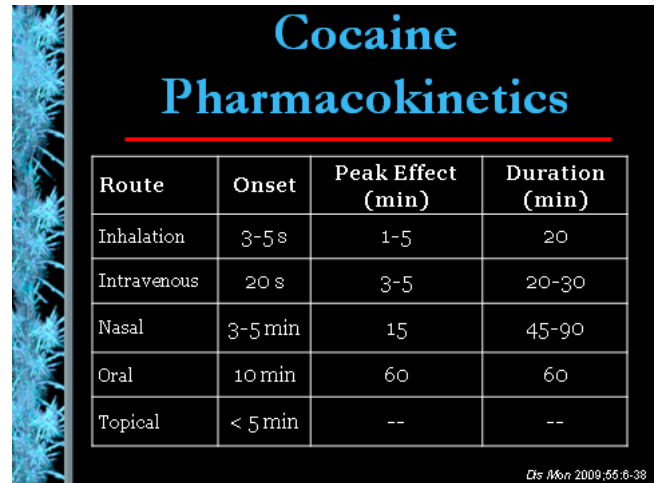
## Dental Considerations with Illicit Drug Users

	Cardiovascular Effects	Respiratory Effects	Xerostomia	Interaction with local anesthesia	Interaction with vasoconstrictors	Interaction with narcotic analgesics
<b>Cannabis</b>	+	++	++	-	+	-
<b>Cocaine</b>	++	+	++	+++	+++	+++
<b>Narcotics</b>	++	++	++	-	-	+++
<b>METH</b>	+++	+	+++	-	+++	+++

## Other Notes or Questions to Ask:

## Cocaine

- Cocaine is one of the alkaloids present in the leaves of *Erythroxylon coca*.
- Main psychoactive constituent is benzoylmethylecgonine.
- The principal method of administration is snorting.
- Interferes with reabsorption of Dopamine and stimulates pleasure centers of brain.
- **Cocaine powder** (cocaine hydrochloride) is made from the leaves of the coca plant, it is separated with alcohol, gasoline, or kerosene.
- **Freebase** - a method using ammonia and ether that separates the free-base molecule of cocaine, can be smoked, high potency, ↑ toxicity.
- **Crack** - a method that converts cocaine hydrochloride into a smokable form using bicarbonate. Results in lower potency than freebase, ↑ impurities.
- Half-life: 0.7-1.5 hrs
- Detectable in the body for up to 10 days after use. Cocaine can be found on the street using an infinite number of street names and slang. It can be snorted, injected, smoked, or eaten. The level and length of the effects depend on how the drug was induced.



**Cocaine Pharmacokinetics**

Route	Onset	Peak Effect (min)	Duration (min)
Inhalation	3-5 s	1-5	20
Intravenous	20 s	3-5	20-30
Nasal	3-5 min	15	45-90
Oral	10 min	60	60
Topical	< 5 min	--	--

Dr. Mørk 2009;55:6-38



**Cocaine Effects**

• Euphoria	• Paranoia
• Arousal	• Hallucinations
• Lightheadedness	• Restlessness
• Dizziness	• Aggression
• Blurred vision	• Delirium
• Tinnitus	• Vomiting
• Disorientation	• Tremors
• Dilated pupils	• Shivering
• Hyperthermia	• Insomnia
• Tachycardia	• Tachypnea

Mt Dent J 2015;55:385-9

### Cocaine Effects

Immediate effects: Within a few minutes a euphoric 'high' feeling occurs which can last for up to 90 minutes.

"There's no happy ending to cocaine. You either die, you go to jail, or else you run out."

- Sam Kinison

- Anesthetic effect.
- CNS excitation → CNS/Respiratory depression.
- ↑ Heart rate, ↑ oxygen demand.
- Vasoconstriction of coronary arteries causing ↓ oxygen supply.
- Peripheral vasoconstriction increases BP 15-20%.

Lethal Snorted Dose: "1.4 grams for a 70kg male."  
One 'line' of cocaine ~ 50-100mg.

### Cocaine Oral Effects

- Nasal Septum perforation & palatal perforation (vasoconstriction → local ischemia).
- "Saddle-nose" deformity
- Increased BP
- Local anesthetic toxicity
- Vasoconstrictor toxicity – potentially fatal
- Xerostomia
- Bruxism


## Other Notes or Questions to Ask:

**Narcotic:** A drug derived from opium or opium like compounds, with potent analgesic effects associated with significant alteration of mood and behavior, and with the potential for dependence and tolerance following repeated administration.

**Opiate:** A medication or illegal drug that is either derived from the opium poppy, or that mimics the effect of an opiate (a synthetic opiate).

### **Heroin**

- The most powerful known non-synthetic painkiller (medical name: diacetylmorphine).
- Heroin is not a naturally occurring drug, it is refined from morphine.
- Can be snorted or injected: “Chasing the dragon.”
- In its purest form, Heroin is a white powder but it is most commonly seen is brown due to impurities.
- Black tar heroin is not really heroin, but an unrefined mixture of lesser acetylated morphine derivatives.



	Half-Life (mins)	Duration of action (hr)
Intravenous	3-5	2-6
Snorting	4-5	2-6
Intramuscular	5-7	2-6
Smoking	3-5	2-6

Current Clinical Pharmacology 2006;1:109-118.

### **Heroin Effects**

- The immediate effect of intravenous heroin is often described by heroin dependents as a “flash”, a warm and intensively pleasant sensation. It is felt with IV, IN, and smoking. No flash with oral or rectal.
- The “flash” is followed by an euphoric, benumbed state, which may be more related to morphine.
- Slows down circulation and heart rate. Heroin also causes generalized vasodilation (users feel warm).
- Depresses bowel activity, which can result in constipation. First-time users often vomit.
- Respiratory Depression.
- At high doses users become drowsy. An excessive dose can produce stupor and coma, and possible death.

Lethal Injected Dose is “22 mg/kg for a 70kg male.” One “stamp bag” is 100 mg Heroin and costs \$10-\$15.

### **Heroin Dental Considerations**

- Xerostomia.
- Drug Interactions (synergistic with any other narcotic).
- Allergic thrombocytopenia (Quinine).
- ↑ risk of endocarditis.
- ↑ risk of HIV and Hepatitis.
- 40% of IV users exposed to some form of Hepatitis.

### **Methadone**

- Synthetic opiate in use since the 1960’s as a narcotic pain reliever and an adjunct to addiction detoxification (1mg/mL concentration).
- Methadone Pharmacokinetics.
- Syrup (Sugar-free? - Sugar-based has a high sugar content [0.9g/5mL]).
- Onset ~ 30 mins; Duration of action 24-36 hrs ;  $T_{1/2}$  = 15-25 hrs.

### **Methadone Dental Considerations**

- Xerostomia
- Increased caries rate with sugar-based formulations
- Consider fluoride supplementation
- Possibly contributes to erosion (↓ pH)
- Same systemic effects as the other opioids

## **Other Notes or Questions to Ask:**

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Consider that people who are opioid-dependent are likely to require greater analgesia post-operatively; will require a pain management plan to manage existing tolerance and to ensure provision of adequate analgesia; may have best outcomes if commenced or stabilized on maintenance pharmacotherapies pre-operatively; and May require careful management not to reinstate opioid dependence if abstinence was achieved pre-operatively (caution in recovering addicts!)

### Why is Meth so popular?

In contrast to Cocaine...

- Meth is easily manufactured – precursors can be bought over-the-counter (OTC).
- The high can last up to 8 hours.
- How used: snorted, injected, smoked, swallowed

Methamphetamine can be easily produced with toxic precursors:

- Pseudoephedrine or Ephedrin
- Acetone
- Red Phosphorus
- Denatured alcohol
- Battery acid
- Iodine
- Muriatic Acid
- Freon
- Anhydrous ammonia
- Drain cleaner
- Paint thinner
- Sulfuric Acid

Methamphetamine is the more powerful and more addictive cousin of amphetamine:

- Positive outcomes: rush, flash, enhances mood, energy, alertness.
- Duration: minutes (rush) up to 12 hours.
- Physical effects: increased heart rate, blood pressure, respiration, flush, sweating.
- Lethal Dose: “70-120mg/kg” or 4-8 grams
- Addicts may use up to 8 grams per day, fatalities reported with as little as 3 grams.

Causes massive release of neurotransmitters dopamine and norepinephrine, also blocking reuptake:

- Results in neurotransmitter depletion.
- Rapid tolerance, withdrawal symptoms.
- Psychosis, violent behavior.

**Meth adverse effects**

- Extremely addictive
- Can cause convulsions
- Heart irregularities
- High blood-pressure
- Fear, fatigue or
- Depression
- Restlessness
- Tremors
- Wasting
- Skin Lesions
- Impotence
- Exposure to HIV/STDs
- Hallucinations
- Desire to self-mutilate
- Paranoia
- Insomnia
- May cause coma and death

### Methamphetamine – “Crank Bugs”

All Meth users suffer from what they call "Crank Bugs." Meth is manufactured with chemicals that are toxic to the human body, and once the drug is taken the chemicals remain. The body's natural reaction is to try and eliminate the toxins (usually slowly leech out through the skin). Users itch and scratch which causes the open sores

### “Meth Mouth”

The phenomenon is thought to be the result of the ingredients used to make Meth, however, Studies have shown that the ingredients are most likely NOT responsible for the rapid destruction to dentition.

- *Navarro et al. 2001. pH decline from 7.4 to 6.9*
- *Critical pH for demineralization of enamel is 5.5*

**Current literature suggests that “Meth Mouth” is the result of: Hyposalivation, High sugar intake, Bruxism, and Poor oral hygiene.**

### Other Notes or Questions to Ask:

### **Dental Management of the Meth patient:**

- Postpone all dentistry if history of recent use.
- For Emergency Procedures:
  - No vasoconstrictor in local anesthetic preparations
  - No Narcotic-containing analgesics
- IV users have increased risk of endocarditis.
- ↑ risk of HIV and Hepatitis.

### **Dental Modifications for Meth Patients:**

- Postpone elective care.
- No vasoconstrictor (for 24 hours after most recent use).
- Recommend avoidance of carbohydrate-rich soft drinks (e.g., water).
- Increased preventive measures.

### **Strategies to promote saliva flow:**

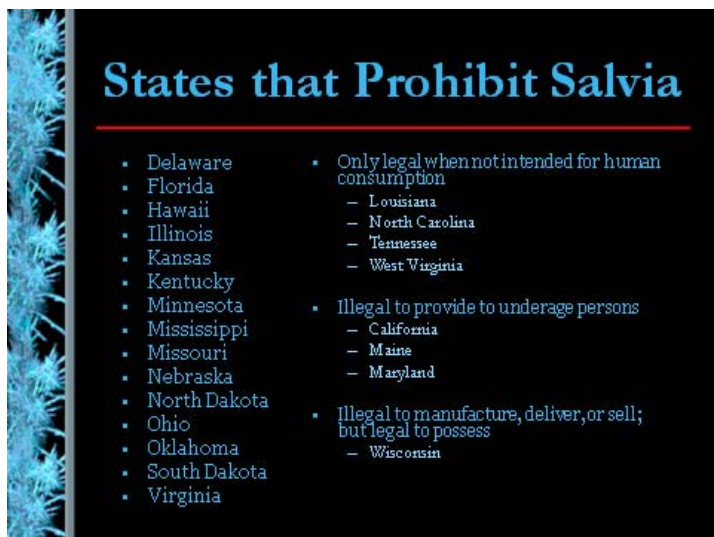
- Sugarless gum
- Saliva replacement (Moi-Stir®)
- Oral moisturizers (Optimoist®)
- Pilocarpine (Salagen®)
- Cevimeline (Evxac®)
- Biotene® Products

The state of Oregon ranks among the top ten states nationally in per capita treatment admissions for methamphetamine. The social costs are staggering. The human costs are incalculable.

- 52% of children in foster care are there due to Meth. Cost to the State: \$12 million a year.
- 50% of adults in prison are there due to Meth-related crime. Cost to the State: \$43 million a year.
- 20% of adults in treatment are there for Meth addiction. Cost to the State: \$10 million a year.

### **Dental Management of the Recovering Meth patient:**

- For the recovering Meth user, who is now clean, there are no contraindications to dentistry!



### **Salvia Divinorum**

- Hallucinogenic Plant in the mint family.
- Used by the Mazatecs in Mexico for its psychoactive properties during traditional spiritual practices.
- Salvinorin A is the active agent.
- K – opioid receptor agonist.
- Hallucinations, dysphoria, delirium, dissociation.
- Can be smoked or swallowed.
- Leaves must be held in the mouth for absorption, stomach acids deactivate the drug.
- Lethal Dose: Unknown.

### **Khat Bush . . . Bath Salts**

- Active ingredient in the leaves is cathinone.

Plant is found in East Africa and Southern Arabia and pharmacologic profile closely resembles that of amphetamine. Cause dopamine and norepinephrine release in the brain and has led to the development of cathinone-based “Designer Drugs” such as MDPV (Methylenedioxypropylvalerone).

### **Other Notes or Questions to Ask:**

Effects very similar to amphetamine, methamphetamine, and MDMA (ecstasy). Intense cravings and as little as 5mg dose can be effective. Can be swallowed, snorted, smoked, or IV. 5-20mg is the usual dose and a 500mg packet can be purchased for as little as \$20.

Duration of action is usually 3-4 hours and side effects may last a total of 6-8 hours. While the lethal dose is unknown, typical effects consist of:

- Hallucinations
- Fever / increased body temperature
- Paranoia
- Tachycardia followed by bradycardia and hypotension
- Vasoconstriction
- Suicidal thoughts

“The LD<sub>50</sub> of MDPV is not known, although it is suggested that non-fatal overdose would be possible at relatively low doses compared to mephedrone.”

*Psychonaut WebMapping Research Group (2009). MDPV Report. Institute of Psychiatry. Kings College: London, UK*

State and local law enforcement officials encountered MDPV in 2009 and 2010 in Iowa, Kentucky, North Dakota, Oklahoma, Texas, and Wisconsin. Currently, MDPV is not a scheduled drug under the Controlled Substances Act (CSA). However, if intended for human consumption, MDPV can be considered an analogue of a schedule I drug under the CSA. Therefore, law enforcement cases involving MDPV can be prosecuted under the Federal Analogue Act of the CSA.

### **Is anyone here afraid of crocodiles? How about krokodil (Russian: "Крокодил")**

Russian junkies created krokodil which they made by mixing codeine with chemicals such as gasoline, red phosphorus, and hydrochloric acid, because heroin was scarce and codeine was available over the counter. Codeine is converted by the liver to desomorphine which is the most active drug in this toxic mixture. It is around 8-10 times more potent than morphine and is described as having a fast onset and a short duration of action, with relatively little nausea or respiratory depression compared to equivalent doses of morphine.

The high associated with krokodil is akin to that of heroin, but lasts for a much shorter period. While the effects of heroin use can last four to eight hours, the effects of krokodil do not usually extend past one and a half hours, with the symptoms of withdrawal setting in soon after.

“Krokodil” (Flesh-eating “zombie drug”) gets its name from the fact that similar to crank bugs and methamphetamine, Krokodil is notorious for producing severe tissue damage, phlebitis and gangrene (making the users skin similar to that of a crocodile); sometimes requiring limb amputation in long-term users.

### **The Take-Home Message**

An estimated 22 million Americans-almost 10 percent of the population-suffer from chemical dependence or abuse drugs, alcohol or both, according to the latest statistics from the Substance Abuse and Mental Health Services Administration of the Department of Health and Human Services. That means 10% of YOUR patients!

Medical histories should include complete pharmacological histories with an emphasis on what constitutes a “drug” and why your patients need to tell you the truth. In this world of polypharmacology and illicit drug use, the interplay of drug interactions with traditional medical therapy is becoming more difficult every day!

### **Other Notes or Questions to Ask:**

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### **Other Notes or Questions to Ask:**

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