

Drugs of Abuse: Alcoholism, Opioids, Cocaine, Hallucinogens and More

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Every physician gets in touch with addicted patients, as 5-7 % of the population is addicted to legal or illegal drugs. But studies have revealed that primary care physicians only identify every 10th patient suffering from dependency syndrome. This article is supposed to help you recognize the typical symptoms of the respective drug consume and treat intoxications as well as withdrawal symptoms.



Dependency Syndrome

Definition of the dependency syndrome

According to the WHO, addiction is **the state of periodic or chronic intoxication caused by the repeated use of a natural or synthetic substance, which is harmful to the individual and society**. Misuse is described as an inappropriate use of a substance, which means an ingestion of excessive doses or the ingestion without medical indication. The repeated ingestion leads to physical and mental adaptation along with the development of an addiction.

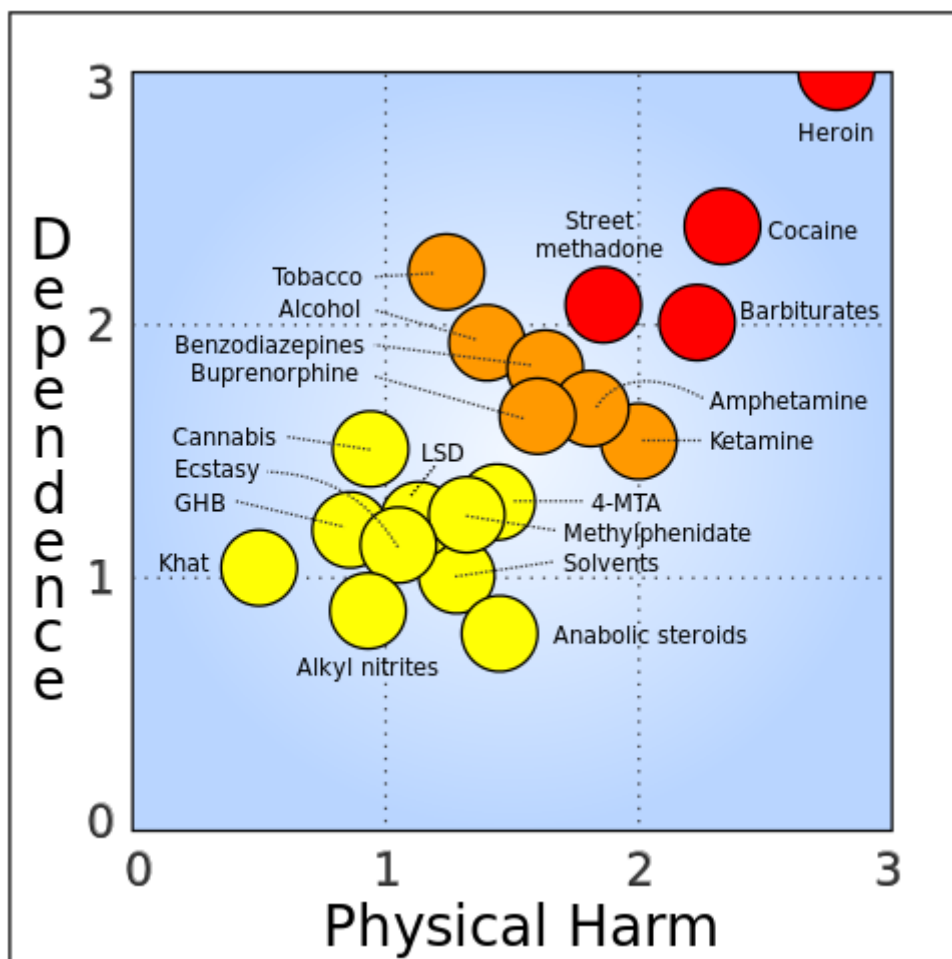


Image: "A rational scale to assess the harm of drugs." by Apartmento2. License Public Domain

Mental addiction is defined as the superior irresistible desire to ingest a special substance again in order to create a positive feeling or avoid a negative one. **Physical addiction** is characterized by drug tolerance with the necessity of increasing doses and the occurrence of withdrawal symptoms.

Therefore addiction involves a vicious circle of **uncontrollable urge for the addictive substance**, called craving, and the not being able to stop, **the addiction**. The disillusionment, which arises from the confrontation with reality at times, in which the patient is not influenced by the substance, is called **contrast phenomena** and nourishes this vicious circle further.

Alongside substance-based addictions, there is a growing number of substance-free addictions, such as gambling addiction and compulsive buying.

Notice: For the definition of an addiction according to ICD-10 **at least three** of the following criteria have to apply:

- Strong urge to consume the substance
- Reduced control capacity
- Physical withdrawal syndrome
- Drug tolerance
- Neglect of other interests
- Persistent consume despite evidence of harmful consequences

Epidemiology of the dependency syndrome

About 5–7 % of the population in Germany are addicted. With about 2.5 million persons concerned, the people **addicted to alcohol** make the biggest part of this group. The number of people being addicted to medicines is 1 million, which is nearly 7 times higher than the number of people addicted to drugs. Patients with a dependency syndrome form the **biggest group of patients** in psychiatric hospitals. It is assumed that at least 15 % of the patients in general hospitals are dependent on alcohol. This makes the socio-medical importance of this group of diseases obvious.

About 42,000 people die of a dependency syndrome in Germany every year. It is possible to additionally count in those 130,000 deaths, which were caused by consequences of smoking. About 10–15 % of those addicted to drugs or alcohol commit suicide. The economic subsequent costs of addiction are approximately 70 billion Euros.

Pathogenesis of the dependency syndrome

There are three substantial factors, which play a role in the development and maintenance of an addiction. This is, on the one hand, the drug, on the other hand, the **individual** and the **social environment**.

Most drugs increase the **release of dopamine** from the central nervous system and by this cause euphoria and well-being. Further neurotransmitters, like **glutamate**, shape the addiction memory. Other decisive factors for the potential of the addiction development are the availability of the drug, the addictive potency and drug effects in terms of anxiolysis and relaxation.

Frustration tolerance, ego strength, and neurotic development are individual factors. In addition to that, it was possible to identify a **genetic vulnerability** in patients suffering from dependency syndrome. It is referred to as a premorbid personality.

Last, the environment has a relevant influence on the pathogenesis of the dependency syndrome, too. It is possible, that negative environmental determinants, like **conflict situations** with the spouse or on the job, peer pressure or a leisure vacuum, reinforce an addiction.

Symptoms of the dependency syndrome

Loss of interest, mood swings, indifference and disturbances in the ability for criticism belong to the mental symptoms of the dependency syndrome. Physical symptoms are strongly dependent on the consumed drug. Especially polydrug-use, which means the consumption of multiple drugs in combination, leads to a fast physical degeneration with loss of body weight, bad skin appearance, and organ lesions.

Denial, trivialization and concealment tendencies are common for addiction patients. In many cases, only the drug is able to briefly boost the lowered self-esteem of the addict, which is caused by feelings of guilt due to lies, drug related crimes, and social failure.

Alcoholism

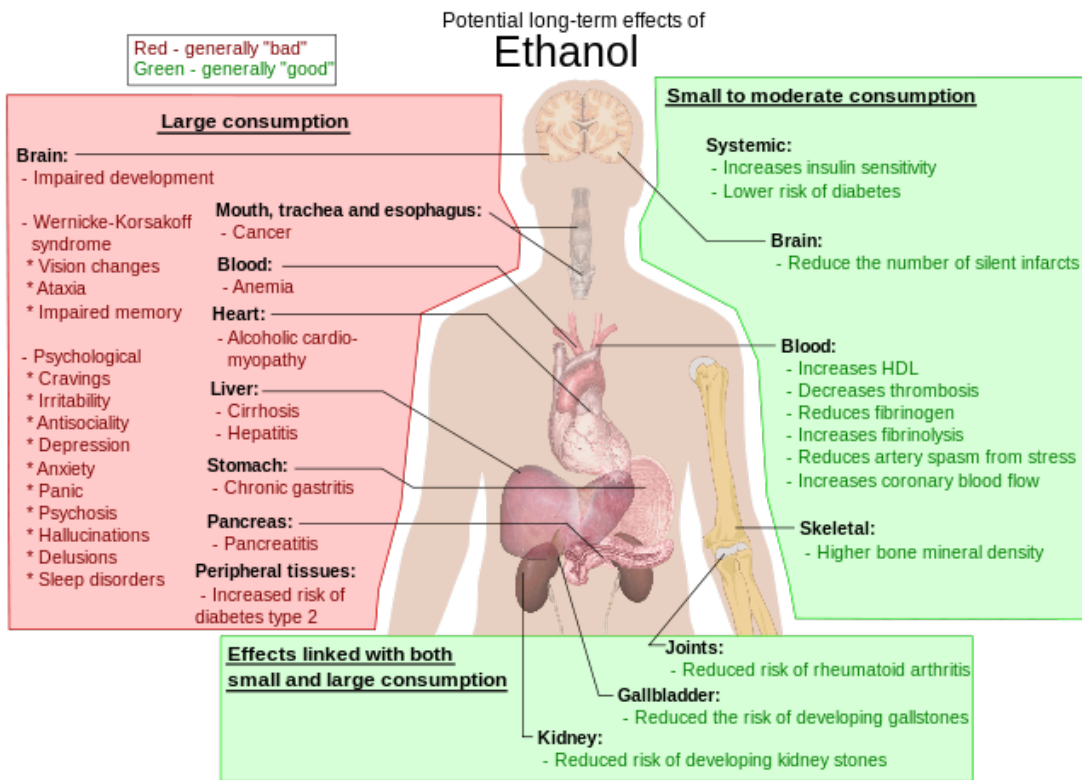
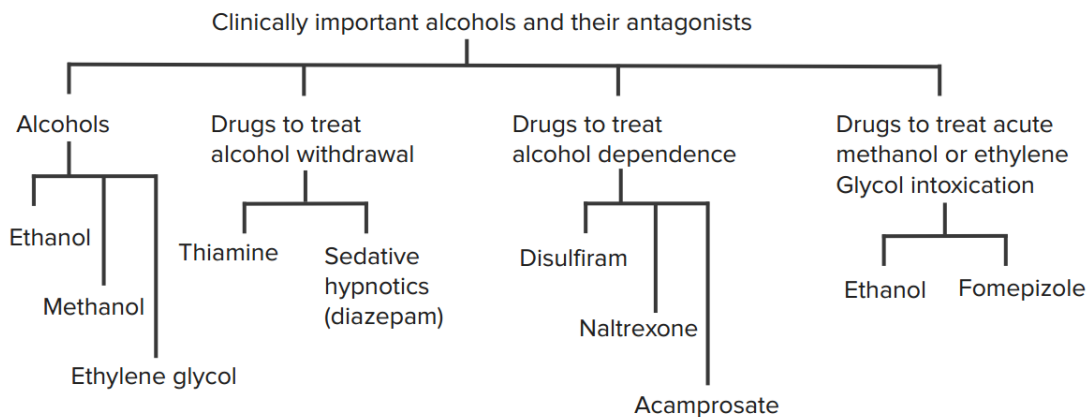


Image: "Most significant possible long-term effects of ethanol" by Mikael Häggström. License: Public Domain

Alcohol is one of the oldest addictive substances in the world. The wine was already in ancient Greece a set part of the evening and was seen as a gift sent from God in the medieval times. In those days it has not been realized that people consuming big amounts of alcohol fell ill more often and died earlier. Only in 1968, the federal social court recognized alcoholism as a disease and an increased number of specialist hospitals for addicts was established.

Definition of alcoholism

Alcoholism is understood as a level of alcohol consume, which **exceeds the socio-cultural standard**. Alcoholism is described as a mental and physical addiction with an **irresistible desire for the substance** and drug tolerance with a consecutive increase of dosage and withdrawal symptoms during abstinence.



Epidemiology of alcoholism

Men are in more cases affected by alcoholism whereby **women increasingly often tend to be addicted, too**. It is one of the biggest socio-medical problems due to absence from work, alcohol-related accidents and treatment costs.

Classification of alcoholism

More than 20 g alcohol per day for women and more than 40 g alcohol per day for men is rated as risky consume.

1st level	Prealcoholic phase	Drinking for easement with decreased ability to cope with mental pressure
2nd level	Prodromal phase	Thoughts about alcohol, patient drinks alone and in secret, first memory gaps
3rd level	Critical phase	After starting to drink the patient loses control over further amount of drinking; after loss of control: try to pause drinking, first physical withdrawal symptoms and consequential damages
4th level	Chronic phase	Drinking in the morning, state of intoxication lasting for days, the tolerability for alcohol is decreasing, mental and physical break downs up to death

5 types of alcoholism are differentiated after **Jellinek**. The **gamma type** with 65 % is the most common type. This one is the addicted alcoholic suffering from loss of control and having an observable drug tolerance. This type is able to stay abstinent at times. The second most common type is the **delta or habitual drinker**. He has a continuous consume of alcohol, which typically lacks breaks and is low in intoxications. He is also referred to as a level alcoholic.

Notice: One version of the glycoprotein transferrin is the Carbohydrate-Deficient-Transferrin (CDT), which is used as a biomarker for constant consume alcohol. The CDT level rises in the serum of an alcoholic due to a changed glycosylation pattern. However, this figure is susceptible and normal in 30 % of all alcoholics.

Opioids



Image: "Opium poppy Papaver somniferum Field in Turkey, near Afyon, c. 1988 Credit: Mark Nesbitt and Delwen Samuel" by Marknesbitt. License: Public Domain

Opium, the concentrated chyle from the **opium poppy's** seed capsule, belongs to the oldest and most widespread drugs. Already Paracelsus used the opium treatment as a therapy for endogenous depressions. Opiates and opioids have the highest dependence

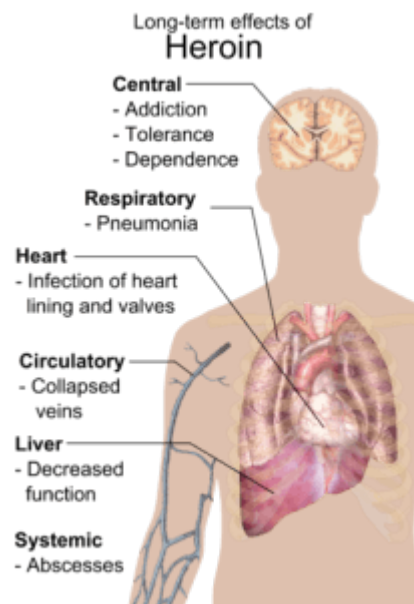
potential of all drugs. Already the first use can conclude in a strong mental and physical addiction.

Dosage forms of opioids

The consumption of **heroin**, also diacetylmorphine or diamorphine, is most common in Germany. It is a white to brown powder, which is produced semi-synthetic with acetic acid and morphine. It is often smoked in the beginning. It's heating on a spoon or an aluminum sheet and the inhaling of the steam is called "chasing the dragon" because of oily ingredients of the heroin shimmer purple to gold. However, the most common way of usage is **the intravenous application**, because like this the kick sets in after about 10 to 20 seconds and none of the expensive heroin is wasted.

Codeine, methadone, and tilidine are misused less often.

Effect of opioids



[Image](#): "Main long-term effects of heroine, including the effects of the contaminants common in illegal heroin" by Mikael Häggström. License: Public Domain

Heroin is very lipophilic and therefore enriches in the **central nervous system** fast. It is metabolized to 6-monoacetylmorphine there. This and another inactive metabolite are being hydrolyzed to morphine within 10 to 30 minutes. The opioid-induced euphoria sets in at that moment. The metabolite 6-monoacetylmorphine attaches to the **μ-opioid receptor** stronger than morphine itself, which causes the intense effect of intoxication. Other effects caused by the opioid receptors are the **feeling of happiness and warmth, somnolence, affective lability and behavioral changes**. Physical symptoms involve bradycardia, loss of appetite, spastic obstipation, tremor and dry pale skin.

Danger of opioids

As heroin has a cleanness of only 3 % in Europe and is stretched with strychnine, lime, and other substances, already a short time of consuming results in physical degeneration. **Injections sites become infected often** and when heroin is sniffed, the nasal septum

can be damaged up to perforation. Numerous consumers become infected with **HIV** and hepatitis due to the usage of unclean needles.

The application of an overdose is the biggest danger of using opioids. Addicts often develop a drug tolerance. They need 10 to 20 times as much of the substance as they needed in the beginning in order to feel a kick or suppress withdrawal symptoms. The effects of opioids are increased especially when poly drug use is practised with alcohol or amphetamines. The intoxication develops typically 2 to 5 minutes after intravenous application. It is characterized by **coma, respiratory depression, and miosis**.

Special type: “crocodile”

Crocodile is a rather new drug, which spills over from Russia to Germany. As a lot of Russians can no longer afford the consume of heroin, they found a way to produce a **heroin-like substance** only from over-the-counter pharmaceuticals (inter alia codeine, iodine, red phosphorus and eye drops), which, in contrast to the quite expensive heroin (about 40–80 Euros per gram), just costs 3–5 Euros per shot.

Typical for the consumption of crocodile is an extremely fast physical degeneration and the formation of **syringe abscesses with distinct** necrosis. In most cases, consumers live only for one year after their start of the misuse. A green discoloration often emerges on the injection site, which gave the drug its name, as it reminds of a crocodile’s skin.

Sedatives and Hypnotics

Substances which are often misused are **benzodiazepines, barbiturates, meprobamate, clomethiazole, and diphenhydramine**. Those substances possess a huge addictive potential and partially a big toxicity, for example, diphenhydramine which is often used within the scope of suicide attempts. Barbiturates are obsolete as hypnotics nowadays, but they are especially used in veterinary medicine as anticonvulsant drugs.

Effects of hypnotics and sedatives

Those medicaments cause **euphoria, sedation, affective lability, dysphoria, memory gaps** when being misused. Sometimes benzodiazepines cause paradoxical activation with anxiety symptoms. Physical symptoms include **dysarthria, ataxia, and exanthemata**. An extended consume of benzodiazepines can cause **dysphoric resentment, indifference, and reduction in mental performance**. High states of arousal with agitation and insomnia are referred to as a **paradoxical reaction** to benzodiazepines.

Withdrawal symptoms of sedatives and hypnotics

The barbiturate abstinence syndrome appears with overall weakness, tremor, myoclonus, nausea, orthostatic deregulation, and nightmares. **Delirious states** with anxious unrest and **cerebral seizures** have been reported after sudden weaning following longer use of higher doses.

Sudden weaning of barbiturates causes a **rebound phenomenon** with anxiety and sleep disturbances. Further withdrawal symptoms are vegetative deregulation, sleep disturbances, tremor, tachycardia, and disorientation. Also typical are **perception disturbances** like **visual perception distortions** and **kinaesthetic failures**, like an elevator feeling.

Treatment of sedatives and hypnotics addiction

Women with anxious personality traits are in many cases affected by benzodiazepine addiction. They have the substance prescribed by their primary physician against panic attacks or something similar and carry out dose increases on their own, as they experience drug tolerance.

Patients often have been addicted for years and attend a hospital because of withdrawal symptoms, when they are refused another prescription of the medicament. Treatment can be carried out with a **sedative antidepressant-like doxepin** till withdrawal symptoms abate and beyond. A **further behavioral therapeutic treatment** is important.

Cannabinoids

It was presumably Napoleon's soldiers who brought hashish from the Arabic-Asiatic area to Europe at the beginning of the 19th century. Cannabis has meanwhile become the most commonly used illegal drug.

Dosage forms of cannabinoids

The **resin of the blossom** is referred to as hashish or shit, which can be bought as clay brown or black lumps, whereas the **dried blossoms** and leaves of the female flowers of the Indian hemp are referred to as **marijuana** or weed. The consumption is carried out mostly by smoking. Some consumers also use vaporizers or process the drug in sweet dishes or teas.

Effect of cannabinoids

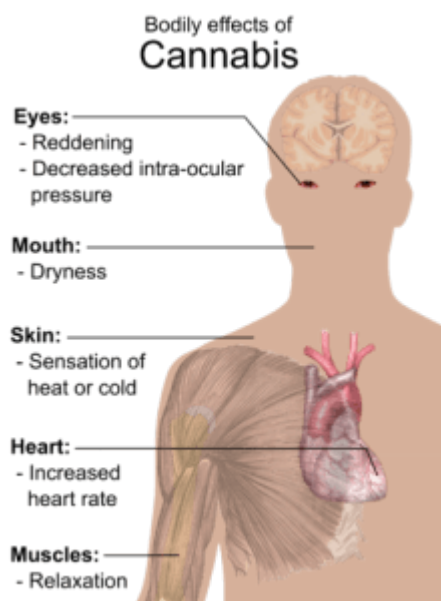


Image: "Main short-term somatic (bodily) effects of cannabis" by Mikael Häggström. License: Public Domain

The symptoms of a cannabinoid intoxication include **euphoria, relaxation, psychomotor slowdown, the flight of ideas, elongation of the time experience and concentration disorders**. The intoxication abates after about 3-5 hours. Physical

symptoms are reddening of the conjunctive, tachycardia, disturbances of the fine motor skills and, after long lasting consumption, [bronchitis](#).

Chronic consumption can trigger a **cannabis psychosis with schizophrenic symptoms**. The risk of suffering from a schizophrenic psychosis is increased at least three times. The amotivational syndrome with lethargy, passivity, and indifference is reported even more.

Withdrawal symptoms of cannabinoids

As a consequence of regular consumption, a mild withdrawal syndrome including **craving, sleeping disturbances, inner unrest, hyperalgesia, and dysphoria** can occur about 10 hours after the last ingestion of the substance. Those withdrawal symptoms are supposed to be distinctive especially with synthetically produced THC, which used to be sold legally as spice. This underlines that cannabis triggers a certain physical addiction.

Cannabinoids as medicaments

Dronabinol is a semi-synthetic THC and authorized for the treatment of the **anorexia-cachexia-syndrome** of tumor- and AIDS-patients in Germany. The fully synthetic THC **Nabilon** is used for the treatment of the symptoms of [multiple sclerosis](#), chronic [inflammatory bowel disease](#), and tic diseases.

Notice: THC can be proved for 2-35 days in the urine respectively 12 hours in the [blood](#).

Cocaine

Already in the 20s cocaine was said to be a fashion drug of an avant-garde subculture and the consumption was celebrated in secret meetings. Today cocaine is still often misused by people, who are under a pressure to succeed, because of the drug's price and the stimulating and self-confidence boosting effect.

Dosage forms of cocaine

Cocaine is a white powder, which is gained from the coca shrub's leaves. The application takes place intranasal by sniffing, intravenous or by smoking. It is called **speedball** in combination with opioids.

Effects of cocaine

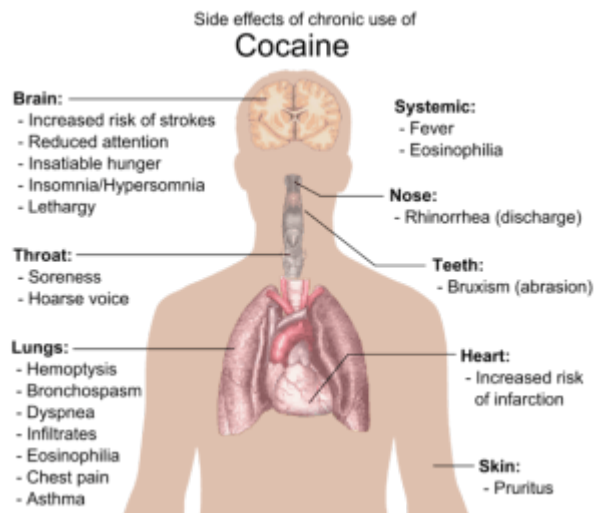


Image: "Main side effects of chronic use of cocaine." by Mikael Hågström. License: Public Domain

The early effect of cocaine matches a **kick** and goes along with a euphoric state with **lifted mood, happiness, an urge to speak, a loss of restraining, increased libido, improved performance, and creativity**. The necessity to sleep decreases as well as the necessity to eat and drink. This is followed by the **state of intoxication** with tactile, visual and acoustical hallucinations. Paranoid thoughts are also common. Afterward follows the **depressive state**, during which anxiety and depression are paramount. The depressive state often leads to the great desire of consuming the drug again in order to end this state.

Those hallucinations can last when the consumption becomes chronic and lead to **paranoid hallucinatory psychoses** with chase or relationship beliefs. The cognitive performance is impaired in the long run. The body suffers from the chronic misuse, too. It comes up to disturbances of the cardiovascular system, impotence and the destruction of the nasal septum and the nasal mucosa as a consequence of nasal application.

Intoxication with cocaine

The symptoms of cocaine intoxications include ataxia, tachyarrhythmia up to cardiac failure, hyperthermia, mydriasis and epileptic seizures. It is possible to treat the intoxication with **diazepam**.

Withdrawal symptoms of cocaine

Dysphoria and a hangover are typical symptoms of the cocaine withdrawal. There is no need for a special medicinal substitution, as cocaine only leads to mental but not physical addiction. **Supporting conversations** are of a greater importance.

Notice: Cocaine only leads to mental, but not physical addiction.

Hallucinogens

Hallucinogens of mushrooms and cacti have been used for religious-ritual methods and magical rituals especially in the area of Middle and South America for a long time. Already the witch doctors observed that it is only possible to achieve a hallucinogenic effect if there are a couple of days to weeks between two ingestions of the drugs. The drug only has a **small addictive potential** due to this reason. In return, the risk of triggering a

psychosis is extraordinarily high.

Dosage forms of hallucinogens

It is a heterogeneous group of psychedelic drugs. A lot of them are gained directly from plants, others, like acid, are fully synthetic. **LSA** from Woodrose seeds, **mescaline** from the peyote cactus, **psilocybin** from mushrooms like the liberty cap and **atropine and scopolamine** from flowers like the angel trumpet and the thorn apple belong to the hallucinogens, which classically trigger vivid perception disorders.

Effect of hallucinogens

The intoxication with hallucinogens manifests itself with **ecstatic emotion intensification, psychedelic effects and flight of ideas**. It is possible to experience distortion of perception, misjudgment and hallucinations as well as changes of the ergo-experience, the body sensation and the space-time experience. The physical symptoms include **an increase in the heart rate, hyperreflexia, mydriasis** and initial nausea. The intoxication is divided up into 4 phases:

- **The initial phase** with inner unrest, tachycardia and vertigo
- **The delirious phase** with psychedelic effects, for example the feeling of being able to fly
- **The relaxation phase**
- **The after-effect phase** with exhaustion, anxiety and depressive state

The experience is extremely dependent on the initial situation. A **horror trip** will possibly be triggered, if the consumer is anxious or depressive. This manifests itself with panic, paranoid anxiety and distortions of perception including negative images.

It can come up to **flashbacks** with recalling of drug-induced pictures, even a longer time after the last ingestion of hallucinogens.

Notice: Intensity and length of the intoxication are reduced by vitamin C. It can be given to patients directly or in the form of fruit juices.

Intoxications with hallucinogens

Intoxications with hallucinogens are quite rare, as they cause strong nausea. However, instances are reported again and again in which teenagers use the ornamental plant **angel trumpet** as a hallucinogenic drug. It contains atropine and scopolamine and symptoms of an atropine poisoning arise 30–60 minutes later. Mydriasis, disorientation, hallucination and delirium need to be mentioned, too. **Physostigmine** can be used against the dangerous poisoning with the atropine containing thorn apple.

Amphetamines

Fully synthetically produced drugs like **methamphetamine** (crystal meth), **amphetamine** (speed), **phencyclidine** and **ephedrine** belong to the amphetamines. Amphetamines are consumed in the form of pills, powder or they are smoked.

Effects of amphetamines

The misuse of amphetamines leads to an **increased stimulation and the subjective**

feeling of a performance improvement. In addition to that, the appetite is suppressed. Mental symptoms include unrest, nervousness, disinhibition, lack of discrimination, euphoria, the flight of ideas, visual and acoustic illusions, paranoid symptoms and anxiety.

One physical symptom is an increased blood pressure with the danger of cardiovascular collapse. **Motoric stereotypes and paranoid hallucinatory psychoses** can manifest after long-term consumption. Some of the substances directly intervene with the central temperature regulation, which can lead to overheating of the body and high loss of liquids with consecutive hyperthermia, rhabdomyolysis, and intranasal coagulopathy. The intoxication is treated with **diazepam and haloperidol.**

Ecstasy

Ecstasy, or also XTC, is a collective term for different methylenedioxyamphetamine (MDMA). It evokes both: **amphetamine typical characteristics and hallucinatory effects.** It is counted to the **entactogens**, the substances, which enable a contact with the own inside, as it acts mostly on the communicative and emotional level.

Crystal meth

Crystal meth, also ice, wint, tick or yaaba, is an extremely potent form of methamphetamine. It evokes a strong mental addiction and a fast physical degeneration. The loss of teeth is especially typical due to reduced salivation, teeth grinding and increased caries, which is referred to as **meth-mouth.**

Withdrawal symptoms of amphetamines

The mental withdrawal dominates, as amphetamines actually do not lead to a physical addiction. The patients suffer from **depressive mood, anxiety, and trepidation.** The addicts are only able to complete normal everyday tasks under the influence of the drug due to the physical weakening and the repealed sleep-wake rhythm.

Amphetamines as medication

Methylphenidate is an amphetamine, which is authorized for the treatment of narcolepsy and the attention-deficit-hyperactivity disorder (ADHD). It appears to be paradoxical to prescribe an amphetamine for a child with hyperactivity at first, but it is assumed that the children try to compensate a decreased brain activity with hyperactivity.

Methylphenidate, better known under its market name Ritalin, has very positive effects on the patients due to that.

Popular Exam Questions

The correct answers can be found below the references.

1. Two 16-year old boys introduce themselves in the emergency room. One of the boys is cold sweated, strongly tachycardic with a heart rate of 140 bpm and distinctly confused. Both boys have widened pupils and the older one of them states, that they have produced a drink from angel trumpet and consumed it. He brought his friend to the emergency room when he started to fantasize about a being in a hedge. You want to give the boy an antidote for the anticholinergic syndrome, as he becomes delirious. Which one is suitable?

- A. Atropine
- B. Butylscopolamine
- C. Norepinephrine
- D. Dopamine
- E. Physostigmine

2. A 26-year old man is brought to the psychiatry by the police after he tried to destroy a tree in the city. He seems to be agitated strongly and states that it was not a tree, but a rocket station of the NSA. The patient also reports that he has been awake for at least 14 days because his sleep was being observed. You recognize a lot of excoriations in the patient's face, several teeth are missing and his clothes are unclean. Which drug is the patient most likely addicted to?

- A. Crystal meth
- B. Acid
- C. Cannabis
- D. Heroine
- E. Lorazepam

3. What is understood by the term "cold turkey"?

- A. Shivering while coming down from heroine
- B. Inhaling of cannabis with a vaporizer
- C. Drug tolerance after regular consumption of ecstasy
- D. Opioid withdrawal without substitution treatment
- E. Thermal hallucination after the consumption of speed

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Correct answers: 1E, 2A, 3D

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