Cocaine and the Nervous System

By Elizabeth Damore

All drugs have a negative effect on the nervous system, but few can match the dramatic impact of cocaine. Cocaine is one of the most potent, addictive, and unpredictable recreational drugs, and thus can cause the most profound and irreversible damage to the nervous system. The high risk associated with cocaine remains the same regardless of whether the drug is snorted, smoked, or injected into the user's bloodstream. In addition to the intense damage cocaine can cause to the liver, intestines, heart, and lungs, even casual use of the drug will impair the brain and cause serious damage to the central nervous system. Although cocaine use affects many components of the body, including vision and appetite, the most significant damage caused by cocaine takes place in the brain and central nervous system.

Spanish explorers first observed South American natives chewing the cocoa leaf, from which cocaine is derived, when they arrived on the continent in 16th century. The South Americans chewed these cocoa leaves in order to stay awake for longer periods of time. Centuries after this initial discovery, Albert Neiman isolated cocaine from the cocoa leaf in 1860. Neiman used this extraction as an anesthetic. Over the ensuing years, cocaine use became increasingly common and was even sanctioned by doctors, who prescribed the drug to aid recovering alcoholics. Cocaine was even a key ingredient in such popular beverages as Coca-Cola. It was not until the long-term health problems associated with cocaine use emerged that the public realized that the drug was harmful and highly addictive.

Cocaine is a versatile drug which can be ingested in a variety of ways. In its purest form, cocaine is a white powder extracted directly from the leaves of the cocoa plant. However, in the modern drug market, pure cocaine is often tempered with a variety of substances in order to make cocaine more profitable for drug dealers. The most common way to ingest powdered cocaine is to inhale the drug through one's nasal passage, where the cocaine is absorbed into the bloodstream by way of the nasal tissues. Cocaine can also be injected directly into a vein with a syringe. Finally, cocaine smoke can be inhaled into the lungs, where it flows into the bloodstream as quickly as when injected into a vein. In 1985, crack cocaine was invented, which is the optimal form of cocaine for smoking. While most cocaine is created through a complex process requiring ether and other unstable and expensive substances, crack cocaine is processed with ammonia or baking soda. Crack cocaine has gained popularity as the drug is cheaper and provides a more potent immediate high than snorting cocaine. However, those
who smoke cocaine run a higher risk of becoming addicted to the drug, as more cocaine is absorbed into the bloodstream through this method of ingestion.

Cocaine produces its pleasurable high by interfering with the brain's "pleasure centers" where such chemicals as dopamine are produced. The drug traps an excess amount of dopamine in the brain, causing an elevated sense of well being. Cocaine acts as a stimulant to the body. In turn, the drug cause blood vessels to restrict, increases the body's temperature, heart rate, and blood pressure, and cause the pupils to dilate. Cocaine also increases one's breathing rate. Cocaine causes such pleasurable effects as reduced fatigue, increased mental clarity, and a rush of energy. However, the more one takes cocaine, the less one feels its pleasurable effects, which causes the addict to take higher and higher doses of cocaine in an attempt to recapture the intensity of that initial high. In any case, a cocaine high does not last very long. The average high a user gets from snorting cocaine only lasts for 15-30 minutes. These highs are less intense, as it takes longer for the drug to be absorbed into the bloodstream when snorted. A smoking high, although more intense due to the rapidity in which the drug is absorbed into the bloodstream, lasts for an even shorter period of only about five to ten minutes. After the euphoric high comes the crashing low, in which the addict craves more of the drug and in larger doses.

Cocaine can cause serious long-term effects to the central nervous system, including an increased chance of heart attack, stroke, and convulsions, combined with a higher likelihood of brain seizures, respiratory failures, and, ultimately, death. An overdose of cocaine raises blood pressure to unsafe heights, often resulting in permanent brain damage or even. Coming down off of cocaine is highly unpleasant, as the user may feel nauseous, irritable, and paranoid. Also, in some cases, a sudden death may occur, although it is impossible to predict who could be killed suddenly by cocaine ingestion. Crack cocaine in particular heightens paranoia in its users, who have the more difficulty quitting the drug than other cocaine users.

Many studies have been done which analyze the impact of cocaine on the brain itself. By inhibiting the brains release of dopamine and other neurochemicals, cocaine can cause serious and often irreversible damage to neurons within the brain. In autopsies, cocaine users had a reduced number of dopamine neurons. When flooded with the excess of dopamine created during a cocaine high, the brain reacts by making less dopamine, getting rid of this excess, and shutting down the dopamine neurotransmitters, sometimes permanently. In turn, many cocaine users feel depressed once they go off of the drug, which makes cocaine is highly addictive. Many addicts report that they crave the drug more than food, and laboratory animals will endure starvation and electroshocks if they can still have the drug.

Cocaine is one of the most dangerous drugs for the central nervous system. As a powerful stimulant, cocaine increases the likelihood of many fatal nervous system malfunctions, including stroke. However, the high initially gotten from cocaine keeps its addicts looking for more, as this highly addictive drug can be difficult to quit. Also, as the neurotransmitters shut down and disappear, the user needs cocaine to create an artificial high. Cocaine can cause serious damage
to the nervous system, as it eats away chunks of the brain and increases blood pressure, heart rate and body temperature, often for the rest of the addict's life.