SPECIAL ISSUE ON ADOLESCENTS & YOUNG ADULTS

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A sad and malignant thing is happening in Russia these days, and it is as disturbing as it is otherworldly—something straight out of the nightmarish dystopia depicted in the wildest visions of Beat Generation writer William S. Burroughs. It is a cautionary tale, and one that is sending shivers down the spines of even the most seasoned chemical dependency professionals. A deadly home-cooked version of a long disused painkiller, recently rediscovered by a new generation of Russian addicts, is stalking young opiate users from St. Petersburg to Vladivostok and literally ripping the flesh from their bones. The drug is called krokodil, or crocodile, and it gets its name from the merciless way it devours its victims’ flesh and also from the disturbing fact that users’ skin takes on a scaly gray-green hue reminiscent of a crocodile’s hide (Priymark, 2011).

The ghastly fallout of the krokodil epidemic has settled disproportionately on disaffected Russian youth and young adults. With the self-centeredness of adolescence still strong, bored and restless youth of the former Soviet Union are often frustrated by what they see as a poor chance of achieving their life goals and are cynical about living under an economic and political system that offers few career opportunities. Too many young Russian men and women are turning to drugs like krokodil to banish feelings of frustration, discouragement and hopelessness.

Some who study Russian youth believe that a majority of young adults of the former Soviet empire tend to fall into one of two distinct groups. The more urban, affluent and westward-looking “progressives” embrace a clear subcultural stance in fashion and music. Progressives also tend to be more materialistic, ambitious and career-oriented.
They often come from families with established political and business connections. Progressives stand in contrast to the mostly rural, poorer and unemployed “normals” whose focus is decidedly local, informal and existential. “Normals” embrace no real subcultural identity and their outlook tends to be more here-and-now and neighborhood-oriented. Members of this group seem to prefer hanging out with long-time friends in familiar territory and creating their own diversions, often through the use of drugs and alcohol (Pilkington et al., 2002). “Normals” appear to have a distinctly nihilistic bent and expect far less from life than the so-called progressives. It is among these improbably named “normals” that krokodil has extracted its terrible toll.

**Home-Cooked Death**

The drug that is decimating Russian “normals” is really just a home-cooked version of a powerful short-acting opioid called desomorphine, a drug that milligram for milligram has almost twice the potency of heroin. The fact that krokodil is only about one-third the price of heroin also adds to its appeal among poor rural youth. Desomorphine (di-hydro-des-oxy-morphine is its chemical name) is a potent analogue of morphine that was first synthesized from codeine by American chemists in 1932. Never commercially exploited in the United States, desomorphine was marketed for a time in Switzerland as a prescription pain medication called Permonid. Desomorphine found a temporary niche in the Swiss formulary for its fast onset and short duration of action, and for the fact that compared with equivalent doses of morphine, it resulted in relatively little respiratory depression.

Desomorphine is an opioid, a semisynthetic substance that is molecularly similar and similar in effect to alkaloid substances, like morphine and codeine, that occur naturally in raw opium. Most opioids have the same basic mechanism of action and do three things in the human body: relieve pain, suppress the cough response and paralyze the gut.

The pain-relieving and cough-suppressing effects of opioids like desomorphine are a happy benefit of these drugs’ ability to bind with naturally occurring neurochemical receptors, called opiate receptors, located on cells throughout the central nervous system. Like other opioids, desomorphine relieves pain by exerting its effects both in the brain and the spinal cord. By binding with receptors in the spinal cord, desomorphine prevents pain signals from reaching the brain. And in the brain, opioids like desomorphine can actually change the subjective experience of the pain itself. After receiving a drug like desomorphine, a patient still may feel pain, but the pain no longer “hurts.” The coordinated action of a drug like desomorphine in both the brain and the spinal cord results in a decreased perception of pain, less reactivity to pain and an increase in pain tolerance. When opioids like desomorphine bind with similar receptors in the respiratory center of the brain stem, breathing rate decreases slightly and the cough reflex is suppressed. Likewise, when desomorphine and similar drugs bind with the opiate receptors in the intestine, the result is a marked reduction in gut motility.

The receptors to which desomorphine binds are those that have evolved in human beings as target receptors for naturally occurring opioid like peptide neurotransmitters called endorphins. Endorphins are neurotransmitters produced in the hypothalamus and pituitary gland. The term “endorphin” implies a similar pharmacological activity rather than a molecular likeness to opiates, and is a contraction of the words endogenous and morphine, chosen to describe a morphinelike substance originating from within the body itself and morphinelike because endorphins mimic opiates’ capacity to relieve pain and produce a sense of well-being.

Sometimes referred to as the “feel good” neurotransmitters, endorphins calm the brain by creating a state somewhat akin to anesthesia. Endorphins are activated during exercise, emotional stress, physical or emotional pain, and orgasm. Interestingly, endorphins are also energized by both laughing and crying. In fact, the greater the energy involved in these activities—for example, in cases of body-wrecking sobbing or a sidesplitting belly laugh—the greater the release of endorphins (Sachteleben, 2011).

The use of desomorphine or any opioid can ultimately result in a dysregulation of endorphinergic systems throughout the nervous system. Some neurophysiologists believe that when desomorphine or a similar opioid is introduced into the body, the brain notices the presence of the opioid but mistakes the opioid for an oversufficiency of endorphins. In an effort to normalize its activity, the brain can shut down production of endorphins and might ultimately take the additional step of down-regulating the number of opiate receptor sites. This dysregulation of endorphinergic channels first results in tolerance, then in physiologic dependence, a process that is inexorable with desomorphine or any other opioid drug.

But the mechanism of action outlined here pertains only to pharmacologically pure desomorphine—that is, desomorphine synthesized by highly trained professional chemists working in a sterile environment using ingredients of known purity and potency and having ready access to complex and costly purifying equipment. And, make no mistake: pharmacologically pure desomorphine is not krokodil. And it is not the desomorphine in krokodil that makes the stuff so physically destructive; it is krokodil’s deadly impurities.
that wreck such terrible havoc on the bodies of its users.

**A Nationwide Epidemic**

In 2002, a small clique of young Siberian heroin addicts stumbled onto the fact that desomorphine could easily be synthesized from the over-the-counter codeine headache tablets that are freely available throughout Russia. This ominous discovery—krokodil—occurred at about the same time that the price of heroin began to rise sharply, outstripping poor, young Russian addicts’ ability to supply their habits. Twenty-something heroin addicts across the former Soviet Union increasingly turned to krokodil as a cheaper alternative to heroin and use of the drug quickly spread to all regions of the country. Since its discovery, krokodil labs have proliferated, and sales of over-the-counter codeine pills have increased tenfold. It is estimated that there are now over 100,000 krokodil addicts in Russia—almost all under the age of 30. Available statistics on the krokodil epidemic are uniformly grim. Government sources report that seizures of krokodil have increased more than twenty times since 2009. But the best efforts of Russian law enforcement have not stopped krokodil from killing 15,000 addicts in the last year, accounting for more than half the drug-related deaths nationwide (Walker, 2011).

The scrouge of krokodil has spread fastest in depressed, rural areas of the former Soviet Union, regions where winter can last up to eight months and where many disaffected “normals” live in a state of ennui and abiding restlessness.

Among the thirty-odd users police found when they raided a krokodil shooting gallery on the notorious Aurora Street in the city of Ufa, the oldest was only 28. Her name was Pavlova and her addiction to opiates dated from her teens when she began mainlining a crude poppy-tar product known as khana. A year before, after a brief flirtation with heroin, she turned to the cheaper and more readily available alternative of home-cooked krokodil to feed her growing habit (Priymark, 2011).

Cooking up a batch of krokodil is as easy as it is reckless, and the whole process can be done in about 30 minutes. Addicts start the process by going from pharmacy to pharmacy, buying up as many codeine tablets as they can and then dissolving the pills in scavenged gasoline, paint thinner or any other polar solvent they can lay their hands on. Cookers then add powerful chemicals that create a malignant admixture of codeine, concentrated hydrochloric acid, iodine and red phosphorus (often scraped from the striking surfaces of matchboxes). The witch’s brew of corrosive catalysts alters the codeine’s molecular structure by saturating a key double bond, changing the codeine into the more powerful and euphoric desomorphine (Eddy et al., 1935). The synthesis is easily learned, and more experienced cooks teach the krokodil cooking process to their neophyte colleagues, some of whom are still in their teens when they learn krokodil’s deadly alchemy. The euphoria of a shot of krokodil lasts a scant 90 minutes, and addicts are quickly lured into an endless cycle of cooking and shooting up—while their flesh and bones are eaten away by krokodil.

The flesh-rotting effects of krokodil stem from the unhappy fact that desomorphine is easier to synthesize than it is to purify. Young addicts, in the panic of opiate withdrawal, often hurry the cooking process and end up injecting toxic amounts of krokodil’s corrosive impurities. Each of these impurities attacks a different organ system. Some destroy nerves, others dissolve bone tissue, while still others impair liver and kidney function. The ultimate and unavoidable result of krokodil use is a raft of hideous and life-threatening complications (Stufflebeem, 2011).

Gangrene often sets in around injection sites, and krokodil users are easy to spot by the odoriferous rotting sores that line their arms and legs. Amputations are common among veteran addicts. Rotting sores quickly progress to the point where addicts’ foul-smelling, gray-green flesh literally falls away from their bodies leaving bones and tendons exposed. Then the bone tissue itself begins to break down—literally digested by powerfully acidic impurities in krokodil.

As if the flesh- and bone-rotting potential of the drug was not enough, the destructive sequela of krokodil also include pneumonia and blood poisoning. Many krokodil addicts display clear signs of neurodegeneration including tremors, tics and speech impediments. A worker in one of the rare Russian treatment programs reports that few krokodil addicts live past thirty (Walker, 2011). But few users seem to want help. Addicts caught in the powerful claws of krokodil often choose continued use over drug treatment, or even medical attention, and often end up dying lingering deaths in their homes.

For those krokodil addicts who do seek help, the road to recovery is rocky. Krokodil withdrawal can last up to a month, and withdrawal symptoms often include seizures and severe,
life-threatening fevers. Without sedation, withdrawing krokodil addicts have been known to pass out from pain (Walker, 2011). Those few who manage to kick the krokodil habit often come away from their addiction physically disfigured and neurologically impaired.

The Russian government has been sluggish in its response to the krokodil epidemic. Proposed legislation to require a prescription for the over-the-counter codeine pills that are the indispensable starting ingredient for the synthesis of krokodil is being resisted by the country’s pharmaceutical lobby. It seems that the profit margin on codeine pills is quite high and many Russian pharmacies rely on the sale of the tablets to stay financially viable.

And it seems that the krokodil has now escaped from the swamp. Several krokodil-related deaths have been reported in Germany, and the disturbing news about krokodil has DEA officials praying that the epidemic never reaches U.S. shores.

One veteran krokodil addict, interviewed in the last month of her life, uttered the undeniable truth about krokodil. In a room reeking of iodine and rotting flesh, the young woman, named Olga, showed visitors her left leg. The skin from the knee down was a shocking coal black—an unmistakable sign of the gangrene infection that would soon take her life. She asked for a cigarette and paused for a moment, exhaling a breath full of smoke over her rotting leg before turning to the interviewer with a wan and resigned smile: “I am only 20 and I used to be pretty. Krokodil has robbed me of my youth, my looks, and my health and now it’s going to take my life. I can’t leave this filth room and I am revolted by my own presence. Krokodil has turned me into a disgusting swamp monster.”

Olga’s words are her sad legacy to young adults across Russia and around the world: consider carefully the waters into which you wade.

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References


