Smoking Synthetic Marijuana Leads to Self-Mutilation Requiring Bilateral Amputations

Karim A. Meijer, MD; Russell R. Russo, MD; Dhaval V. Adhvaryu, MD

Orthopedics
April 2014 - Volume 37 · Issue 4: e391-e394
Posted April 1, 2014
DOI: 10.3928/01477447-20140401-62

Abstract
Synthetic cannabinoids have become a worldwide epidemic because they provide a sometimes legal, easily accessible, and presumably safe alternative to marijuana. Recently published reports have linked acute psychosis, myocardial infarctions, convulsions, self-harm, and even terrorist organizations to these designer substances. This case report outlines the first reported case of Black Diamond, a synthetic cannabis, leading to a self-inflicted burn to the bilateral upper extremities requiring a transradial amputation of the right arm and a toe transfer procedure of the left hand after loss of all digits. The patient presented to the emergency department with self-inflicted fourth-degree burns to the bilateral hands and forearms with second-degree burns of the face, for a total body surface area of 14.5%. The patient was found by firefighters with his hands aflame on his kitchen stove. With no previous medical or psychiatric history and collateral information to confirm the patient’s mental status prior to use of Black Diamond, the patient’s acute psychotic episode was attributed to Black Diamond. After multiple procedures and a lengthy recovery, the patient completed his post-graduate education and entered the professional world. As orthopedic surgeons, we should be involved in educating the public on the harm of these designer drugs, including self-mutilation. The popularity of synthetic drugs in the United States will continue to present a major challenge to all health care providers. Orthopedists are on the front lines of this epidemic because these drugs push patients into risky, traumatic behavior.

The authors are from the Department of Orthopedics (KAM, RRR), LSU Health Sciences Center, New Orleans; and the Department of General Surgery (DVA), Baton Rouge General Medical Center, Baton Rouge, Louisiana.
The authors have no relevant financial relationships to disclose.

Correspondence should be addressed to: Russell R. Russo, MD, Department of Orthopedics, LSU Health Sciences Center, 1542 Tulane Ave, New Orleans, LA 70112 (rrusso@lsuhsc.edu).

Received: March 13, 2014  
Accepted: March 17, 2014  

Synthetic cannabinoids have become a worldwide epidemic because they provide a sometimes legal alternative to marijuana. First sold under the name Spice in 2004, the drug has evolved into many different names (eg, Black Diamond, Mojo, K2, Spice Gold, Aroma, Dream, Genie, Silver) and packaging from incense to tea bags.¹ These designer drugs and the newer bath salts have recently drawn the attention of both the medical and law enforcement communities. Recently published reports of recurring psychosis, myocardial infarctions, convulsions, and even necrotizing fasciitis have been linked to these substances.¹⁻⁶ This case report outlines the first reported case of Black Diamond, a synthetic cannabis, leading to bilateral upper-extremity self-mutilation treated with a transradial amputation of the right arm and a toe transfer procedure of the left hand after loss of all digits.

Synthetic cannabis, like other designer drugs, masquerades as less-harmful legal herbs and incenses that are marketed under the pretense of giving a marijuana-like high without the illegal tetrahydro-cannabinol (THC) chemical formula. In 2009, German scientists tested the popular substances and found no traces of these so-called herbs, only a chemically engineered synthetic THC product meant to evade regular THC screening tests.⁷ Later that year, the German government banned the substance and its many homologues.⁸ Since the early 2000s, these products have evaded authorities; they have only recently come under review, when patients began pouring into emergency departments with severe psychotic events.

Synthetic cannabinoids are chemically altered drugs designed to mimic the effects of traditional marijuana. Often sold in stores and on the Internet as incense, these engineered drugs can have severe side effects, such as acute psychosis leading to self-mutilation. Many case reports are emerging that demonstrate the powerful psychotic effects these new designer drugs can have or the drugs’ ability to exacerbate underlying psychosis in previously susceptible individuals.⁹ Originally created in laboratories for the purpose of research on pain and its effects on brain function, synthetic cannabinoids have escaped the laboratory and are proliferating across Europe and the United States. Many states have acknowledged the dangers of these drugs, as well as others such as bath salts. They have been banned in 18 states since October 2011.¹ This case report serves as a warning to the medical community and orthopedic surgeons in particular because these drugs are undetectable in routine emergency department screening and have added medical concerns. These patients may need medical and psychological treatment for their addiction, withdrawal, and recurrent psychoses.
When presented with a patient with a mangled extremity, the physician must keep in mind the whole patient. Initial treatment should begin with the ABCs of trauma, followed by a secondary survey and full medical and psychosocial assessment to restore the patient’s best possible functional and cosmetic result. This case report outlines the treatment of a patient who smoked Black Diamond, a synthetic cannabis, which led to an acute psychosis. The patient deliberately burned his hands and face and was treated accordingly with burn resuscitation, multiple debridements, transradial amputation, toe transfer, and ultimately a myoelectric prosthesis, giving him a chance at a fulfilling life.

**Case Report**

A healthy 26-year-old man presented to the emergency department with self-inflicted fourth-degree burns to the bilateral hands and forearms with second-degree burns to the face, for a total body surface area of 14.5%. The patient was found by firefighters with his hands aflame on his kitchen stove. The smoke detectors had alerted the firefighters to the residence, and with the patient’s hands still gripped to the stove, 6 fire-fighters and an electroshock weapon were required to subdue the individual and remove him from the flames. The patient had no previous medical or psychiatric history except for attention deficit disorder, which had been treated with lis-dexamfetamine dimesylate and kept stable for many years. He was an intelligent and high-functioning member of society pursuing a post-graduate degree. His social, family, and surgical histories were otherwise unremarkable (Figures 1–2).

---

Figure 1:
Initial emergency department photograph of the dorsum of the left hand.
On admission to the emergency department, standard burn protocol and fluid resuscitation were initiated. The patient underwent urgent irrigation and debridement to identify healthy tissue margins. His initial debridement required amputations of his right thumb and ring and small fingers at the level of the metacarpophalangeal joint and the index and long fingers at the level of the proximal interphalangeal joint. His left hand required amputations of the thumb and index, long, and ring fingers at the level of the metacarpophalangeal joint, with the long and ring fingers being amputated at the proximal interphalangeal joint. The small finger required a transmetacarpal amputation. Over the course of the next month, the patient underwent multiple debridements of his bilateral upper extremities, as well as fasciotomies (Figures 3–4).
Figure 3:
Photograph showing debridement of the right upper extremity.
Once the patient was stabilized both medically and psychologically, his history was reviewed and revealed that prior to his acute psychotic outbreak, the patient had purchased Black Diamond, a synthetic marijuana, and smoked it to get high. Through collateral information, the mental state of the patient was completely lucid prior to smoking Black Diamond. The patient had just returned home from visiting a friend. Moments after
smoking the synthetic marijuana, the patient had paranoid delusions causing him to feel his hands were going to harm him. At that point, he placed them on the stove and attempted to burn them off to “get the devil out of [him].”

The patient subsequently underwent multiple procedures, including a groin flap for coverage of his left hand, placement of roughly 900 cm\(^2\) of synthetic dermal substitute to his upper extremities, multiple skin grafts, and eventually a transradial amputation of his right upper extremity. He was subsequently fitted with a myoelectric prosthesis and began to return to normal activities. The patient is now in good health and attending a professional university, where he is progressing well with no recurrent paranoid delusions.

It is of note that an attempt was made after initial debridements to arrange a hand transplantation; however, the patient did not meet the requirements of the accepting facility.

When attempts at hand transplantation failed, the authors chose to perform a large toe transfer for pollicization. This allowed the best possible functional outcome for the patient given the limitations.

**Discussion**

This case report is one of the first to elucidate a link between synthetic cannabinoids and paranoia leading to self-mutilation. Through an arduous process of multiple orthopedic, burn, and plastic surgery procedures, this patient was able to make a recovery to a functional state in which he can lead a meaningful and productive life.

Although recently banned by both the US Drug Enforcement Agency and individual states, these drugs continue to increase in popularity. The complexity of designer drugs allows overseas manufacturers of these substances to evade authorities and sell them legally while sidestepping current laws. It is possible that more patients will present as the current patient did with disfiguring injuries leading to loss of limb and even death. A possible explanation for the increased demand may be the potential for evading drug tests, which may shift the demographic of patients who abuse these drugs toward working professionals or athletes who may undergo routine drug testing. Recently, urine samples collected from 5956 athletes showed that 4.5% of samples had metabolites of JWH-018 and/or JWH-073, which are synthetic cannabinoids.\(^{10}\) Orthopedic surgeons and the medical community must
be able to recognize the effects of such synthetic drugs because they do not appear on routine emergency department tests. Send-out laboratory tests exist but are commonly used only for state drug testing of workers and athletes or for postmortem diagnostic testing.

Synthetic cannabinoids produce symptoms similar to those of marijuana; however, unlike marijuana, synthetic cannabinoids produce unexplainable psychotic symptoms in some individuals. Multiple case reports have demonstrated this psychosis.\textsuperscript{11,12} Synthetic cannabinoids can also aggravate existing medical and psychological conditions or cause an outbreak of an acute psychotic episode in someone who may be healthy but who has a family history of psychological disease or a predisposition to a psychotic break. Case reports have illustrated a possible link, but there are no standardized large-scale published reports proving a correlation.

Because these designer drugs were only introduced in the United States in the past couple of years, reports in the medical literature on their effects have been sparse. The first physician encountered by patients taking the drugs may likely be an orthopedic surgeon due to the psychotic outbreaks and patients’ subsequent dangerous behavior leading to traumatic injuries. Orthopedic surgeons must be diligent in identifying signs of intoxication and in aiding primary care physicians and emergency department doctors in diagnosing and treating these patients so as to avoid recurrence of these events.

Educating the community, and specifically legislators, is the duty of physicians as patient advocates. Physicians need to be more active with state and national leaders to protect the community from these seemingly harmless over-the-counter drugs, which have the potential to cause serious harm. As their popularity rises, so will the devastating consequences. It is hoped that more states formally ban designer drugs and that the federal government takes action on the importation of these drugs. Recent news has documented the importation of synthetic marijuana as a multimillion dollar industry for terrorist organizations.\textsuperscript{13} Designer drugs are more than a danger to our health; they are also a problem of national security. It is hoped that the current patient’s story will inspire law changes and protect others from the dangers of designer drugs.

References


10.3928/01477447-20140401-62
Abstract

Synthetic cannabinoids have become a worldwide epidemic because they provide a sometimes legal, easily accessible, and presumably safe alternative to marijuana. Recently published reports have linked acute psychosis, myocardial infarctions, convulsions, self-harm, and even terrorist organizations to these designer substances. This case report outlines the first reported case of Black Diamond, a synthetic cannabis, leading to a self-inflicted burn to the bilateral upper extremities requiring a transradial amputation of the right arm and a toe transfer procedure of the left hand after loss of all digits. The patient presented to the emergency department with self-inflicted fourth-degree burns to the bilateral hands and forearms with second-degree burns of the face, for a total body surface area of 14.5%. The patient was found by firefighters with his hands aflame on his kitchen stove. With no previous medical or psychiatric history and collateral information to confirm the patient’s mental status prior to use of Black Diamond, the patient’s acute psychotic episode was attributed to Black Diamond. After multiple procedures and a lengthy recovery, the patient completed his post-graduate education and entered the professional world. As orthopedic surgeons, we should be involved in educating the public on the harm of these designer drugs, including self-mutilation. The popularity of synthetic drugs in the United States will continue to present a major challenge to all health care providers. Orthopedists are on the front lines of this epidemic because these drugs push patients into risky, traumatic behavior.

The authors are from the Department of Orthopedics (KAM, RRR), LSU Health Sciences Center, New Orleans; and the Department of General Surgery (DVA), Baton Rouge General Medical Center, Baton Rouge, Louisiana.

The authors have no relevant financial relationships to disclose.

Correspondence should be addressed to: Russell R. Russo, MD, Department of Orthopedics, LSU Health Sciences Center, 1542 Tulane Ave, New Orleans, LA 70112 (rrusso@lsuhsc.edu).

Received: March 13, 2014
Accepted: March 17, 2014
Synthetic cannabinoids have become a worldwide epidemic because they provide a sometimes legal alternative to marijuana. First sold under the name Spice in 2004, the drug has evolved into many different names (eg, Black Diamond, Mojo, K2, Spice Gold, Aroma, Dream, Genie, Silver) and packaging from incense to tea bags.¹ These designer drugs and the newer bath salts have recently drawn the attention of both the medical and law enforcement communities. Recently published reports of recurring psychosis, myocardial infarctions, convulsions, and even necrotizing fasciitis have been linked to these substances.¹–⁶ This case report outlines the first reported case of Black Diamond, a synthetic cannabis, leading to bilateral upper-extremity self-mutilation treated with a transradial amputation of the right arm and a toe transfer procedure of the left hand after loss of all digits.

Synthetic cannabis, like other designer drugs, masquerades as less-harmful legal herbs and incenses that are marketed under the pretense of giving a marijuana-like high without the illegal tetrahydro-cannabinol (THC) chemical formula. In 2009, German scientists tested the popular substances and found no traces of these so-called herbs, only a chemically engineered synthetic THC product meant to evade regular THC screening tests.⁷ Later that year, the German government banned the substance and its many homologues.⁸ Since the early 2000s, these products have evaded authorities; they have only recently come under review, when patients began pouring into emergency departments with severe psychotic events.

Synthetic cannabinoids are chemically altered drugs designed to mimic the effects of traditional marijuana. Often sold in stores and on the Internet as incense, these engineered drugs can have severe side effects, such as acute psychosis leading to self-mutilation. Many case reports are emerging that demonstrate the powerful psychotic effects these new designer drugs can have or the drugs' ability to exacerbate underlying psychosis in previously susceptible individuals.⁹ Originally created in laboratories for the purpose of research on pain and its effects on brain function, synthetic cannabinoids have escaped the laboratory and are proliferating across Europe and the United States. Many states have acknowledged the dangers of these drugs, as well as others such as bath salts. They have been banned in 18 states since October 2011.¹¹ This case report serves as a warning to the medical community and orthopedic surgeons in particular because these drugs are undetectable in routine emergency department screening and have added medical concerns. These patients may need medical and psychological treatment for their addiction, withdrawal, and recurrent psychoses.

When presented with a patient with a mangled extremity, the physician must keep in mind the whole patient. Initial treatment should begin with the ABCs of trauma, followed by a secondary survey and full medical and psychosocial assessment to restore the patient's best possible functional and cosmetic result. This case report outlines the treatment of a patient who smoked Black Diamond, a synthetic cannabis, which led to an acute psychosis. The patient deliberately burned his hands and face and was treated accordingly with burn resuscitation, multiple debridements, transradial amputation, toe transfer, and ultimately a myoelectric prosthesis, giving him a chance at a fulfilling life.