

Chapter 8

Freedom from Nicotine - The First 72 Hours

Are you all packed, map in hand and aware of common hazards up ahead? Are you ready for that first step? Are you still a bit apprehensive? It's totally understandable. Still, I encourage you to try to relax, to take slow deep breaths and ponder this: when going cold turkey, without use of any product or procedure, nearly everything felt during the first three days is evidence of what may be the most beautiful healing your body has ever known. It is good not bad.



If you have decided in favor of educated “on-your-own” recovery, rest assured, you will not experience any quitting product side effect or adverse event. Instead you will witness and experience the response of your body and mind as they navigate a temporary period of deep and profound healing. If a smoker, it will likely be your body’s most intense healing ever. Picture 100 trillion cells²⁴⁶ receiving far more oxygen and far fewer toxins.

Psychologically, the first 24 hours are usually the biggest hurdle of all. It’s here, during these early magic moments that we re-discover how to breathe, move about, eat and go to sleep without introducing nicotine back into our bloodstream.

The minutes will pass whether we sit on pins and needles while intensely focusing upon each passing second, or attempt to relax, make ourselves as comfortable as possible or keep ourselves occupied. A clock or watch will soon announce the passing of an hour. When it does, celebrate! You’ve taken that first giant step home. Congratulations!

A new supply of the super-toxin nicotine did not arrive. Its absence likely diminished destruction of surviving brain gray matter,²⁴⁷ allowed more unhealthy cells throughout the body to die natural deaths (apoptosis),²⁴⁸ diminished nicotine’s influence in preventing bone regeneration,²⁴⁹ and permitted a decline in nicotine induced angiogenesis which causes plaque build-up within arteries to harden and accelerates tumor growth rates.²⁵⁰

246 National Institutes of Health, [Human Cells 101](#), NICHD, <http://www.nichd.nih.gov> - page last updated 9/18/06.

247 Brody, AL et al, [Differences between smokers and nonsmokers in regional gray matter volumes and densities](#), Biological Psychiatry, January 1, 2004, Volume 55(1), Pages 77-84.

248 Cucina A, et al, [Nicotine Inhibits Apoptosis and Stimulates Proliferation in Aortic Smooth Muscle Cells Through a Functional Nicotinic Acetylcholine Receptor](#), The Journal of Surgical Research, November 26, 2007.

249 Zheng LW, et al, [Changes in blood perfusion and bone healing induced by nicotine during distraction osteogenesis](#), August 2008, Volume 43(2), Pages 355-361.

250 Cooke JP, [Angiogenesis and the role of the endothelial nicotinic acetylcholine receptor](#), Life Sciences, May 30, 2007, Volume 80(24-25), Pages 2347-2351; also see, Heeschen C, et al, [Nicotine stimulates angiogenesis and promotes tumor growth and atherosclerosis](#), Nature Medicine, July 2001, Volume 7(7), Pages 833-839.

Most importantly, we arrested our dependency for an entire hour. We were the jailor and it was our prisoner. Forget about forever, forget about tomorrow, and forget about two hours from now. All we control are the next few minutes, minutes during which nicotine need not enter our bloodstream.

Nicotine's Half-life

Contrary to marketing suggestions of those selling quitting chemicals that stimulate brain dopamine pathways, the only way to restore natural stimulation and sensitivities is to remove the chemicals. The speed and beauty of natural recovery can be seen within just one hour of remaining 100% nicotine-free, as the concentration of nicotine in our bloodstream declines by 25%.

“Half-life” is defined as “the time required for half the quantity of a drug or other substance deposited in a living organism to be metabolized or eliminated by normal biological processes.”²⁵¹ Most older cessation literature firmly fixes nicotine’s elimination half-life at about two hours.²⁵² But nicotine’s half-life can vary based upon genetic, racial and hormonal factors.²⁵³ Let’s ignore genetic differences, as we have no idea which genes we have or don’t have.

As for racial variations, a 1998 study found an average nicotine half-life of 129 minutes in Caucasians and 134 minutes in African Americans.²⁵⁴ A 2002 study compared Chinese-American, Latino and Caucasian smokers. It found that Latino’s had the shortest half-life (122 minutes), Chinese-Americans the longest (152 minutes), with Caucasians in the middle (134 minutes).²⁵⁵

Nicotine’s half-life was found to be shorter in women (118 minutes) than men (132 minutes), and even faster in women taking oral contraceptives (96 minutes). This was thought to be associated with estrogen.²⁵⁶ Its half-life has been found to be shorter during pregnancy (97 minutes) than after giving birth (111 minutes).²⁵⁷ Sadly, new born babies whose mothers smoked endure a nicotine withdrawal period five times longer than what their mother’s would have been. Instead of a 2-hour elimination half-life it

251 half-life. (n.d.). The American Heritage® Dictionary of the English Language, Fourth Edition. Retrieved August 22, 2008 from Dictionary.com.

252 Benowitz NL, et al, [Interindividual variability in the metabolism and cardiovascular effects of nicotine in man](#), The Journal of Pharmacology and Experimental Therapeutics, May 1982, Volume 221(2), Pages 368-372; also see Feyerabend C, et al, [Nicotine pharmacokinetics and its application to intake from smoking](#), British Journal of Clinical Pharmacology, February 1985, Volume 19(2), Pages 239-247.

253 Benowitz NL, [Clinical pharmacology of nicotine: implications for understanding, preventing, and treating tobacco addiction](#), Clinical Pharmacology & Therapeutics, April 2008, Volume 83(4), Pages 531-541.

254 Pérez-Stable EJ, et al, [Nicotine metabolism and intake in black and white smokers](#), Journal of the American Medical Association, July 8, 1998, Volume 280(2), Pages 152-156.

255 Benowitz NL, et al, [Slower metabolism and reduced intake of nicotine from cigarette smoking in Chinese-Americans](#), Journal of the National Cancer Institute, January 16, 2002, Volume 94(2), Pages 108-115.

256 Benowitz NL, et al, [Female sex and oral contraceptive use accelerate nicotine metabolism](#), Clinical Pharmacology & Therapeutics, May 2006, Volume 79(5), Pages 480-488.

257 Dempsey D, et al, [Accelerated metabolism of nicotine and cotinine in pregnant smokers](#), Journal of Pharmacology Exp Therapeutics, May 2002, Volume 301(2), Pages 594-598.

increases to 11.2 hours.²⁵⁸ If considering breast-feeding, nicotine's breast milk half-life averages 97 minutes.²⁵⁹

Interestingly, a 1993 nicotine patch study found that when nicotine was administered directly into the bloodstream (intravenously) it had a 2 hour elimination half-life but when administered through the skin via nicotine patch (transdermally), once the patch was removed nicotine's elimination half-life was 2.8 hours.²⁶⁰ This finding is confirmed by a second patch study that found it to be a minimum of 3.3 hours.²⁶¹

The liver is the primary organ in eliminating nicotine from the bloodstream, and does so by breaking it down into other chemicals, its metabolites. Although studies are limited, it makes sense that any activity which increases blood flow through the liver (exercise or eating) should tend to accelerate nicotine depletion. One study reports that liver blood flow increases by 30% after meals, with a 40% increase in the rate that nicotine is cleared from arriving blood.²⁶²

As suggested by the above half-life data, most of us had sufficient nicotine reserves to comfortably make it through 8 hours of sleep each night (4 half lives leaving us with 6.25% of our normal daily supply). But within 24 hours of ending all nicotine use our remaining reserves will become so small they may be difficult to detect (.02 or just 2/100ths of our normal daily level).

It is here that surgery is nearly complete and true healing begins in earnest. Within three days, with absolute certainty, we again inhabit a nicotine-free body and mind.

As for detection, we often get the question, for how long after I stop using it will my insurance company or employer be able to detect nicotine in my system? As seen above, unless examining hair, which permanently records nicotine use, measuring nicotine in blood, urine and saliva is easy to beat and rather useless. But one of nicotine's longer-lasting metabolites (the chemicals it breaks down into) is cotinine, which has a generally recognized half-life of 17 hours.²⁶³

Hopefully you're not trying to tick, fool or beat the system but sample the full flavor and wonderful aroma of freedom from nicotine.

258 Dempsey D, et al, [Nicotine metabolism and elimination kinetics in newborns](#), Clinical Pharmacology Therapeutics, May 2000, Volume 67(5), Pages 458-465.

259 Luck W, [Nicotine and cotinine concentrations in serum and milk of nursing smokers](#), British Journal of Clinical Pharmacology, July 1984, Volume 18(1), Pages 9-15.

260 Gupta SK, et al, [Bioavailability and absorption kinetics of nicotine following application of a transdermal system](#), British Journal of Clinical Pharmacology, September 1993, Volume 36(3), Pages 221-227.

261 Keller-Stanislawski B, et al, [Pharmacokinetics of nicotine and cotinine after application of two different nicotine patches under steady state conditions](#), Arzneimittel-Forschung, September 1992, Volume 42(9), Pages 1160-1162.

262 Hukkanen J, et al, [Metabolism and disposition kinetics of nicotine](#), Pharmacological Reviews, March 2005, Volume 57(1), Pages 79-115.

263 Swan GE, et al, [Saliva cotinine and recent smoking--evidence for a nonlinear relationship](#), Public Health Reports, Nov-Dec 1993, Volume 108(6), Pages 779-783.

Natural Fruit Juices

If our health permits, why not devote the money we would have spent purchasing nicotine, toward purchase and use of some form of natural fruit juice for the first 72 hours. Juice will not only help stabilize blood sugar levels, it will aid in accelerating removal of nicotine from our blood. Cranberry juice is excellent.

Hypoglycemia is a fancy word for what occurs when our “blood sugar (or blood glucose) concentrations fall below a level necessary to properly support the body's need for energy and stability throughout its cells.”²⁶⁴

Causes of low blood sugar in non-diabetics include skipping or delaying meals, eating too little, increased activity or exercise and excessive alcohol.²⁶⁵ Warning signs include an inability to concentrate, anxiety, hunger, confusion, weakness, drowsiness, sweating, trembling, warmness, nausea, dizziness, difficulty speaking and blurred vision.²⁶⁶

We reviewed in Chapter 6 how each hit of nicotine served as our spoon pumping stored glucose into our bloodstream via our body's fight or flight pathways. It allowed us to skip breakfast and lunch without experiencing low blood sugar or hypoglycemic type symptoms. One of recovery's greatest challenges is learning to again properly feed and fuel our bodies. It's not a matter of consuming more calories but learning to spread them out more evenly over our entire day by eating smaller portions of healthy foods more frequently.

As an aid in blood sugar stabilization, we recommend sipping on natural fruit juices the first three days unless diabetic or otherwise inappropriate due to other health conditions (such as acid reflux). But don't over do it or go beyond three days as juice tends to be rather fattening. Make sure it's 100% natural juice, no sugar added and avoid fruit drinks and aides.

A 2008 study examined the effects of drinking 480 milliliters or 16 ounces of unsweetened, normal-calorie cranberry juice (280 calories) upon blood sugar. Spectrometry analysis found that while low-calorie cranberry juice (38 calories) and water produced no significant changes in blood sugar levels, that normal-calorie cranberry juice resulted in significantly higher blood glucose concentrations within 30 minutes, which were no longer significant after 180 minutes.²⁶⁷

As for fruit juices accelerating nicotine removal, the heart pumps about 20% of our blood

264 [hypoglycemia](#). (n.d.). Dorland's Medical Dictionary for Health Consumers. (2007). Retrieved August 22 2008 from <http://medical-dictionary.thefreedictionary.com/hypoglycemia>

265 National Institutes of Health, [Hypoglycemia](#), National Institute of Diabetes and Digestive and Kidney Diseases, NIH Publication No. 03-3926, March 2003.

266 Hepburn DA, et al, [Symptoms of acute insulin-induced hypoglycemia in humans with and without IDDM. Factor-analysis approach](#), Diabetes Care, November 1991, Volume 14(11), Pages 949-957.

267 Wilson T, et al, [Human glycemic response and phenolic content of unsweetened cranberry juice](#), Journal of Medicinal Food, March 2008, Volume 11(1), Pages 46-54.

through our kidneys. Our kidneys filter approximately 50 gallons or 189 liters of blood daily. This results in removal of about two quarts of waste products and extra water, which pass to the bladder as urine.²⁶⁸

The word “renal” means “of or relating to the kidneys.” “Renal clearance” is defined as the volume of blood from which a chemical such as nicotine is completely removed by the kidney in a given amount of time (usually a minute).²⁶⁹ A controlling factor in determining renal clearance rate is the pH level of urine produced by our kidneys.²⁷⁰ The more acidic our urine, the quicker nicotine is removed from the bloodstream.

A 2006 study found that drinking one liter of full-strength grapefruit juice (34 ounces or about 2 pints) will increase the rate by which the kidneys remove nicotine from blood plasma by 88%, as compared to when drinking 1 liter of water (231 milliliters of nicotine-free blood produced per minute using grapefruit juice vs. 123 milliliters of blood when drinking water).²⁷¹ The study found that even if the grapefruit juice was half-strength that nicotine’s renal clearance rate increased by 78% (219 milliliters per minute).

The pH scale ranges from 0 to 14 with 7 being neutral. The further below 7 a substance is, the greater its acidity. The higher a substance is above 7, the greater its alkalinity. According to the FDA,²⁷² the below fluids have the following pH ranges:

• Cranberry juice	2.3 - 2.5
• Grapefruit juice	2.9 - 3.3
• Pineapple juice	3.3 - 3.6
• Orange juice	3.3 - 4.2
• Apple juice	3.4 - 4.0
• Prune juice	3.9 - 4.0
• Vegetable juice	3.9 - 4.3
• Tomato juice	4.1 - 4.6
• Milk	6.4 - 6.8

But don’t overdo it. Remember, our primary objective is to keep blood sugar as stable as possible during the most challenging portion of recovery.

268 National Institutes of Health, [Your Kidneys and How They Work](#), NKUDIC, National Institute of Diabetes and Digestive and Kidney Diseases, NIH Publication No. 07-3195, August 2007.

269 [renal clearance](#). (n.d.). The American Heritage® Dictionary of the English Language, Fourth Edition. Retrieved August 20, 2008, from Dictionary.com website.

270 Tucker GT, [Measurement of the renal clearance of drugs](#), British Journal of Clinical Pharmacology, December 1981, Volume 12(6), Pages 761-770.

271 Hukkanen J, et al, [Effect of grapefruit juice on cytochrome P450 2A6 and nicotine renal clearance](#), Clinical Pharmacology and Therapeutics, November 2006, Volume 80(5), Pages 522-530.

272 U.S. Food & Drug Administration, [Approximate pH of Foods and Food products](#), Center for Food Safety & Applied Nutrition, April 2007.

Caffeine Use

Caffeine is a mild central nervous system stimulant found in coffee beans, tea leaves and cocoa beans. The question during recovery is whether or not we can handle a doubling of our normal daily caffeine intake without experiencing “caffeine jitters” or other symptoms of over-stimulation?

Nicotine somehow doubles the rate by which the body depletes caffeine. What’s that mean? It means that if we were drinking 2 cups of coffee while using nicotine, once nicotine use ends, that the stimulant effect of those two cups of coffee might now feel like 4 cups.

According to a 1997 study, “continuous caffeine consumption with smoking cessation has been associated with more than doubled caffeine plasma levels. Such concentrations may be sufficient to produce caffeine toxicity symptoms in smoking abstinence conditions.” The study found “a significant linear increase in caffeine sputum levels across 3 weeks post cessation,” and that “three weeks after cessation, concentrations reached 203% of baseline for the caffeine user.”²⁷³

An earlier study found that the clearance rate of caffeine from blood plasma averaged 114 milliliters per minute in nicotine smokers and 64 milliliters per minute in non-smokers.²⁷⁴

Symptoms of caffeine intoxication have been seen with as little as 100 milligrams of caffeine daily, and may include restlessness, nervousness (anxiety), excitement, insomnia, a flushed face, increased urination and gastrointestinal complaints. Intoxication symptoms seen when more than 1 gram of caffeine is consumed per day include muscle twitching, rambling flow to thoughts and speech, irregular or rapid heartbeat, irritability and psychomotor agitation.²⁷⁵

Many of us can handle a doubling of our daily caffeine intake without getting the jitters. But how can we tell whether the anxieties we feel are related to nicotine cessation or too much caffeine? It isn’t easy. Experiment with an up to 50% reduction in daily caffeine intake if at all concerned. Be careful not to reduce normal caffeine intake by more than 50% unless you want to add the symptoms of caffeine withdrawal to those of nicotine withdrawal.



Caffeine withdrawal symptoms can include headache, fatigue, decreased energy,

273 Swanson JA, et al, [The impact of caffeine use on tobacco cessation and withdrawal](#), Addictive Behavior, Jan-Feb 1997, Volume 22(1), Pages 55-68.

274 Joeres R, [Influence of smoking on caffeine elimination in healthy volunteers and in patients with alcoholic liver cirrhosis](#), Hepatology, May-June 1988, Volume 8(3), Pages 575-579.

275 American Psychiatric Association, Caffeine Intoxication, [Diagnostic and Statistical Manual of Mental Disorders](#), Fourth Edition, Text Version, Page 232.

decreased alertness, drowsiness, decreased contentedness, depressed mood, difficulty concentrating, irritability, and a foggy mind. Symptoms typically begin 12 to 24 hours after caffeine use ends, reach peak intensity at 20 to 51 hours, and normally last 2 to 9 days.²⁷⁶

The following is a sampling of the number of milligrams (mg) of caffeine “typical” in various substances:²⁷⁷

- 85mg coffee - 8 ounces drip brewed
- 80mg “energy drinks”
- 75mg coffee - 8 ounces percolated
- 40mg espresso - 1 ounce servings
- 40mg tea - 8 ounces brewed
- 28mg tea - 8 ounces instant
- 26mg baker’s chocolate - 1 ounce
- 25mg iced tea - 8 ounces
- 24mg some soft drinks - 8 ounces
- 20mg dark chocolate - semi sweet - 1 ounce
- 6mg cola beverage - 8 ounces
- 5mg chocolate mild beverage
- 4mg chocolate flavored syrup
- 3mg coffee – decaffeinated

The stimulant effects of a 24mg soft drink before bed or a 20mg chocolate bar could now feel like two sodas or two chocolate bars. Consider a modest reduction of up to one-half if experiencing difficulty falling to sleep.

Look at it this way, if we were a big caffeine user it’s cheaper now. We get twice the stimulation for half the price.

Recovery Sensations - Good, Not bad

The early days of recovery will be a significant challenge for some of us. Although it may sound strange, within reason, everything we feel as we climb to the point where withdrawal’s symptoms peak is beneficial and good not bad. What more honest signs of healing could we have? Does it make sense to fear healing? Why fight coming home to a place where entire days pass without ever once wanting nicotine? Don’t fight recovery, hug it. Hug it hard.

276 Juliano LM, et al, [A critical review of caffeine withdrawal: empirical validation of symptoms and signs, incidence, severity, and associated features](#),

Psychopharmacology, October 2004, Volume 176(1), Pages 1-29.

277 National Institute of Health, [Caffeine](#), National Toxicology Program, webpage updated 04/23/08, <http://cerhr.niehs.nih.gov/common/caffeine.html>