

How would I like my coffee? How about double-double...TOIL AND TROUBLE!

The danger of excess coffee consumption

by Joseph Paramagurunathan

You may actually have a drug addiction, you just don't know it!

As many of us university students no doubt can attest to, the rigours of schoolwork, extra-curriculars, and paid employment often leave us physically drained. While the temptation to stay in bed each morning and skip class/work is always in the back of our minds, we know that in the long run we would only be hurting ourselves. As such, where do we find the energy to function? The answer for a large population of university students is simple: COFFEE! Ah yes, whether you prefer a double-double from Timmies or 2-cream-2-sugar from Williams, coffee in its various concoctions is the saving grace for many of us.

The primary ingredient that gives coffee its stimulatory effect is of course, caffeine. Since 1820, caffeine has been one of the most widely used psychoactive drugs and is often found in everyday beverages such as tea, energy drinks, and- most commonly- in the aforementioned coffee. According to a study conducted by the National Coffee Association of the USA, university-age students are the fastest growing demographic in terms of coffee consumption. In 2005, about 26% of university-age students claimed to be regular consumers of coffee. However, one year later that percentage grew to 37%.ⁱ While regular consumption of coffee is not necessarily detrimental to one's health, the next question that arises is how many cups of coffee constitute as "regular"? While 1 or 2 cups a day may be normal for some, it is not inconceivable to believe that 4 or 5 cups a day may be a regular daily intake for many students depending on the demands of their lives.

Everyone drinks coffee, what's the big deal?

What are the possible adverse health effects associated with such consumption? If you do some research you will find that there are many areas of proper functioning and development that are affected, but this article will focus on the increasing danger of low calcium intake by university-age women- influenced in large part by the consumption of large amounts of caffeine. As is well-known, osteoporosis is a major disease associated with bone health. While both men and women are susceptible to the disease, women are more so because of the increased

need for calcium due to pregnancy, lactation, etc. In addition, women's bones are on average thinner than those of men, and become especially thin after menopause.ⁱⁱ It is therefore important that young women consume large amounts of calcium during their younger years so that later in life their bones will not be as brittle.

As for caffeine's role in this, the first influence we can confidently assume is that all the coffee being consumed may be displacing milk products in the diet. It is quite likely that milk, in addition to other essential beverages such as water and natural fruit juices, are being displaced from young women's diets due to the increased consumption of coffee. Some may argue that they add milk to their coffee in order to meet their calcium demands. However, even if young women are consuming adequate amounts of calcium either through diet or through supplements, their high caffeine intake may be preventing the absorption of the calcium into their systems. In order for calcium to properly be absorbed, the body must synthesize the active form of Vitamin D, 1,25-(OH)2D3 (also known as calcitriol). Calcitriol is synthesized in the kidney and is transported to the intestine where it aids in the absorption of calcium. It also aids in the resorption of calcium from bone as well as the reabsorption of calcium from the kidney- all with the intent of maintaining adequate blood calcium levels.

Low levels of blood calcium (known as hypocalcemia) produced either through increased excretion or decreased intake of calcium results in the stimulation of calcitriol to increase calcium absorption. However, some studies have shown that caffeine may play a role in inhibiting the conversion of 25-(OH)D (the precursor of calcitriol) to 1,25-(OH)2D3 (calcitriol).ⁱⁱⁱ The less calcitriol converted, the less absorption of calcium. Studies conducted on rats have shown a reduction in the production of calcitriol in the kidneys and subsequently a reduction in calcium absorption in the intestines. This observation was made after the rats consumed large amounts of caffeine.^{iv}

Coffee is also a well-known diuretic and as such, contributes to the greater production and excretion of urine. Part of the reason for the greater amount of urine production is the greater excretion of ions in the kidneys- including that of calcium ions. Increased consumption of caffeine has been shown to correlate with an increased loss of calcium ions in the urine.^v

But I need coffee in order to function! What are the alternatives!?

It is primarily these three factors- the displacement of milk in the diet, the possible inhibition of calcium absorption, and the increased excretion of calcium ions in urine- that should be worrying to young women who consume large amounts of coffee per day. As with the intake of any food or beverage, the key is moderation. A cup of coffee in the morning to get you out of bed and perhaps a cup to keep you awake during those late nights of paper writing is fine. However, it is best to try and find ways of cutting down your coffee consumption and finding other means of boosting your energy levels. Exercise and a healthy diet go a long way to helping your body find the energy it needs and is a far better long-term solution. The other half of the equation is proper calcium intake. Instead of 2 or 3 cups of coffee per day why not take in 2 or 3 cups of milk? Not only does it provide a healthy dose of that oh-so-essential calcium, but many don't realize that milk provides a great amount of energy.^{vi} Another calcium-rich energy booster you can resort to is yogurt- which is especially good if you want some flavour! If you are trying to replace the stimulant effects of caffeine, why not try some alternative methods. You could try an early morning exercise routine to get you moving, or perhaps listen to some heart-pumping inspirational music.

As has been shown, copious amounts of caffeine consumption does not need to be a regular way of life for young female students as well as for male students. It's all right to have a cup of coffee every now and then, but large amounts of coffee consumption can put your future bone health at great risk- especially if you are a woman. There are alternatives that are healthier for your body and allow your dietary intake to be more balanced. So why not return to that beautiful white beverage you so regularly consumed when you were little? Replace that thermos of coffee you take to everyday class with fresh milk. Your body will no doubt thank you for it further in your life. No bones about it!

ⁱ Larkin, S. Current trends of Coffee Consumption. Retrieved on November 15, 2010 from: http://www.streetdirectory.com/food_editorials/beverages/coffee/current_trends_of_coffee_consumption.html

ⁱⁱ Wu, T., Willett, W.C., and E. Giovannucci. 2009. Calcium Intake is Inversely Associated with Fasting Plasma Concentrations of C-Peptide in Women and Plasma Concentrations of 25 Hydroxyvitamin D are Inversely Associated with Plasma Concentrations of C-Peptide in Men. *The Journal Of Nutrition*. January 2009.

ⁱⁱⁱ Yeh, J.K., and J.F. Aloia. 1986. Differential Effect of Caffeine Administration on Calcium and Vitamin D Metabolism in Young and Adult Rats. *Journal of Bone and Mineral Research*. (1): 3

^{iv} Yeh, J.K., and J.F. Aloia. 1986. Differential Effect of Caffeine Administration on Calcium and Vitamin D Metabolism in Young and Adult Rats. *Journal of Bone and Mineral Research*. (1): 3

^v Massey, L.K., and K.J. Wise. 1984. The Effect of Dietary Caffeine on Urinary Excretion of Calcium, Magnesium, Sodium, and Potassium in Healthy Young Females. *Nutrition Research*. (4:) 43-50

^{vi} Foltz, J.D. 2005. Milk By Any Other Name...Consumer Benefits From Labelled Milk. *American Journal of Agricultural Economics*. 87(1): 214-228

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