

# Cancer and Sleep

I slept badly for years. My father died suddenly when I was 10 years old, and my mother, stressed and anxious, talked to me almost every night until three or four a.m.. I was stressed in turn, and sometimes slept so little that I found it difficult to distinguish between dream and reality. I felt that I was walking a razor edge, with madness below. At that time, I was already conscious of the psychological implications of poor sleep, but I didn't become aware of the physical risks posed by poor sleep until much later. When I was 31, my partner died of cancer, and a year on I had a cancer scare myself. Later in my thirties I learnt to sleep, more or less, but it wasn't really until I became self employed that I really learnt how to sleep well. I work with inventors, and around six years ago. I suggested that we use the talents and experience of engineer and medical device developer Steve Walpole to see if we could develop a device to encourage better sleep, simply. The result is the **Zeez** sleep pebble, now available in beta versions, which we hope to launch later this year. See [www.zeez.org.uk](http://www.zeez.org.uk). In this article I'll try to summarise simply and briefly issues that I think are important in relation to cancer and sleep. Download my sleep tips at <http://www.zeez.org.uk/sleeptips/>. I haven't repeated them here, although I do mention particular matters of relevance to cancer and sleep.

## **Poor sleep increases risk of developing cancer, and affects survival**

Recently it has been well reported that there is a link between cancer and poor sleep, and intuitively, I think that many of us feel that there must be such a link, and yet there has been surprisingly little research concerning the risk that poor sleep presents for the development of cancer. A 5 year study of 2000 Icelandic men aged over 67<sup>1</sup>. During the study, 135 men developed prostate cancer. None had had prostate cancer at the beginning of the study, and those who reported severe sleep issues proved to be significantly more likely to go on to develop prostate cancer. Secondly, a study on colorectal cancer found that those who had less than 6 hours sleep each night were significantly more likely to develop cancer than those who slept for more than 6 hours. Several studies have considered tumour aggression / survival and sleep issues. A 2012 study at Case

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<sup>1</sup> <http://cebp.aacrjournals.org/content/22/5/872.abstract>

Western University established a strong correlation in post menopausal women between poor sleep and tumour aggression<sup>2</sup> and a Stanford University study reported in 2014 showed sleep efficiency in women with advanced breast cancer to be a significant predictor of survival<sup>3</sup>. A study researcher summarised the position in stating that "**short sleep duration is a public health hazard leading not only to obesity, diabetes and heart disease, but also to cancer**"<sup>4</sup>. It makes sense to address our sleep issues.

## **Cancer sufferers find it harder to sleep**

Cancer sufferers have a higher incidence of insomnia and other sleep disorders than the general population<sup>5</sup>. Estimates vary between 30 and 88%, compared to around 15% of the general population. Cancer sufferers experience fatigue, restlessness, sleepiness and most commonly, insomnia - difficulty in falling asleep, or nighttime waking combined with an effect on daytime functioning. Around 30 per cent of cancer sufferers have sleep apnoea. Not surprisingly, sleep issues affect the ability of many people to deal with their cancer. 73% of cancer sufferers with sleep issues had difficulty sleeping before their diagnosis<sup>6</sup>.

Animal studies show that tumours develop faster when sleep is fragmented. This seems to result from disruption to melatonin production. Melatonin is the hormone which regulates our circadian rhythms (sleep/wake cycle) and also inhibits cancer cells and triggers apoptosis (cell death) of cancer cells<sup>7</sup>. Poor sleep is also linked with insulin resistance and weight gain, both of which are risk factors in the development of progression of cancer.

Cancer patients are at particular risk of insomnia and sleep/wake disorders in the period time beginning six months before their diagnosis and ending 18 months thereafter. Anxiety, depression, pain, GI tract disturbance, and medications all play a part in this. And radiation disturbs REM sleep.

Despite all this, cancer patients often don't talk about sleep problems and they are frequently undiagnosed and unaddressed. Please, address sleep problems!

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<sup>2</sup> <http://www.sciencedaily.com/releases/2012/08/120827113359.htm>

<sup>3</sup> <http://www.journalsleep.org/ViewAbstract.aspx?pid=29448>

<sup>4</sup> [http://www.huffingtonpost.com/2012/09/06/sleep-breast-cancer-aggressive-deprivation\\_n\\_1854658.html](http://www.huffingtonpost.com/2012/09/06/sleep-breast-cancer-aggressive-deprivation_n_1854658.html)

<sup>5</sup> [file:///C:/Users/User/Downloads/Sleep+disturbance+in+cancer+patients%20\(1\).pdf](file:///C:/Users/User/Downloads/Sleep+disturbance+in+cancer+patients%20(1).pdf)

<sup>6</sup> [file:///C:/Users/User/Downloads/Sleep+disturbance+in+cancer+patients%20\(1\).pdf](file:///C:/Users/User/Downloads/Sleep+disturbance+in+cancer+patients%20(1).pdf)

<sup>7</sup> [http://depts.washington.edu/epidem/Epi583/2009\\_11\\_06/Blask\\_Melatonin%26Cancer.pdf](http://depts.washington.edu/epidem/Epi583/2009_11_06/Blask_Melatonin%26Cancer.pdf)

## How is poor sleep linked to cancer incidence and progression?

There had been surprisingly little study, but it seems as this may have something to do with our cortisol cycle. Cortisol is often called the "stress hormone". It is produced from cholesterol by the adrenal glands in response to stress and low blood glucose and is present in the body in an inverse proportion to melatonin. In other words, when cortisol is high, melatonin will be low, and vice versa. See my sleep tips for more about melatonin and its production <http://www.zeez.org.uk/sleeptips/> . Cortisol should be at its lowest between midnight and 4a.m., and at its highest around 8-9a.m.. From that peak, ideally it would gradually diminish through the day, melatonin levels increasing, and with cortisol at a low level, and melatonin at a high level, we should sleep beautifully. Unfortunately, often, that doesn't happen. We get stressed, we get hungry, we don't eat breakfast, we skip carbs, we eat sugar and refined carbs, we over exercise, and our cortisol goes up and our melatonin goes down.. And then, with our cortisol high, we lie in bed worrying. And later, with our cortisol low, we struggle out of bed feeling absolutely grim.

At the same time that we have stresses and behaviour which increases our cortisol, we are probably doing things which decrease our melatonin. Melatonin is relevant to cancer sufferers not just because it regulates our circadian rhythms but because it is an antioxidant which prevents damage to DNA and protects our cells against cancer. **People, we want high melatonin and low cortisol** (at bedtime)! Time for that yoga session. Bring on the flotation tank. Say good bye to the mean-spirited and needy.

A little more about cortisol levels. As I said above, cortisol should be highest in the morning and gradually diminish throughout the day. If levels are flattened, or highest in the afternoon, this will affect our sleep and our immune system. A 2010 study found significantly higher night time cortisol levels in patients with ovarian cancer than controls<sup>8</sup>. And yet often, when cortisol is tested, no ken of daytime variations. Satisfactory conclusions can't be drawn from a single test.

You may get an idea of what is happening to your cortisol levels simply by paying attention to your body. Do you feel tired in the morning on waking? Wake up between 2 and 4a.m.? Find that you mind is racing when your head hits the pillow even though you are exhausted? In that case, you may conclude

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<sup>8</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3118555/>

that your cortisol levels are disturbed and take action to reduce stress, support your adrenal system, and increase melatonin production. I have covered the matter of melatonin production in the sleep tips. What more can be done to support your adrenal system?

### **Zeez Sleep Pebble**



The Zeez sleep pebble addresses sleep in a completely new way. Whereas medicines offer chemical solutions, and CBT and Mindfulness seek to reduce the stress and anxiety that get in the way of good sleep, the Zeez pebble models good sleep by gently pulsing the same frequencies that are emitted by the brain of a good sleeper. Rather like a metronome encouraging a pianist to keep time, it encourages the user's brain to follow a good sleep pattern. More than timing, it also seeks to match the brain's power and waveforms. There is a lot of computing inside. It is both sophisticated and novel, patents applied for. The result of decades of research, its ability to match the brain is made possible through the use of parallel processing. No other technology produces these low frequencies at such low power - and it is this combination which we believe to be valuable. At the same time, it is simple to use. One button. On/off.

## Restoring the cortisol cycle

Given the relevance of cortisol and melatonin cycles to cancer sufferers, I want to say more about what can we do to restore a proper cortisol cycle. Plenty is written about the bad effects of cortisol on sleep - and there is also some evidence to suggest that good sleep itself lowers cortisol levels<sup>9</sup>. Our own observation of people using the Zeez sleep pebble is that often they do sleep better: they get to sleep more quickly, wake less and on waking fall back to sleep more easily. They feel more energetic in the morning. See <http://www.zeez.org.uk/testers/> All of this indicates, we think, less night time cortisol. And we need proper independent studies with a large patient population to establish whether or not this is the case. Researchers please note.

It can be difficult to restore a proper cortisol cycle once this is disturbed - often there is a vicious cycle, with poor sleep increasing stress, and high cortisol interrupting sleep. Support for the adrenal system can help. This usually involves quite high supplements of magnesium and vitamin C and vitamin B5 and B6 supplementation, since these can become very depleted when the adrenal system is stressed. Ginseng, Rhodiola and other herbs may also be recommended. Eating habits can play a part. We think that breakfast is important<sup>10</sup> for serotonin production and therefore sleep ([sleeptips](#)), although we might not feel like it. If our cortisol cycle is as it should be, we feel hungry in the morning. But if it is out of sync, we are more likely to feel hungry at other times of day. In fact, it seems that we regulate the cortisol cycle best by "eating like a king, lunching like a prince, and dining like a pauper". It may also help to eat some healthy snacks, so that our blood sugar level stability is maintained. Breakfast should include protein and healthy fat.

Many cancer sufferers have sleep apnoea, and that ought to be treated. In the affluent west, we use CPAP machines to keep airways open. A non-inflammatory diet may help, and cranial work and throat exercises can also be useful. Our sleep pebble has no role in treating sleep apnoea but it may help

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<sup>9</sup> <http://www.hindawi.com/journals/ije/2010/759234/>

<sup>10</sup> Eating in the morning lowers our cortisol for the next part of the day Some writers recommend keeping cortisol high in the morning and delaying food to maximise morning fat-burning. This may be fine for people with a good cortisol and sleep/wake cycle but for those of us struggling with sleep issues or cancer we favour breakfast (including protein and fat) over abstinence.

sufferers and their partners to sleep through the noise of a CPAP machine and snoring.

## **What about Zeez?**

How can the Zeez sleep pebble help? Poor sleep is a factor in both the development and progression of cancer. Improving sleep quality is so important that an approach should be multifactorial - blackout curtains, exercise, time outside, avoiding blue light, reducing stress, diet and nutrition, and Zeez too, if possible. You may want to avoid sleeping pills - studies show that many increase the risk of cancer<sup>11 12</sup>. We think that the Zeez sleep pebble can help kick start good sleeping patterns and make change easier and that it could play a valuable role in restoring sleep/wake cycles and reducing night time cortisol. And we need independent evidence. Our limited experiences with cancer sufferers have been good, both in relation to sleep problems resulting from the stress of diagnosis (various cancers) and in relation to sleep problems following cancer diagnoses and treatments (prostate cancer). We will be crowd funding later this year for full production, and offering the Zeez at £250/£25wk rental. That is quite an investment. We know that the Zeez pebble is a valuable device, and that good sleep is priceless, and would also like it to be widely available, so we are also working on getting the independent research needed to get support to offer the Zeez widely. In the meantime, we have beta models available.

Anna McKay, March 2015

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<sup>11</sup> <http://www.webmd.com/sleep-disorders/news/20120227/sleeping-pills-called-as-risky-as-cigarettes>

<sup>12</sup> <http://bmjopen.bmj.com/content/2/1/e000850.full>