

## A New Angle on Brain Detoxification by Tom Moorcroft, DO

Scientists and physicians long debated why we sleep. Today we know sleep is required for consolidation of long-term memories and improves learning. It is a key component of hormone synthesis. Sleep allows for the growth and repair of muscles and tissues. And now we know sleep is critical for brain detoxification. In fact, the vast majority of all brain detoxification occurs while we're sleeping.

During the day, toxins, such as  $\beta$ -amyloid and tau-proteins, are slowly building up in our brains. When we sleep a relatively newly discovered brain cleansing system, called the glymphatics, goes to work. The cerebrospinal fluid (CSF) that surrounds, nourishes and protects the brain interacts with the interstitial fluid to create a cleansing wave that moves through the brain removing the toxins that have built up during the day. The glymphatics are the waste removal system of the brain.

As these toxins build, so do the levels of inflammatory mediators, such as interleukin-1 beta (IL-1 $\beta$ ) and tumor necrosis factor-alpha (TNF- $\alpha$ ). As levels of IL-1 $\beta$  and TNF- $\alpha$  increase, the body prepares for sleep. At usual end of day levels, these inflammatory mediators help promote non-rapid eye movement (NREM) sleep. This is critical as stage 3 NREM is slow wave sleep, the stage of sleep when the glymphatic system is most effective. In states of acute illness, when IL-1 $\beta$  and TNF- $\alpha$  are further elevated, the body experiences greatly increased levels of NREM sleep. This highlights the body's amazing self-healing, self-regulating mechanisms. When acutely ill, the body promotes deeper, more restorative sleep and greater brain detoxification.

Deposition of  $\beta$ -amyloid in the brain leads to cognitive decline and eventually Alzheimer's disease. The accumulation of  $\beta$ -amyloid in the prefrontal cortex is associated with disruption of slow wave sleep and may reduce the ability for memory consolidation (Mander 2015). Researchers have found shorter sleep duration and lower sleep quality are associated with greater  $\beta$ -amyloid burden (Spira 2013). Further studies are needed to determine if poor sleep merely accelerates the development of or is actually a cause of Alzheimer's disease. Most disturbing is poor sleep can lead to increased  $\beta$ -amyloid deposition and greater burden of  $\beta$ -amyloid can lead to worsening sleep. This becomes a self-perpetuating cycle of ongoing cognitive decline and declining sleep quality.

Additionally, poor sleep leads to over-activation of the hypothalamic-pituitary-adrenal or HPA axis. This is the master hormone system of our bodies. This system has many functions, including regulating stress hormones, metabolism, sleep, learning and social interactions. Chronically increased levels of stress hormones increases body-wide inflammation and often leads to poor sleep quality and insomnia; decreasing the brain's ability to detoxify.

Fortunately, there are things we can do to optimize our sleep and the function of the glymphatic system. Much like the lymphatic system that cleanses the rest of body, the glymphatic system is affected by external factors, such as gravity and body position, even levels of stress. Sleep researchers have found that poor sleepers often spend more time on their backs with their heads straight and the favorite position of consistently good sleepers is lying on their right side (DeKonick 1983).

Following up on this work, researchers at Stony Brook University and the University of Rochester found that glymphatic clearance is least efficient in rats lying on their stomachs and most efficient when they were lying on their right sides (Lee 2015). Others studies have found that a nose down position greatly decreases brain detoxification. Observation of wild animals and domestic livestock has shown a preference to sleep not only on their sides, but also with their heads slightly uphill.

When we look for an explanation for why this might occur, we find some answers in unexpected places. NASA scientists have long studied “gravity deficiency syndrome,” a host of metabolic, hormonal and structural issues that occur when the body is in a weightless state. Their research has shown that blood can “feel” gravity and this is a crucial stimulus for the body’s regulatory functions. Other researchers have had participants spend days up to weeks in a horizontal position in bed. This led to changes in their health similar to that caused by gravity deficiency. Lack of gravity equals lack of health. The solution: Follow nature’s example.

Seeing the wisdom in the natural world, physicians and researchers began investigating the benefits of sleeping in a more natural position, one where the head is elevated slightly above the feet. While researchers have yet to investigate the direct benefits of this position on the glymphatic system, scientific research and clinical experience has shown that with the head elevated by as little as 3-6 inches, “inclined sleep” has incredible health benefits.

Sleeping inclined decreases snoring and sleep apnea, which in turn decrease the strains placed on the heart, vascular system and brain. Approximately, 56% of patients with obstructive sleep apnea (OSA) have position-dependent OSA. Positional treatments, such as inclined sleeping, can be very effective standalone treatments or adjuncts to improve the overall efficacy of other medical interventions (Ravesloot 2013).

The highest pressures your brain experiences throughout the day are when you’re sleeping. And, despite a complex system for regulating pressure in the brain, this can lead to migraines. Within a few weeks to a couple of months of becoming incline sleepers, many people I work with begin waking up headache free. Improvements in eye, ear and head pressure are often reported.

Gastro-esophageal reflux (GERD) and heartburn are common conditions for which people frequently take one or more medications. Sleeping in an inclined position often improves, if not cures, this condition.

The changes we are discussing are most likely related to the direct activity of gravity on the jaw (keeping the airway open), the blood (less pooling in the head), and the digestive juices (gravity keeping them in the stomach where they belong, doing their job as nature intended). Turning our attention back to the lymphatic system, the CSF and interstitial fluid are primarily water and are strongly acted upon by gravity. Inclined sleeping may promote increased lymphatic drainage and improved overall quality of sleep by utilizing gravity to help with waste removal. This also reminds us of the importance of keeping ourselves well hydrated.

The brain detoxification potential of inclined sleep is tremendous. I have had patients experience detoxification reactions where they had a temporary, but dramatic increase in brain fog for several days to a couple of weeks after starting inclined sleep. In one severe case, after 3 days of inclined sleep, the person could no longer tolerate the intensity of the detoxification reaction and required treatment with intravenous glutathione, a potent anti-oxidant and toxin binder. Within 30 minutes of the infusion, the person's brain cleared and he continued to sleep inclined with steady, ongoing improvements in brain function.

Rather than seeing dramatic, overnight changes, when supporting the natural healing systems within the body with inclined sleep, I commonly see slow, steady improvements over time. Most of my patients who start sleeping inclined never go back.

As I mentioned, positional sleep treatment may work so well that it alleviates the need for complex medical treatments and this leads to further benefits. Take the case of sleep apnea. If a CPAP machine is no longer needed, it can be removed from the bedside where it was acting as an antenna bringing high levels of electrical current from the walls much closer to the users head. What many people don't realize it that the electro-magnetic fields (EMFs) associated with electrical devices, including CPAP, lights, and even computers and tablets can have significant negative health consequences. Wi-Fi is also a significant contributor to EMF toxicity in our environment.

While we may not be able to protect ourselves from the negative effects of EMFs at all times, we can do this when we sleep. Taking another page out of nature's book, we can reconnect to the earth while we sleep. This can be done simply by plugging a high quality grounding pad, such as the Lokosana® grounding pad by SAMINA, into a grounded electrical outlet. Electrons, which are critical for cellular communication and turning off inflammation, are brought from the earth right to your bed. I have personally measured an over 1600 millivolt (mV) drop in the electricity levels running through my body by placing a Lokosana grounding pad on my bed. My final reading was 40 mV

(Experts feel sleeping in anything over 100 mV is detrimental to your sleep). Combining inclined sleep and grounding is an excellent combination therapy for anyone who is chronically ill and anyone who wants to be chronically healthy.

In order to get enough slow wave sleep to support optimal brain function, most people need to get 7-9 hours of sleep per night. This translates to sleeping approximately 1/3 of your life. If 1/3 of our existence is dedicated sleep that optimizes brain detoxification and our overall health, shouldn't we do everything we can to optimize our sleep?

#### About Dr. Tom Moorcroft, DO

Dr. Tom Moorcroft is a global leader in solving complex medical mysteries. He is a co-founder of Origins Of Health, an Osteopathic wellness center, focused on solving the riddles of chronic illness enabling their patients to regain their health and regain their lives. Dr. Moorcroft specializes in the diagnosis and treatment of chronic tick-borne illness, mold illness and infections-induced autoimmune encephalitis in children and adults.

Dr. Moorcroft's personal and professional medical philosophy focuses on supporting optimal function of the core body systems responsible for health with simple, natural interventions; utilizing more conventional approaches, such as medications, when needed. Each individual is a unique unity of body, mind and spirit. Successful diagnostic and treatment strategies are truly patient-centered and address all three levels. Dr. Moorcroft believes the true source of radiant health is within each of us. His goal is to empower each of his patients to take the steps necessary to get in touch with the inner source of health so they can experience optimal health.