

Improve Sleep Quality – Pick the Right Pillow!

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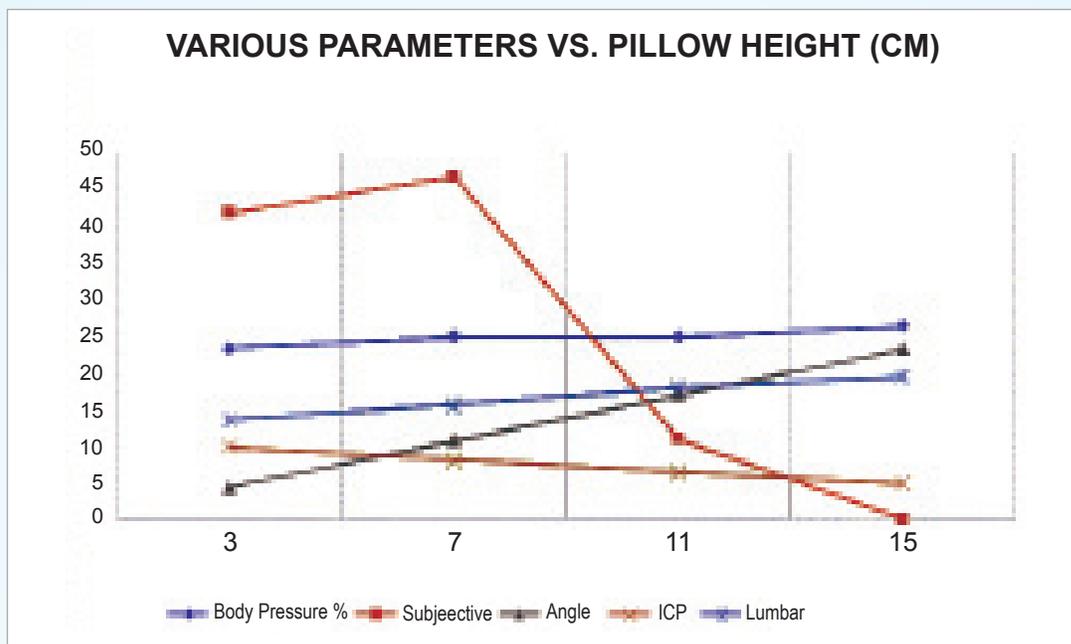


Fig. 1. Body Pressure, Subjective, Cervical Angle, CSF as a function of the Pillow Height

We can see that lumbar pressure increases while intracranial pressure decreases as the height of pillow increases. Subjective experience is poor at low and high pillow heights, being optimal around 7 cm. Body pressure does not change significantly with a change in pillow height. Keeping all these factors in consideration, I concluded that a pillow height between 3 to 7 cm would be best for sleep.

MOST of us think that the main function of sleep is to relax our tired body. But there is one very important process which is often not discussed. Our brain can clear out all the harmful accumulated toxins through secretion, absorption and flow of a fluid called Cerebrospinal Fluid (CSF) during sleep. This is the same fluid that surrounds and cushions the brain and the spinal cord.

Though this cleansing process occurs all the time, yet during the day it is observed to be almost negligible. This is because the brain cannot simultaneously clean itself and be aware of the surroundings during the daytime. So, it is only during sleep, that our brain can cleanse itself properly. If we can think of making this cleaning process more efficient, we can improve the quality of sleep. But how do we ensure that?

For the cerebrospinal fluid to be more efficient in cleaning the accumulated toxins, it is extremely important to maintain optimal pressure. Various studies have shown that the absorption of toxins slows down drastically if CSF pressure goes below 6.8 cm of water. In fact, for an adult, the optimal value of CSF pressure is between 9 cm of water and 18 cm of water. But how do we control this pressure through external means?

High school physics has taught us fluid pressure and how its flow varies with height. Can there be any external height gradient that can similarly affect the CSF pressure inside our

brain and lumbar (spinal) regions? Could it be our sleeping pillow?

Pillow height can impact the pressure exerted on the various body parts like head, neck, chest, waist and the hip while at sleep. CSF pressure varies with the inclination of our body to the horizontal. This gave me an idea to connect all these previous studies to get a relationship between CSF pressures as a function of pillow height.

I used the data obtained from earlier studies and extrapolated it using Lagrange Interpolation Polynomial. I found that the angle of body inclination must lie between 0° to 7.6° for CSF pressure of an adult to lie between 9 cm to 18 cm of water.

To determine the optimal pillow height, I then plotted body pressure, subjective experience, cervical angle, intracranial (brain) pressure of CSF and lumbar pressure of CSF as a function of pillow height (Fig. 1).

So, buy a proper pillow! You may just be surprised to see your performance go up a notch as a result.

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