Bed and Health

By Bernard M. Hua, L.Ac. (M.D. in Taiwan)

Everyone knows how important sleep is in daily life. Most people spend one third of their lifetime sleeping. The basic functions of sleep are to relieve tiredness, allow you to regain energy, and allow your internal organs rest from the rigors of waking activity. Good sleep improves your appearance, puts you in a good mood, elevates your spirit, and is generally an excellent reward to your body for hard work. Conversely, without good sleep, you will appear visibly tired, experience a drop in energy level and a dip in your mood, and most importantly your daily performance will suffer greatly.

Long periods without good sleep can cause dizziness, palpitations, a poor appetite, and a sickly pallor in the face. If the situation is not rectified promptly with a regime of regular and sound sleep, it can further develop into insomnia, which is notoriously hard to cure.

There are many different kinds of beds or mattresses. There are, for example, those made of rice straw, wheat stems (floor mats), wood planks, ivory, iron, bamboo, iron springs, water, etc. There is the popular Japanese bed (called ta-tami in Chinese), and even a brick bed (still used in some areas of northern China, it is warmed underneath by fire fueled with animal dung, timber or coal). I believe most people would say that the spring mattress is the best, because it is soft and comfortable. But do you know which kind of bed is the best for your health? The answer is definitely not the spring mattress, but is a bed made of wooden planks or boards. Are you surprised?

Clinically, it has been found that many patients suffer from back pain and lower back pain. Of course, there are many reasons to cause those problems. However, if you ask them what kind of bed they sleep on – the answer is always "a spring mattress!" Ask this question a thousand times, and a thousand times the answer comes back the same – a spring mattress! Even if you want to buy a bed with a wood sleeping surface, it is not easy. The materials and quality of a spring mattress are soft. We experience a lot of comfort while lying down on it. But, if this mattress is used continually over a long period of time, many people will feel soreness and pain in the back and lower back regions. Why does the spring mattress cause pain symptoms in the back, but not a bed made of wood? What is the reason? After a detailed consideration of the Mechanic's Principle, I came to the following conclusions:

Fig. I

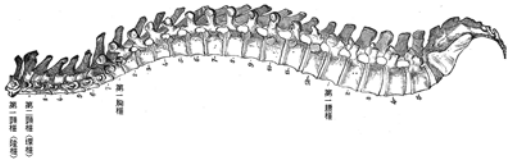

Figure. I is a side view of a human spinal cord. It reveals that the human spine is curved. One curve starts at the occipital area to the upper back area; the other curve begins at the thoracic area and ends at the hip

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Fig. II shows a curve of the human spine as it would appear while lying on your back. You can imagine that the curve arches like a bridge. Now we can divide the bridge into three points: point A, point B, and point C. Point A and C are the two supporting legs of the bridge, point B is the middle part of the bridge (also called the center of gravity).

According to Mechanic's Principle, assuming the bridge foundation is firm and strong, and applying some basics of Newton's Law, the arrow points A and C show the amount of the acting force and the opposite force are equal, but their direction is different (opposite). Therefore, the B point (middle part) that bears the force is the component force, which means the pressure over B point is very little (theoretically approaching zero). Since the forces have been evenly distributed to the two supporting points, B point (middle part) can carry no force (burden). Because of this, the bridge is able to last and endure. There is a curve on the hard bed in Figure II. This curve represents the bridge, and also represents the curves of the lumbar and cervical regions of the human spine.

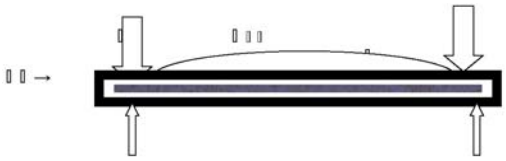
Fig. II

Now, let's apply this theory to sleeping on a hard (firm) mattress or bed. Point A represents the supporting point of your upper back, point C represents the supporting point of your hips. The arrows pointing downward represent a human's weight on the bed, or the acting force. The arrows facing upward represent the opposite force of the hard bed. The amount of the acting force and the opposite force are equal, but their direction is opposite. Therefore, the pressure in the middle point (point B representing your lower back) is almost approaching zero, because the middle point burden (force) has been distributed evenly to the supporting points of the two sides. Clearly, we can see that when we sleep on a firm mattress, the muscles, tendons, and ligaments over the lumbar region have less burden (force), and therefore, it's easy to recover from fatigue.

For those people who sleep on a spring mattress or other kinds of soft mattresses, the treatment of their backs can be likened to a bridge built on the sandy and unsteady foundation of a beach. According to Newton's Law, the two supporting points of the bridge's acting force are larger than the opposite force because there is the lack of a firm foundation. In this case, the supporting points of the bridge don't have proper support and the

weight will inevitably shift to the middle part of the bridge. Therefore, the middle part of bridge bears what is termed resultant force. There are infinite multiple differences between the resultant force and the component force, because the component force is zero, and zero can be an infinite multiple to any number. Now, if a heavy truck crosses over the bridge, it is possible there will be a crash in the middle part of the bridge. The human being's lumbar curve is the same as the structure theory of the bridge.

Fig. III



The physical and physiological functions of a soft mattress are shown in Figure III. The points A and C (arrows pointing downward) represent the human body. The arrows pointing upward represent opposite force. The arrows pointing downward are larger than the arrows pointing upward, revealing that the opposite force of a soft mattress is smaller. In this situation, the two supporting points bear resultant force; the meaning of resultant force is to focus gravity forces of two sides together in the middle part of the curve. In other words, the middle part of the curve bears a heavy (huge) burden.

The spinal cord is the main trunk of the human body. The spinal cord supports the majority of the body's weight; it's a combination of bones, joints, discs, ligaments, tendons and muscles. Based on the above theory, sleeping on a soft mattress forces the middle part of the lumbar spine to bear more resultant force. We keep a certain tension on muscles, tendons, and ligaments of the lumbar spine, if we sleep 8 hours during the night. After long hours of sleeping in this manner, this tension will cause fatigue. The surrounding muscles, tendons, and ligaments will structurally weaken and lose their elasticity. This can easily result in further injury to the lumbar area if it is turned quickly, if the arms and legs are stretched in a certain manner, for example, in bending or moving objects, or even with a simple cough or sneeze. Furthermore, extended pressure on the spine can cause the disc to weaken, to shift off-center, or to become brittle and break. The intervertebral disc nuclear protrusion later can cause pinched nerves, lumbago, or adhesions with the surrounding tissues. The movements of the lumbar area are generally limited in bending or rotation. In time this will lead to sclerosis, even calcification and ossification. In severe cases, the individual may become bed-ridden.

The movement of people bending to pick up objects, according to the function of length of lever arm and torque in physics is such that when you bend to pick up a 10 kilogram object, your lumbar spine supports 10 times the weight of that object. In this case, your lumbar spine will bear 100 kilograms of weight. (1 kilogram = 2.2046 pounds) If you are not skilled in physical work, how can you come away without a lumbar injury?

The cervical spine is a curve; the same theory also applies to the cervical. Sleeping on a spring mattress for a long time will cause herniated disc of the cervical spine.

Of course, auto accidents or sports injuries are the most common reasons to cause disc bulge of the cervical spine. The intervertebral discs C5-C7, or C6-C7 are where herniated discs of the cervical spine are commonly seen; the intervertebral discs L1-L2, L4-L5, and L5-S1 are where disc protrusions are commonly seen.

Why is a bed made by wooden planks the best? Because it greatly matches the Mechanic's Principle. It makes the lumbar spine of the human body lying on it bear the component force. The component force can greatly minimize the pressure (burden) of the lumbar spine. The lumbar region can get completely rested while lying on a bed made by wooden planks as the muscles, tendons, ligaments of the lumbar spine do not need to be tense over a long time.

Maybe some people will say, "The bed made by wooden planks is too hard. How can you sleep when you are suffering?" Although it is hard, you can put two layers of a cotton quilt blanket on it. Since the underneath foundation is hard and stable under the quilts, the component force will still function in the middle point of the lumbar spine.

The treatments for disc protrusion of cervical or lumbar spine:

- Resting in bed for general cases
- Performing traction in bed, or even considering surgery for severe cases
- Acupuncture
- Physical therapy: infra-red, massage, tuina therapy, ultrasound, heat pad, etc.
- Brace, orthosis

Self care for disc protrusion of cervical or lumbar spine:

- Always stand up straight, have good posture
- Avoid flexion (bending forward) of cervical or lumbar regions
- Avoid exercise of lumbar region
- Avoid using extremely hard or thick pillows as a prevention for disc protusion of the cervical spine

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About the author:

Bernard M. Hua, L.Ac. (M.D. in Taiwan)

- M.D. in Western Medicine, National Defense Medical Center, Taipei, Taiwan, 1952-1961, the 54th class
- Chief-resident and attending surgeon in general surgery at Tri-Service General Hospital in Taipei (The teaching hospital of National Defense Medical Center, Western Medicine)
- CEO of Tien-Hsiang Hospital, Ming-Young Hospital, and Lung-Hua Hospital in Taiwan, 1971-1990
- Master of Acupuncture & Oriental Medicine, South Baylo University, Anaheim, California, 1995; Vice Director of Chinese Class and Clinic Supervisor, South Baylo University, 1998-1999
- Ph.D. Acupuncture & Oriental Medicine, Nanjing University of Traditional Chinese Medicine, 2001
- Books Published: A Research of Zi-Wu Circulation, 1983; Sixty three Prescriptions, 1998; The Treatment of Facial Paralysis, 2001