



Camellia Newsletter

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Prevent Locomotive Syndrome Through a Diet!

◆◇What is locomotive syndrome

Have you heard of locomotive syndrome? It is a condition of reduced mobility due to the impairment of locomotive organ systems such as muscles, bones and joints. Nowadays, it has become a cause of shortening a healthy life-span and increased requirements of nursing care that are tied with metabolic syndrome and dementia. The Ministry of Health, Labour and Welfare of Japan is aware of the situation, and now starts releasing precautions and educating people about locomotive syndrome. Following this governmental movement, the media has extensively reported about locomotive syndrome.

Locomotive syndrome comes from muscle weakness, the reduction of balance ability, and the disorder of organs of the moving systems. People who get locomotive syndrome tend to suffer from a limited mobility as well as pain and deformation of joints. Once these symptoms progress, they will be unable to walk and stand up.

The most basic but useful prevention for locomotive syndrome is to keep muscle mass. Therefore, we should not chose effortless or comfortable ways for our daily movement. For example, using stairs instead of elevator or escalator. Walking to stores nearby instead of using a car. Try to sit on a chair with a straight back. Keep walking with a good posture and with big strides. A bad posture places a burden on knees and the lower back. If you think you are out of shape due to lack of exercise, we suggest making your body a little bit less comfortable or easy in daily movements. Bones become stronger with vibrations and weights from body movements and receiving the sun light. These small changes can also prevent the development of osteoporosis.

◆◇Branched-chain amino acids are strong supporters for keeping muscles

The muscle mass of people who are in their 20's decreases about 30% when they become 80 years old, especially people around their 40s start reducing 0.5~1% of their muscles annually. However, we can prevent the muscle reduction by having sufficient nutritional foods and doing adequate exercise. The key factor for the prevention is proteins.

Protein is a nutrient for making muscular tissues and necessary to prevent loss of muscle strength. It is also important for people who get in shape by doing exercises like walking and yoga. As muscles burn

fats and convert them into energy sources for doing exercises, taking a good volume of proteins before the exercises provides better metabolism. Proteins in food are decomposed into amino acids and absorbed by the body. There are many kinds of amino acid, but branched chain amino acids are involved in keeping muscle mass. Branched chain amino acids are valine, leucine, and isoleucine. They are commonly called BCAA and used for sports drinks and supplements. BCAA are essential amino acids that cannot be synthesized in the body, so we need to take them from foods.

When the body lacks energy sources during exercise, it starts to compensate this energy from amino acids which are produced from muscle proteolysis. BCAA serve as an energy source for muscles during exercise, promote the synthesis of body proteins that are the material of muscles and internal organs, and suppress the degradation of muscles. Leucine promotes the secretion of a hormone called insulin. Just like leucine, insulin promotes the synthesis and suppresses the decomposition of body proteins, and enhances the absorption of amino acids.

Exercise and BCAA play an important role in preventing muscle loss. BCAA are essential amino acids not only for the prevention of locomotive syndrome but also for the people who often do exercises and want to keep their muscle mass.

◆◇Foods abundant in BCAA

Muscle fibers grow with a series of “destruction” which means giving loads on muscles with exercises and “repair“ which means making muscles rest and have nutrition.

Muscle pain coming from exercises is an inflammation of damaged muscle in which muscle tissues were destroyed during exercise. The pain heals once the repairing process for the muscle tissues is over. According to research studies, BCAA taken before the exercise immediately become energy sources for muscles which in turn alleviate muscle damages and speed up the recovery from muscle pain and fatigue. They are also effective in reducing frequencies of being seized with cramps and the paralysis of muscles during exercise. Other studies have reported that BCAA are effective for the improvement of the reduction in appetite. A high protein diet (a high BCAA diet) promotes the depletion of body fats because it is less likely to affect the decrease in muscle mass compared to a high carbohydrate diet, and proteins are easily used as energy sources.

Table 1 shows the required daily intake of BCAA per kg of body weight. For example, a person with a body weight of 50 kg needs a total 4250 mg of BCAA (1300 mg of valine, 1950 mg of leucine and 1000 mg of isoleucine) in a day. As Table 2 shows, there are foods that contain a good amount of



BCAA. We should take account of these foods with the amount of exercise you do in order to accomplish the daily requirement.

Table 1: The required amount of BCAA per day (mg)

	Total BCAA	Valine	Leucine	Isoleucine
Per kg of the body weight	85	26	39	20

Reference: The Ministry of Health, Labour and Welfare of Japan, *Dietary Reference Intakes for Japanese (2015)*

Table 2: The amount of BCAA in foods (mg)

Names of foods	Total BCAA	Valine	Leucine	Isoleucine
Sliced raw tuna (about 8 slices)	4800	1400	2100	1300
Bonito (about 4 slices)	4300	1300	1100	1900
Chicken breast (100g)	4300	1200	1900	1200
Horse mackerel (1 mid. sized fish)	3760	1100	960	1700
Raw pacific saury (1 mid. sized fish)	3650	1100	1600	950
Chicken thigh (100g)	3290	910	1500	8800
Egg (1 egg)	2610	830	1100	680
Beef (100g of sirloin)	2360	650	1100	610
Freeze-dried tofu (1 piece)	1600	448	720	432
Milk (200ml)	1360	400	620	340
Natto (1 pack)	1305	415	550	340
Firm tofu (1/4 piece)	1210	330	560	320
Cheese (1 small piece)	1020	320	460	240

◆◆**Have sufficient proteins for your future**

Proteins play very important roles in preventing locomotive syndrome and maintaining your beauty and health conditions. It is important to consciously select not only animal-based proteins but also plant-based proteins that contain less fats. Maintaining and increasing our muscle mass bring long-term benefits for us. We recommend to review your life style habits from both exercise and daily diet point of views in order to avoid shortening a healthy life-span and requiring nursing care when you are old.