

Response to Locomotive Syndrome in Japan

Jun Kobayashi¹, Mamoru Tanaka², Keiichi Ikeda³

¹Faculty of Nutrition, University of Kochi, Kochi, Japan

²College of Bioscience and Biotechnology, Chubu University, Aichi, Japan

³Faculty of Pharmaceutical Sciences, Hokuriku University, Ishikawa, Japan

ABSTRACT

Locomotive syndrome is also known as “Locomo” and exercise organ syndrome. This disorder refers to disability resulting from daily physical activity, such as standing or sitting. The term Locomo appears to be used only in Japan. Interestingly, Locomo has been observed in cases in which motor function is impaired due to disorders of peripheral bones, muscles and joints, but also in cases of disorders involving the brain and nervous system. In the current paper, we describe the history of Locomo in Japan. In addition, we discuss future challenges related to Locomo, and provide a series of recommendations regarding the syndrome.

Keywords: Locomotive syndrome, disorders of exercise organs, difference from metabolic syndrome.

INTRODUCTION

Locomotive syndrome (commonly referred to as “Locomo” in Japan) begins with the failure of exercise organs (muscle, bone, joint, cartilage, intervertebral disc, or a combination of these), followed by a deterioration of physical movement function, such as standing and walking (Fig. 1) (Matsumoto *et al.*, 2016). The term Locomo appears to be used for disease diagnosis only in Japan, and is sometimes known as exercise organ syndrome. When walking, information is first received by the eyes, then processed in the brain. After assessing the situation, the brain issues a motion command, which is communicated to the limbs via the nerves, prompting the movement of joints and muscles. Physical activity requires the coordination of multiple bodily organs. Thus, walking difficulty can be caused by weakness of the bones, joints, and muscles, but also by impairments of the sensory organs and nerves. Therefore, it is necessary to consider multiple causes. As the symptoms progress, the condition interferes with daily life, and the likelihood of requiring care increases. Locomo involves the functional deterioration of not only the organs involved in exercise, but also the relationships between the organs. This disorder is typically considered from the perspective of healthy life expectancy, which refers to the period for which a person can live without health problems restricting their activities in everyday life. Treatment seeks to lengthen healthy life expectancy. In the nursing-care insurance system in Japan, there is a government-prescribed requirement to implement support to maintain or improve the functioning of the body to reduce the likelihood of a need for nursing care, enabling people to continue to live independently. Nursing care is deemed necessary in cases where the patient’s physical state is poor, and they have difficulty performing activities of daily living (Ministry of Health, Labour and Welfare, 2015). In Japan, it is widely considered to be beneficial to prolong exercise organs to prevent Locomo and extend healthy life expectancy by maintaining walking ability for a longer time. Carrying out appropriate exercise earlier and more efficiently could reduce overall medical costs. In the current paper, we describe the history of Locomo in Japan, and discuss recommendations to meet future challenges related to the disorder.

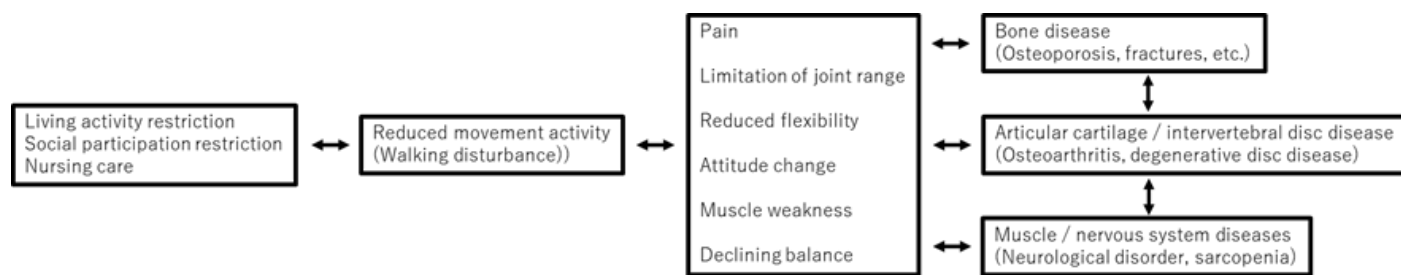


Fig. 1. Concept of Locomo

Reprinted from Reference [3] and partially modified.

Historical background

In 2007, the Japanese Orthopedic Association proposed the concept of Locomo, in the context of the unprecedented super aging society in Japan (The Japanese Orthopaedic Association, 2017). In 2012, the Health Japan 21 (second) directive announced by the Ministry of Health, Labour and Welfare set an aim to raise public awareness of the syndrome by 80% by 2022. According to a survey conducted by the Ministry of Health, Labour and Welfare, the primary cause of the need for support and long-term care is disability involving the exercise organs (Fig. 2) (Ishi, J, 2014), which had more impact than the better-known conditions of cerebrovascular disorder and dementia. Therefore, prevention of Locomo is considered a major factor for extending healthy life span in Japan.

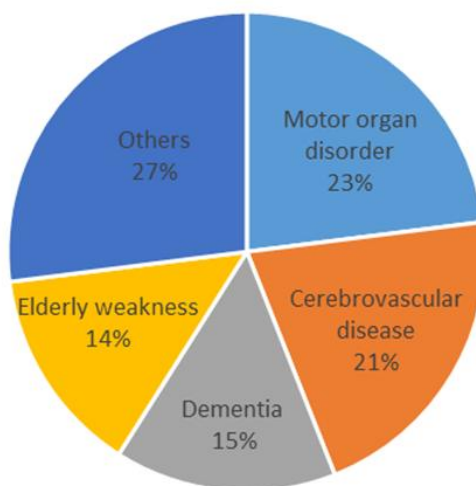


Fig. 2 Factors of necessary support and required nursing care

Reprinted from Reference [6] and partially modified.

Diagnostic criteria for Locomo

There are currently no objective diagnostic criteria for Locomo. As a method for identifying Locomo, the Japanese Orthopedic Association proposes the following seven-stage criteria : 1) difficulty standing on one foot when putting on a sock, 2) stumbling or slipping in the house, 3) inability to walk up stairs without

railings, 4) inability to cross a pedestrian crossing within the green light period, 5) inability to walk continuously for 15 minutes, 6) difficulty carrying 2 kg of groceries after shopping, and 7) difficulty moving heavy items around the house. These criteria are easy to understand for the general public, describing common movements in everyday life. However, the criteria do not involve the systematic measurement of strength, and do not control for variables. For example, in criterion 1, the degree of burden of exercise would be expected to differ depending on the length and elasticity of socks. Similarly, criterion 3 does not take differences in the slope and length of stairs or the length and height of each step into account. Although the “Locomo 25” questionnaire was developed in recent years (Table 1; The Japanese Orthopaedic Association, 2017, and Matsumoto *et al.*, 2016), it only provides a relatively subjective self-assessment of health condition, and the objectivity of the measure remains low.

Difference from metabolic syndrome

Metabolic syndrome (commonly known as “Metabo” in Japan) was reported earlier than Locomo in Japan. Although Metabo is treated as a confirmed condition in Japan, the Ministry of Health, Labour and Welfare has established penalty provisions for intervention in special medical checkups, and encourages strict compliance with measures to reduce the number of Metabo patients in private healthcare. In contrast, there is no such provision for Locomo. In addition, systematic diagnostic criteria for Metabo have been established. The diagnostic criteria for Locomo described above are not typically observed in people with Metabo. However, these diagnostic criteria include phenomena that are common among elderly people in general (Matsumoto *et al.* (2016)). Although it is inevitable that aging will involve weakening of the legs, it is unclear at what point this should be treated as a disease.

Recommendations

In Japan, the proportion of older people in the population is very high, with 27.3% of the Japanese population reported to be over 65 in 2016 (Statics Bureau, Ministry of Internal Affairs and Communications, 2017). Because the ratio of medical expenses to the Japanese national budget is currently considered to be too high, reducing medical expenses is a major issue. Therefore, it is recommended that hospital visits should be reduced as much as possible by implementing measures for maintaining health, enabling individuals to understand their own health condition and seek early treatment before the onset of disease. This is related to the national insurance system in Japan. Importantly, admitting a patient to hospital for treatment contributes not only to the patient’s own physical and financial burden, but also to the national financial burden. Although this is also the case for Metabo, there is currently an opportunity to take steps at a national level for the effective prevention of Locomo. Therefore, the public funds used for raising awareness about Locomo and the benefits of medical examination could be less than the medical expenses resulting from the disorder. However, some health food manufacturers in Japan have promoted and taken advantage of the effects of their products on Locomo to increase product sales. For example, supplements containing cartilage components have been promoted via numerous television and magazine advertisements, and are sold at high prices (Health Industry Newspaper, 2018). Because Metabo and Locomo are not real illnesses, there have been cases in which it is difficult to prosecute for violations of the Pharmaceutical Affairs Law, and such advertisements remain widespread. As mentioned above, we consider that the current diagnostic criteria for Locomo are also applicable to many older people without the disease. It is natural for human strength to decline with age. Thus, it is currently unclear whether it would be beneficial for other countries to adopt the

conception of Locomo that is now widely used in Japan. We propose that it is valuable to pay attention to these issues and promote healthy life span, but that the current situation in Japan, in which the disorder is exploited by health food companies, should be avoided. Moreover, Locomo is currently recognized as a discrete disease in Japan. Rather than treating Locomo solely as a disease, we suggest that it is important to think about daily exercise and diet more than drug treatments.

Table 1 Locomo 25 questionnaire

No.	Contents
1	Do you experience pain (including numbness) anywhere in the neck, shoulders, arms or hands?
2	Do you experience pain anywhere in your back, hips or buttocks?
3	Do you experience pain (including numbness) anywhere in the lower limbs (leg attachment, thighs, knees, calves, shin, ankle or foot)?
4	How hard does it feel to move your body in daily life? [Please answer the following questions about your daily life in the past month]
5	How difficult is it to get up from bed, or lie down in bed?
6	How difficult is it to get up from a seat?
7	How difficult is it to walk in the house?
8	How difficult is it to wear and take off your shirt?
9	How difficult is it to wear and take off trousers?
10	How difficult is it to defecate using a toilet?
11	How difficult is it to wash your body in the bath?
12	How difficult is it to climb stairs?
13	How difficult is it to walk quickly?
14	How difficult is it to arrange your appearance when you go out?
15	How long can you keep walking without taking a break?
16	How difficult is to go next door or around the neighborhood?
17	How difficult is it to carry approximately 2 kg of groceries (e.g., a 2 liter milk carton) home?
18	How difficult is it to go out by train or bus?
19	How difficult is it to perform basic tasks in the home (e.g., preparing meals, cleaning up, light cleaning)?
20	How difficult is it to perform relatively heavy jobs at home (e.g., using a vacuum cleaner, raising and lowering a futon)?
21	How difficult is it to engage in sports and dancing (jogging, swimming, Japanese croquet, dancing)?
22	Do you refrain from communicating with close acquaintances and friends?
23	Do you avoid participation in local activities or events?
24	Are you worried that you may fall in the house?
25	Do you feel worried that you will be unable to walk in the future?

Total score of 7 points or more: Locomo Level 1. Total score of 16 points or more: Locomo Level 2.

REFERENCES

- 1) Health Industry Newspaper. (2018). Locomotive syndrome countermeasure materials appear one after another -Functional indicator foods have reached over 100 items. Article on January 15, 2018, <https://headlines.yahoo.co.jp/hl?a=20180115-00010001-kenkoshin-ind> (checked January 2018).
- 2) Ishii, J. (2014). Locomotive syndrome awareness campaign -About Locomo challenge. The 2nd Health Investment Working Group Document, Ministry of Economy, Trade and Industry Next Generation Health Care Industry Association, April 4, 2014.
- 3) The Japanese Orthopaedic Association. (2017). New concept "Locomotive syndrome (exerciser syndrome)". <http://www.joa.or.jp/public/locomo/> (checked in January 2018)
- 4) Mastumoto, H., Nakaso, N., Matsuura, A., Akita, T., Hagino, H. (2016). Relationship between severity of locomotive syndrome and the incidence of falling, prevalence of low bone mass, and sarcopenia. *Phys. Ther.*, 43(1): 38-46.
- 5) Ministry of Health, Labour and Welfare. (2015). Mechanism of accreditation of nursing-care requirements in long-term care insurance system. <http://www.mhlw.go.jp/topics/kaigo/kentou/15kourei/sankou3.html> (checked March 2018)
- 6) Statistics Bureau, Ministry of Internal Affairs and Communications. (2017). Population of elderly people, <http://www.stat.go.jp/data/topics/topi971.htm> (checked March 2018).