



# Routine stair climbing for vascular health

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Atherosclerotic vascular damage plays a key role in the development of cardiovascular disease (CVD) [1, 2]. Therefore, the management of atherosclerotic vascular damage is crucial (i.e., maintaining vascular health) [1, 2]. In addition to the management of conventional risk factors for CVD, lifestyle modification is also recommended [3, 4]. Increased physical activity is beneficial for conventional risk factors for cardiovascular disease such as hypertension, glucose/lipid metabolism, and/or obesity, and maintaining good physical activity may maintain vascular health [3, 4]. In Japan, the “Physical Activity Criteria for Health 2013” recommends that among individuals with health checkup data within the criterion range, those aged 65 years or older should perform physical activity of any intensity for 40 min or more every day and those aged 18–64 years should perform physical activity at an intensity of 3 Mets or higher for 60 min or more every day [5].

However, methods to assess physical activity have not been fully established. Questionnaires are one of the methods, but they take time (Fig. 1). In clinical practice, for the management of patients with hypertension, a simpler method is needed. In this issue, Yamaji et al. proposed a simple question: “Up to how many flights of stairs do you usually use for climbing?” is a simple alternative approach to identify patients who participate in physical activity that is good for vascular health (Fig. 1) [6]. This question does not reflect the extent of physical activity. However, the flow-mediated vasodilatation of the brachial artery (FMD) in the patients answered “over the third floor” was higher than that in the patients answered “the second floor or none”. Endothelial dysfunction is an initial step of atherosclerotic vascular damage, and FMD is a marker of endothelial function [7, 8]. A recent meta-analysis conducted by Matsuzawa et al.

reported that FMD significantly predicted cardiovascular events (adjusted relative risk [95% CI]: 1% increase in FMD 0.88 [0.84–0.91]) [9]. Thus, it is possible that the physical activity in the patients who answered “over the third floor” provides better cardiovascular outcomes than that in patients who answered “the second floor or none”.

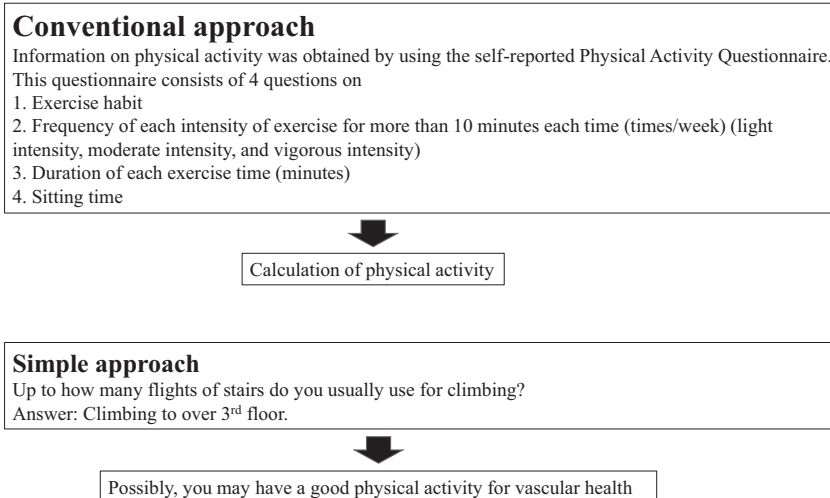
The FMD-J study is a multicenter prospective observational study conducted in Japan (i.e., all study participants were Japanese men and women) to examine the usefulness of FMD to predict the development of subclinical organ damage or new-onset cardiovascular events [10]. In a sub-analysis of the FMD-J study, Maruhashi et al. reported that FMD above the cutoff value of 7.1%, derived from receiver-operator curve analyses for cardiovascular outcomes, was significantly associated with a lower risk of the outcomes [11]. In addition, in another subanalysis of FMD-J studies, the median FMD was 7.2% (interquartile range, 5.2%–9.1%) in subjects aged 30 to 74 years without cardiovascular risk factors or cardiovascular disease [12]. Based on these findings, we proposed that the cutoff value for normal endothelial function is 7% [12]. In Yamaji’s study, the FMD value in patients who answered “over the third floor” was 3–4% [6]. This value was low compared to the normal range of FMD [10, 12]. As mentioned above, Matsuzawa et al. proposed a linear relationship of FMD value with cardiovascular events. Therefore, further study is needed to clarify whether low FMD values provide favorable cardiovascular outcomes compared with even lower FMD values.

Yamaji et al. could not determine the mechanisms underlying the significant difference in FMD between patients who answered “over the third floor” and those who answered “the second floor or none”. One possibility might be that this difference reflects the difference in the commitment to maintaining physical activity. Maintaining a good level of physical activity is an important issue [13]. Many environmental factors affect adherence. For example, the COVID-19 pandemic lockdown had a large negative impact on maintaining a healthy lifestyle [14]. Physical and mental stresses in daily life and/or job strain may disturb the

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**Fig. 1** Approaches to assess physical activity in patients



maintenance of a good level of physical activity. Therefore, it is necessary to clarify whether the patients who answered “over the third floor” have a strong will to maintain good physical activity.

### Compliance with ethical standards

**Conflict of interest** The author declares no competing interests.

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