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Development of Dialysis Patient Exercise Therapy Support System I -Proposal for the Continuation of Exercise Therapy-

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Objectives : Participating in physical activity, whether at home or in a medical facility, is considered an effective therapeutic approach for dialysis patients, regardless of whether it is a dialysis or non-dialysis day. However, maintaining a consistent exercise routine can be challenging. Therefore, we proposed an exercise therapy support system aimed at promoting and continuing exercise for dialysis patients.
Methods : We added functionality to our dialysis patient support system to promote exercise and its continuity (Fig. 1). There are a number of reasons that patients may struggle to sustain regular exercise, including physical condition and mood. One contributing factor is that dialysis patients can only quantify their exercise levels numerically. However, we hypothesized that if there were visible effects or rewards corresponding to the exercise volume, patients would be more inclined to continue. Therefore, we explored the introduction of a "reward" concept based on exercise volume, specifically incorporating the ability for the exercise-generated energy to charge a mobile phone.
Results : Many dialysis patients use an ergometer to exercise (Fig. 2). We converted the rotational energy obtained from the pedaling motion of this ergometer into electrical energy using a dynamo generator (Fig. 3), and stored the energy to charge electronic devices, such as mobile phones (referred to as an Ergo-storage device) (Fig. 4).
Conclusions : We have introduced a "reward" function using the Ergo-storage device as a mechanism to encourage the implementation and continuity of exercise for dialysis patients, regardless of their location or dialysis status. This is expected to motivate dialysis patients to actively engage in exercise, whether on dialysis or non-dialysis days, and regardless of being at home or in a medical facility. Acknowledgment This research was supported in part by Gakushin Kaken (JP20H03982).

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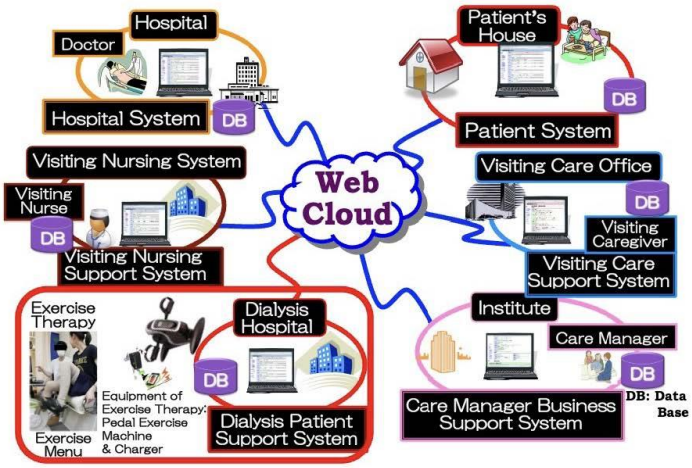

Fig. 1 Overview of PD Patient Support System
(The red frame shows the added exercise function)

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Fig. 2 Pedal exercise

Fig. 3(a) Bicycle dynamo power generation mechanism

Fig. 3(b) Using the rotation of the bicycle front wheel to power a light

Fig. 4(a) Converting a dialysis patient's exercise into electricity for charging

Ergo-storage device (Left) and Ergometer (Right)

Fig. 4(b) Charging of a mobile phone using the ergo-storage device