Несмотря на существенные различия значений в двух сериях проведенных экспериментов, корреляционный коэффициент при линейной аппроксимации зависимостей в обоих случаях стремится к 1. Таким образом, можно сделать вывод о линейном характере зависимости результатов, полученных классическим инвазивным методом и методом ближней инфракрасной спектроскопии.

Целью дальнейших исследований является выявление факторов, влияющих на показания неинвазивного глюкометра. В частности, при визуальном сравнении двух испытуемых наблюдались следующие различия: телосложение, цвет кожи, ее толщина (грубость). Так или иначе, применение неинвазивного глюкометра однозначно требует индивидуальной его калибровки.

Список использованных источников

1. МГБСМП [Электронный ресурс] / Сахарный диабет. Актуальность проблемы – Режим доступа: https://www.mgbsmp.by/ informatsiya/informatsiya-dlya-patsientov/543-sakharnyj-diabet-aktualnost-problemy – Дата доступа: 25.10.2022.

2. ГУЗ «Городская поликлиника №3 г. Гродно» / Гипогликемия – истинная и ложная – Режим доступа: http://www.3grp.by/hls/page-doctors/page-endocrinologist/727/ – Дата доступа: 25.10.2022.

3. Медицинский онлайн-справочник MSD Manuals [Электронный ресурс] / Diabetes Mellitus (DM) – Режим доступа: https://www.msdmanuals.com/en-sg/professional/endocrine-and-metabolic-disorders/diabetes-mellitus-and-disorders-of-carbohydrate-metabolism/diab-etes-mellitus-dm – Дата доступа: 25.10.2022.

4. Томский политехнический университет, VI научно-практическая конференция [Электронный доступ] / Неинвазивные методы измерения сахара в крови – Режим доступа: https://core.ac.uk/download/ pdf/53086006.pdf – Дата доступа: 25.10.2022.

5. Мой диабет [Электронный доступ] / Определение уровня сахара в крови через слюну – Режим доступа: https://moidiabet.ru/news/opredelenie-urovnja-sahara-v-krovi-cherez-sljunu – Дата доступа: 25.10.2022.

6. БГУИР, 54-я научная конференция аспирантов, магистрантов и студентов [Электронный доступ] / Метод неинвазивного определения уровня глюкозы в крови – Режим доступа: https://libeldoc.bsuir.by/ bitstream/123456789/32913/1/Krivonos_Metod.pdf – Дата доступа: 25.10.2022.

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BALANCE THERAPY GAMIFICATION BASED ON STABILOTRAINER WITH MOBILE ACCESS

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This article is devoted to the gamification of balance therapy based on stabilotrainer with mobile access, with the preservation of training results on a cloud server and the differentiation of access to a remote database. Variants of game training are considered.

The stabilotrainer is an electronic device that allows you to develop movement coordination, body sensitivity and concentration. Exercises on a Stabilotrainer help to improve the sensitivity of the feet and leg muscles, coordination of movements, reaction speed and physical dexterity.

Earlier, the concept of a biofeedback stabilotrainer oriented for home use was proposed [1].

The following structure of the complex was justified:

– stabilometric platform with mobile access;

– control unit – a portable device (laptop or smartphone) that receives data from the stabilometric platform and controls the system;

– data display device (external monitor) – displays the instructions and training results;

– server – synchronizes the control device and the data display device, stores the results of trainings.

It is convenient to save the results of the training sessions on a cloud server – it will allow users to access the studies from any device, as well as provide an opportunity to maintain a database of users. Authorization and user registration service will allow each user to have his own set of saved results, as well as differentiate access to the database.

The ability to manage the simulator remotely allows the instructor to regulate the training process by continuously monitoring the condition of the trainee and the dynamics of the training process. In addition, the evaluation of process dynamics can be automated, based on the data continuously obtained during training. The stabilometric platform is able to assess the degree of tiredness, which can help to improve the effectiveness of ongoing training without compromising health.

Typical exercises on stabilotrainer are:

– hold in the center – this is an exercise for maximum stability – you need to hold the cursor as close to the center of the circle as possible;

– bypassing the circles – by changing the center of gravity of your body you need to place the cursor in the center of each circle displayed on the monitor in turn;

– slalom – it is necessary to follow the sinusoidal guide as precisely as possible.

In general, there are the following control possibilities [2]:

– changing the duration of the workout – up to the onset of physical tiredness;

– changing the scale of displayed processes;

– change of success criterion;

– change of frequency of task changes.

Changing the scale in the exercise "Target" makes it possible to consistently narrow the zone of permissible deviations (see Figure 1).

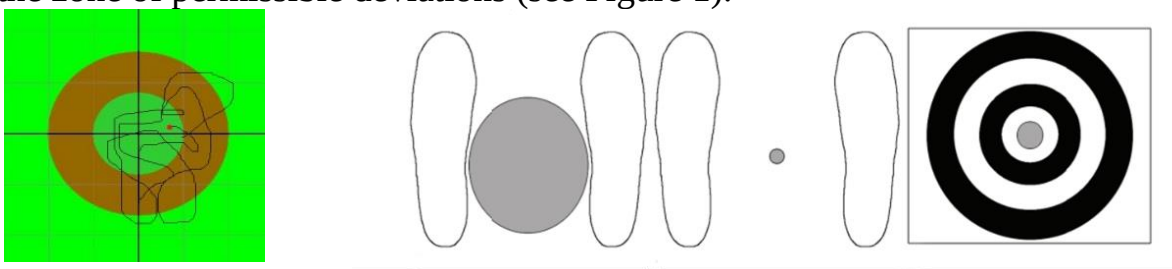

Figure 1 - Scale changing in the test "Target"

At the initial stages of training it is advisable to scale up so that in the patient's coordinates such a target occupies almost the entire area of support. As the motor skill is practiced, the stabilometric platform will record fewer and fewer instances of the trainee's center of pressure leaving the target, and at the right moment the stabi-

lotrainer will be able to independently decide to change the scale towards narrowing the target.

For the exercise “Slalom” it is possible to adjust the width of the permissible deviation and the sinusoid parameters in the same way.

By introducing multimedia games into training for athletes, for rehabilitation patients, or for balance therapy, variety and additional motivation in passing the tests are created. The patient (the trainee), controlling what is happening on the screen with his own body movements, plays the role of a kind of game manipulator. For example, in the game "Labyrinth", the user can be tasked to pass it in a certain time, gradually complicating the levels of the game (Figure 2).

Figure 2 - Concept of the game "Labyrinth" in the stabilotrainer

One way or another, the gamification of balance therapy can be implemented on the basis of a stabilometric platform with mobile access. In this case, one can either create a game story and the application itself from scratch, or use existing games available in the public domain, replacing the input data in them with the data obtained from the stabilometric platform.

References

1. Лютыч А. В. Стабилотренажер с биоуправлением по опорной реакции // Сборник конкурсных научных работ студентов и магистрантов Ч.1 / УО «Брестский государственный технический университет»; редкол.: Н.Н. Шалобыта [и др.]. – Брест: Издательство БрГТУ, 2022. – С. 101–105.

2.Стабилометрическое исследование [Электронный ресурс]. – Режим доступа: https://biomera.ru/upload/biblio/skvortcov_preprint.pdf – Дата доступа: 25.10.2022.

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ИСПОЛЬЗОВАНИЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ ПРИ ОРГАНИЗАЦИИ ПАССАЖИРСКИХ ПЕРЕВОЗОК ПОСРЕДСТВОМ БЕСПИЛОТНОГО ТРАНСПОРТА

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