Dividat

Company

Dividat is a Spinoff company from the Institute of Movement Sciences from the ETH Zurich. We develop digitized training and assessment solutions for measuring and promoting body-brain interaction. All of our products and concepts are developed on the basis of scientific knowledge and validated in practice in studies and continuous customer contact.

The company was founded by Eva van het Reve who conducted her doctoral thesis at the ETH Zurich in the field of Geriatric Rehabilitation. The company is based in Schindellegi in Switzerland.

ETH zürich

Spinoff ETH zürich

swiss made software

+AWARDED COMPANY+ by Schweizerische Eidgenossenschaft Confédération suisse Confederazione Svizzera Confederaziun svizra Swiss Confederation Innosuisse - Swiss Innovation Agency

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Our solutions are used in more than 300 Institutions worldwide:

Karolinska Institutet

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VAMED health. care. vitality.

Université de Montréal

Dividat Senso: Evidence

Assessments are an essential part of any therapy and training intervention. Ideally, an assessment includes a diverse set of dimensions: physical, cognitive, social & psychological. The assessment determines people's resources and problems and gives an indication of what the treatment or training should be. Therefore, it provides initial data for a personalized training design.

With Dividat Evidence we focus mainly on physical and cognitive dimensions, even though social & psychological dimensions are equally important. The performance analysis optimally includes a series of examinations to obtain the most complete overall picture of current performance. Our goal is to determine meaningful parameters with high predictive value. This means that we want to help people to find values that predict the effects on activities in daily living. For that it is important to have standardised test that can be compared in time.

Tests included in Dividat Evidence

Sway-Test (Romberg)

Measures posture control

Measured Metrics

Maximum deviation, Mean sway speed, Anterior/posterior sway, Medial/lateral sway, Sway path length

Go-NoGo

Measures selective attention and response control

Measured Metrics

average reaction time (ms), error, missed

Stroop Test

Measures the ability to inhibit the dominant response to a stimulus

Measure Metrics

average reaction time (ms), error

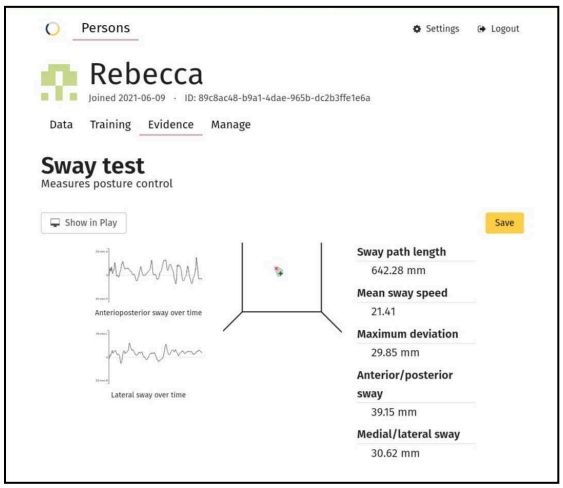
Flexi Test (figural)

Measures figural cognitive flexibility

Measured Metrics

average reaction time (ms), error, missed

Example Result Page of Sway-Test



Dividat Evidence: Research

GONOGO TEST

The Go/No-Go Task is used to evaluate the inhibitory motor system, which involves the response to a presented stimulus (GO) and the inhibition of a presented similar stimulus (NO-GO). Responses to those NO-GO stimuli represent the critical motor inhibition information. Studies with people suffering from Mild Cognitive Impairment have shown worse performance in Go/No-Go tasks, when considering accuracy and reaction time [1, 2].

STROOP TEST

The Stroop Test measures the ability to inhibit irrelevant stimuli and provoked reactions. Inhibition is a fundamental function which is needed to focus on important information and to act adequately in daily life. The test consists of both congruent (word RED presented in the colour RED) and incongruent (the word RED presented in the color blue) tasks. In general, the response latency for incongruent tasks is longer compared to the congruent, whereas this increase is called Stroop effect. This effect has been shown to increase in older adults and is sensitive to cognitive decline associated with normal aging [3, 4].

FLEXIBILITY TEST (FIGURAL)

The flexibility test (figural) measures cognitive flexibility and ability of switching between different concepts. This cognitive flexibility declines with age and often leads to an inability to adapt to new situations and environments. However, individuals presenting symptoms of mild cognitive impairment often present increased impairment of cognitive flexibility. Through the accurate measurement of both reaction times and accuracy, the flexibility test can therefore generate relevant information from a clinical point of view[1, 5].

SWAY TEST

The maintenance and control of postural balance is important for aspects of daily living, whereas poor postural control is a potential predictor of future falls. This control can be assessed with the so-called Romberg Test, a static posturography measure. Participants are asked to stand as still as possible for 30 seconds, in the first attempt with their eyes opened and in the second with their eyes closed. The Romberg Quotient, meaning the ratio between an "eyes closed" and "eyes open" value for a metric RQ is thereby potentially useful for identifying fallers because it measures an individual's reliance on visual input for postural control. Therefore, both the RQ, as well as the anterior-posterior (AP) measures are particularly relevant for fall risk classification [6]. Moreover, also the mediolateral sway has been shown to be increased in older people who experienced recurrent falls, suggesting it as a preliminary screening [7]. However, most common balance tests either often lack accuracy, or they are difficult to implement in a clinical setting.

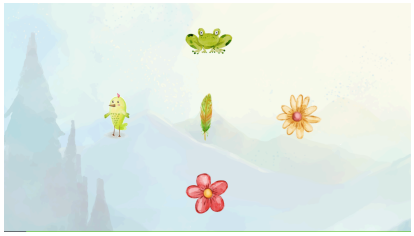
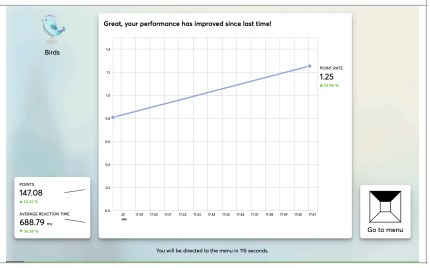
1. Guarino, A., et al., *Executive functions in the elderly with mild cognitive impairment: a systematic review on motor and cognitive inhibition, conflict control and cognitive flexibility.* Aging & Mental Health, 2020. **24**(7): p. 1028-1045.
2. Cid-Fernández, S., M. Lindín, and F. Díaz, *Effects of amnestic mild cognitive impairment on N2 and P3 Go/NoGo ERP components.* J Alzheimers Dis, 2014. **38**(2): p. 295-306.
3. West, R. and C. Alain, *Age-related decline in inhibitory control contributes to the increased Stroop effect observed in older adults.* Psychophysiology, 2000. **37**(2): p. 179-189.
4. Zurrón, M., et al., *Age-related effects on event-related brain potentials in a congruence/ incongruence judgment color-word Stroop task.* Frontiers in Aging Neuroscience, 2014. **6**(128).
5. Giller, F. and C. Beste, *Effects of aging on sequential cognitive flexibility are associated with fronto-parietal processing deficits.* Brain Structure and Function, 2019. **224**(7): p. 2343-2355.
6. Howcroft, J., et al., *Elderly fall risk prediction using static posturography.* PLoS One, 2017. **12**(2): p. e0172398.
7. Melzer, I., N. Benjuya, and J. Kaplanski, *Postural stability in the elderly: a comparison between fallers and non-fallers.* Age Ageing, 2004. **33**(6): p. 602-7.

Dividat Senso: Play

The Dividat Senso is also a training device that addresses both motor and cognitive issues that affect gait stability and improves skills that are needed in the interaction with the environment during walking. The Dividat Senso comes with a touch sensitive input device, a computer and a TV that is attached to a stand. We have developed a touch sensitive hardware which enables users to play the games with steps or weights shifts. The Senso has 5 independent sensor plates with 4 sensor each allowing to accurately measure any forces like steps or weight shifts that users perform on the device. There is a set of different training games (currently 15 games) included in training environment. Each program is selected to target a specific goal. We regularly update the software to include more training programs. A new training program is developed together with research institutes in Switzerland and also abroad.

EXAMPLE GAME: BIRDS:
Aim: The training game "Birds" trains selective attention - the ability to react to certain (relevant) stimuli and to be able to ignore others (irrelevant).

Task: Return the feather in the middle to the correct bird. To do this, take a step to the bird that matches the displayed feather. Take the steps as quickly as possible.

Example training plan	Example training game	Example training results
		

Dividat Senso: Technical details

The Dividat Senso consists of the (1)Senso, (2) a Computer and a (3)Screen

- Dividat Senso is a CE certified medical device
- Size: 1.13m x 1.13m
- Height: 310 mm (Plate)
- Product lifecycle: 10 years
- Maximum user weight: 180 kg
- Satinated surface (high slip resistance)
- 20 sensors to measure force on the platform
- 5 vibration motors for tactile and haptic feedback

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