

The background of the image shows three white, rectangular activity trackers. Two are lying flat on a dark wooden surface, while the third is propped up against them. The trackers have a minimalist design with a small screen and some physical buttons. A semi-transparent white banner is overlaid at the bottom, containing the brand name and tagline.

**Fibion SENS** 

The New Age of Activity Tracking

# Fibion SENS Validity and Reliability







**fibion**SENS 





# Fibion SENS Validity and Reliability – 2018 Study\*

- **SENS is reliable and valid for measuring sedentary behavior and activity in patients with knee osteoarthritis.** Walking is not easily detected and can be misclassified with “other activities” for this population.

Reliability and Construct Validity

hindawi.com/journals/arthritis/2018/6596278/

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Table of Contents

Special Issues

On this page

Abstract

Introduction

Methods

Results

Discussion

Abstract

Physical inactivity is important to address, and an objective way of measuring inactivity is by accelerometry. The objective of this study was to determine the **reliability and construct validity** of the SENS motion system to record physical activity and inactivity in **patients with knee osteoarthritis**. Participants with an age > 40 years and an average weekly pain above 0 on a numeric rating scale (0 = no pain, 10 = worst pain) were included. Participants had a total of two study visits and at each visit participants completed a standardized activity. Data from 24 participants were analysed. A mean agreement of 99% (SD 3%) for sedentary behaviour and a mean agreement of 97% (SD 9%) for active behaviour were found. The agreement for “walking” was 28% (SD 18%). Mean agreement between recordings on the two visits was 96% (SD 8%) for sedentary behaviour and 99% (SD 1%) for active behaviour. The SENS motion activity measurement system can be regarded as a reliable and valid device for measuring sedentary behaviour in patients with knee OA, whereas detection of walking is not reliable and would require further work.

PDF

Citation

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Citations

1383

the standardized environment

categories (sedentary, standing, differentiation between sedentary ment. Particularly, walking was

Source: <https://www.hindawi.com/journals/arthritis/2018/6596278/>



# Fibion SENS Validity and Reliability: 2018 Study\*\*

- **Good reliability:** SENS showed 98% agreement for sedentary vs. active behaviors and 83% for four-category classification, with the highest agreement for sedentary (96%) and the lowest for walking (77%).

The screenshot shows a web browser window displaying a Hindawi journal article. The browser's address bar shows the URL [hindawi.com/journals/arthritis/2018/6596278/](https://www.hindawi.com/journals/arthritis/2018/6596278/). The page has a teal header with 'Table of Contents' and 'Special Issues' links. On the left, a sidebar titled 'On this page' lists sections: Abstract, Introduction, Methods, Results, Discussion, Conclusion, Conflicts of Interest, and Authors' Contributions. The main content area is titled '3.2. Reliability' and contains a paragraph of text with several yellow highlights. Below the text is 'Table 6', which is a 4x2 grid with columns labeled 'A' and 'B' and rows numbered 1 to 4. The table is currently empty. To the right of the table is a caption: 'Table 6 Percentage of agreement between the SENS motion system data recorded at the two study visits while performing the standardized protocol with mean, median, standard deviation (SD), and range.' On the far right, a green sidebar contains links for 'PDF', 'Citation', 'More', and 'Order', along with statistics: 'Views 1383', 'Downloads 196', and 'Citations 10' (represented by a colorful geometric icon).

**3.2. Reliability**

A mean agreement of 98% (SD 3%) was observed between the recordings obtained with the SENS motion system from the two study visits when using the dichotomized categories “sedentary” and “active” behaviours. When grouping the data into the 4 predefined categories, a mean agreement of 83% (SD 10%) was observed. The lowest percent agreement for the latter approach for categorization was 77% (SD 14%) for the category “walking” and the highest percent agreement was 96% (SD 8%) for the category “sedentary”; see Table 6 for percent agreement for each participant in each category.

	A	B
1		
2		
3		
4		

**Table 6**

Percentage of agreement between the SENS motion system data recorded at the two study visits while performing the standardized protocol with mean, median, standard deviation (SD), and range.

**3.3. Feasibility Questionnaire**

Source: <https://www.hindawi.com/journals/arthritis/2018/6596278/>



# Fibion SENS Validity and Reliability – 2022 Study

- **SENS device has demonstrated superior validity and relative reliability compared to ActivPAL, which is regarded as a near gold-standard activity monitor.**

The screenshot shows a web browser displaying a PubMed article page. The URL in the address bar is <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9126721/>. The page title is "Data Availability Statement". The main content is the abstract, which is highlighted in yellow. The abstract text reads: "To evaluate interventions to promote physical activity, valid outcome measures are important. This study evaluated the validity and reliability of the ActivPAL3™ and the SENS motion® activity monitors with regard to the number of steps taken, walking, and sedentary behavior in hospitalized patients (n = 36) (older medical patients (+65 years) (n = 12), older patients (+65) with acute hip fracture (n = 12), and patients (+18) who underwent acute high-risk abdominal surgery (n = 12)). Both monitors showed good (≥60%) percentage agreement with direct observation for standing and no. of steps (all gait speeds) and high agreement (≥80%) for lying. For walking, ActivPAL3™ showed moderate percentage agreement, whereas SENS motion® reached high percentage agreement. The relative reliability was moderate for sedentary behavior for both monitors. The ActivPAL3™ showed poor (walking) to moderate (steps) reliability for walking and steps, whereas SENS motion® showed moderate reliability for both activities. For slow walkers, the relative reliability was moderate for SENS motion® and poor for ActivPAL3™. This trial is registered with the ClinicalTrials.gov identifier [NCT04120740](https://clinicaltrials.gov/ct2/show/study/NCT04120740)." The page also includes a sidebar with "OTHER FORMATS" (PubReader, PDF (1.3M)), "ACTIONS" (Cite, Favorites), "SHARE" (Twitter, Facebook, LinkedIn), and "RESOURCES" (Similar articles in PubMed). A "Back to Top" button is visible in the bottom right corner.

Rehabil Res Pract

## Abstract

To evaluate interventions to promote physical activity, valid outcome measures are important. This study evaluated the validity and reliability of the ActivPAL3™ and the SENS motion® activity monitors with regard to the number of steps taken, walking, and sedentary behavior in hospitalized patients ( $n = 36$ ) (older medical patients (+65 years) ( $n = 12$ ), older patients (+65) with acute hip fracture ( $n = 12$ ), and patients (+18) who underwent acute high-risk abdominal surgery ( $n = 12$ )). Both monitors showed good ( $\geq 60\%$ ) percentage agreement with direct observation for standing and no. of steps (all gait speeds) and high agreement ( $\geq 80\%$ ) for lying. For walking, ActivPAL3™ showed moderate percentage agreement, whereas SENS motion® reached high percentage agreement. The relative reliability was moderate for sedentary behavior for both monitors. The ActivPAL3™ showed poor (walking) to moderate (steps) reliability for walking and steps, whereas SENS motion® showed moderate reliability for both activities. For slow walkers, the relative reliability was moderate for SENS motion® and poor for ActivPAL3™. This trial is registered with the ClinicalTrials.gov identifier [NCT04120740](https://clinicaltrials.gov/ct2/show/study/NCT04120740).

### 1. Introduction

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Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9126721/>



# Fibion SENS Validity and Reliability – 2022 Study

- Study found that **SENS has high validity and reliability in measuring gait accelerations in patients with knee osteoarthritis**, showing strong agreement with the validated Xsens system.

> [Sensors \(Basel\)](#). 2022 Jul 15;22(14):5289. doi: 10.3390/s22145289.

## Criterion Validity of Linear Accelerations Measured with Low-Sampling-Frequency Accelerometers during Overground Walking in Elderly Patients with Knee Osteoarthritis

Arash Ghaffari <sup>1</sup>, Ole Rahbek <sup>1</sup>, Rikke Emilie Kildahl Lauritsen <sup>1</sup>, Andreas Kappel <sup>1</sup>, Søren Kold <sup>1</sup>, John Rasmussen <sup>2</sup>

Affiliations + expand

PMID: 35890969 PMCID: [PMC9322915](#) DOI: [10.3390/s22145289](#)

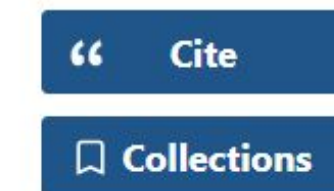
### Abstract

Sensors with a higher sampling rate produce higher-quality data. However, for more extended periods of data acquisition, as in the continuous monitoring of patients, the handling of the generated big data becomes increasingly complicated. This study aimed to determine the validity and reliability of low-sampling-frequency accelerometer (SENS) measurements in patients with knee osteoarthritis. Data were collected simultaneously using SENS and a previously validated sensor (Xsens) during two repetitions of overground walking. The processed acceleration signals were compared with respect to different coordinate axes to determine the test-retest reliability and the agreement between the two systems in the time and frequency domains. In total, 44 participants were included. With respect to different axes, the interclass correlation coefficient for the repeatability of SENS measurements was [0.93-0.96]. The concordance correlation coefficients for the two systems' agreement were [0.81-0.91] in the time domain and [0.43-0.99] in the frequency domain. The absolute biases estimated by the Bland-Altman method were [0.0005-0.008] in the time domain and [0-0.008] in the frequency domain. Low-sampling-frequency accelerometers can provide relatively valid data for measuring the gait accelerations in patients with knee osteoarthritis and can be used in the future for remote patient monitoring.

#### FULL TEXT LINKS



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Source: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9322915/>



# Fibion SENS Validity and Reliability – 2023 Study

- **SENS accurately measures physical activity and sedentary behavior in children and adolescents**, showing strong agreement with video observations and moderate to excellent reliability.

► Eur J Pediatr. 2023 Aug;182(8):3639-3647. doi: 10.1007/s00431-023-05014-z. Epub 2023 Jun 1.

## Validation of an accelerometer system for measuring physical activity and sedentary behavior in healthy children and adolescents

Camilla Milther <sup>1</sup>, Lærke Winther <sup>2</sup>, Michelle Stahlhut <sup>3</sup>, Derek John Curtis <sup>4</sup>, Mette Aadahl <sup>3 5</sup>, Morten Tange Kristensen <sup>5 6</sup>, Jette Led Sørensen <sup>2 5</sup>, Christian Have Dall <sup>5 6</sup>

Affiliations + expand  
PMID: 37258775 PMCID: PMC10460328 DOI: 10.1007/s00431-023-05014-z

### Abstract

The study aims to assess the concurrent validity of the SENS motion<sup>®</sup> accelerometer system for device-based measurement of physical activity and sedentary behavior in healthy children and adolescents. Thirty-six healthy children and adolescents (mean ± standard deviation (SD) age, 10.2 ± 2.3 years) were fitted with three SENS sensors while performing standardized activities including walking, fast walking, sitting/lying, and arm movements. Data from the sensors were compared with video observations (reference criteria). The agreement between SENS motion<sup>®</sup> and observation was analyzed using Student's t-test and illustrated in Bland-Altman plots. The concurrent validity was further evaluated using intraclass correlation coefficient (ICC) and was expressed as standard error of measurement (SEM) and minimal detectable change (MDC). Strong agreement was found between SENS and observation for walking time, sedentary time, and lying time. In contrast, moderate agreement was observed for number of steps, sitting time, and time with and without arm movement. ICC<sub>2,1</sub> values were overall moderate to excellent (0.5-0.94), with correspondingly low SEM% for walking time, sedentary time, lying time, and time with arm movement (2-9%). An acceptable SEM% level was reached for both steps and sitting time (11% and 12%). For fast walking time, the results showed a weak agreement between the measurement methods, and the ICC value was poor.

**Conclusion:** SENS motion<sup>®</sup> seems valid for detecting physical activity and sedentary behavior in healthy children and adolescents with strong agreement and moderate to excellent ICC values. Furthermore, the explorative results on arm movements seem promising.

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Source: <https://pubmed.ncbi.nlm.nih.gov/37258775/>



# Fibion SENS Validity and Reliability – 2024 Study

- SENS accurately identifies physical activity types and postures with high agreement in free-living conditions.

Comparative Study > Int J Behav Nutr Phys Act. 2024 Jul 17;21(1):77.  
doi: 10.1186/s12966-024-01627-1.

## Thigh-worn accelerometry: a comparative study of two no-code classification methods for identifying physical activity types

Claas Lendt<sup>1</sup>, Theresa Braun<sup>2</sup>, Bianca Biallas<sup>2</sup>, Ingo Froböse<sup>2</sup>, Peter J Johansson<sup>3, 4</sup>

Affiliations + expand  
PMID: 39020353 PMCID: PMC11253440 DOI: 10.1186/s12966-024-01627-1

### Abstract

**Background:** The more accurate we can assess human physical behaviour in free-living conditions the better we can understand its relationship with health and wellbeing. Thigh-worn accelerometry can be used to identify basic activity types as well as different postures with high accuracy. User-friendly software without the need for specialized programming may support the adoption of this method. This study aims to evaluate the classification accuracy of two novel no-code classification methods, namely SENS motion and ActiPASS.

**Methods:** A sample of 38 healthy adults (30.8 ± 9.6 years; 53% female) wore the SENS motion accelerometer (12.5 Hz; ±4 g) on their thigh during various physical activities. Participants completed standardized activities with varying intensities in the laboratory. Activities included walking, running, cycling, sitting, standing, and lying down. Subsequently, participants performed unrestricted free-living activities outside of the laboratory while being video-recorded with a chest-mounted camera. Videos were annotated using a predefined labelling scheme and annotations served as a reference for the free-living condition. Classification output from the SENS motion software and ActiPASS software was compared to reference labels.

**Results:** A total of 63.6 h of activity data were analysed. We observed a high level of agreement between the two classification algorithms and their respective references in both conditions. In the free-living condition, Cohen's kappa coefficients were 0.86 for SENS and 0.92 for ActiPASS. The mean balanced accuracy ranged from 0.81 (cycling) to 0.99 (running) for SENS and from 0.92 (walking) to 0.99 (sedentary) for ActiPASS across all activity types.

**Conclusions:** The study shows that two available no-code classification methods can be used to accurately identify basic physical activity types and postures. Our results highlight the accuracy of both methods based on relatively low sampling frequency data. The classification methods showed differences in performance, with lower sensitivity observed in free-living cycling (SENS) and slow treadmill walking (ActiPASS). Both methods use different sets of activity classes with varying definitions, which may explain the observed differences. Our results support the use of the SENS motion system and both no-code classification methods.

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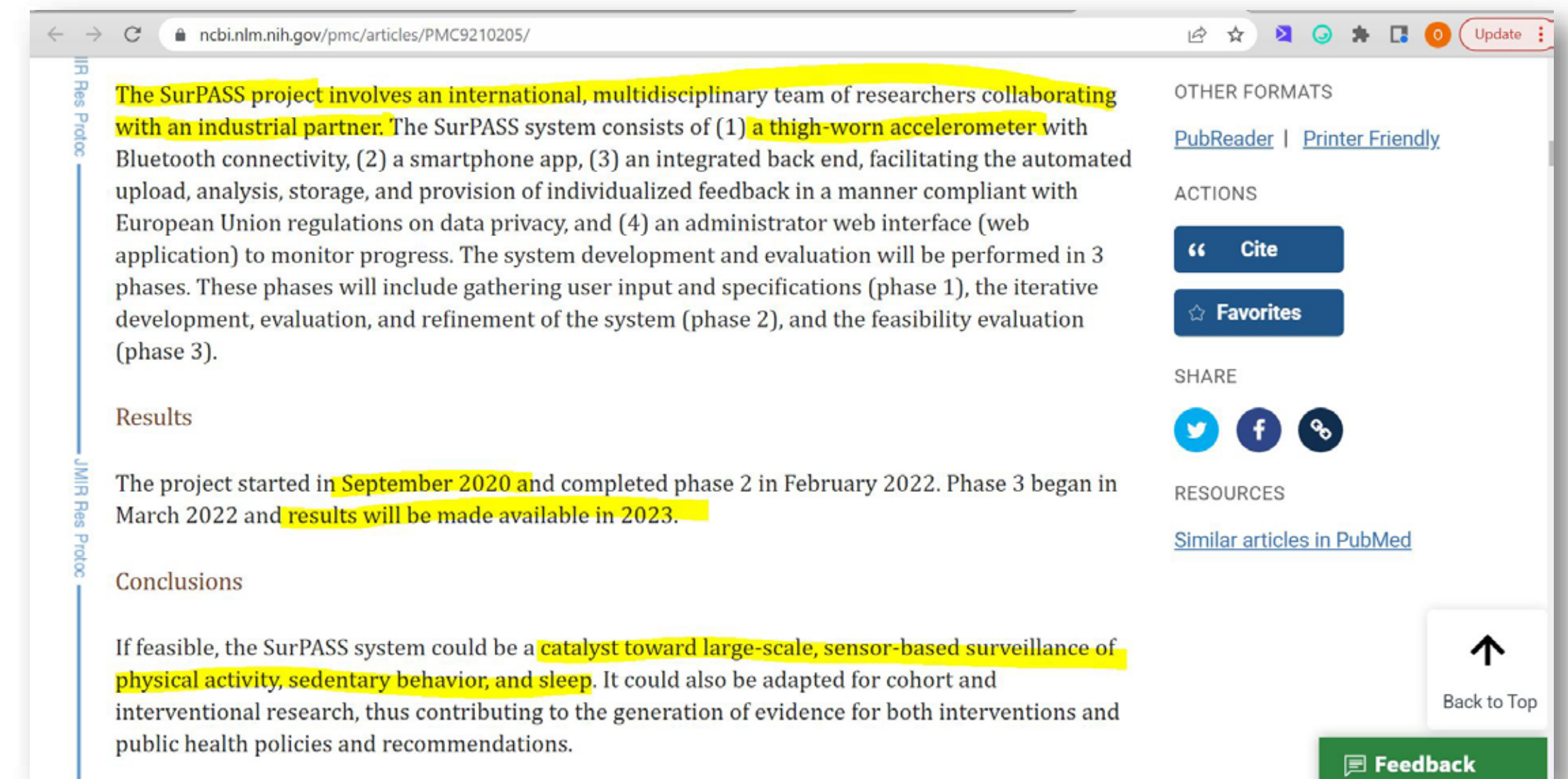
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Source: <https://pubmed.ncbi.nlm.nih.gov/39020353/>



# SurPASS: The National Surveillance of Physical Activity, Sedentary Behavior, and Sleep in Denmark

- **SENS** has been part of the **SurPASS** project from **September 2020**.
- Objective: to develop and assess the feasibility of a sensor-based system for monitoring physical activity, sedentary behavior, and sleep at a national level in Denmark with the potential to adapt it for cohort and interventional research in public health and policy.



Source: <https://pubmed.ncbi.nlm.nih.gov/35666571/>



# SurPASS

**SurPASS: AUTOMATING DEVICE-BASED MEASUREMENT IN COHORT STUDY RESEARCH**

On behalf of the SurPASS team  
Andreas Holtermann and Nidhi Gupta

Twitter: @P...

PROPASS' 4th ANNUAL MEETING April 2022

Andreas Holtermann

## THE SURPASS SYSTEM

**The backend**  
The brain of system

**The sensor**  
On participants body

## UNIQUENESS AND NOVELTY

```

graph TD
    A[GDPR safe data] --> D[Data infrastructure for harmonization of data from multiple countries]
    B[Standardised automated data processing] --> D
    C[Back-end the brain] --> D
    
```

## THE SURPASS MEASUREMENT

- No battery charge
- Record for 3 consecutive weeks
- Cheap

7 days measurement

ActiPASS/Acti4

- Fully automatic data processing
- Fully automatic data analysis

## THE APP

Step 5: Place the sensor halfway down the right thigh, as shown in the picture. The sensor's round part marked with the text "Sensor" should point down towards the floor when you are standing.

What type of day is it?

WORK DAY  
DAY OFF  
SICK



# Fibion SENS: Validity and Interchangeability with Research-Grade Accelerometers

- Although SENS was not included in Crowley et al. (2019), the study suggests that it would produce similar results when analyzed using the same methodology.
  - The study demonstrated that different thigh-worn accelerometers provide comparable data, supporting the idea that Fibion SENS aligns with this standard.
  - Conclusion: **SENS can be used interchangeably with other thigh-worn accelerometers.**
- Note: Some of the authors are involved in the SurPASS project.

The image shows a screenshot of a web browser displaying a PubMed article. The browser tabs show 'Comparison of physical behavior' and the URL is 'pubmed.ncbi.nlm.nih.gov/31419998/'. The article title is 'Comparison of physical behavior estimates from three different thigh-worn accelerometers brands: a proof-of-concept for the Prospective Physical Activity, Sitting, and Sleep consortium (ProPASS)'. The authors listed are Patrick Crowley, Jørgen Skotte, Emmanuel Stamatakis, Mark Hamer, Mette Aadahl, Matthew L Stevens, Vegar Rangul, Paul J Mork, and Andreas Holtermann. The article is from 'Int J Behav Nutr Phys Act.' 2019 Aug 16;16(1):65. The abstract states: 'Background: Pooling data from thigh-worn accelerometers across multiple studies has great potential to advance evidence on the health benefits of physical activity. This requires harmonization of information on body postures, physical activity types, volumes and time patterns across different brands of devices. The aim of this study is to compare the physical behavior estimates provided by three different brands of thigh-worn accelerometers.' The full text snippet visible includes: 'midsection of the right thigh. Raw data from each accelerometer was processed and classified into 8 physical activities and postures using the Acti4 software. Absolute differences between estimates and the respective coefficient of variation (CV) were calculated. Results: We observed very minor differences between physical behavior estimates from three different accelerometer brands. When averaged over 24 h (1,440 min), the absolute difference (CV) between accelerometers were: 1.2 mins (0.001) for lying/sitting, 3.4 mins (0.02) for standing, 3.5 mins (0.06) for moving, 1.9 mins (0.03) for walking, 0.1 mins (0.19) for running, 1.2 mins (0.19) for stair climbing, 1.9 mins (0.07) for cycling. Moreover, there was an average absolute difference of 282 steps (0.03) per 24 h. Conclusions: Physical behaviors were classified with negligible difference between the accelerometer brands. These results support harmonization of data from different thigh-worn accelerometers across multiple cohorts when analyzed in an identical manner. Keywords: Accelerometry; Data pooling; Harmonization; Health; Objective measurement; Posture; Tri-axial; Validation.'

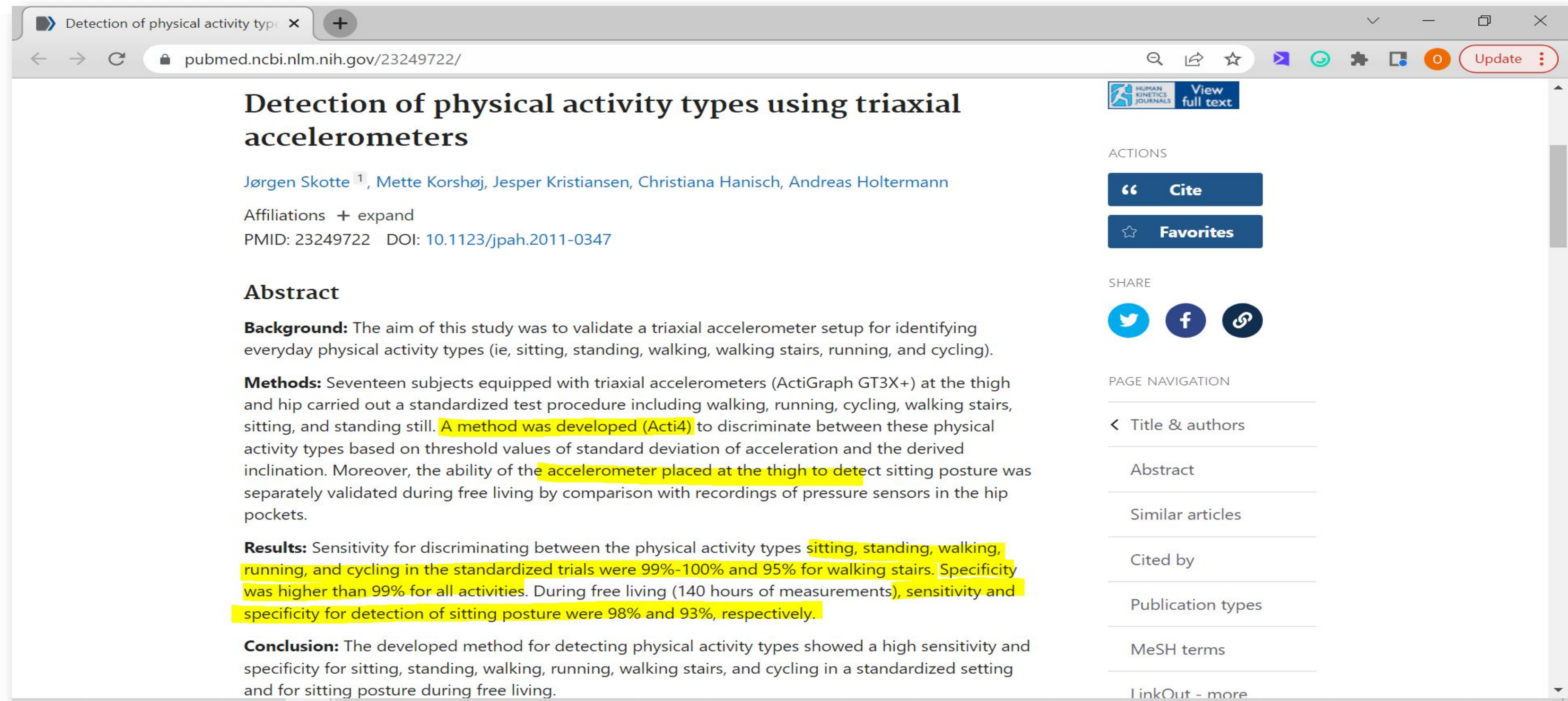
Source:

<https://link.springer.com/article/10.1186/s12966-019-0835-0>



# ACTI4 Algorithms Integration

- **Validated methods in SENS:** validated methods from this study are being integrated into SENS cloud in collaboration with the authors of the publication, making them available for all users.



Source: <https://pubmed.ncbi.nlm.nih.gov/23249722/>



# Validation and Ongoing Studies Using Fibion SENS\*

## Ongoing Validation Studies

1. **University of Science and Technology, Norway** – Comparing Acti4 and SENS algorithms.
2. **Australia & Denmark collaboration** – Acti4 validation with 50–100 children (3–14 years), data collection ongoing.
3. **West Lake University, China** – Lab validation; ActiGraph vs. Fibion SENS in free-living conditions.
4. **Copenhagen Study** – Validating SENS algorithms in children (6–15 years) with video-based criteria.
5. **Karolinska Institute** – Study details in progress.

## More Studies Using Fibion SENS

1. **Karolinska Institute, Sweden** – SB & PA assessment in 600 children and youth.
2. **Occupational Health Research Center, Finland** – Workplace SB study with 40 adults.
3. **Malmö University** – SB and mental health research in 200 adults.
4. **Karlstadt University** – SB & PA measurements with 40 SENS devices.
5. **Århus University, Denmark** – Psychiatric study with 520 children (age 11).

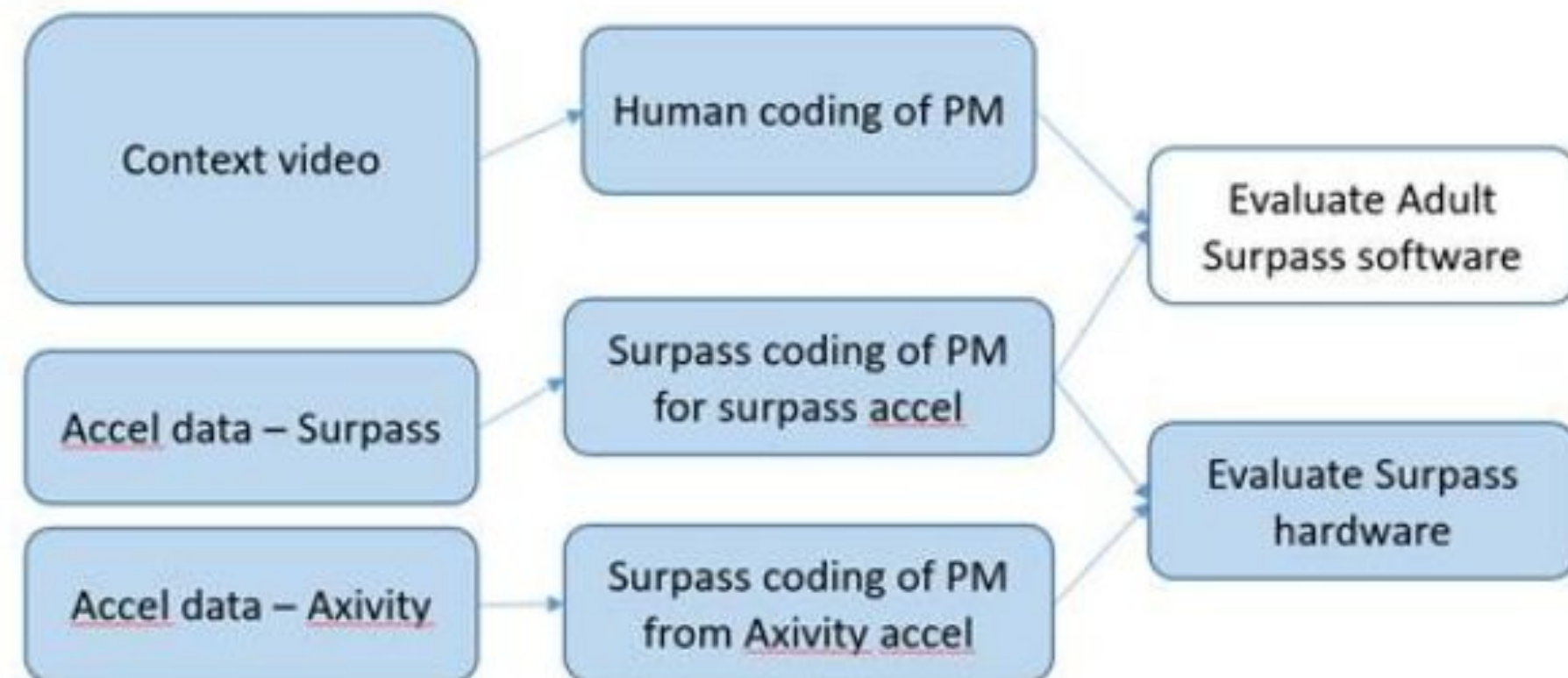


# Validation and Ongoing Studies Using Fibion SENS\*\*

1<sup>st</sup> study mentioned is done in Australia in a collaboration with NFA (Andreas Holtermann)

Lab study – evaluate adult SurPASS,  
develop/evaluate revised child  
SurPASS, develop/ evaluate lab ML

Lab collection – n=40, 3-14  
years, = sexes, ~20 activities,  
?2mins each activity



Professor Leon Straker  
John Curtin Distinguished Professor

School of Allied Health & enAble Institute  
Faculty of Health Science  
Curtin University





# Summary of Validity and Reliability

1. SENS device has been shown to have better validity and relative reliability than ActivPAL (Pedersen et al. 2022)
2. SENS provides raw data (12.5 Hz), so any algorithms for thigh-worn accelerometry can be used (validated Acti4 integrated to cloud)
3. SENS shows strong validity in children and adolescents (Milther et al. 2023).
4. SENS reliably measures gait in knee osteoarthritis patients (Ghaffari et al. 2022).
5. SENS accurately classifies activity types and postures in free-living conditions (Lendt et al. 2024).
6. Studies show raw data identical between brands (Crowley et al. 2019): always safe bet as raw data always accessible

Several ongoing high-profile projects using SENS as their primary measurement

7.



# Testimonial



“

*Large amount of high-quality data is crucial for successful research. Fibion SENS Motion provides unique features that makes data collection, analyses, harmonization and feedback to participants easier - and with less burden – both for participants and researchers.”*

---

**Professor Andreas Holtermann, MSO, MSc, PhD**

The National Research Centre for the Working Environment, Copenhagen, Denmark  
Working group member at ProPASS



# Project Management with Fibion SENS Made Easy

## Key features that make data collection, analysis and reporting easier and faster:

1. **Pre-charged devices** – Ready to use out of the box, no charging needed.
2. **Over 22 weeks of measurement time** – Long battery life for extended studies.
3. **Remote control** – Adjust settings and manage devices remotely.
4. **Automatic data upload** – Data is uploaded without manual intervention.
5. **Remote access from anywhere** – Monitor participants and access data online.
6. **GDPR compliant** – Ensures secure and privacy-compliant data handling.
7. **Automatically calculated variables** – Saves time by processing raw data automatically.
8. **Automatic participant reports** – Generates reports for easy data interpretation.



FIBION SENS



**"Impressive Overall Performance Coupled With  
Unrivalled Ease Of Use."**



# The Beginning

- University spin-off
- Fibion was established 2014



UNIVERSITY OF JYVÄSKYLÄ



Olli Tikkanen



Arto Pesola

STUDIES IN SPORT, PHYSICAL EDUCATION AND HEALTH  
211

Olli Tikkanen

Physiological loading during  
normal daily life and exercise  
assessed with electromyography



STUDIES IN SPORT, PHYSICAL EDUCATION AND HEALTH  
252

Arto Pesola

Reduced Muscle Inactivity, Sedentary  
Time and Cardio-Metabolic Benefits

Effectiveness of a One-Year Family-Based  
Cluster Randomized Controlled Trial





# Fibion Product Development Team



Olli Tikkanen, PhD in Sport Sciences



Arto Pesola, PhD in Exercise Physiology



Tommo Reti, DSc in Internet Media Technology and Business

## Peer Production

*Specialists who have a broad knowledge of their respective fields and various talents share these qualities with each other and create something new together.*



Ari Peltoniemi, MSc in Computer Sciences and Information Systems



Marko Havu, Biomedical Engineer, MSc Biomechanics, PhD candidate in Neuroscience and Biomedical Engineering





**Fibion**  
web.fibion.com



# Features that Make Data Collection a Breeze

The simplest way to get data remotely.

Participant only need to attach the device (no tech skills needed).



## Wearable Device

- Stick-and-Play patch
- Lightweight and waterproof
- Over 5 months 24/7 measurement time
- Over 2 years of standby time
- Automatic data transmission
- Hotspot upload™



## Accurate Data

- XYZ acceleration data
- Analysed sitting time, activity types and intensity
- Real-time remote data
- 2 weeks of data logging



## Smart Management

- Data management platform
- Cloud server
- Smartphone app
- Manage all sensors remotely
- Fibion online and PDF participant reports



# Disposable Patch



- The patch should be replaced after 14 days
- The patch typically loosens itself after 10-17 days.
- If redness or irritation occurs during use, remove the patch immediately
- 3M, Medical approved, ISO 10993-10



# Attaching the Patch and Device



Clean the skin where the patch is meant to be placed.



Remove the back side.



Place the patch on the outer side of the thigh.



Remove the white edge.



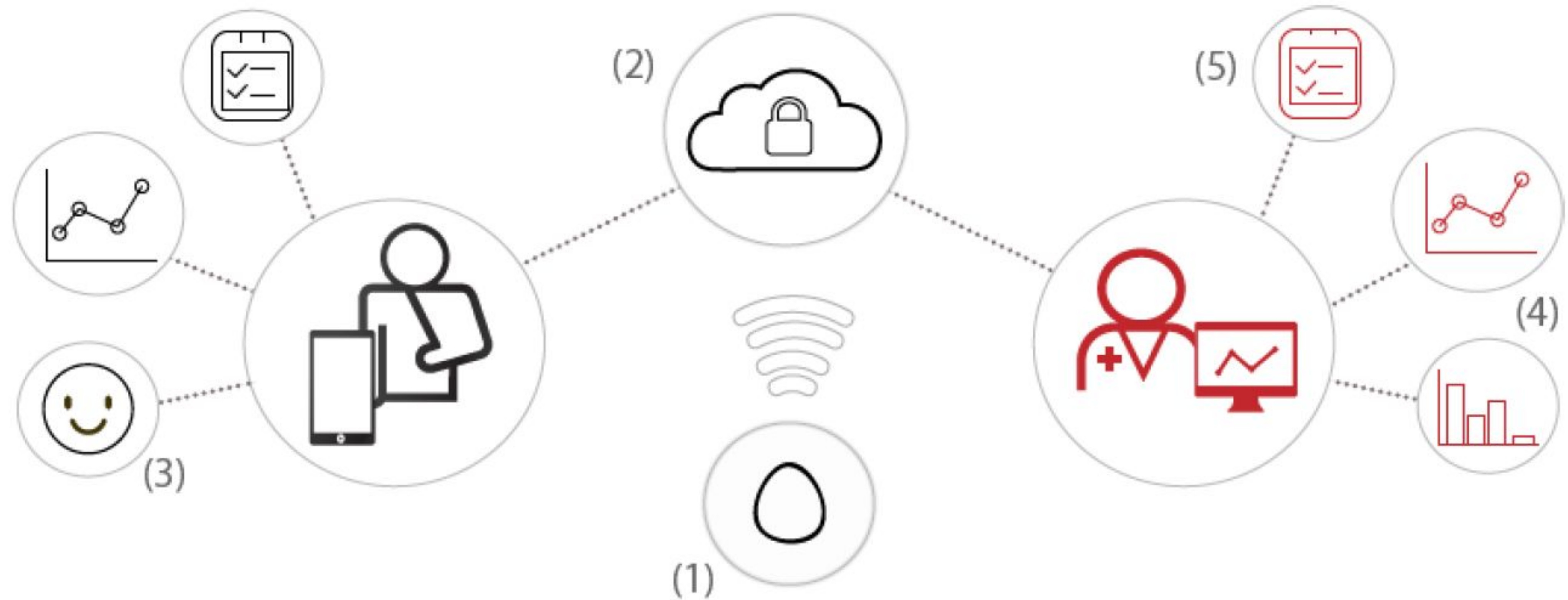
# New innovations

With our revolutionary Data-Management-as-a-Service (D-MAS™) and Hotspot Upload™ you can concentrate making world class research as you don't need to worry about GDPR regulations, sensor charging, data downloads, data storage, data backups, participant feedback reports etc.



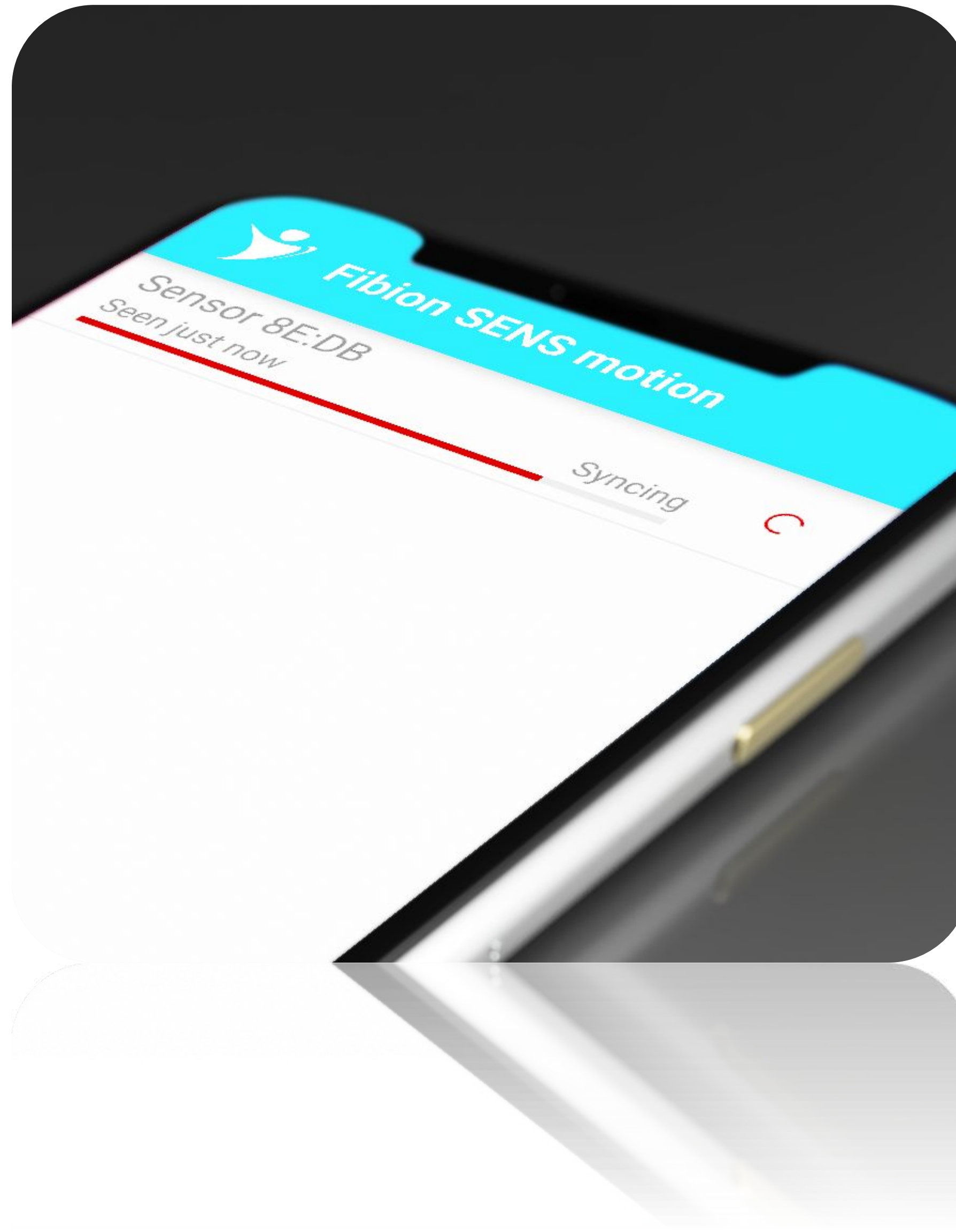


# System Architecture






# Smartphone App




1. iOS and Android
2. Bluetooth
3. Android: automatic data upload
4. iOS: need to tap to allow




# Web Portal



Project Select  
Chinese validation

 English

 olli.tikkanen@fibion.com

 Sensors

 Patients

 Measurements






















Workspace

Sensors

All Status

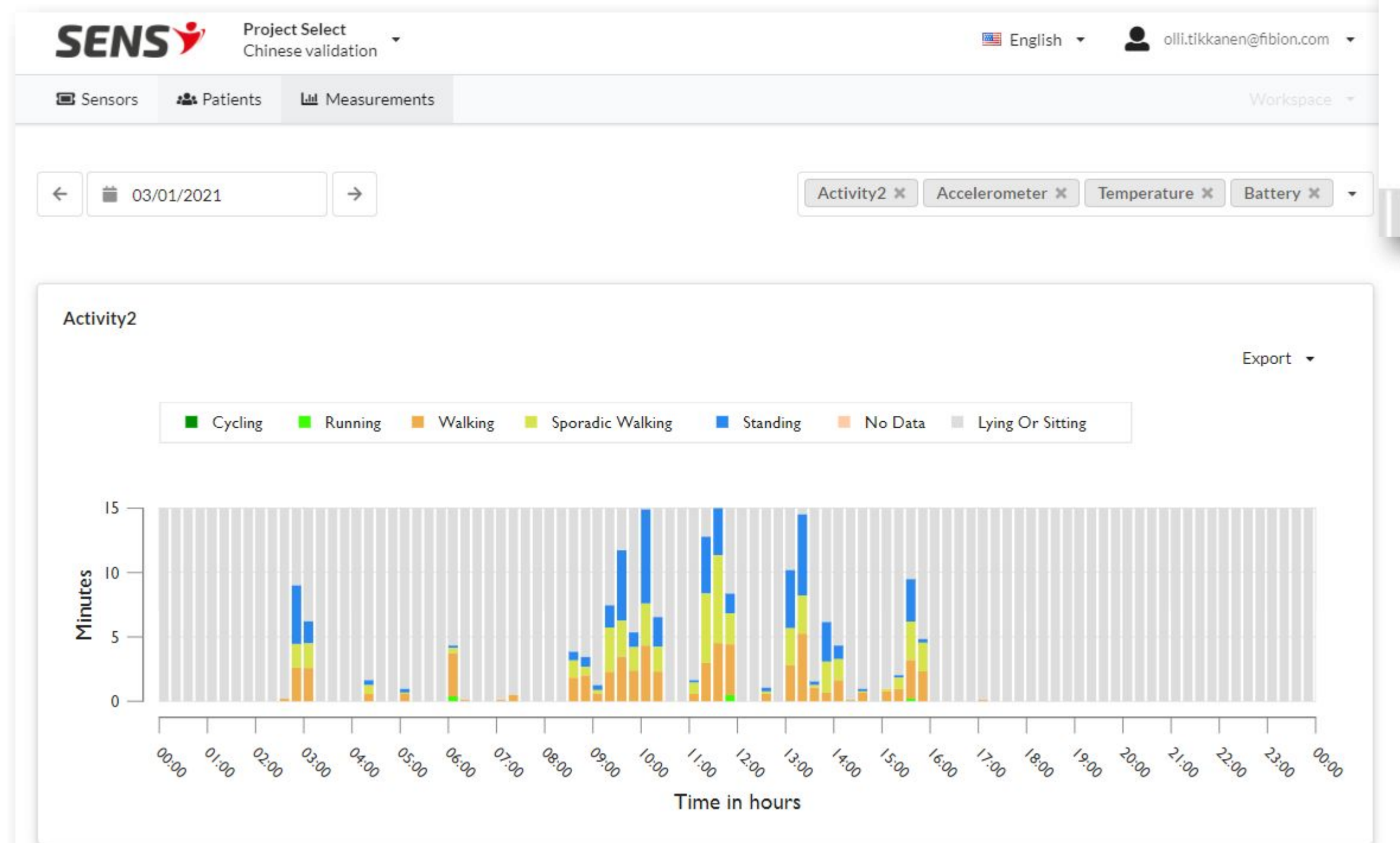


# Remote Control

<b>SENS</b> 		Project Select Chinese validation 	 English 		 olli.tikkanen@fibion.com 
 Sensors	 Patients	 Measurements	Workspace 		
Name 	Status	Last Online	Control		
44-7F.89	 Putting to Sleep	4 months, 21 days ago	<div>Wakeup</div>		
44-88.0F	 Putting to Sleep	5 months, 4 days ago	<div>Wakeup</div>		
48-13.4A	 Deep Sleep	2 months, 24 days ago	<div>Wakeup</div>		
48-1C.2F	 Deep Sleep	2 months, 24 days ago	<div>Wakeup</div>		
48-8A.DE	 Deep Sleep	2 months, 24 days ago	<div>Wakeup</div>		
48-8F.43	 Deep Sleep	2 months, 24 days ago	<div>Wakeup</div>		
48-90.5E	 Deep Sleep	2 months, 24 days ago	<div>Wakeup</div>		
48-96.B7	 Deep Sleep	2 months, 24 days ago	<div>Wakeup</div>		
48-A8.AA	 Deep Sleep	2 months, 24 days ago	<div>Wakeup</div>		
			<div></div>		



# Web Portal



Export

- PDF Report
- CSV
- Raw

## Export Raw

### Select Export Period

Period between Start Date and End Date is maximum 14 days

From

03/01/2021 00:00

To

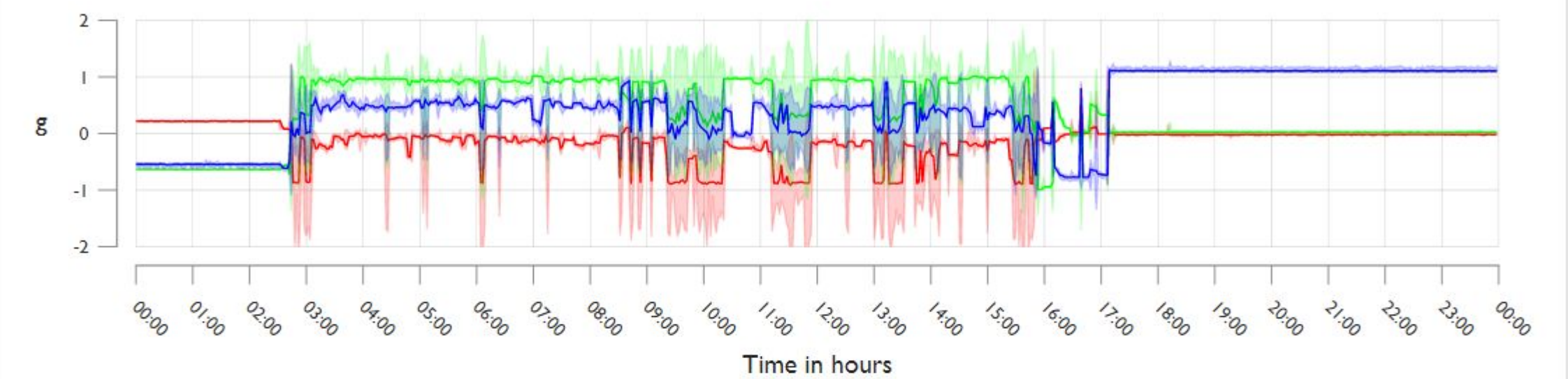
03/02/2021 00:00

Cancel

Export

### Accelerometer - Sensor: 48-C3.EE

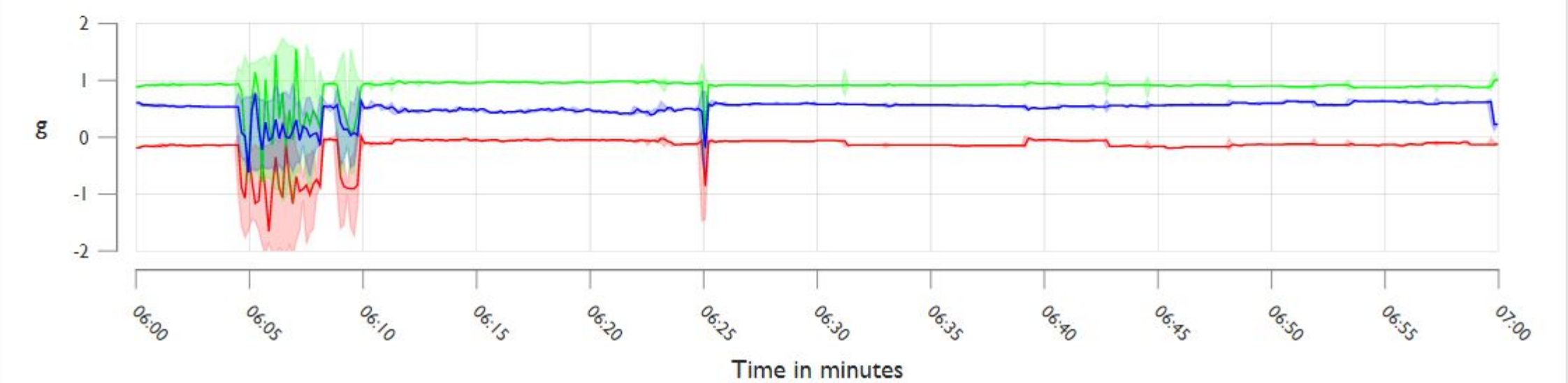
Export



← 06:00 →

Export

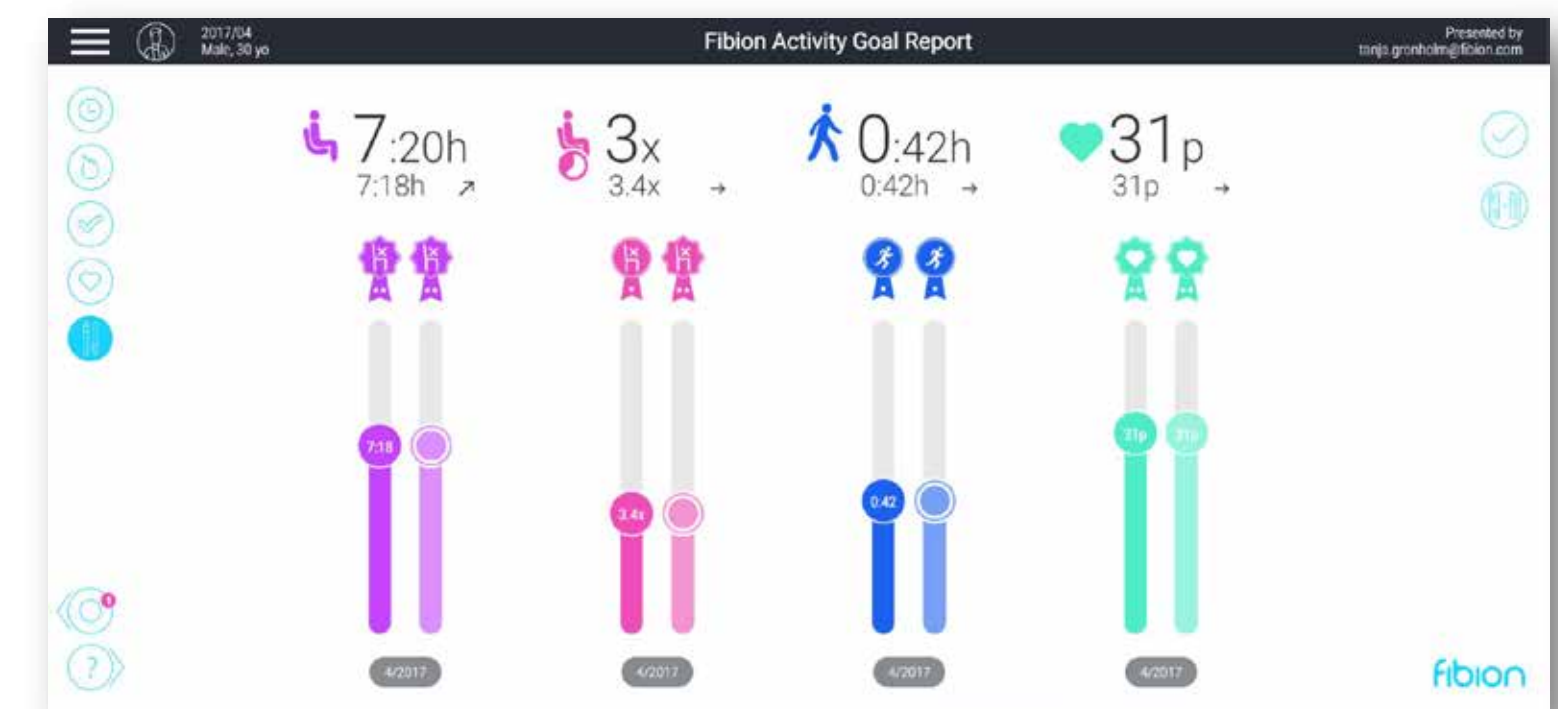
Accelerometer





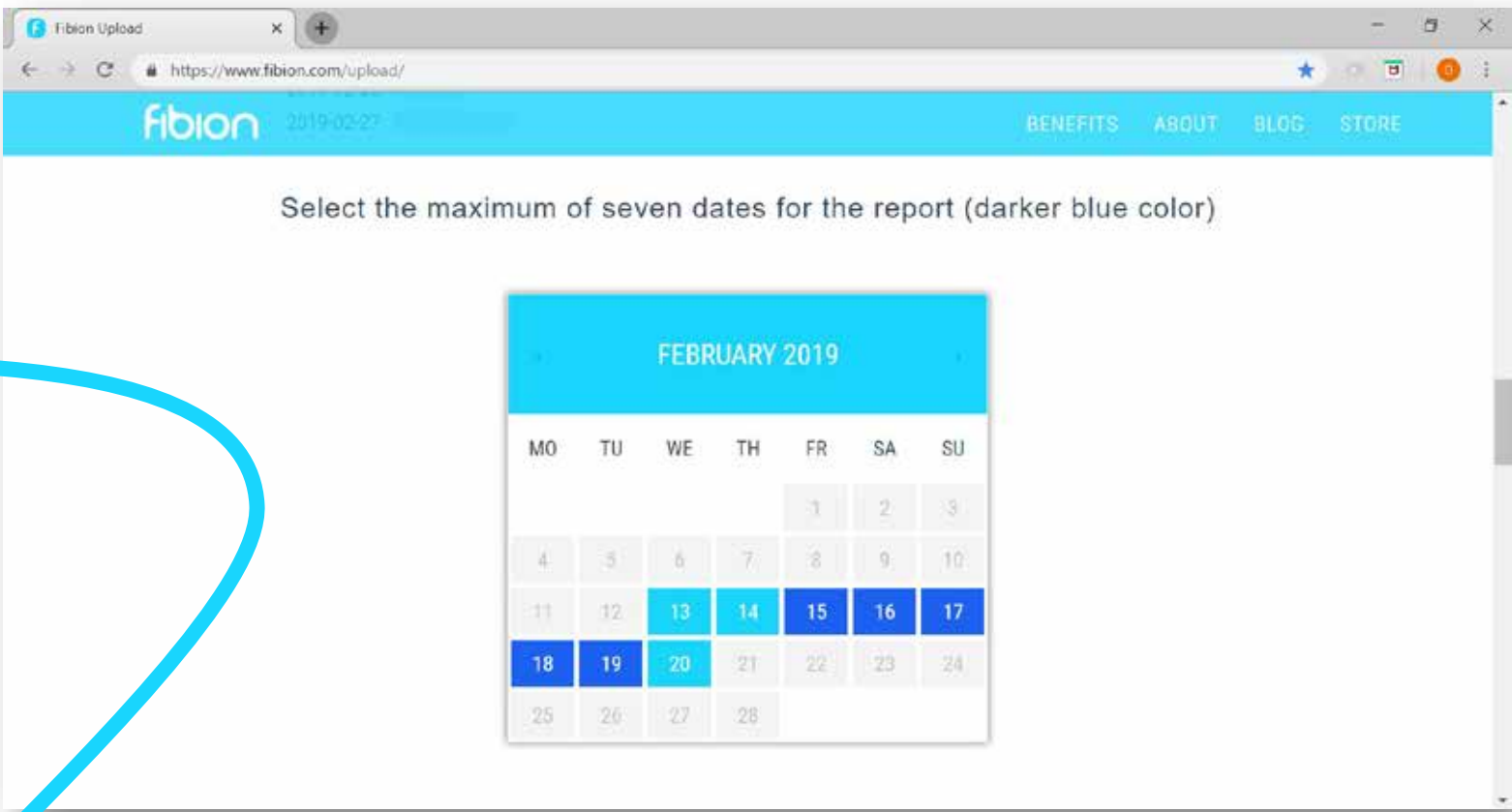
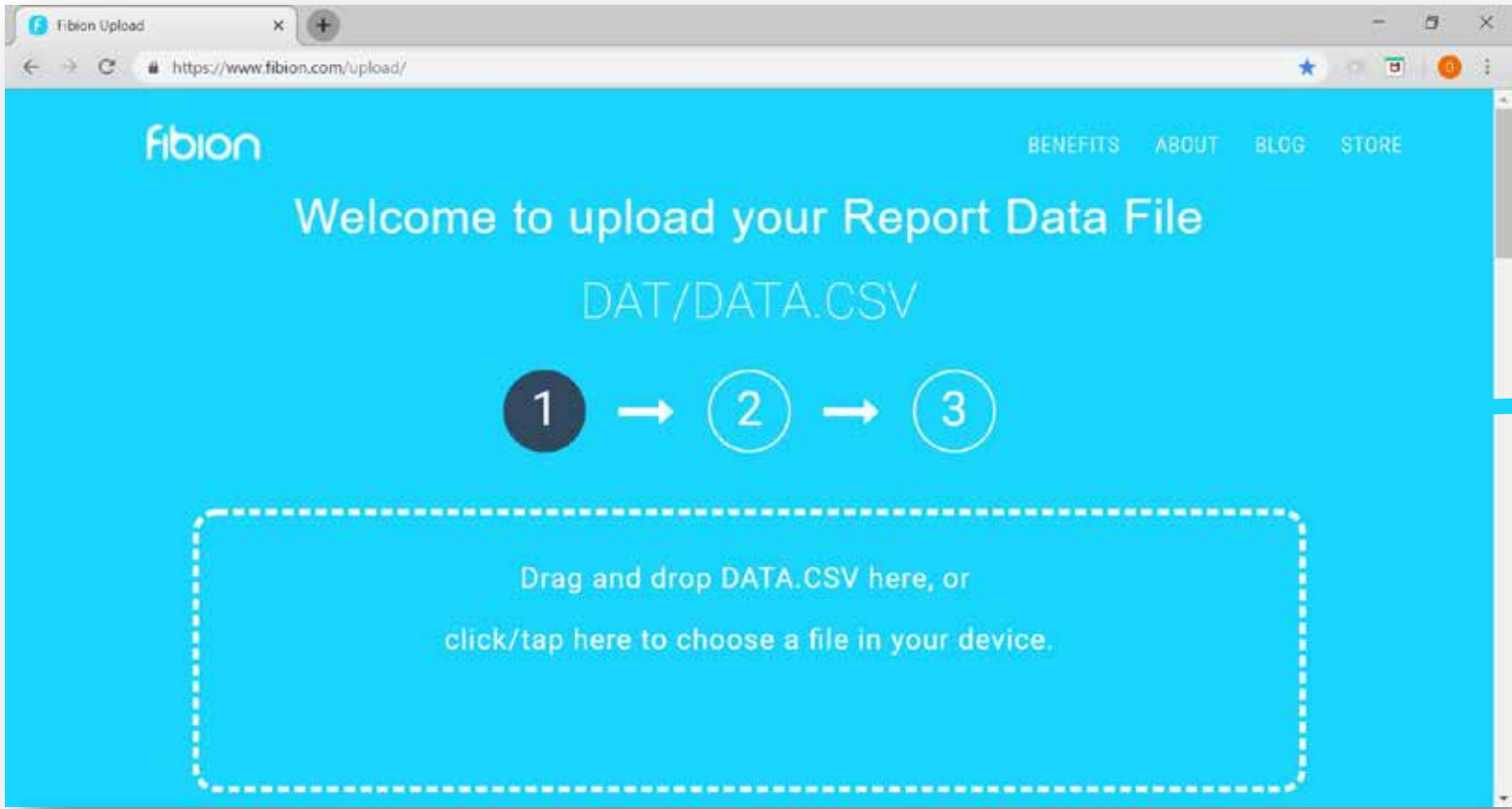
# Participant Feedback Reports

1. Automatically produced reports
  - a. PDF text report
  - b. Interactive online report
2. Can be shared as a simple web link
3. Interactive goal setting tools
4. Different language options
5. Group reports can be created easily
6. API available

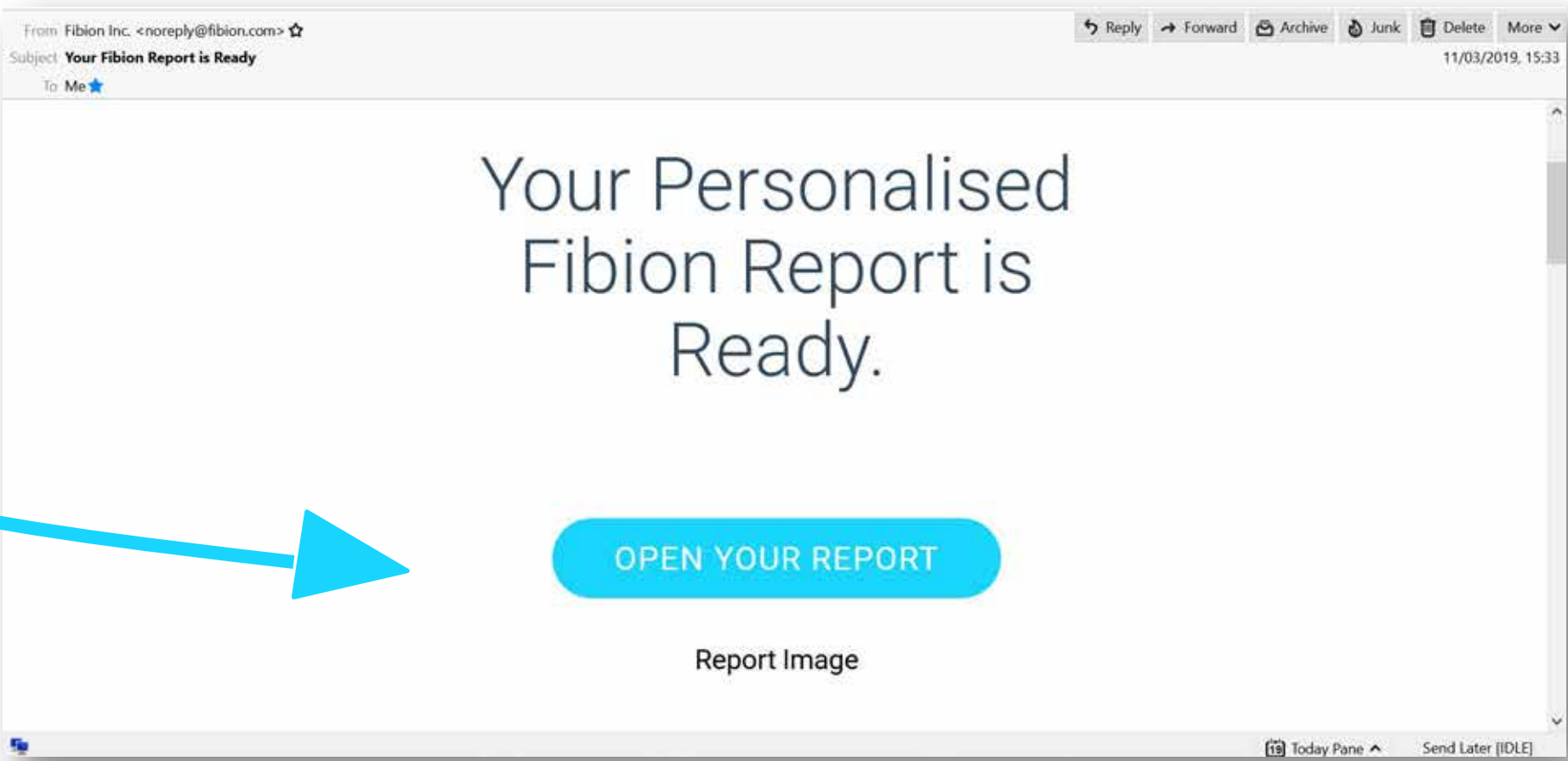
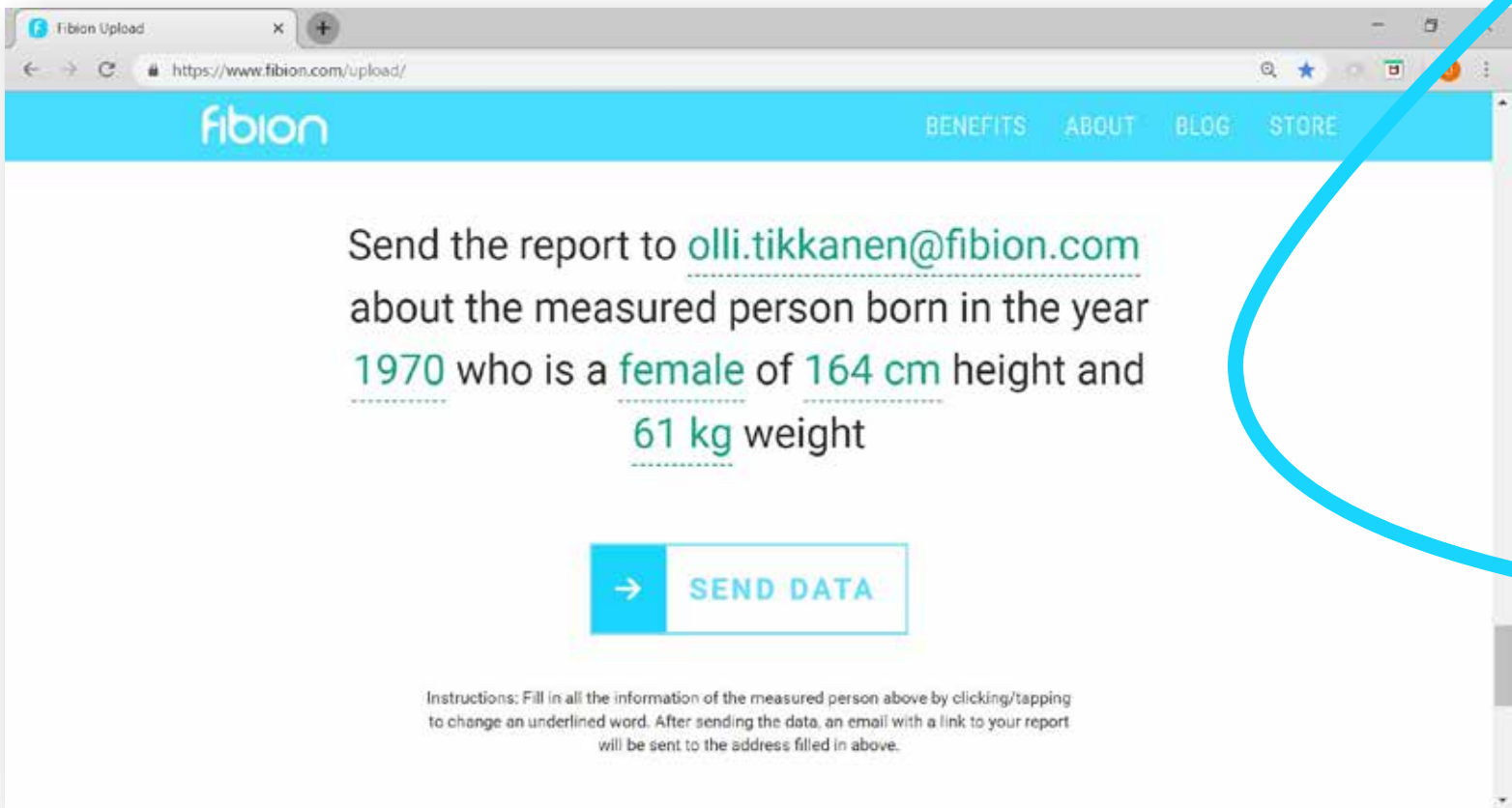




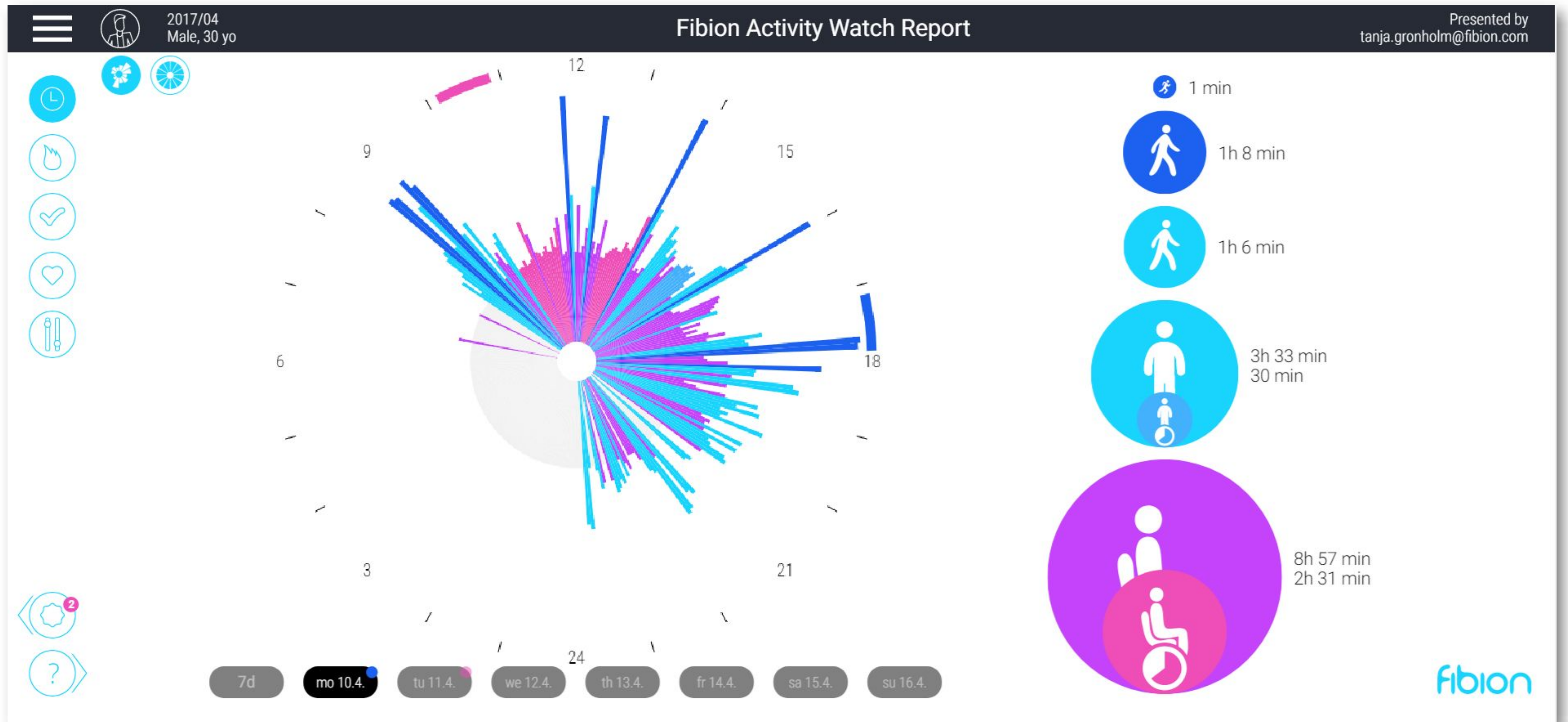
# Report Creation and Examples



<https://www.fibion.com/upload/>  
Fibion code: rnd6845







Example (in Swedish): <https://beta.fibion.com/report/fd99tG73UJFG/sv>





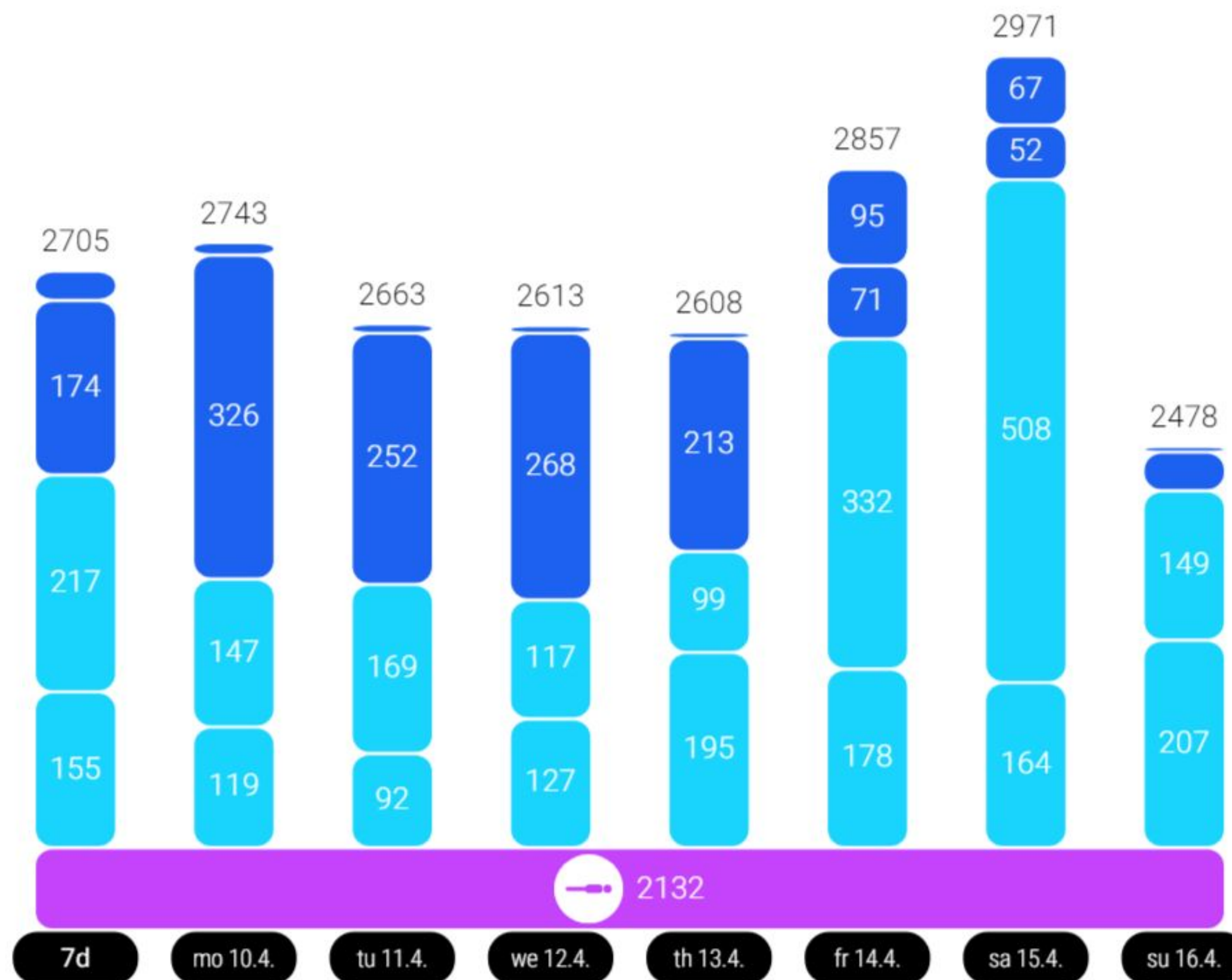
2017/04  
Male, 30 yo

## Fibion Activity Energy Report

Presented by  
tanja.gronholm@fibion.com

kcal

kJ



4 min



38 min



1h 39 min



4h 48 min

fibion

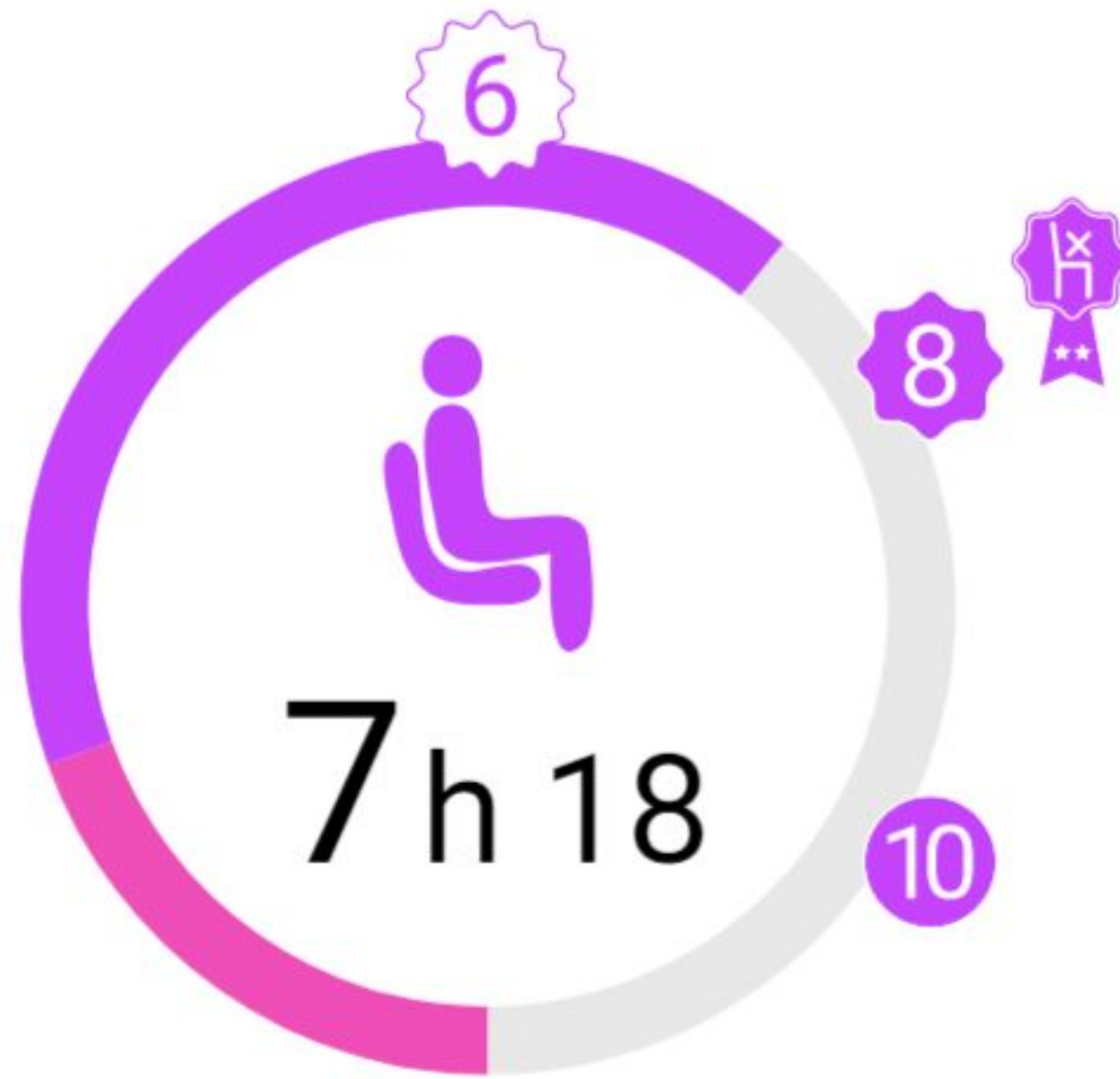




2017/04  
Male, 30 yo

## Fibion Activity Recommendation Report

Presented by  
tanja.gronholm@fibion.com



3.4 x



0.4 x



42 min



fibion

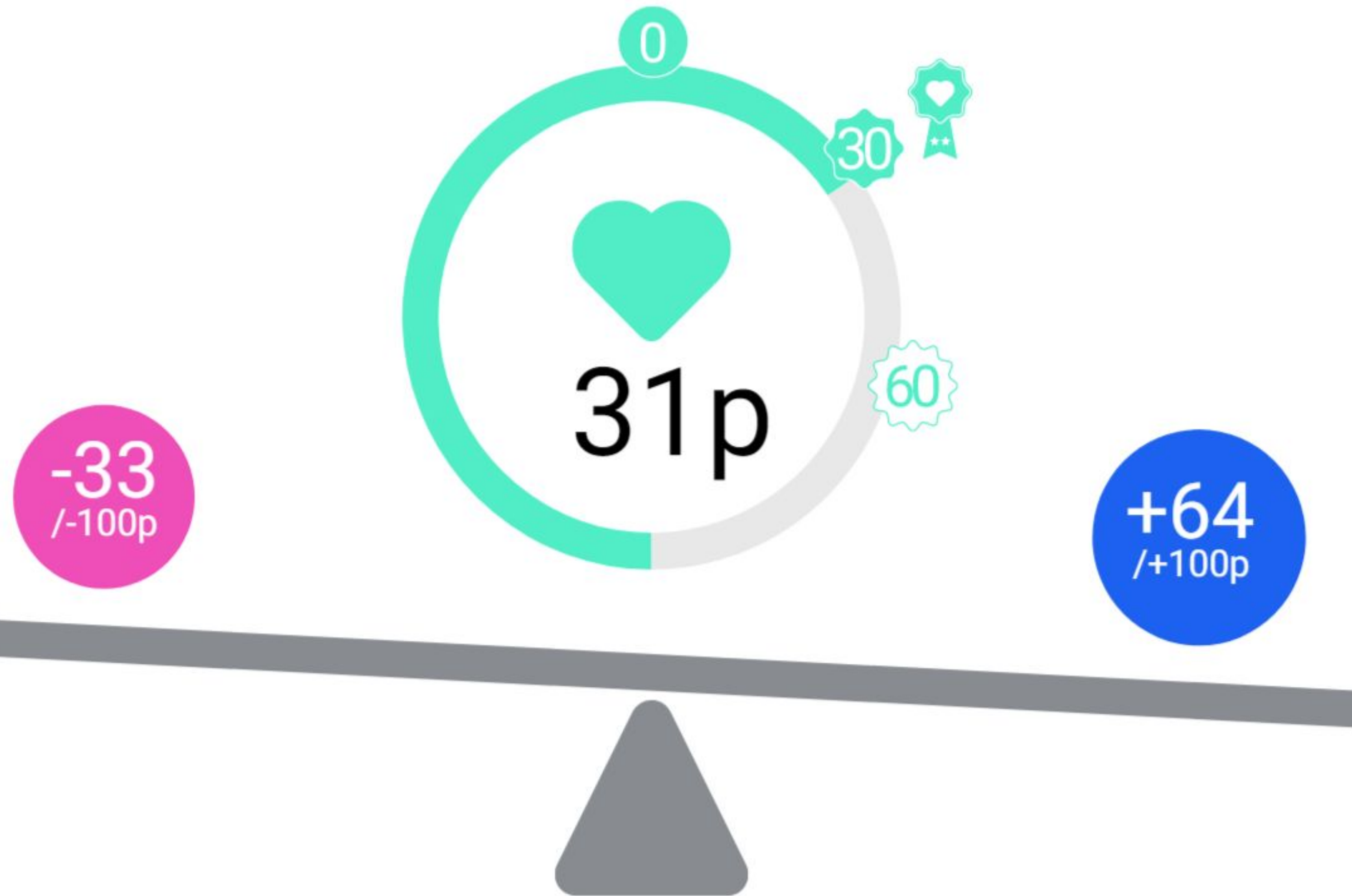




2017/04  
Male, 30 yo

## Fibion Activity Health Report

Presented by  
tanja.gronholm@fibion.com



fibion





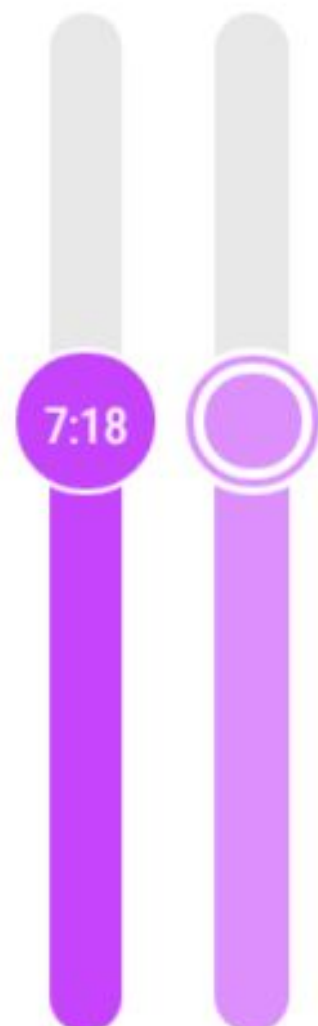
2017/04  
Male, 30 yo

## Fibion Activity Goal Report

Presented by  
tanja.gronholm@fibion.com



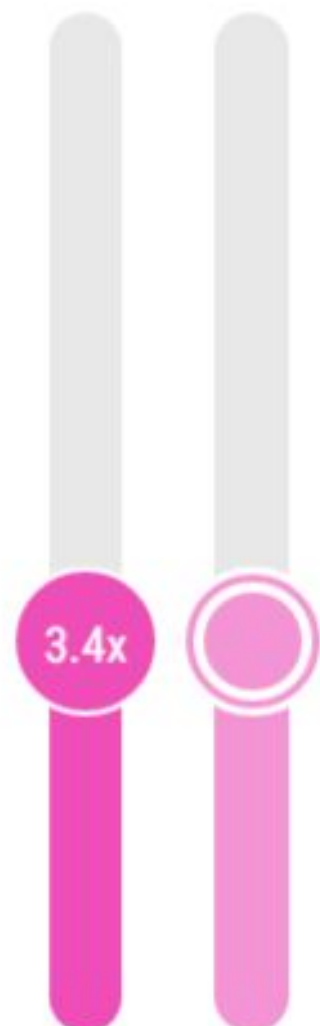
7:20h  
7:18h ↗



4/2017



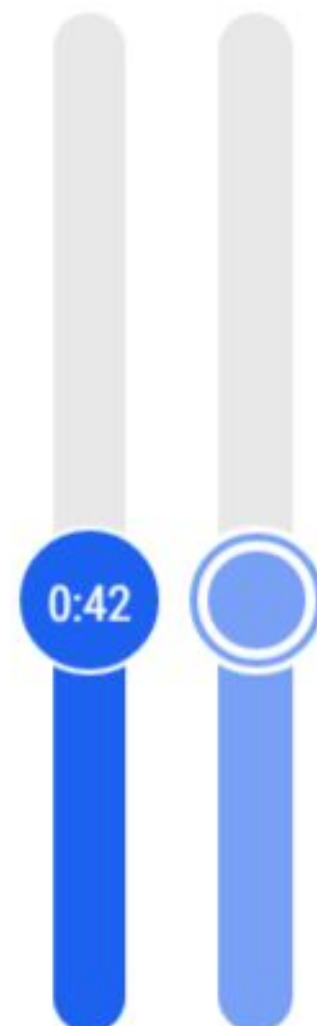
3x  
3.4x →



4/2017



0:42h  
0:42h →



4/2017



31p  
31p →



4/2017



fibion



# **fibion** GOAL REPORT

11/2016 Male, 35 yo

Presented by olli.tikkanen@fibion.com

## MY GOALS

 **7:05h**  
8:29h ↘



You set a goal to **reduce sitting time by 1h 24 min per day**. You used to sit 8h 28 min per day and your goal is to sit 7h 5 min per day.



You set a goal to **reduce the number of long sitting periods**. On average, you had 5.8 long sitting periods per day and your goal is 2 long sitting periods per day.




You set a goal to **reduce the duration of moderate-to-vigorous activity**. On average, you had 2h 7 min moderate-to-vigorous activity per day and your goal is 1h 40 min moderate-to-vigorous activity per day.



Your goal sitting and moderate-to-vigorous activity **increases your Fibion Points by 23 points**. You had 45 Fibion Points per day and your goal is 68 Fibion Points per day.

 **2x**  
5.8x ↘

## MY ACTIONS

 **1:40h**  
2:07h ↘

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# fibion FIBION MÅLSÄTTNINGSVRKTYG

4/2017 Man, 30 år

Fibion-rapport presenteras av tanja.gronholm@fibion.com

 **5:50h**  
7:19h ↘

 **2x**  
3.4x ↘

 **0:59h**  
0:42h ↗

## MINA MÅL



Du ställde ett mål att minska tiden du sitter med 1h 29 min per dag/. Du brukade sitta 7h 18 min per dag och ditt mål är att sitta 5h 50 min per dag



Du ställde ett mål att minska antalet långa perioder av sittande. I medeltal, hade du 3.4 långa perioder av sittande per dag och ditt mål är 2 långa perioder av sittande per dag.



Du ställde ett mål att öka varaktigheten av medel till högintensiv aktivitet/. I medeltal, hade du 42 min medel- till högintensiv aktivitet per dag och ditt mål är 59 min medel- till högintensiv aktivitet per dag.



Ditt mål för sittande och medel- till högintensiv aktivitet ökar dina Fibion-poäng med 30 poäng. Du hade 31 Fibion-poäng per dag och ditt mål är 61 Fibionpoäng per dag.

## MINA ÅTGÄRDER

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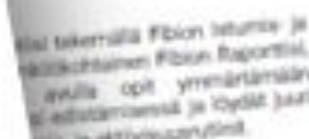
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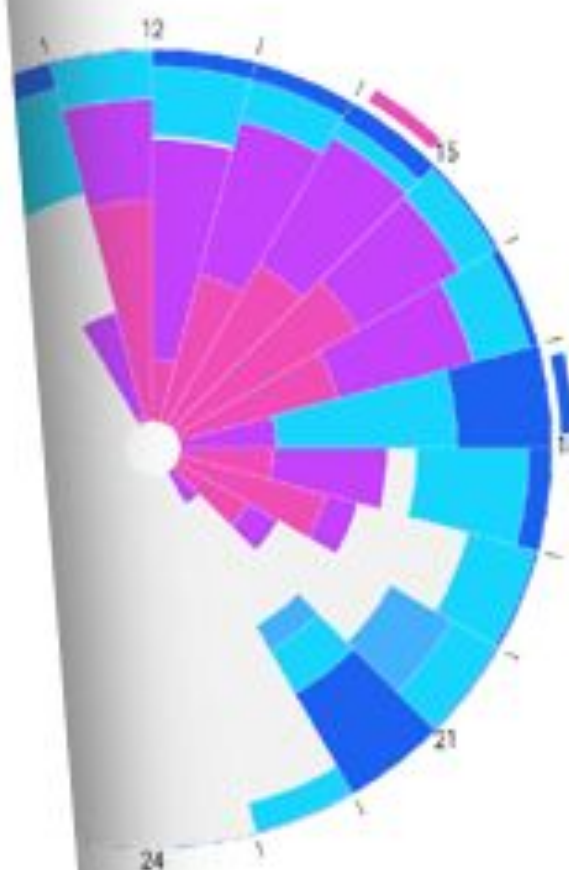
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Fibion



keskimääräistä istumista ja aktiivisuutta mittauksella. Kellon kehällä keskimääräinen istuminen sekä keski ja kovatehoista aktiivisuutta. **sininen** väri havainnollistaa istumista, **vaaleanpunainen** väri pitkiä **sininen** väri sekominuuttia ja kevyttä kävelyä, **turkoo** väri pitkiä **sininen** väri repasta kävelyä, pyöräilyä sekä kovatehoista aktiivisuutta. **sininen** väri



44 min 43 min 7 min

Katso päivittäin aktiivisuutesi:  
<http://www.fitness.mobi/report/125v%1a65P333#watch>

Iskut keskimäärin 7h 35 min päivässä. Lapsien taso on 6-10, hyvä taso 6-8 ja erinomaisen taso alle 6h päivässä. Iskuluvuksi on **hyvää tasolla**

Suola- ja keskimäärin 4,3 pakkia, (yli 30 min)  
 istumajakso päivässä. Lupaava taso on 3-5, hyvä taso  
 1-3 ja erinomainen taso alle 1 pakkia istumajaksoa  
 päivässä. Pakkaiden istumajaksot ovat lupaavalla tasolla.

[illegible]

Olti aktiivisen keskimäärin **3h päivässä**. Kaikki aktiivisuu-  
den mittaus, kävely ja juoksu, lasketaan. Lupaava taso  
on 6-8, hyvä taso 8-10 ja erinomainen taso yli 10h päivässä.  
Aktiivisuudet on **luokiteltu viiteksi** tauluiksi.

Seisojien keskimääräinen pituus oli 1,70 m, paino 68 kg, ja ikä 25 vuotta. Seisojien keskimääräinen pituus oli 1,70 m, paino 68 kg, ja ikä 25 vuotta.

**päivässä** on keskiarvo aktiivisuutta kokiensaäänä 40 min  
tuntia kohti. Tämän laskettaessa nopea kävely ja sitä  
intensivisempi liikuminen, kuten juoksu, loppava taso on  
80-90, hyvä taso 60-80 ja erinomainen taso yli 90 min  
päivässä. Nopea aktiivisuus on lupaavalla tasolla.

Alkoholisääliväuden määrä vähentää ihmistä ja sen ihmisen leveyshaijia. Pitä pekaallaan seiminen alvasta tulo ja ikkunenalvaperi naki, jota myös seimista on tekee tautia. Hepeä alvivaan nostaa ulos, parantaa muininberkityä ja tekee syliin ja muinuitaan sekä 2 tymin diabetes naki alvityin tekaasi.

AKTIIVISUUSTASAPAINO

Eluraispisteesi ovat -38 esteikolla -100-0. Mäännemän  
ja pidempi jaksot, stä shasemmat ovt  
atunipisteesi. **Likuntapisteesi ovt +71, esteikolla**  
0-+100. Mäännemän ja kovempi esteikolla  
tunest npeste esteikolla, stä kokeemmat ovt  
likuntapisteesi.

-100+100. Lupaava taso on 0-30, hyvä taso 30-60 ja  
 erinomaisen taso ylä 60 pistettä. #100pisteet ovat hyvällä

suurin osan ihmisen ihmisen määrä yhdistettynä riittävän  
 oikean ihmisen määrään vähentää ihmisen ihmisen  
 myydyksiä ja yläpää ja kehittää kummit ja  
 oimittajiksi. Föörpöidessä kummit ja  
 ihmisen tai ihmisen ihmisen.

istumista 2h 13 min päivässä leuut ennen 7h 30 min päivässä ja saavutat tuikeutuksen istumalla 5h 23 min kello 14-15 aikaan vähentää istumista!

Enemmän mukaisen alumiinin tai reppaan aktiivisuuden  
määrä rentas Fibropistettä 27 pistettä. Seula oli 33  
Fibropistettä päivässä ja tuotuksesi on saada 60  
Fibropistettä päivässä, mikä on erinomainen taso.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Aseta tavoitteesi ja näe niiden vaikutus **Fiktionistasiin**  
<http://www.fiction-movie-report.com/2016/11/05/2738499/>



# Data Exports: Activity Data and XYZ Data

```

utc, local, unixts, general/nodata/time, activity/lying+sitting/time, activity/upright_stand/time, activity/upright_sporadic_walk/time, activity/upright_walk/time,
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	1	utc	local	unixts	x	y	z
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	4	2021-02-08T22:00:00.209000Z	2021-02-08T23:00:00.209000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	5	2021-02-08T22:00:00.301000Z	2021-02-08T23:00:00.301000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	6	2021-02-08T22:00:00.394000Z	2021-02-08T23:00:00.394000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	7	2021-02-08T22:00:00.486000Z	2021-02-08T23:00:00.486000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	8	2021-02-08T22:00:00.578000Z	2021-02-08T23:00:00.578000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	9	2021-02-08T22:00:00.670000Z	2021-02-08T23:00:00.670000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	10	2021-02-08T22:00:00.762000Z	2021-02-08T23:00:00.762000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	11	2021-02-08T22:00:00.854000Z	2021-02-08T23:00:00.854000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	12	2021-02-08T22:00:00.946000Z	2021-02-08T23:00:00.946000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	13	2021-02-08T22:00:01.039000Z	2021-02-08T23:00:01.039000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	14	2021-02-08T22:00:01.131000Z	2021-02-08T23:00:01.131000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	15	2021-02-08T22:00:01.223000Z	2021-02-08T23:00:01.223000+01:00	1.61282E+12	-0.352	-0.216	-0.672
	16	2021-02-08T22:00:01.315000Z	2021-02-08T23:00:01.315000+01:00	1.61282E+12	-0.352	-0.216	-0.672



# Use of Device

1. Enclosed structure – fully waterproof
2. Battery cannot be changed or charged
3. Operation time:
  - i. 2 years stand-by time
  - ii. 22 weeks of measurement time





# Specifications

- Sensor for movement
- 3D Accelerometer -4G to 4G
- Storage memory: 14 days
- Sensor for temperature
- Battery - In use 22 weeks
- Sampling frequency 11 Hz (22 Hz possible)
- 2.4GHz low energy transfer
- Transfer time for 1 day's data ~5 min
- Length: 47 mm
- Width: 22 mm
- Thickness: 4.5 mm
- Weight: 7 grams
- Patch: 3M, Medical approved, ISO 10993-10



## General information

CE This product is classified as medical equipment, class 1, in accordance with the directives 2002/96/EC (WEEE), 93/42/EEC, 2014/53/EU (RED), 2014/30/EU (EMC) and 2002/95/EC (ROHS). EN60601-1-Medical Device General Safety. The patch is tested for irritation and skin sensitization (DS/EN ISO 10993-5:2013).



# Selected Fibion Scientific References

University of  
**Kent**



**Berkeley**  
UNIVERSITY OF CALIFORNIA



Universidad  
de Cádiz



UNIVERSITY OF JYVÄSKYLÄ



South-Eastern Finland  
University of Applied Sciences



上海交通大学  
SHANGHAI JIAO TONG UNIVERSITY



University of the  
Highlands and Islands  
Oilthigh na Gàidhealtachd  
agus nan Eilean

**SeAMK**

SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES



NUI Galway  
OÉ Gaillimh



University  
of Worcester



Anglia Ruskin  
University

Cambridge & Chelmsford



**WISCONSIN**  
UNIVERSITY OF WISCONSIN-MADISON



Sylvia Lawry Centre for  
Multiple Sclerosis Research



**ARCADA**  
University of Applied Sciences



KAMK • University  
of Applied Sciences



Edge Hill University



Qatar Orthopaedic and Sports Medicine Hospital  
مستشفى جراحة العظام والطب الرياضي قطر



UNIVERSITY OF  
**LEICESTER**



**UQÀM**

Université du Québec à Montréal



# FIBION WEARABLES

## FIBION FLASH

- 9-Axis Motion
- HRV/ECG

## FIBION HELIX

- 3-Axis Accelerometer
- HRV/PPG

## FIBION G2

- 6-Axis Motion
- Sleep Positions
- Posture Allocation
- Event Marker Button

## FIBION VITALS

- 9-Axis Motion
- Temperature
- Respiration
- ECG/HRV
- Sleep Positions
- SPO2

## FIBION SENS

- 3-Axis Accelerometer
- Sleep Movement
- Posture Allocation





# Thanks!



## Olli Tikkanen

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[www.fibion.com](http://www.fibion.com)