



OI in the smart age.

Instruction for a smart use of your
smartphone to increase safety and quality of
life

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Disclaimer

No financial connection to any of the products and services
listed in this presentation

AS.IT.OI 40 years of activity for OI patients.





Forty years ago patients not or poorly treated
and often severely crimped.

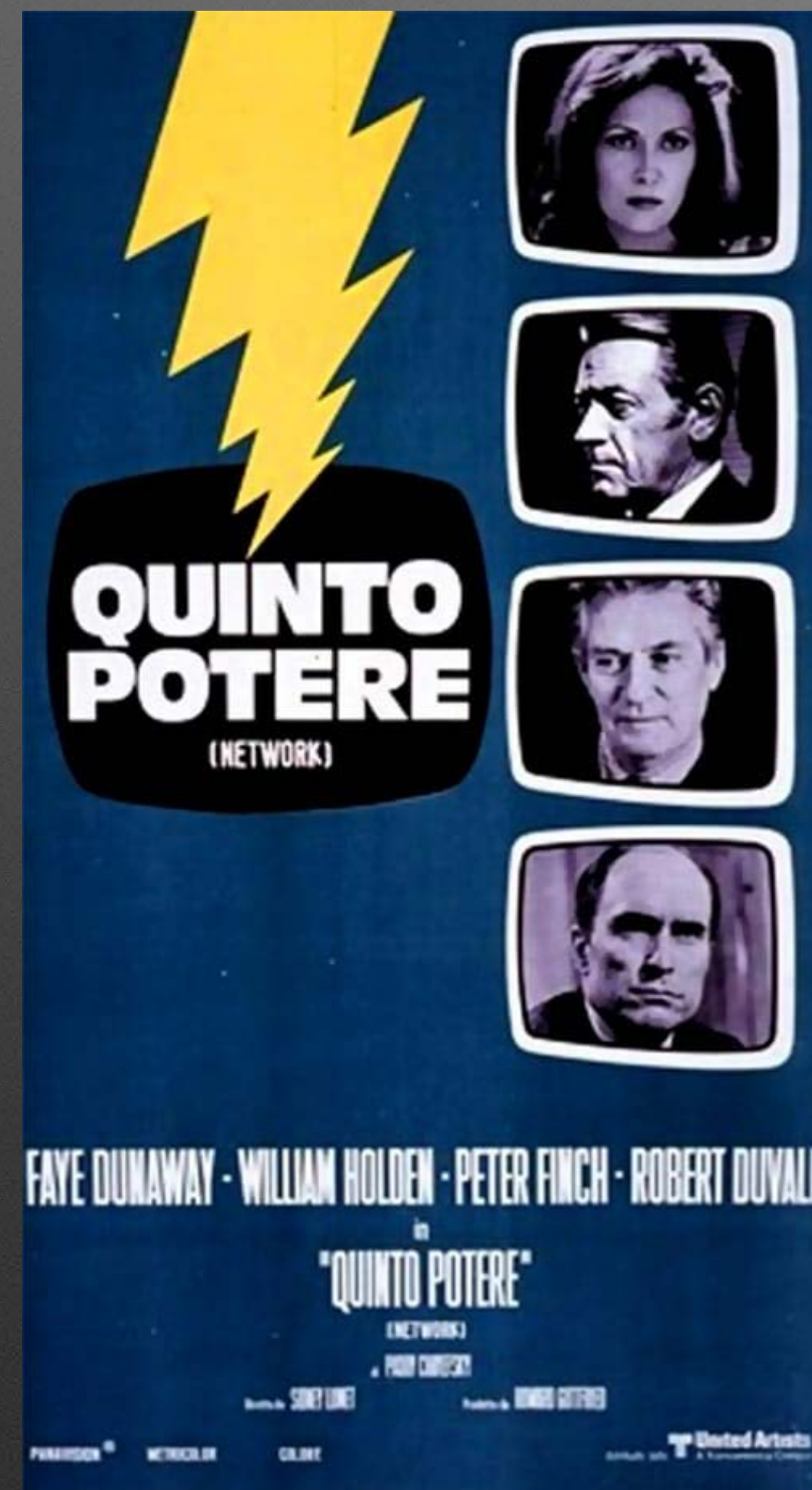
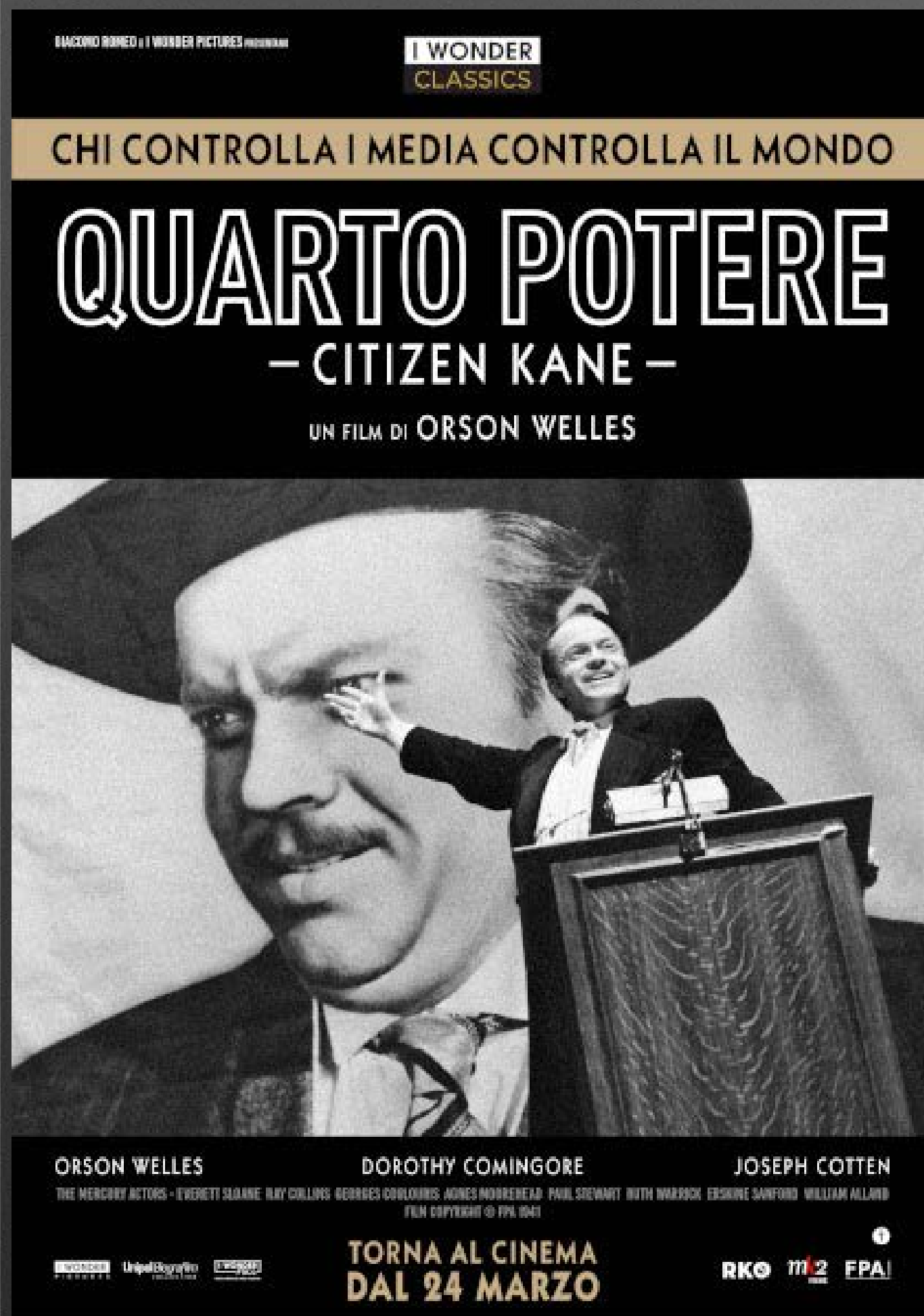


In spite of these conditions most of the patients were able to overcome their handicap and were socially and professionally active

First cases of Italian children treated in France



Evil use of data from newspapers, tv network, virtual money and social network



Good use of your fingers for data communication

- Smartworking
- Exchanging clinical data (xray, images)
- Food and drink delivery
- Enterteiment
- Social relations when you can't get in real contact.



Oil in adults –Easy Check at home

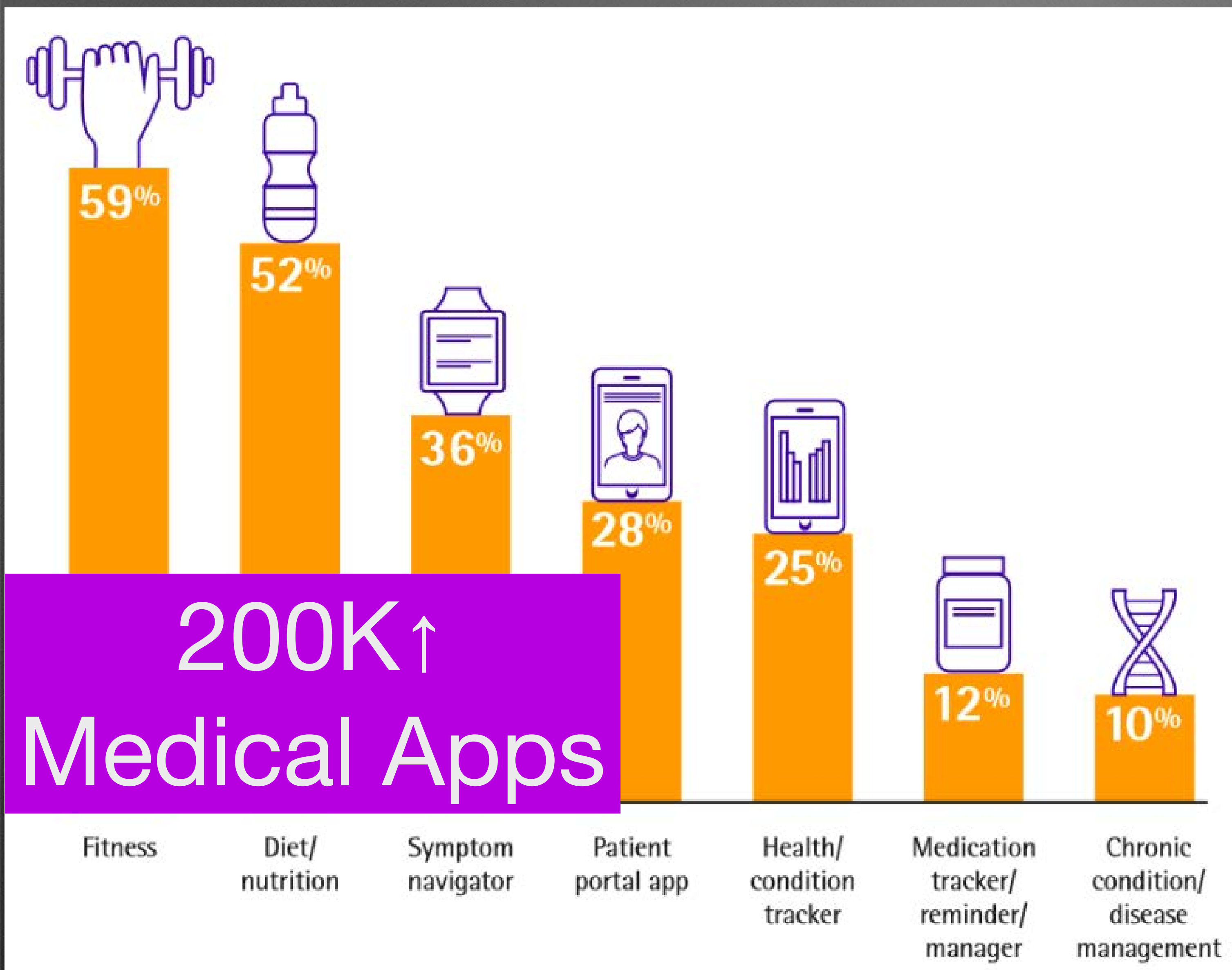
- Fractures
- Pain
- Spine
- Breath
- Weight
- Strength
- Laxity
- Osteoporosis
- Quality of life

Popularity and adoption of smartphones

- How many here have smartphones?
- Use apps for health reasons yourself?
- Use wearables or have other devices that talk to smartphone?
- Patients asking you to recommend an app to help manage their disease or help them exercise and lose weight?

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Patients Use Apps for Health Reasons



- 2016 Survey:

- Use of health apps doubles since 2014 from 16% to 33% in 2016
- Use of wearable technology up from 9% in 2014 to 21% in 2016

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- Activity and sleep trackers are TNTM
- Still growth market – 112M by 2018
- Fitbit wins in sales 2016
- Various styles – features – prices

Fitness -- Wearables



- Heartrate monitor
- Sleep monitor
- Stairs climbed
- Calories burned
- Oxygen saturation
- Time/date display
- Swim monitor
- Smartwatches have some of the above and are competitive

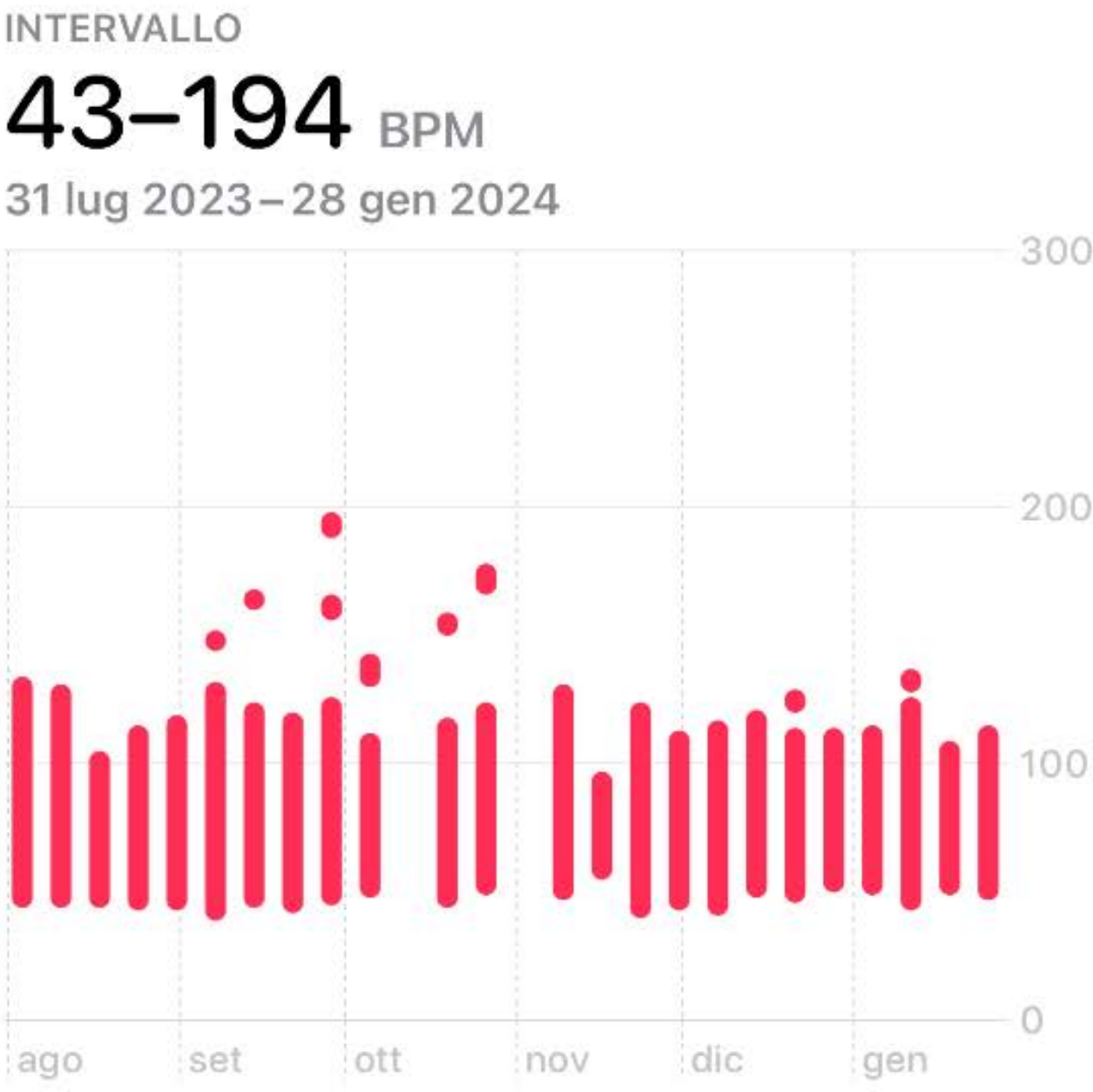
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Smartwatches

- Advantages over wristbands:
 - Answer phone
 - Receive and send texts
 - Emergency SOS button
 - Fall down alert
 - Get alerts from programs on your phone like calendar alerts, pill reminders
 - Track odd exercises, get exercise progress reports
 - Basal energy expenditure more accurate
- Disadvantage: expensive
- May be >60% of wearable market by 2021

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H | G | S | M | **6 M** | A



Allenamento **49–174** BPM

[Mostra più dati - Battito cardiaco](#)

Dati in evidenza [Mostra tutto](#)

❤️ **Frequenza cardiaca: allenamento**

Durante l'ultima camminata, l'intervallo

Dati sanitari in evidenza

🔥 **Attività**

- Passi >
- Distanza camminata/corsa >
- Dispendio calorie attive >
- Ore in piedi >
- Minuti di esercizio >
- Allenamenti >

🧠 **Benessere mentale**

- Minuti di esercizio >

❤️ **Cuore**

- Battito cardiaco >

💊 **Farmaci**

- Farmaci >

🔥 **Distanza camminata/corsa** 09:44 >

0,87 km

🔥 **Passi** 09:44 >

1.282 passi

🔥 **Piani saliti** 09:26 >

1 piano

💊 **Bisoprolo** 08:44 >

Assunti

1 unità

Wearables - Smart Tops, Socks and App

- Monitor Running/walking form, heart
- Alert when corrections needed
- Works with sports tops that monitor breathing and heart rate



Mobile Medical App Oversight

Food and Drug Administration (FDA) must approve mobile apps that are:

1. An extension of one or more medical devices which controls the device or monitors patient or analyzes medical device data
2. Transform the mobile platform into a regulated medical device by using attachments
3. Performing patient-specific analysis and providing patient-specific diagnosis, or treatment recommendations.

Home Health - Smart Thermometers

- Some need wire (*Kenza*) and others use Bluetooth (*Withings*) to talk to app
- Apps let you track symptoms
- Define multiple users.



Home Blood Pressure Monitors

- Cuff or wrist models
- Bluetooth to app
 - iHealth, Withings, Omron 10
- Check for FDA approved
- Pulse Oximeter also available



Lab-in-a-Box Health Tracking

<https://cue.me/#inflammation>

- Cue systems
- Samples blood, saliva, mucous
- Monitor Vitamin D, inflammation, influenza, testosterone, fertility
- Sends results to app



Apps/Devices FDA Regulatory Oversight

2. Mobile apps that use **attachments**, display screens, sensors or other such similar components to transform a mobile platform into a **regulated medical device**.

- **Example:**

Kardia Mobile
ECG-AliveCor.com



Other Smartphone Attachments

- Ultrasound (Philips)
- Stethoscope (Eko)
- Pulse Oximeter (iHealth)
- Otoscope (Welch Allyn)
- Ophthalmoscope (WA)
- Some have AI assisted diagnostics in app



Philips Lumify Ultrasound

Monitoring Adherence

- Asthma/COPD Smart Inhaler
- Device that fits onto an inhaler, Bluetooth spirometers
- Wirelessly syncs with app
- Record trending data
- Shared with physician

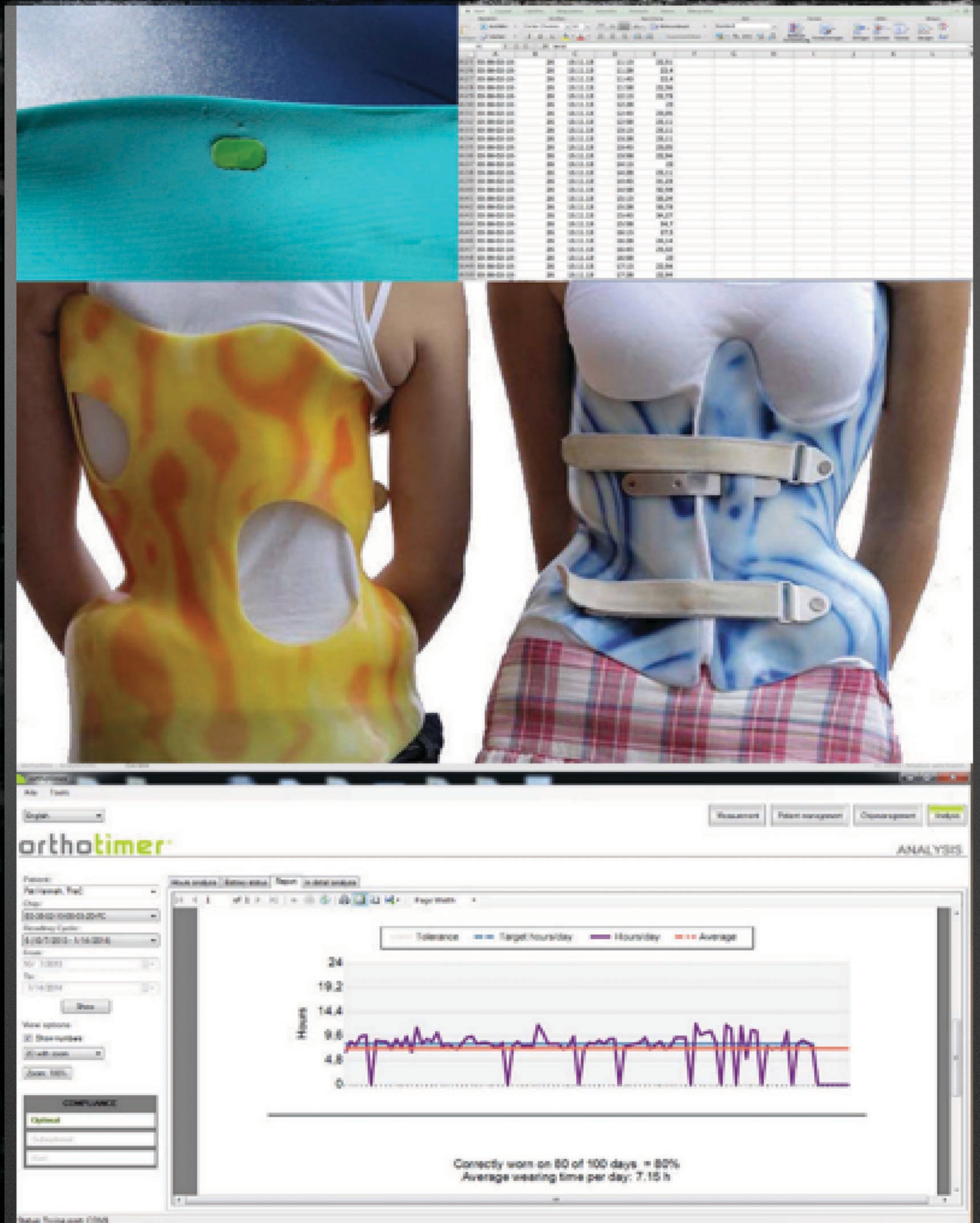
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Compliance evaluation for brace

- Using a thermal sensor to check effective timing in brace.
- Checking every three months-

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THERMAL IMAGING AND DIAGNOSTIC IN OI

Format: Abstract ▾

Send to ▾

Med Biol Eng Comput. 2018 Sep;56(9):1633-1643. doi: 10.1007/s11517-018-1806-3. Epub 2018 Feb 26.

Evaluation of high resolution thermal imaging to determine the effect of vertebral fractures on associated skin surface temperature in children with osteogenesis imperfecta.

Fane De Salis A¹, Satchi R², Dimitri P^{2,3}.

Ⓜ Author Information

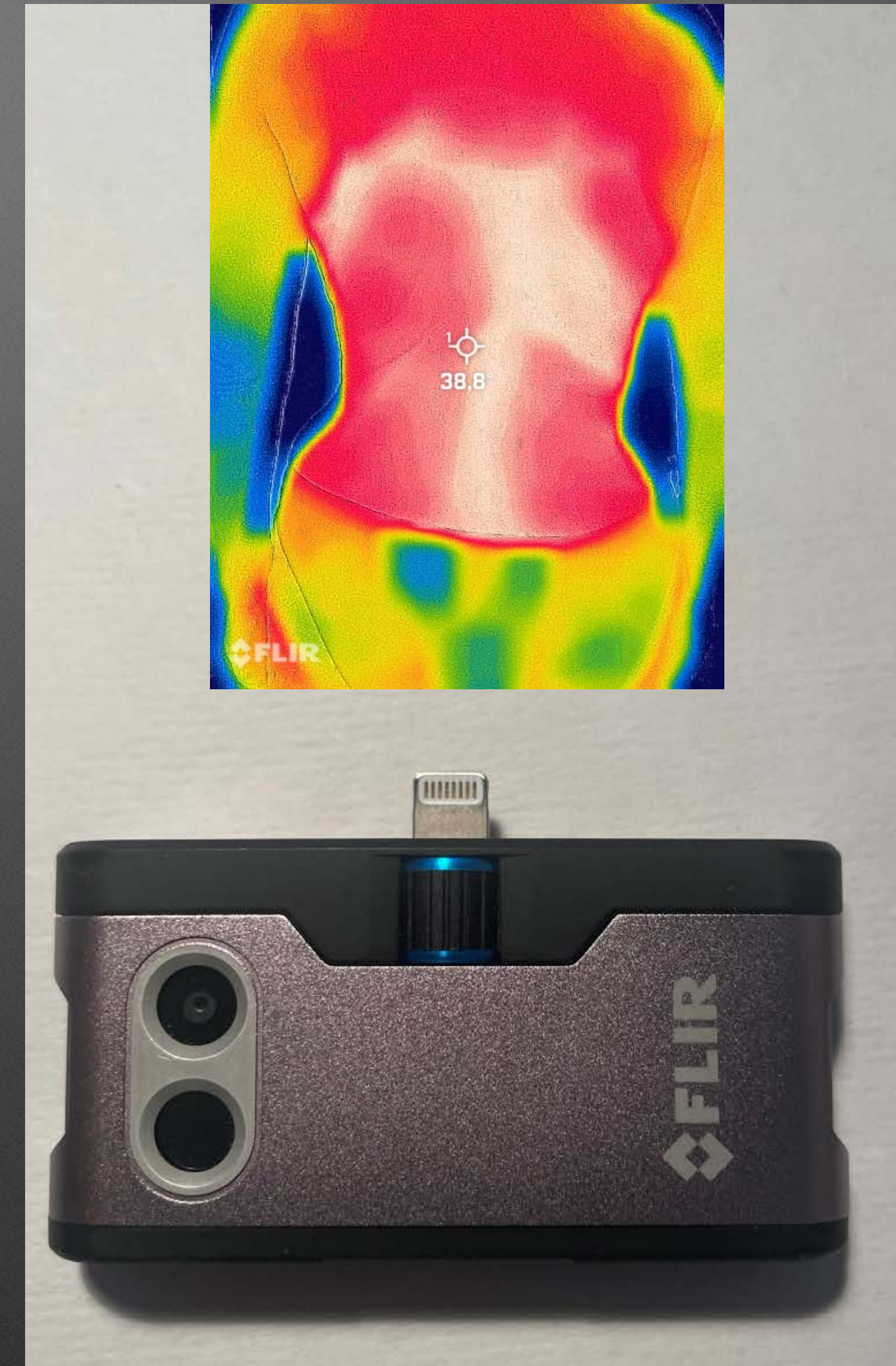
Abstract

Vertebral fractures are common in children with osteogenesis imperfecta (OI). Current imaging methods for fracture detection (X-ray and DXA) use ionising radiation. This pilot study explored whether the alteration in blood flow in vertebral fractures results in skin temperature changes that may be detected using high resolution thermal imaging (HRTI) and thus assist diagnosis and monitoring of fractures in OI patients. Eleven participants aged 5-18 years with OI and known vertebral fractures were enrolled. Small metal discs were placed on the skin surface alongside the vertebrae before participants had DXA and X-ray scans and thermal imaging of their backs. Visibility of the discs on the DXA and X-ray scans and thermal images allowed the temperatures of the skin surface above vertebrae without (healthy) and with fractures to be compared to their respective adjacent skin surface regions (region of reference, ROR) by calculating the temperature percentage change (TPC). The TPC between the skin temperature over the fractured thoracic vertebrae ($n = 11$) and the ROR was significant (1.44%, $p = 0.002$, 95% confidence). TPC between the skin temperature over healthy thoracic vertebrae and ROR was not significant (0.97%, $p = 0.15$, 95% confidence). HRTI may provide a novel tool for assisting in detection of vertebral fractures in OI. Graphical abstract • Patients (aged 5-18) with osteogenesis imperfecta and known vertebral fractures. • Thermal imaging was performed alongside routine imaging (DXA scan and spinal X-ray). • The temperature above each vertebra was compared with its adjacent skin region to assist with diagnosis of the fracture.

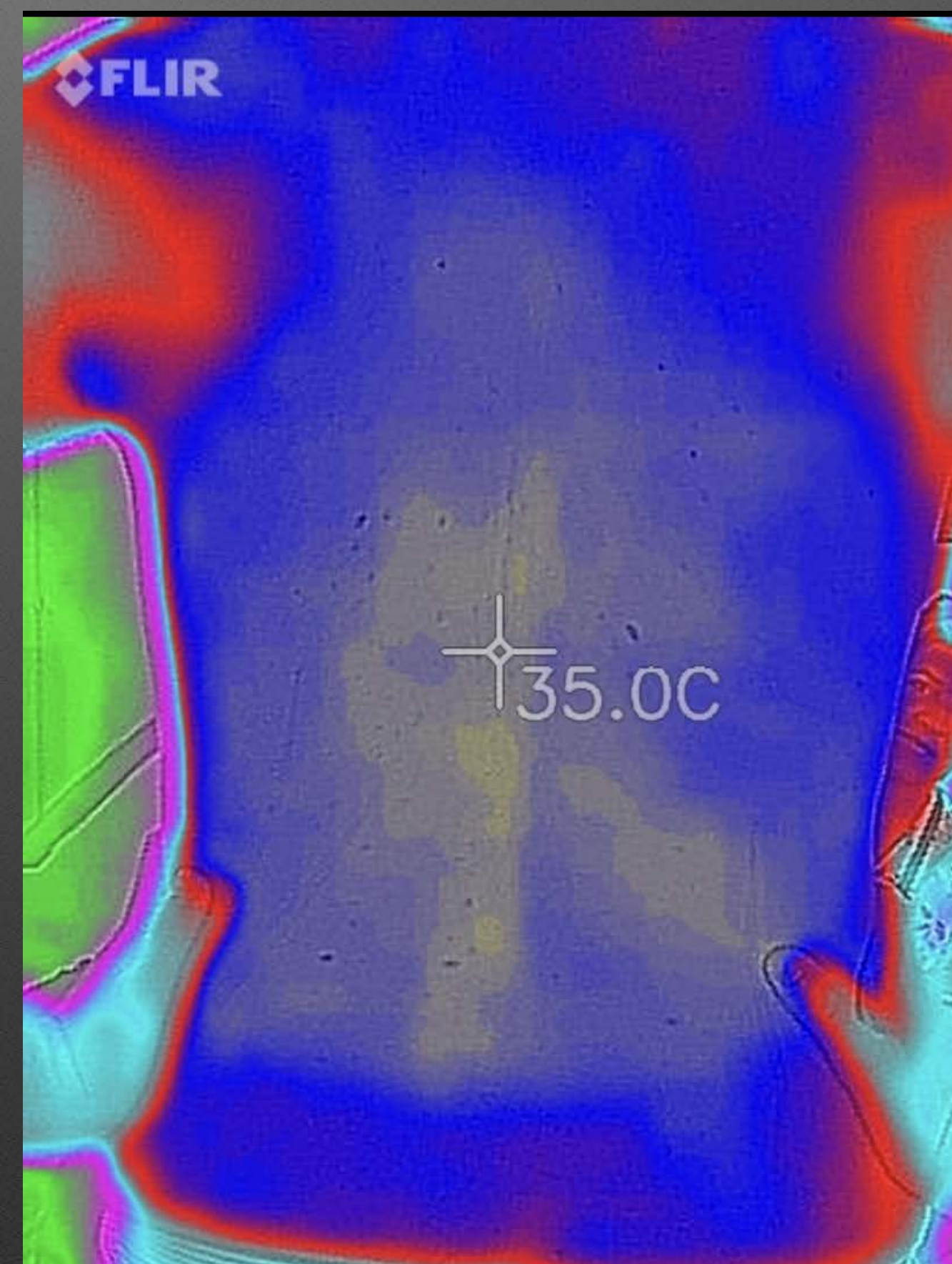
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Thermoscanner device for smartphones

Easy to use
Cost 400 – 500 €

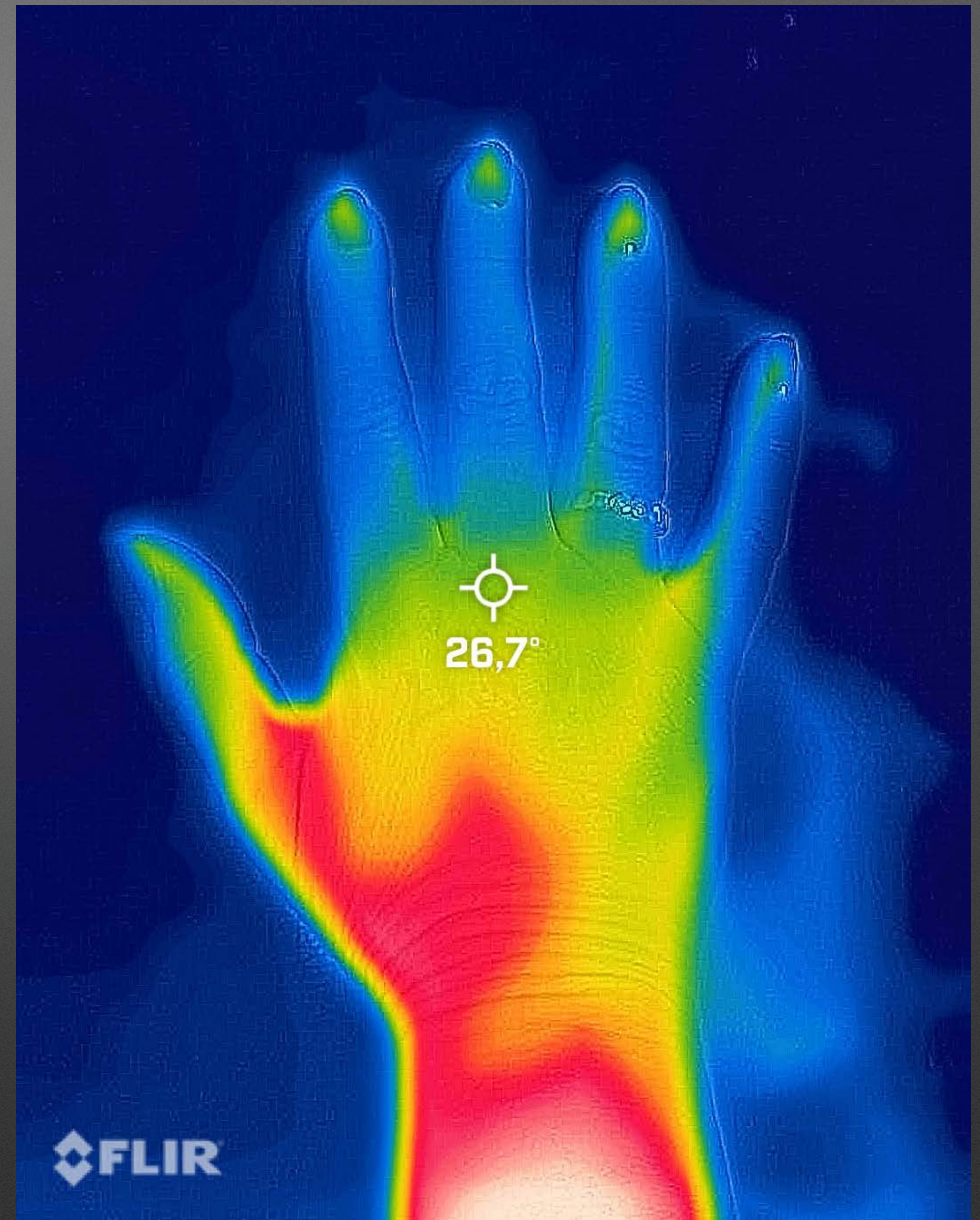


OI PATIENTS WITH THORACOLUMBAR MINIMAL FRACTURE AND RIGHT COSTAL PAIN



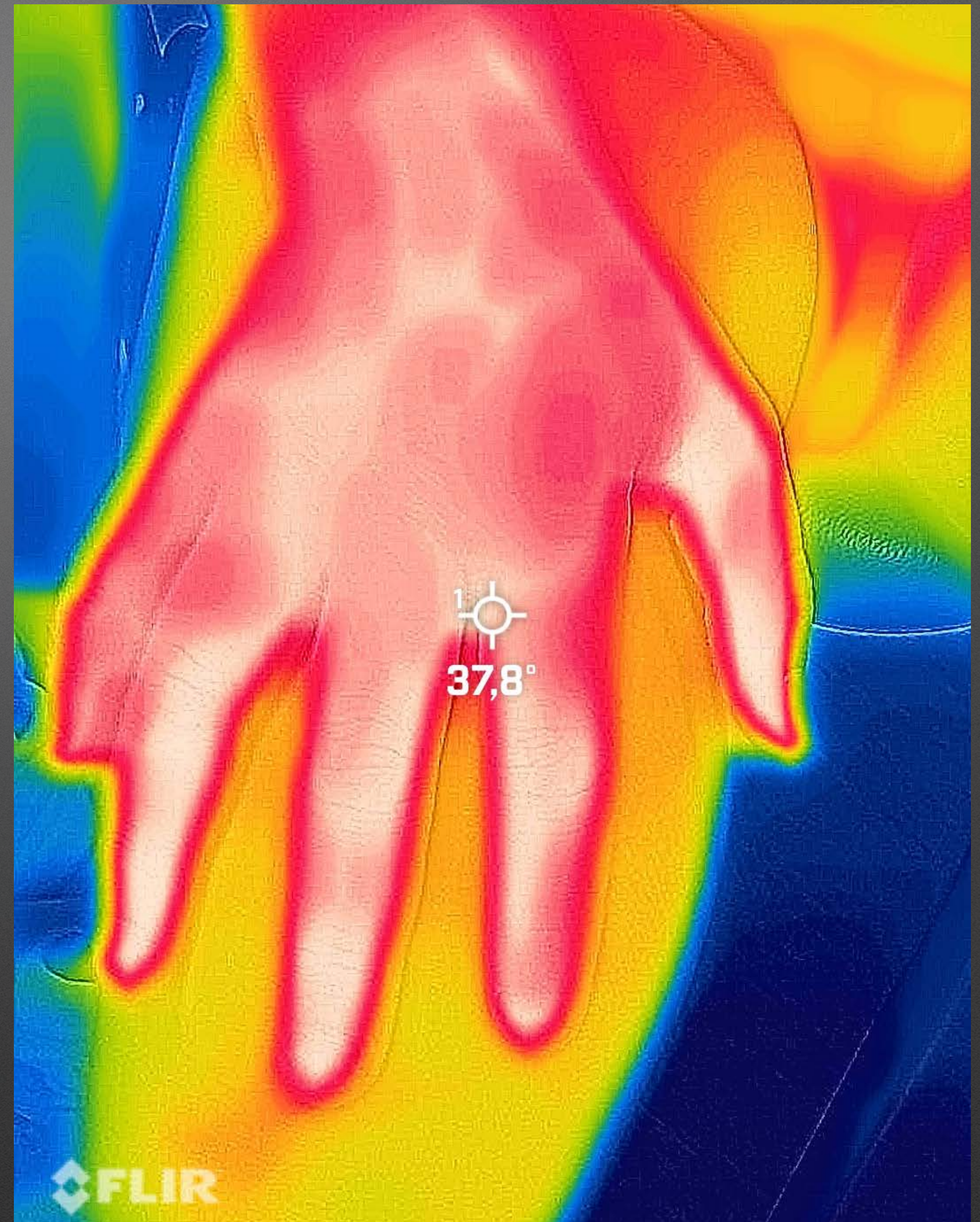
Raynaud syndrome detection

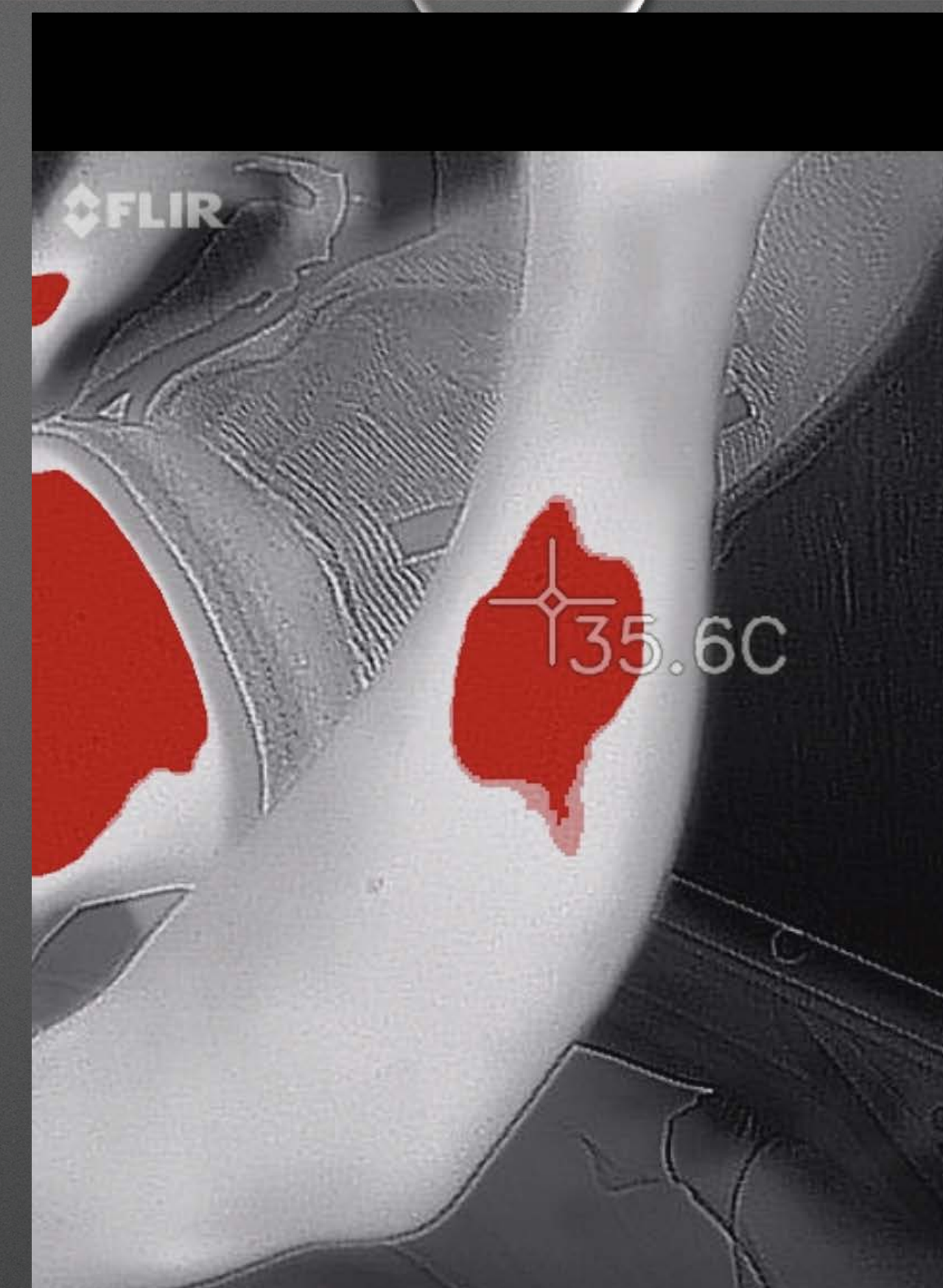
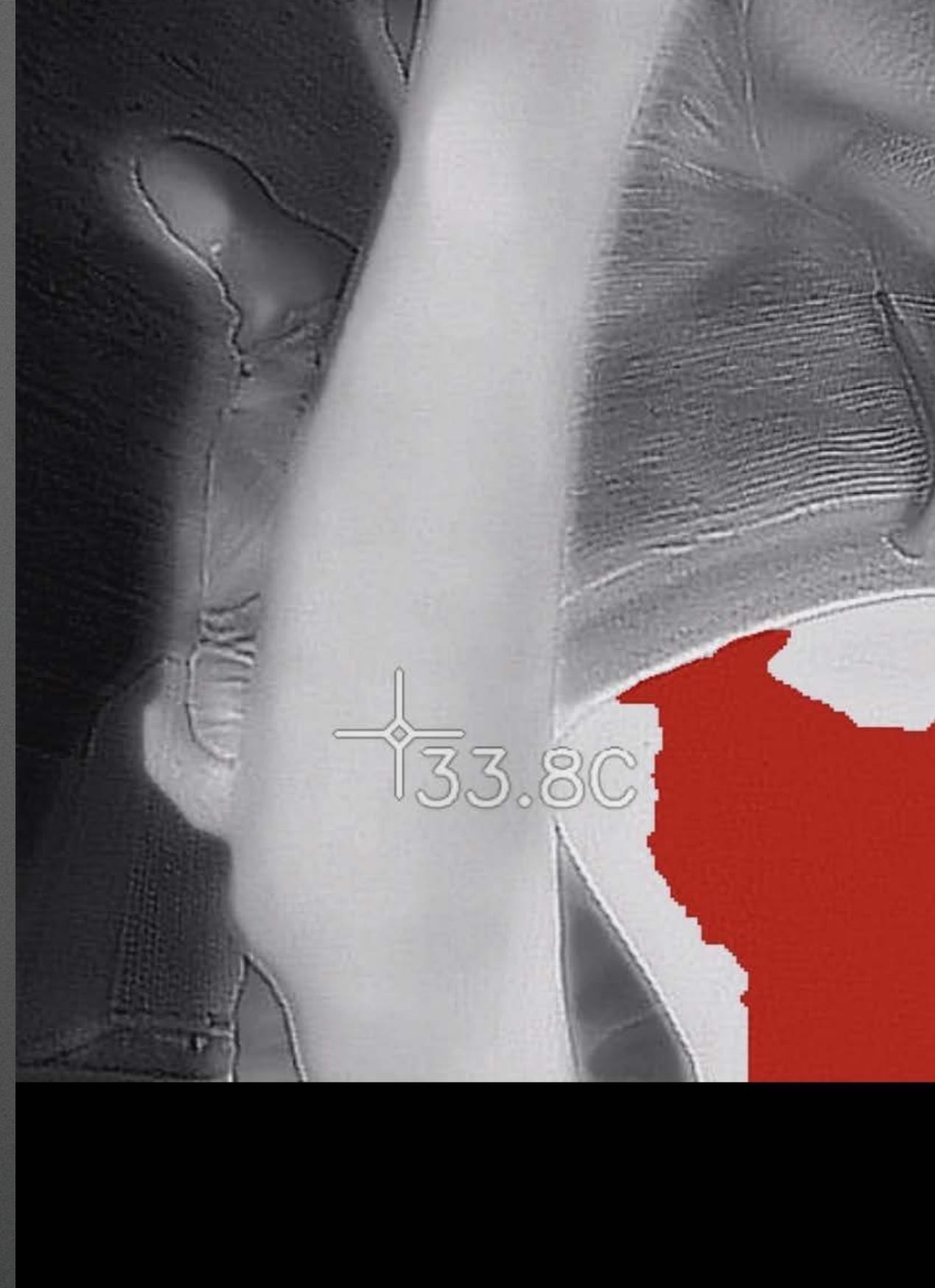
Diagnosis and therapy survey



Inflammatory detection

Follow up at home





OI TYPE V – FRACTURE ON RIGHT ARM

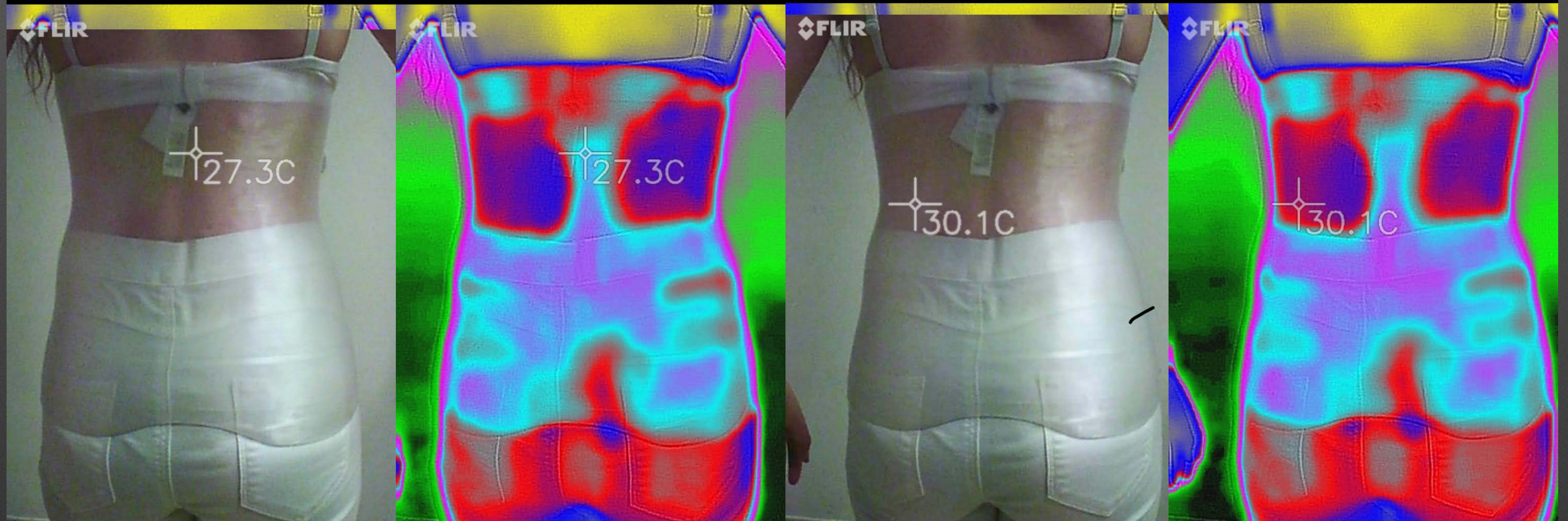
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Child growing and brace effectiveness



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3D PRINTED BRACE PET G 1.5 mm

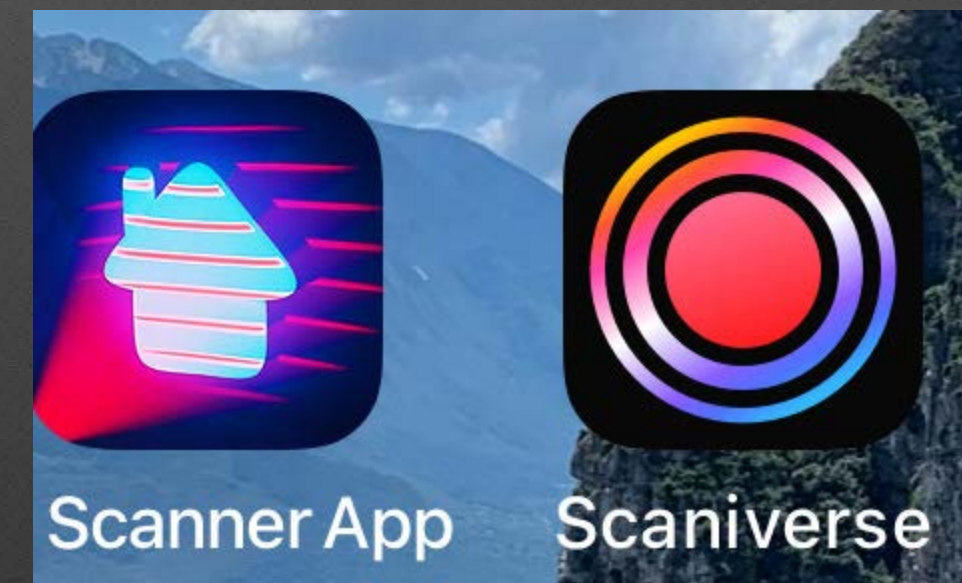


Checking brace at home

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Easy 3D scanner for orthosis

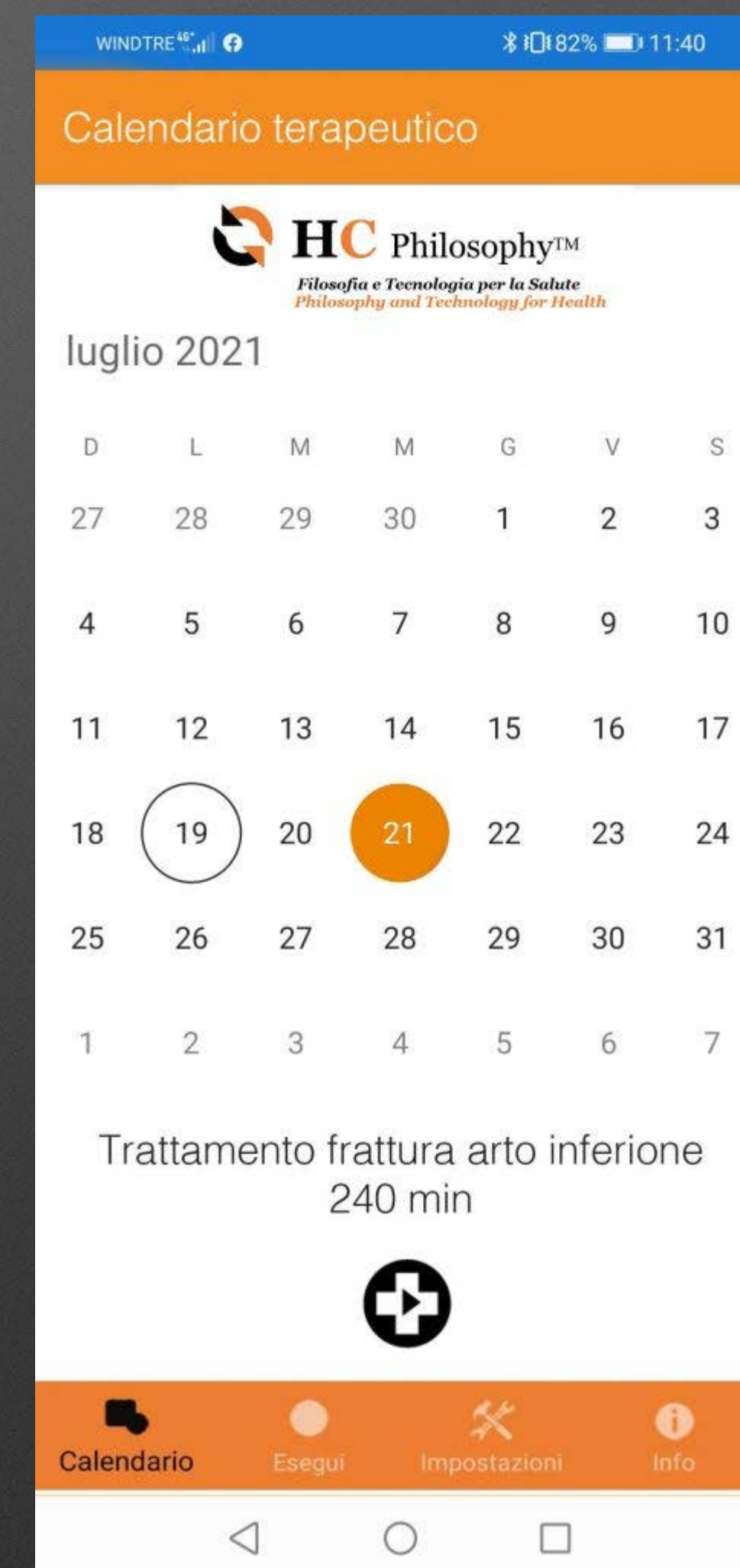
- Free app for 3D scanning for last generation smartphones
- Easy scan a surface at home
- Send STL file to orthopedic farm
- Receive the orthosis at home.



“Progetto finanziato con il Piano Sviluppo e Coesione Veneto – FSC 2021-2027 Stralcio (Delibera CIPESS 79/2021) - Area tematica 01 Ricerca e Innovazione – Settore 01.01 Ricerca Sviluppo”

Wearable suits for magnetic treatment (trunk, arms, legs, hands, feet)

Bone consolidation
Pain
Inflammation



How does it work?

- Your doctor create you personal program. (as usual a few hours a day)
- On your phone you can control the treatment
- You put on the garment.
- On his computer your doctor can check in remote the adherence to treatment.



But as soon as possible...

Get out

Meet friends

Move

Look beauty with your eyes.

nuove leve tra le influencer



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