

What does Digital Therapeutics have to offer & how will AI help?

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Digital Therapeutics – Definition

What are Digital Therapeutics?

Digital therapeutics (DTx) deliver **evidence-based** therapeutic interventions to patients that are driven by **high quality software** programs to prevent, manage, or treat a medical disorder or disease.

They are used **independently** or **together** with medications, devices, or other therapies to optimize patient care and health outcomes.

Source: Digital Therapeutics Alliance – <https://dtxalliance.org>

Digital Therapeutics: The evolution of digital health

What distinguishes Digital Therapeutics from other health innovations

	WELLNESS & SUPPORT	DIAGNOSTIC & MONITORING	THERAPEUTIC INTERVENTIONS
Overview	Products that capture, store, transmit health data	Products that measure and/or intervene	Products that deliver therapeutic interventions directly to patients
Clinical evidence	<i>Not typically required</i>	Required	Required
Real world outcomes	<i>Not typically required</i>	<i>Not typically required</i>	Required
Examples	<ul style="list-style-type: none"> ▪ Lifestyle apps & fitness trackers ▪ Telehealth platforms ▪ Health Information Technology ▪ Consumer health information ▪ Enterprise support 	<ul style="list-style-type: none"> ▪ Digital diagnostics ▪ Digital biomarkers ▪ Remote patient monitoring ▪ Medication adherence tools ▪ Ingestible sensors ▪ Connected drug delivery devices 	Digital therapeutics deliver interventions that treat, manage, and prevent a broad spectrum of behavioral, mental, and physical diseases and disorders

Source: Digital Therapeutics Alliance – <https://dtxalliance.org>

Digital Therapeutics: Quality and evidence

Product Quality Matters.

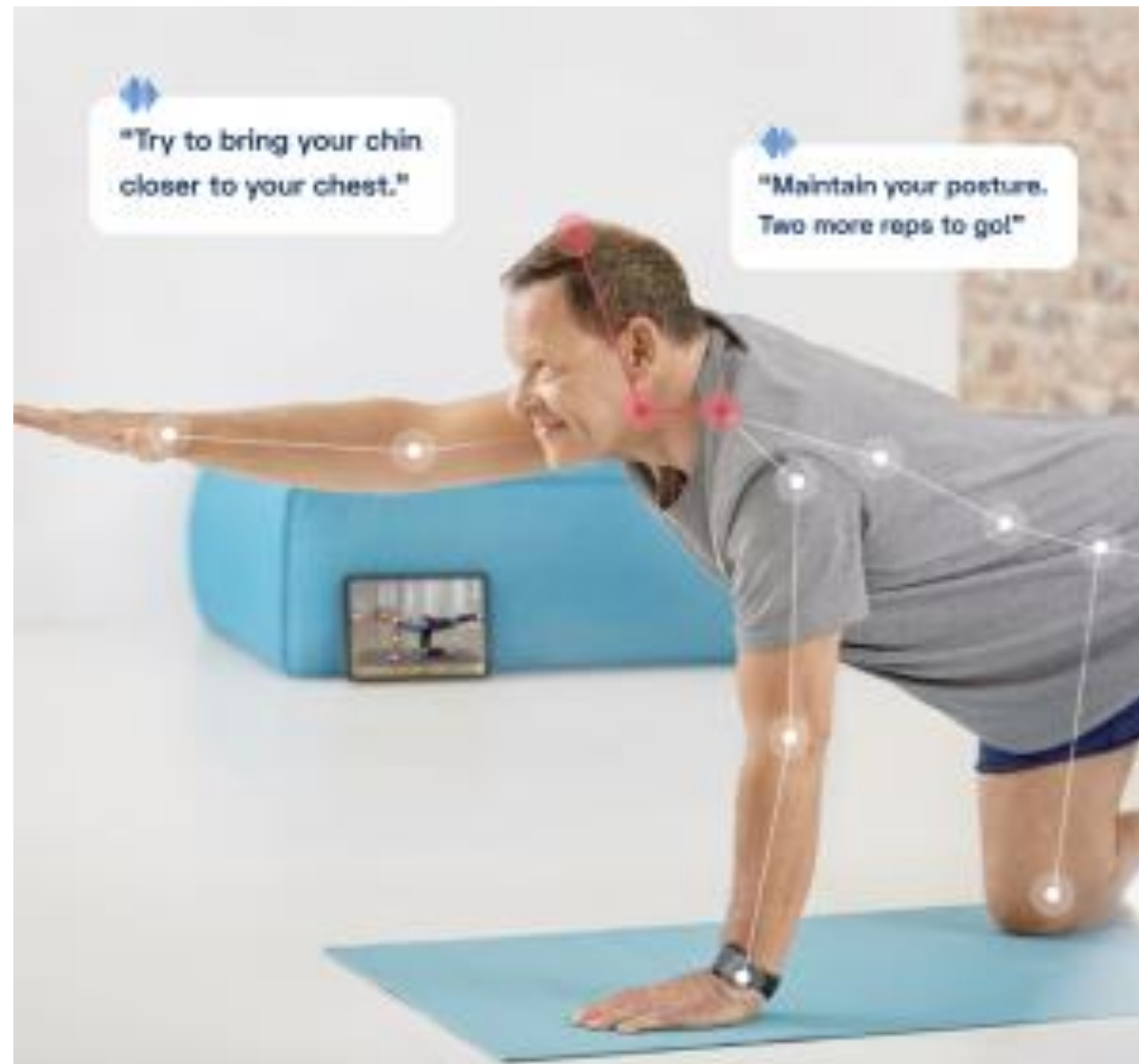
What should I expect from a digital therapeutic?

DTx products must adhere to each of these foundational principles:

1. Prevent, manage, or treat a medical disorder or disease
2. Produce a medical intervention that is driven by software
3. Incorporate design, manufacture, and quality best practices
4. Engage end users in product development and usability processes
5. Incorporate patient privacy and security protections
6. Apply product deployment, management, and maintenance best practices
7. Publish trial results inclusive of clinically meaningful outcomes in peer-reviewed journals
8. Be reviewed and cleared or approved by regulatory bodies as required to support product claims of risk, efficacy, and intended use
9. Make claims appropriate to clinical validation and regulatory status
10. Collect, analyze, and apply real world evidence and/or product performance data

DTA's [industry principles](#), [code of ethics](#), and [best practices](#) establish expectations for [high quality DTx products](#).

Digital Therapeutics – Managing Back Pain



Coaching for self-management of non-specific lower back pain (sub-acute and chronic back pain).

Motion Coach is a computer vision and motion analysis technology that fits in your pocket. With the selfie camera of a smartphone and Kaia Health's proprietary AI algorithms, Motion Coach can analyze movements in real-time to evaluate performance and guide users through training.



<https://www.kaiahealth.com>

Digital Therapeutics – Physiotherapy & Rehabilitation



DYGI
Rehab

Screening

Daily caregivers are able to make an objective assessment of the citizens' physical ability and need for assistance.

Exercise

The tailored exercise programmes can be performed in the citizens' own home with supervision from the caregiver and assistance from videos.

Analysis

DigiRehabs manageable analysis function ensures that the rehabilitation effort can be watched in real time. No elderly person is exercising in vain.

<https://digirehab.dk/en/#om-digirehab>

Digital Therapeutics – Treating Psychosis with VR



The six-session gameChange VR therapy consists of six everyday scenarios: a street, a bus, a café, a pub, a doctor's waiting room, and a shop. Each scenario has five levels of difficulty.

Every level provides an opportunity to test out fearful cognitions while limiting the use of safety-seeking behaviours, allowing patients to build confidence in their ability to cope.

Learning is facilitated by a virtual coach and therapeutic gaming elements are included.

<https://gamechangevr.com>

Digital Therapeutics – Exposure Therapy with VR



REALISTIC INTERACTIVE CHARACTERS

Actors filmed with 360 degree video in a real location. You can stand at a fixed point in the location and interact with a character.

<https://www.timestory.dk/projects/>

VRExposure is a virtual reality exposure therapy tool for therapists working with people who suffer from social anxiety. It consists of 12 VR exposure experiences in a supermarket and a bus.

The person with social anxiety can train to stand close to people and communicate, while the therapist can observe what the person is looking at during the experience.

We use speech recognition and pulse measuring tools. VRExposure has been tested on people with social anxiety and the result is highly positive. It shows that VR exposure therapy can help people reduce anxiety.

Digital Therapeutics – Cognitive & Behavioural Disorders



Therapies designed to directly target and activate specific neural networks in the brain to treat cognitive impairment, including ADHD, major depressive disorder (MDD) and autism spectrum disorder (ASD).

20 April 2020: Akili announces Endeavor© Digital Attention Treatment is now available for children with (ADHD) under FDA COVID-19 Enforcement Discretion Guidance

<https://www.akiliinteractive.com>

Digital Therapeutics – Diabetes Management



Beta Bionics iLet Bionic Pancreas

Continuous glucose monitoring,
dual insulin/glucagon pump &
machine learning algorithms,
combined into one solution

FDA 'Breakthrough Device'
Designation awarded 11/12/19

<https://www.betabionics.com>

Artificial Intelligence (AI) is powered by Algorithms

- Rule-based algorithms – Instructions constructed by humans
- Machine-learning algorithms – Inspired by how living creatures learn
- If used appropriately, AI has the potential to adjust the therapies to the needs of the individual user over time, and so increase the effectiveness of the treatment
- We can expect to see many more examples of AI-based Digital Therapeutics
- Expectations are high, but it will take years for the evidence base to be built

What does digital therapeutics have to offer & how will AI help?

- *Any questions?*