Tech Devices and Dystonia - July 2025

DystoniaSurveys.org

What do we need? Ways to measure these things:

-something for tremor, spasms, jerks

-something for tilt

-something for gait

-something for pain

-something for pressure we are under, pushing our limbs

Anything current?
Here is a list of what I have found on the Internet and in published reports. The list is not an endorsement of any product, just a list of what seems to be developed.

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This is a new small wearable device

-it has an accelerometer

-it has a gyroscope

-it measures range of motion, velocity, smoothness of movement
It measures cervical flexion, rotation asymmetry, movement velocity

It can measure the 'jerk' (log dimensionless jerk)- to determine smoothness of motion

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Other devices for movement disorders:

- Inertial Measurement Units (IMUs):

IMUs, containing accelerometers, gyroscopes, and magnetometers, are used to measure acceleration, angular velocity, and orientation changes, providing data on movement patterns.

Xsens DOT sensors register and analyze movement in dystonia. Can connect with mobile apps

Sensor data can measure range of motion, velocity, and smoothness of movement

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Computer Vision Systems:

- CMOR (Computational Motor Objective Rater):

A video is made of the patient and then the computer studies it for head tremor and other movement abnormalities. It can quantify head angles, movements and tremor

- MODYS@home app:

  It can be used at home to take videos and link to computer to study motion

Some devices at home can measure angular velocities, accelerations, Euler angles

Other devices:

1..Thermometer -digital or with mercury

-on forehead artery or in body mouth, or ear

-record can be kept of patterns

2. Glucose monitor – blood sugar level

3. Scale- weight – record can be kept by tech device

4. blood pressure monitor – cuff – home measurement is now possible though the lay person discovers that it is normal for variation of blood pressure depending on activity so individual patterns matte

5. blood oxygen level- clip device on finger measure amount of oxygen in the blood

Wearables for fitness

A device on the wrist can track many aspects of body function and mostly measure motion

-an accelerometer tracks movement

-a gyroscope measures orientation and rotation

It can count your steps and note rhythm of the steps

Through such wearables or home devices it is possible to track:

1.Location

It uses GPS to locate you but also then can track your progress as you move up or down hill, and around the city. It can show how well you manage on inclines, hills, steps

2.Heart rate

The device shines a light through your skin and then examines it to determine a basic heart rate though its accuracy is not always precise

A stethoscope also measures internal body sounds of heart, lungs or bowels. It is a device that the layperson may not know how to interpret well however

3. Calorie logging and calorie burning

A person can record what they eat and it calculates and tracks calories

A person can also estimate during any physical activity you h ave, how many calories you just burned

4, Blood pressure

It measures the strength of how your blood is being pushed through the body. It is not as technically accurate as medical equipment is

Some devices can measure not only blood pressure but arterial pressure

5,Oxygen in blood

A clip on finger device can measure the amount of oxygen there is in your blood – pulse oximeters also measure heart rate

It can 6..Body composition

estimate body fast and help detect patterns of change though it is only an estimate

A handheld monitor can use bioelectrical impedance to estimate per cent of body fat

7..Weight scales
These can measure weight and connect with an app to keep a record and show patterns of change

Smart scales can also estimate body fat and muscle mass.

One device, a skinfold caliper is handheld and helps estimate percent of body fat using a pinched skin fold

8..Sleep

Because it has motion sensors it measures how much you move around even when asleep. It can see how much sleep is interrupted.
Some devices during sleep can detect drops in oxygen level that may help with those who suffer sleep apnea. The devices can also determine changes in heart rhythm during sleep.
A sleep tracking mat can measure how you sleep and changes in position and therefore give insights into quality of sleep

9..Step counter

It has a 3 axis accelerometer and when turned on is at work measuring at all times it is worn, even when the person is standing still. It works with a personal algorithm to track

-how many steps were taken

-at what speed a person moved, stops, starts, acceleration, deceleration. (for a person with dystonia it might help measure unusual gait, wobbliness, jerkiness?)

-number of calories likely burned by this motion

10. sugar in blood

A glucomoter can measure the amount of sugar in your blood using a drop of blood from a simple needle prick

A continuous glucose monitor is a device attached to the body that can continually track blood sugar level

11, Lung function

A peak flow meter is a plastic device a person blows into to move a mechanism and helps meause the strength of the output of breath. Often a color code assesses severity of problem -green, yellow , red

A spirometer can assess lung function. One type directly measures forced vital capacity in milliltres, being the total volume of air you forcible exhale after taking a full breath in.

One app with a clip on technology measures chest expansion as you breathe and looks for patterns related to anxiety

12,, mobile devices for EKG

AliveCor and KardiaMobile can help track heart rhythm.

13 sweat gland activity

Some body sensors can measure electrical activity or sweat gland activity

14. mental health

Some argue that knowing a person's pulse, blood pressure and sweat activity is an indirect way of noticing how they handle stress or how much stress they are under.
Some wearable devices claim to measure sympathetic brain activity and skin conductivity that can be linked to a person's anxiety level.
Some devices connected to smart watches of smart home technology can track emotional response to music or can track the voice through a microphone to determine anxiety level.

One hand held biosensor measures changes in skin pores to link them to levels of anxiety

An earlier product, mood rings is found to not actually detect moods. The liquid crystals in the rings do respond to temperature and then can seem to respond when the weather is cold, or a person has exercised or is holding a warm beverage.

There is no device that actually can objectively measure pain directly.
A device can enable a person to describe or rank their pain daily and can store and reveal patterns but these are still just subjective data.

Objective measurements of pain are being developed but slowly.

An MRI scan done in hospital uses a large magnet and pulsed radiofrequency waves to make an image of the brain . The technology does not use radiation. This technology also cannot actually calibrate pain but it can see if there is vascular compression or a tumor or some other visible cause of pain

HAPTIC TECHNOLOGY

There are devices that seem somewhat vaguely related to the movement disorder problem, given that they use tactile sensors, measure forces and work with vibrations.
However these mostly seem to create the sensory experience, not to suppress it or calm it.

However, it is interesting that with dystonia, where a muscle is super tight, the sensation of that may be the actual thing that this technology is creating too. So it is in the very area of our problem but not reducing it, possibly just using it.

However that could show potential. If that technology could just dampen the message that would be wonderful

The other thing with dystonia though is that sometimes we do want to add pressure to an area, to help with the dystonia, and that is for sensory tricks.

If we push on our chin right side, the left neck tilt may suddenly disappear. If we push gently between our eyes the tremors may magically leave. There are pressure points, possibly acupuncture points on our body that when they are touched, make the dystonia muscle wherever it is, just loosen. It is a phenomenon not well understood yet by researchers but this new technology that can CREATE the sensation at the sensory trick location might be very useful.

If for instance we had a headband or wrist band or tuque, neck scarf or vest that could push in on us at just the right place for the sensory trick, we might have real easing of the dystonia symptoms.

This new technology is called HAPTIC technology.

Most of the time it is for creating sensation. It is used in video games to create in a steering wheel or joy stick or game control a vibration or pressure as if the person really was in the activity they are watching. The technology uses 3 sensory systems – cutaneous (skin), kinesthetic, and haptic. Here are some ways it is being used already:

1. In a light aircraft as it approaches a stall, the pilot feels vibrations in the controls. This is a warning. With springs and weights, and angle of attack programming a system can help warn the user of this critical stall point more efficiently and sooner.
2. When people are excavating mixed material like large rocks in silt or clay, the technology creates a force feedback to warn if there is an unseen obstacle in the mix.
3. In the 1960s it was found that a researcher could raise and lower an array of metal rods behind the back of someone, producing tactile dots on the back so that a user could identify visual pictures of that pattern.

4. In 1994 a vest took an audio signal and electromagnetic technology to convert bass sound waves into vibrations. They then were represented in the vest as the user having just been punched or kicked.
5. In 1994 a computerized arm was made so that a person could insert their fingers into it and using tiny receptables seem to 'feel ' an object displayed on a computer screen
6. In 1995 A wristwatch was developed with a skin tap capability. Connected to a mobile phone the wearer could respond to phone calls just by a tap to send brief messages
7. In 2015 a smart watch allowed users to get alerts from their mobile phone using skin tap sensing
8. It is possible to create the impression you are feeling texture even though the fabric is just on a screen. Using mechanoreceptors, sensors register vibrations produced by friction and interaction of a fingerprint over a material.
9. An unbalanced weight attached to a motor shaft then rotated, will spin in an irregular way causing the device to shake. This effect is used for videogames to create the feeling of bumps or knocks as one plays the game, sensed in the joystick or steering wheel.
10. In 1976 a video game used haptic feedback to get handlebars of a game contols to vibrate when the screen showed a collision.
11. In car driving video games, forced feedback devices use motors so that the force on the wheel is felt when the game shows a person cornering a vehicle
12. Using touch and 3D sensors, it is possible to get the video gamer to see angles of objects and feel their physical presence
13. Concentrated gusts of air in tiny air vortex ring pockets can be shot out to deliver dramatic gusts of air for video games
14. Ultrasound beams on a finger create a localized sense of pressure even though the finger is not touching anything. The array of ultrasound transducers can deliver sensation of vibration and even the feel of virtual 3D objects
15. Armbands, vests and suits can create haptic sensations in the skin or muscles of the user. The wearer can feel they have been hit by a bullet, or can feel they are undergoing weight and resistance training
16. A robotic hand with 129 touch sensors in every finger and joint pad can give back information to a human operator at a distance. This enables the robot to do tasks such as typing as directed
17. Haptic technology allows a robotic device to make an incision, sense the tactile and resistance to this and to do minor medical procedures like laparoscopy directed by a surgeon from a distance.
18. A touch screen in a vehicle dashboard enables the driver to give touch commands without taking their eyes off the road.

19. The car steering wheel or driver's seat can provide haptic information and vibrate if another vehicle is too close.
20. In 2020 a computer game put voice coil actuators in the palm grips of a game control, and gave feedback to match the game, such as the pressure of wind and sand if the screen showed a sandstorm.
21. In virtual reality games, a vest or suit can be equipped to allow holograms to be seen and felt or to have users feel explosions or bullet impacts right on them
22. For those with hearing impairments a vest or wristband will sense an auditory signal or voice and translate it into a series of vibrations. In this way the deaf can feel sounds.
23. A blind person can with this technology feel a screen that shows text or graphic information
24. With this technology a person who is deaf can see on a screen any text or graphic information
25. With upper limb motor dysfunction or problems with muscle control, haptic feedback has been put into robotic devices to help people recover sensory function
26. For people who are aging and have balance problems haptic technology can help warn early with sensory feedback to prevent falls.

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