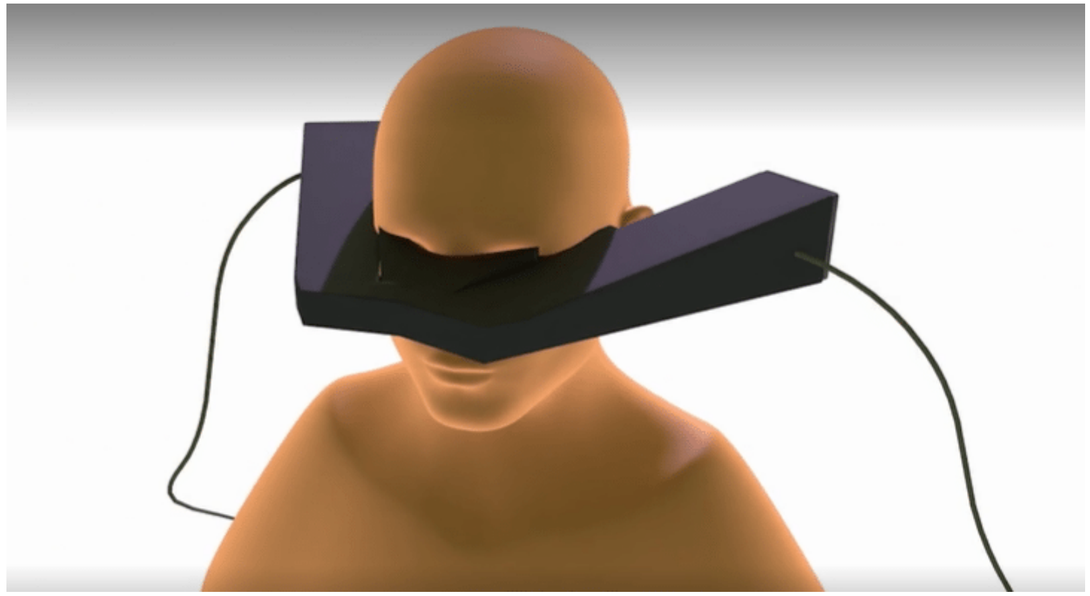
TEMPORAL DISCRIMINATION THRESHOLD

Cervical dystonia is a movement disorder characterized by abnormal muscle contractions in the neck and head that can cause the head to twist or turn to one side, or to tilt forward or backward. The condition can be uncomfortable and may affect a person's ability to perform everyday activities. TDT, or temporal discrimination threshold, is a measure of a person's ability to perceive small differences in the timing of two stimuli. It is an important aspect of perception, and it can be affected by a number of factors, including age, attention, and fatigue. In the context of cervical dystonia, TDT may be affected by the condition because it can cause abnormal muscle contractions in the neck and head that can interfere with the ability to accurately perceive timing differences.

To diagnose cervical dystonia, a medical professional will consider the individual's symptoms, medical history, and any other relevant information. This may include a physical examination, imaging tests, or other diagnostic tests to help confirm the diagnosis. In some cases, TDT may be an additional piece of information that could be taken into account when making a diagnosis. Additionally, tracking TDT during treatment can help determine whether the treatment is having a positive effect on the individual's ability to perceive timing differences, which may be a useful measure of treatment efficacy.

The goal of developing an experimental setup to accurately measure TDT is particularly relevant in the context of cervical dystonia, as previous research has found that TDT is abnormal in a high percentage of individuals with the condition.

Traditionally, Visual TDT has been measured in a controlled laboratory environment, but the proposed VR application offers a low cost alternative that allows tests to be carried out in a person's own home. This could potentially be more convenient and accessible for individuals with cervical dystonia, as it allows them to complete the test in their own environment without the need to travel to a laboratory. Additionally, previous test equipment for measuring TDT has often been expensive, with costs reaching into the thousands of euros. A less costly test would increase the ability to extract population-wide data and potentially improve our understanding of the relationship between TDT and cervical dystonia.



To date, measuring TDT required expensive equiptment used in the lab or a healthcare facillity

USER STORIES

"As a patient with Cervical Dystonia, I want to be able to accurately diagnose my condition so that I can get the appropriate treatment as soon as possible."

"As a patient with Cervical Dystonia, I want to be able to test myself from home so that I don't have to travel to a laboratory or medical facility."

"As a patient with Cervical Dystonia, I want to be able to track my symptoms and progress over time so that I can better understand my condition and how it is affecting my daily life."

"As a researcher studying Cervical Dystonia, I want to be able to collect data from a large number of patients and their relatives so that I can better understand the disease and develop effective treatment options."

"As a Neurologist treating Movement Disorders, I want to be able to remotely collect data from patients so that I can minimize the burden of testing on patients and their families."

II. VRx Health

PROBLEM STATEMENT

Current methods for measuring TDT, such as visual TDT in a controlled laboratory environment, can be inconvenient and costly for individuals with cervical dystonia. There is a need for a less expensive and more accessible method of measuring TDT, such as a virtual reality (VR) application that can be used in a person's own home, to increase the ability to extract population-wide data and potentially improve our understanding of the relationship between TDT and cervical dystonia.

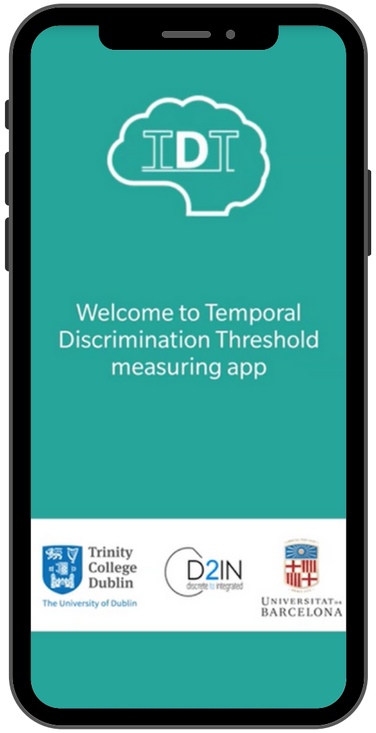
NEED STATEMENT

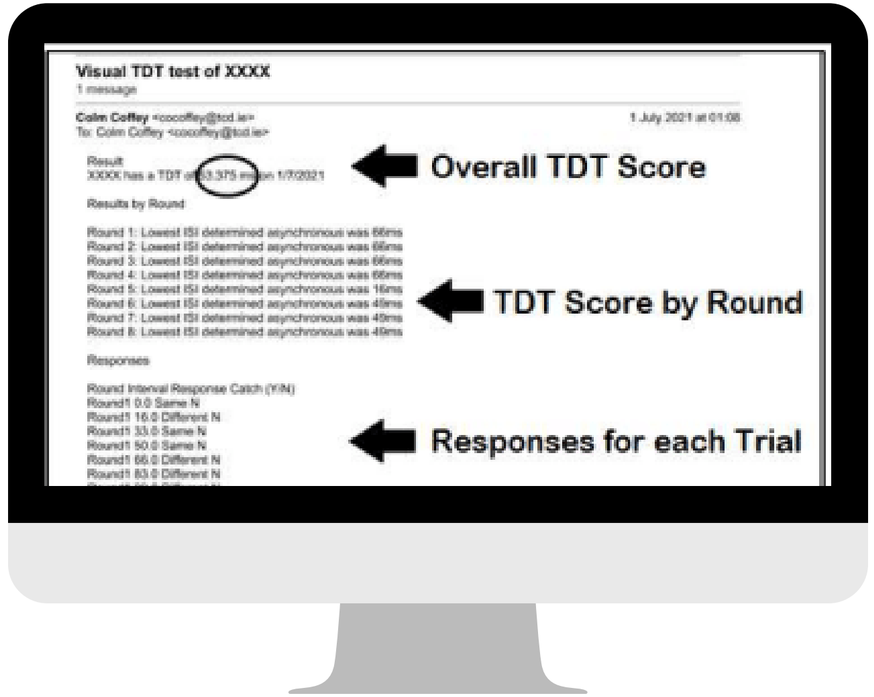
There is a need for an accurate and convenient method of measuring temporal discrimination threshold (TDT) in individuals with cervical dystonia, as TDT can be affected by the condition and tracking TDT during treatment can be a useful measure of treatment efficacy.

PROPOSAL

The proposed VR application is programmed to measure a patient's TDT from the comfort of their own home. The VR device is programmed to listen for verbal cues, allowing the patient to observe visual stimuli and respond accordingly.
A live screen recording is remotely monitored by the experimenter to ensure the test is carried out correctly.

TEST SETUP





1. Test Parameters set on Smartphone app

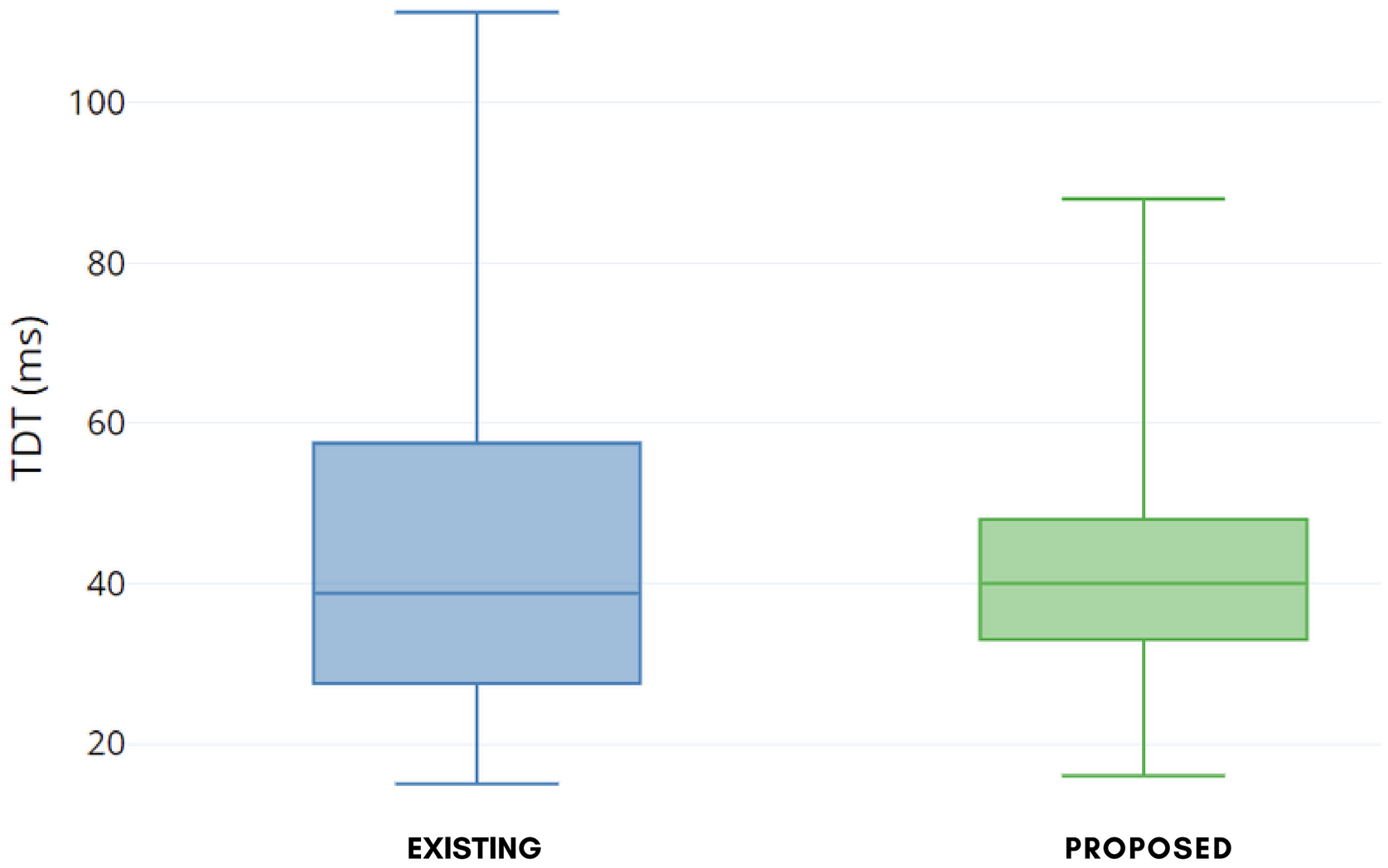
2. Test executed using VR Headset

3. Results emailed Immediately to Experimenter

RESULTS

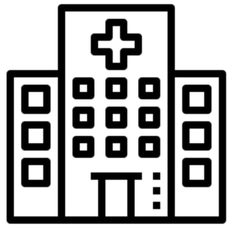
A pilot study of 27 subjects showed similar TDT results between the standard approach and the proposed new VR App.

The VR App showed significantly less variability which suggests good reliability.



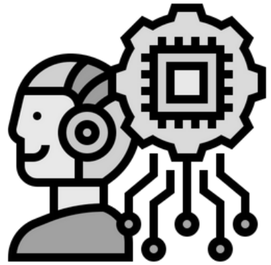
TEST COMPARISON

EXISTING



Requires controlled setting

In-person Test Monitoring



Expensive Equipment

PROPOSED

Home setting possible

Low-cost equipment

Remote test monitoring

ADDRESSING KEY REQUIREMENTS

1. Time Effectiveness

- Optimised test procedure
- Less time is required to carry out a test
- More patients can be assessed

2. Cost Effectiveness

- Less than 10% of the cost of existing equipment
- Reduced test time reduces consultant overhead costs
- Laboratory environment is not necessary

3. Ease of Use

- Minimal training necessary
- Intuitive functioning user interface
- Ease of use principles followed
- Results are automatically compiled and emailed to the experimenter

4. Accuracy / Precision

- Results closely align with best practice methods
- Bland-Altman test shows good coherence with existing device
- TDT results appear to be reliable given low variability