Investigating the feasibility of using an innovative new alcohol and cannabis impairment testing device based on Drug Recognition Experts' protocol

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CARSP ACPSER

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Introduction

- Drug Recognition Expert Testing most widely recognize and accepted method for drug and alcohol impairment detection

- Significantly underutilized due to lack of resources both at roadside and police stations

- Increased risk of injury or death to public from drug-impaired driving.

The Problem

33% of traffic fatalities are the result of impaired driving

RCMP

3% of night time drivers were impaired between late night and early morning hours, Thursday through Sunday

RCMP

Urine & oral fluid testing is ineffective:

- Identifies **if** a person has used drugs; not impairment
- Lab analysis / confirmation takes 2 – 5 days
- *"Drager has defended its (oral fluid) test, saying it was never designed to test for impairment, but to identify the presence of THC" – Canadian Press*

Roadside testing (SFST) is inadequate:

- Specifically designed for alcohol impairment screening.
- Does not detect impairment from cannabis or other drugs.
- *"The Standard Field Sobriety Test is not sensitive to clinically relevant driving impairment caused by oral THC." - Society for the Study of Addiction*

Police Station testing (DRE) is inefficient:

- Cannot be completed at roadside
- Testing time is approximately 40 mins.
- Severe shortage of trained experts – limited access, nationally

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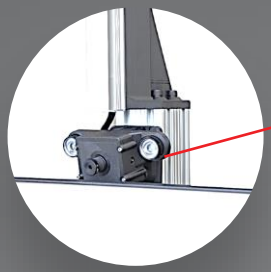
https://www.rcmp-grc.gc.ca/ts-sr/index-eng.htm

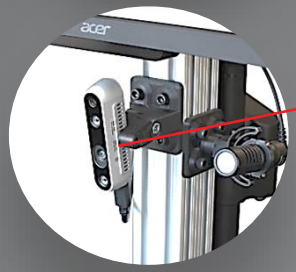
Drug Recognition Expert Evaluations

- 1. Breath Alcohol Test
- 2. Interview of Arresting Officer
- 3. Preliminary Examination (includes pulse check)
- 4. Eye examination (HGZ, VGN, convergence
- 5. Divided Attention Tests (Romberg, Walk and Turn, One leg stand, finger to nose)
- 6. Vital Signs (blood pressure, pulse, temperature)
- 7. Dark Room Checks (pupil sizes)
- 8. Muscle Tone
- 9. Check for injection Sites
- 10. Interrogation of Subject
- 11. Opinion of evaluator
- 12. Toxicological Sample Urine and/or oral or blood

CannSight 1.0



Tools for analyzing Eye Behavior.



Technology for evaluating Brain Function.

Instruments for measuring Biophysical Parameters.

Operator station for computing results.

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Testing Protocol (Full DRE Protocol)

- ✓Eye tests
- ✓Divided attention tests
- ✓Bio-signal and indicators
- ✓Interview with subject

Advantages

- Simulates entire, court admissible, DRE test
- Detects impairment from **all drug classes**

- Remote operation option
- Real time interpretation
- Workplace Drug Testing Clinics

Study Parameter

- Proof of concept trial evaluating device with standard DRE protocol.
- 12 subjects (6 male, 6 females) divided into cannabis and alcohol group
- All subjects tested by an approved oral fluid swab test (Dräger DrugTest® 5000) and a breathalyzer before starting any testing procedure to detect other drugs of abuse in their body.

Study Parameter

- Subjects drank/smoked to achieve the estimated levels for blood alcohol level (BAC > 8-10 mg/100ml) and THC concentration (> 5 ng/ml), respectively.

- A total of 48 impairment assessment tests were conducted under the supervision of a medical doctor (Medical cannabis & addiction medicine specialist).

Study Parameter

- Each subject was tested four times for impairment as follows:
  - A baseline pre-drinking/smoking test by an in-person DRE (gold standard)
  - A post-drinking/smoking test by an in-person DRE (gold standard)
  - A baseline pre-drinking/smoking test by CannSight 1.0
  - A post-drinking/smoking test by CannSight 1.0

Results

- All subjects achieved the target levels for body alcohol level (BAC > 8-10 mg/100ml) and THC concentration (> 5 ng/ml), respectively.
- 83% of alcohol subjects were determined to be impaired following consumption of alcohol by both the in-person DRE and CannSight 1.0.
- All cannabis subjects self-rated their impairment levels on a visual analog scale between the numbers of 6 to 9 (0=Not High, 10= Very High) following inhalation.
- 33.3% of cannabis subjects were determined to be impaired by the in-person DRE and CannSight 1.0 after consuming cannabis (THC > 5 ng/ml).
- More than 80% of subjects answered YES when they were asked if they would drive (after they had achieved the target BAC and THC levels).

Results

- One of the cannabis subjects (frequent user) showed positive on the results of the oral fluid test (THC > 5ng/100 ml) before cannabis consumption at the trial site.
- The baseline impairment determinations by the in-person DRE and CannSight 1.0 showed that he was not impaired.
- Following cannabis consumption, his second oral fluid test was confirmed to be positive (THC > 5ng/ml).
- However, he failed post-smoking impairment tests done by the in-person DRE and CannSight 1.0.
- Test results were confirmed by the medical specialist.

Summary

Objective	• To determine if CannSight 1.0 accurately and reliably simulates the DRE testing protocol.
Subjects	• 12 subjects in total (6 alcohol and 6 cannabis)
Test location	• Toronto, Ontario
Results	• 100% match between in-person DRE testing and the results of CannSight 1.0 (sensitivity 100%, specificity 100%)
Conclusion	• CannSight 1.0 is **validated** for use in measuring drug and alcohol impairment and is a valuable tool for remote DRE testing.

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Discussion:

- In line with previous literature, our results show that there is NOT a linear correlation between THC levels in oral fluid / blood and actual mental and psychomotor impairment levels.

- Our results indicate that self-perceived level of mental impairment does not correlate with actual impairment levels, as shown in DRE and CannSight 1.0 assessments.

Conclusion:

- The results of this study show that the accuracy of impairment assessments done by CannSight 1.0 is comparable with the results of the tests done by DREs in person.
- Reliable device to perform the DRE protocols, the current gold standard for impairment detection, objectively and accurately at any location and time.
- Application in communities in areas with limited DRE access
- Future directions:
  - Substance specific recognition via machine learning protocols
  - Rapid roadside impairment detection

Future directions

CannSight 1.0
40 minuets

Testing Protocol (Full DRE

- ✓ Eye tests (4)
- ✓ Divided attention tests (4)
- ✓ Bio-signal and indicators (5)
- ✓ Interview with subject (1)

Advantage

- Simulates entire, court admissible, DRE test
- Detects impairment from **all drug classes**
- Location agnostic

Use Cases

- Police Stations
- Workplace Drug Testing Clinics

CannSight Mobile
10 minuets

Testing Protocol (Modified DRE

- ½ Eye tests (2)
- ✓ Divided attention tests (4)
- ½ Bio-signal measurements (2)

Advantage

- Rapid impairment detection
- Targets **alcohol and cannabis** impairment.

Use Cases

- Roadside
- Remote Worksites

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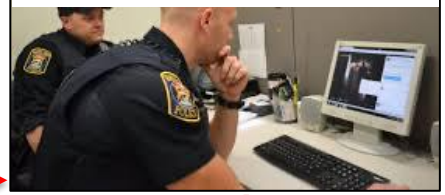
1) ERRATIC DRIVER: Roadside Officer conducts CannSight Mobile test (10 mins)

2) Video / bio-signal data uploaded for remote DRE analysis

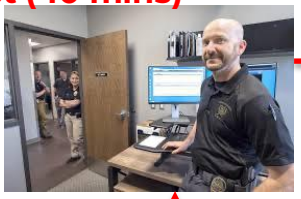
3) DRE sends impairment decision to Roadside Officer (3 mins)

SUSPECTED IMPAIRMENT: Roadside Officer instructed to send subject to Station.

AI-assisted Analysis by DRE



1) Station Officer conducts CannSight Stationary test (40 mins)



2) Data uploaded for DRE analysis

3) DRE sends IMPAIRMENT CONFIRMATION to Station Officer (3 – 5 mins)

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Questions ?