

# Specialized DentistVRy: Using Virtual Reality to Manage Pain and Anxiety in Patients with Stroke

## A Case Series Report

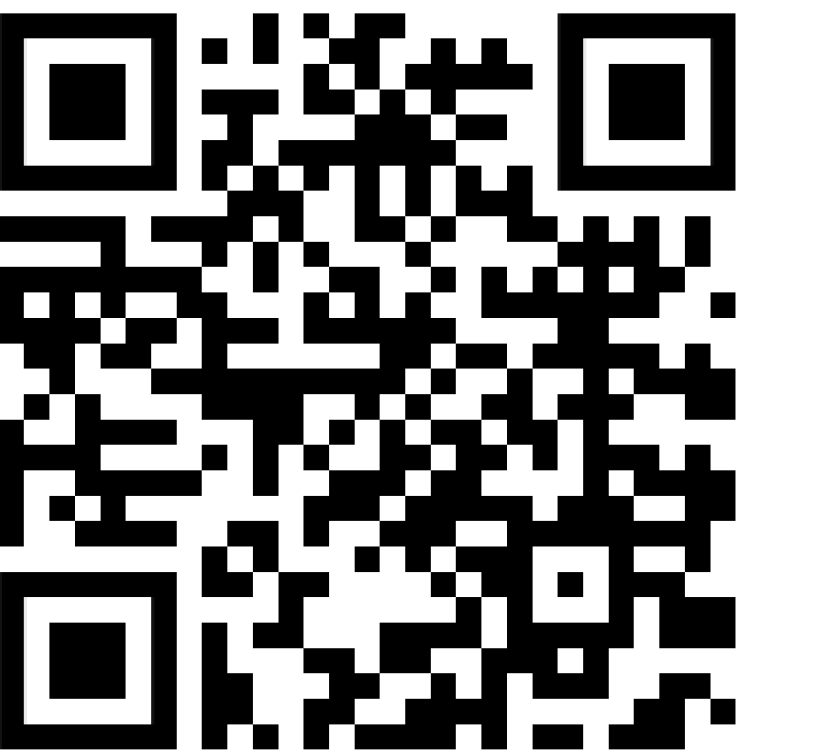
### AUTHORS

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### INTRODUCTION

- Virtual Reality (VR) is increasingly used to manage pain and anxiety in dentistry.
- Increased anxiety is a common psychological outcome in stroke, with many patients unable to receive standard dental anesthetics.
- To our knowledge, this case series is the first to explore the use of VR with stroke patients undergoing dental treatments.

### OBJECTIVE

In a *clinical context* and with patients with *stroke and dental anxiety*, to evaluate the following:

- Acceptability of the intervention (hardware and software/content)
- Impact of intervention on patient self-reported pain and anxiety
- Impact of intervention on dental team workflow
- Appropriateness of evaluation instruments & metrics

### INTERVENTION

- Hardware:**
  - Participant 1 (P1) - Oculus Go
  - Participant 2 (P2) - Oculus Quest 2
- Software:**
  - Participants selected 360° VR videos from a YouTube playlist to watch in a reclined position.
- Cleaning Procedure:** Head-mounted devices (HMDs) were sanitized with medical-grade disinfectant wipes and CleanBox™ UV-C light technology.



### PROTOCOL & PARTICIPANTS

- Case series with mixed-methods design:
  - Observations of reactions to VR and impact on workflow using a standard tool
  - Semi-structured interviews to collect qualitative feedback from patients & dentist
  - Modified standardized pain and anxiety scales & ratings pre- and post-intervention
  - System Usability Scale (SUS) to evaluate dentist perceptions of VR HMD usability
- Patients: n = 2, ages 70 and 58, both male, > 1 year post-stroke, history of dental anxiety. Recruited from specialized dental clinic at Toronto Rehabilitation Institute.
  - P1: simple tooth extraction, P2: exam cleaning and scale polish.
  - Two appointments: (1) observations without VR, description of intervention and purpose of study, become familiar with VR (2) with VR, both in reclined position.



### RESULTS

#### Acceptability

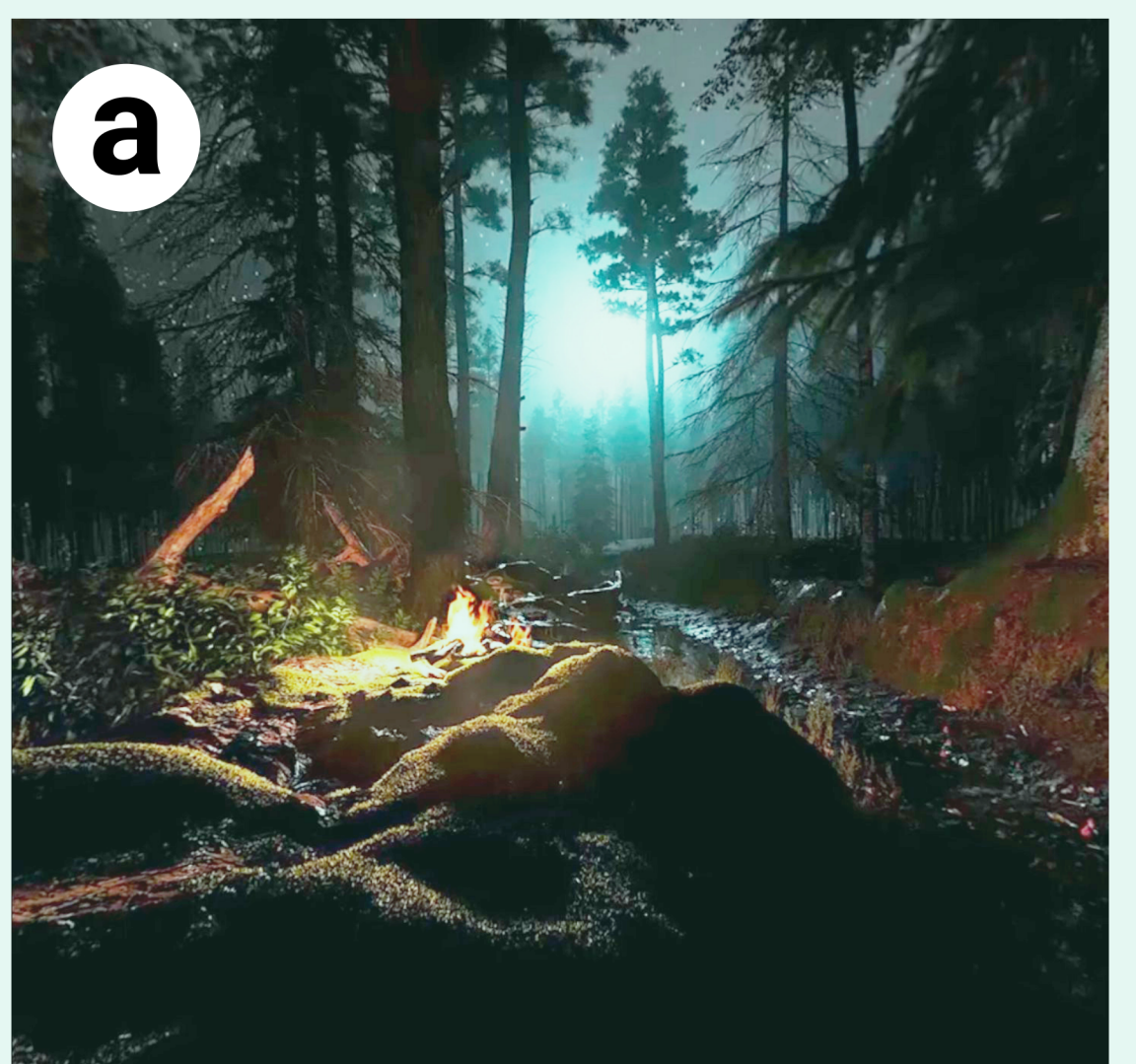
- Both patients wore VR for the duration of the procedure (25-30 min) and described the VR headset as comfortable and "a good distraction".
- No symptoms of simulator sickness (e.g., nausea) reported/observed.
- Dentist described the patients as less anxious and requiring less reassurance compared to previous dental treatments.

#### Impact on Workflow

- Dentist rated the VR HMD as having high usability (SUS = 75).
- No interference with workflow, hand positioning, or communication.
- No impact on time to complete procedure.
- Overall better than standard-of-care strategies (e.g., calm voice, sedation).
- Requires extra pre-appointment time for set-up/patient to gain VR familiarity.

#### Hardware/Software Challenges

- P2 (Quest 2) rated experience in the virtual world higher compared to P1 (Oculus Go, reported that blurriness of the videos interfered with experience).
- HMD controller not used; difficulty establishing Quest 2 "boundaries"; participants reported noticing "gap" at nose bridge; reclined position meant focal point of videos was the sky.



Screen capture of 360° VR YouTube video:  
a) View from upright seated position.  
b) View from reclined position.

### DISCUSSION

- VR was well-tolerated and shows potential to help manage pain and anxiety.
- No adverse events occurred.
- The dental team was satisfied with the intervention, intends to continue using it with other stroke patients.
- The dental team was interested in exploring VR with other populations (dementia & acquired brain injury).
- 180° videos should be considered for patients in reclined position for greater selection/improved view.
- Future research should evaluate the effectiveness of VR on minimizing pain and anxiety in a larger sample.