**Introduction**

**Temporomandibular Joint Disorder (TMJD)**
- Acute or chronic inflammation of the TMJ (FIG. 1)
- Affects approximately 35 million people in the U.S.
- Sleep labs (FIG. 2) required for accurate diagnosis
  - Electrodes record and analyze the activity of the masseter and temporalis muscles to detect bruxism events (clenching/grinding)
  - Uncomfortable and does not acquire data consistent with natural sleeping patterns

**Purpose of Project**

Develop a user-friendly TMJD diagnostics system that will allow patients to be screened comfortably in their own home.

**Electromyography**

Technique for evaluating and recording electrical activity produced by skeletal muscles (FIG. 3). It is the only quantitative method to measure and document the severity, progression, and treatment of muscle dysfunction in the TMJD patient.

**Project Design**

**EMG Circuit**

Amplify and filter EMG signals from facial muscles to detect bruxism events and record electromyographic data (FIG. 4)

![Figure 4. EMG circuit for right masseter muscle](image)

**Neuroband Data Acquisition Unit**

- Modification of existing EEG headband
- Includes ports for electrode snap leads located within chin strap and headband
- Comfortable, adjustable, and user-friendly

**LabVIEW Program and Laptop**

- Patient view: Start button to begin data acquisition, analysis and storage
- Clinician view: View EMG signals and tabulated results
- Intuitive design for ease of use

**Results**

- EMG signals are amplified and filtered in analog circuitry
- Data is analyzed in LabVIEW program to store and tabulate results
- Intuitive graphical user interface with display options

**Conclusion**

The product improves the screening and diagnosis of TMJD by presenting a portable and user-friendly device that maintains the accuracy of sleep labs while optimizing comfort and allowing for the collection of EMG data in the patient’s natural sleeping environment.

**References**


