VIVIAN NGUYEN

PRODUCT DEVELOPMENT ENGINEER

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TEST FIXTURE FOR MULTIPLEX ELECTRODES IN BCI - RESOLUTION MEDICAL

What?

- Designed a custom test fixture to evaluate the performance of multiplex electrode pads used in brain-computer interface (BCI) devices. The fixture was aimed at simulating real-world conditions to ensure the electrodes meet the required electrical, mechanical, and biocompatibility standards.

How?

- **Fixture Design:** Created the test fixture using **SolidWorks** to ensure compatibility with the BCI device's electrode array and facilitate testing under controlled conditions.
- **Electrode Testing**: Designed the fixture to test **electrode integrity**, contact resistance, and **biocompatibility**, ensuring **reliable signal transmission** between the electrodes and neural tissue.
- **Rapid Prototyping:** Utilized **3D printing** and **CNC machining** to fabricate precision parts for the fixture.
- **Collaboration:** Worked closely with the neurosurgery and electrical engineering teams to fine-tune test parameters and refine fixture functionality.

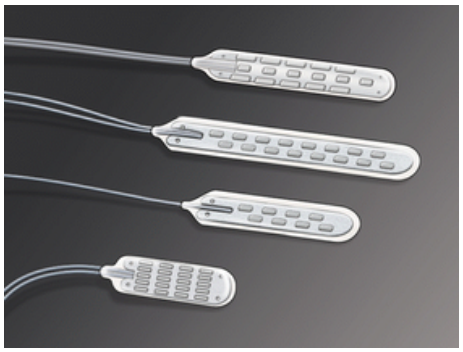
TEST METHOD DEVELOPMENT FOR PADDLE LEAD - RESOLUTION MEDICAL

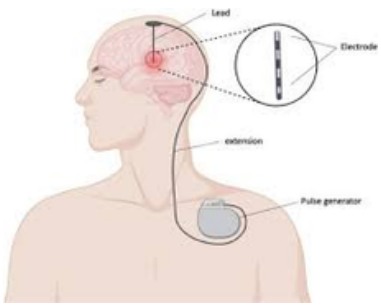
What?

- Developed a standardized test method to evaluate the flexibility and deployment force of paddle leads used in epilepsy treatment to ensure safe and reliable implantation during surgery.

How?

- **Test Methodology Development:** Developed procedures to measure **deployment forces**, **bending flexibility**, and **tensile strength** of the paddle lead materials to ensure the device can be implanted with minimal complications.
- **Mechanical Testing:** Designed and executed tests to simulate **real-world conditions**, ensuring that the paddle lead could be safely deployed within the brain with no risk of failure or misalignment.
- **Data Analysis:** Collected and analyzed **force-displacement** data using **Minitab** to assess the paddle lead's performance under expected deployment conditions.
- **Documentation & Reporting:** Created detailed test protocols and reports to support design validation (DV) and preclinical testing phases.





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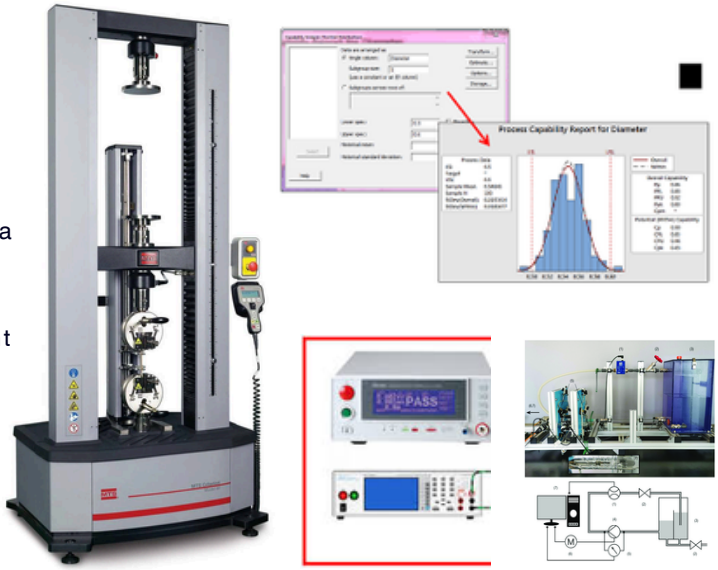
DESIGN VERIFICATION TESTING (DVT) - RESOLUTION MEDICAL

What?

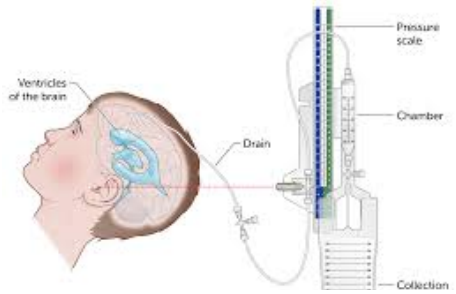
Performed the Design Verification Testing (DVT) for fatigue testing and mechanical integrity of a heart pacing device. This project involved developing and executing a robust testing protocol to ensure the device could withstand long-term usage under dynamic mechanical stresses.

How?

- **Test Flow Development:** Designed test parameters, conditions, and data collection methods for **fatigue testing** to ensure the pacing device's **durability**.
- **Test Execution & Data Collection:** Conducted **mechanical fatigue** and **hydraulic tests**, gathering data on device durability and failure modes.
- **Data Analysis:** Analyzed fatigue cycles and mechanical stress data using **Minitab** to identify design improvement opportunities.
- **Cross-Functional Collaboration:** Coordinated with engineering, quality assurance, and regulatory teams to ensure compliance with FDA and ISO standards.



HEAD MOTION TRACKER SYSTEM - UNIVERSITY PROJECT

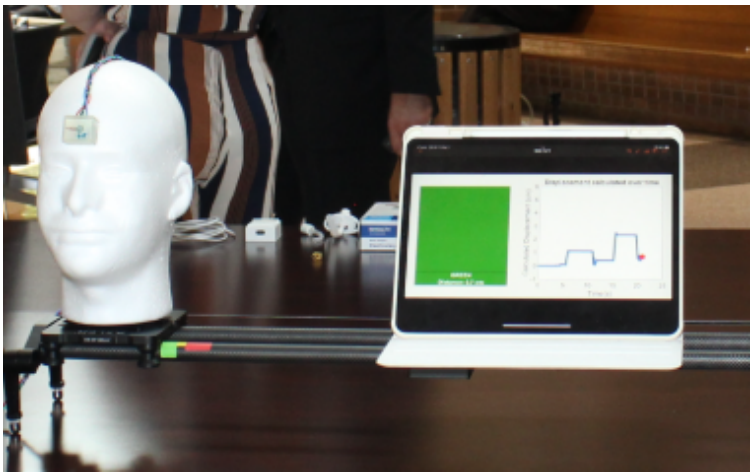


What?

- Developed a real-time head motion tracking system for monitoring cranial movement during External Ventricular Drainage (EVD) procedures.
- Aimed to reduce the risk of catheter dislodgement by providing continuous motion feedback.
- Enabled reliable head position tracking during patient repositioning, transport, and recovery phases.

How?

- **Python & MATLAB (Data Analysis):** Created algorithms for attitude estimation and real-time motion tracking.
- **SolidWorks (Mechanical Design):** Designed an ergonomic, durable sensor housing optimized for medical use.
- **Arduino (Hardware Integration):** Integrated IMU sensors with Arduino to capture multi-axis motion data.
- **Prototyping (Hands-On Assembly):** Assembled and wired the full system, including sensors and enclosures.
- **Testing & Validation:** Conducted iterative testing to ensure accuracy, stability, and user safety.
- **Collaboration & Documentation:** Worked in a multidisciplinary team and documented all design and testing procedures.



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