BAYER'S DIGITAL CAMPUS CHALLENGE 2021

FREQUENCY THERAPIES

Prepared by TechnicallyMed

$131B

USED IN TREATING HIGH BLOOD PRESSURE A YEAR

650M

MEDICINE PRESCRIPTIONS FILLED FOR HIGH BLOOD PRESSURE EACH YEAR

DESPITE THE EFFORT ...

HYPERTENSION WORLDWIDE DEATH TOLL

7.6 MILLION

PER ANNUM

Raised blood pressure is responsible for 13.5% of the total deaths worldwide. According to the American College of Cardiology, elevated blood pressure is a leading risk factor for heart disease as it damages arteries and restricts blood flow. Consequently, weakens the heart muscles and leads to a heart attack or stroke which 54% and 47% respectively are attributable to high blood pressure.

WHY MEDICATIONS ARE DEFECTIVE?

ONLY ABOUT 1 IN 4 ADULTS WITH HYPERTENSION HAVE THEIR CONDITION UNDER CONTROLLED

Dynamic Combinations

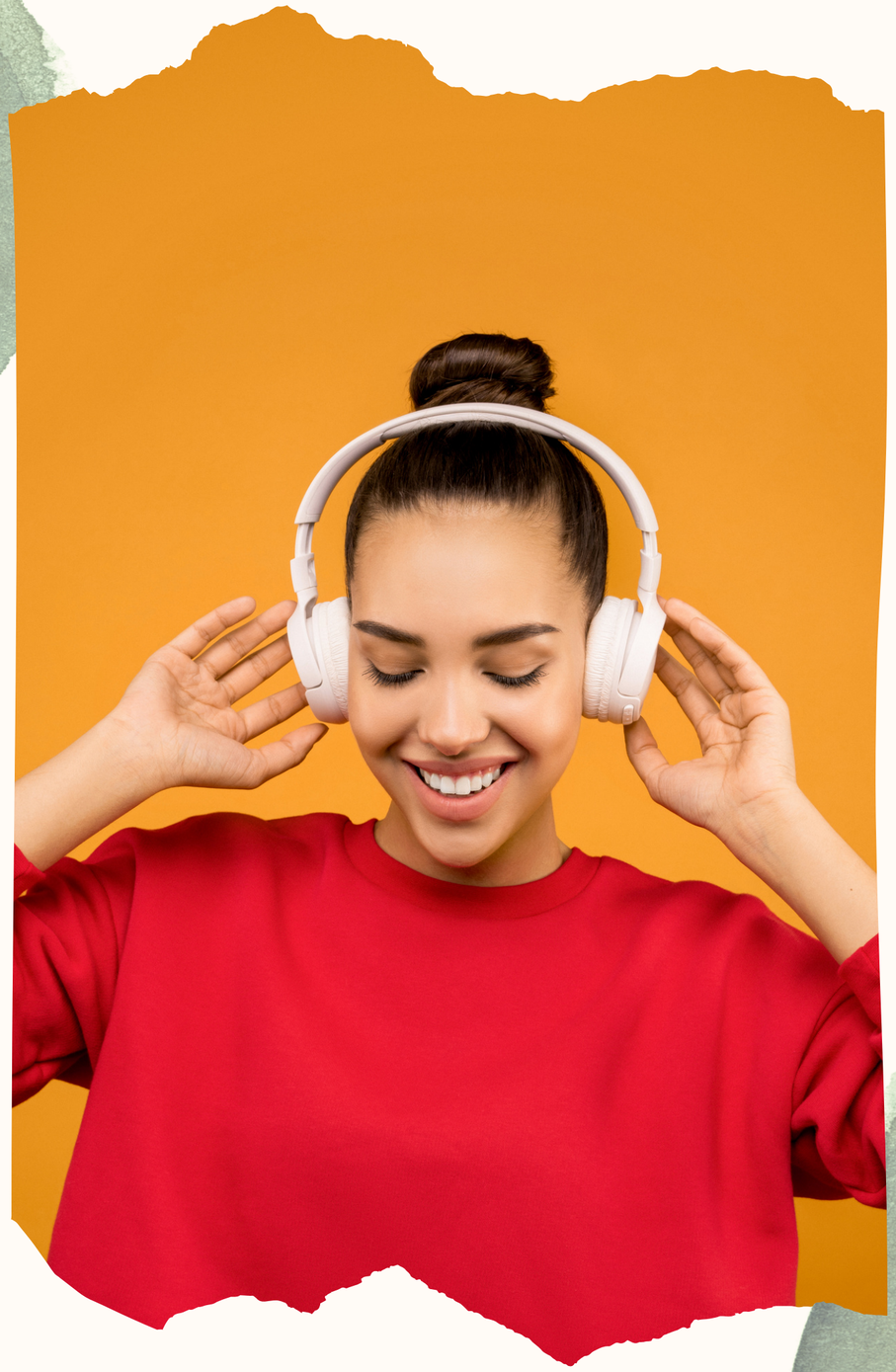
Selecting the "best" high blood pressure medication depends on several things from the patient's general health to drug sensitives. Combinational medication is commonly prescribed and in need of constant review to boost BP-lowering effects

Continous Medication

The majority of individuals with hypertension are required to take meds for the rest of their life. Stopping any blood pressure medication may lead to withdrawal symptoms such as a rerise in BP and in severe cases even sudden death

Side Effects

Although side effects of blood pressure medicines vary, dangerous effects such as dizziness and fatigue are alarming as they put the elderly at higher risk of slipping and falling. Knowing that 70% of the elderly have hypertension, imagine the possible number of deaths caused by a fall



SOUND FREQUENCY THERAPY

WHAT IS SOUND THERAPY?

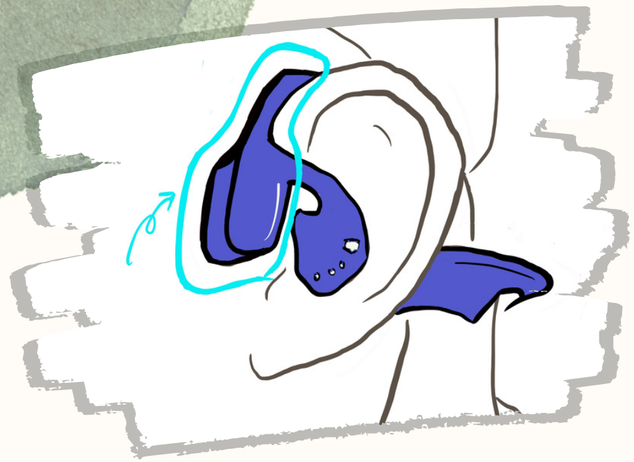
Sound therapy uses aspects of music to promote physical and mental healing. It was first introduced in ancient Greek to cure mental disorder. Nevertheless, due to development of technology , sound therapy has proven to treat physical condition such as rheumatic, pain reduction and blood pressure.

PREM :-

PORTABLE RESONATIVE ELECTROENCEPHALIC MIRRORING

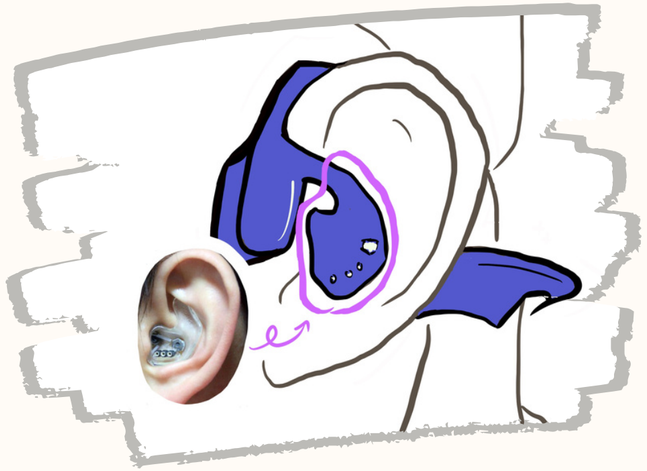
Taken inspiration from the technology HIRREM (high-resolution, relational, resonance-based, electro encephalic mirroring) studied by The Wake Forest Team (2016), PREM combines sound therapy and brain wave monitoring in a single and portable device that aims to provide patients with a home accessible alternative treatment method from traditional medication to treat hypertension. As digital health continues to be promoted, PREM is also hopeful of being considered to be used in treatment plans for psychiatric conditions.

OUR APPROACH



BONE CONDUCTION HEADPHONE

Bone conduction headphones use vibrations to transmit sound directly to the inner ear through the bones located in the upper cheek and jaw, This vacates the ear canal without imparing sound qulity.



IN-EAR ELECTROENCEPHALOGRAPHY

Electroencephalography (EEG) is a device used by neuroscientist to record electrical signals in the brain. Similarly, the in-ear EEG uses 3 electrodes equipped on the earpiece to record brain activity from within the ear canal whitout affecting normal life.

STATISTICAL SHARING

The team behind TechinallyMed plans to develop an application to store brain activity and therapy frequency records and live syncs these records for both the patient and their therapist. Additional features for therapist to remotely tune the treatment frequencies are also in plan.

HOW DOES PREM WORK?

BRAIN ACTIVITY MONITORING

Pre therapy, an assessment of the patient's brain electrical pattern is done while having their eyes closed, partially and fully open to monitor brain activity at rest and active.

FREQUENCY TUNING

During a 90-120 minutes therapy session, the dominant frequency is identified from constant brain activity monitoring and translated into an audible tone. The translated tone is then played to the patient within 8 milliseconds. Throughout the session, patients would be hearing a series of tone matching their dominant frequency at each interval

STATISTICAL SYNC

Through an application, patients are able to view their brain activity as well as the tones they are currently hearing. The therapist will be able to view these data in sync as well as tune the device remotely if they are treating their patients through virtual sessions.

THE SCIENCE BEHIND PREM

Normally, an individual's brain activity is fairly well balanced. However, for patients, their brain's plasticity may have shifted patterns due to repetitive fight-or-flight responses from medical conditions. Consequently, dysfunctional patterns of the autonomic system would occur. Sound therapy on the other hand corrects the frequencies in the human body. According to cognitive neuroscientist Petr Janatam, different circuits of the brain have preferred frequencies at which they oscillate thus with an external stimulus it is capable of synchronizing neural network. PREM allows the brain to autocalibration or reset from a stuck pattern by eliciting appropriate frequencies. For better understanding, similar to pendulum swings swings can be amplified if it is push at the right moments.

HOW CAN PREM BENEFIT?

PROLONG BLOOD PRESSURE DROP

PREM is set to reduce the patients blood pressure by an average of 16mmHg with an average of 17.7 therapy sessions indicating a possible improvement from stage 1 hypertension to normal blood pressure. Although patients would not be suggested to take off their meds during within the treatment period, it is observed by study that the effects sound therapies does not rebound or worsen conditions after end of treatment.

DIGITAL HEALTH ADOPTION

As digital health initiatives continue to develop, it is crucial to consider providing patients with the same treatment plans as doing clinical in-office visits. As equipments such traditional EEG and medical softwares are made unavailable to patients, PREM provides an in-house friendly alternative that therapist can use for virtual therapy sessions. Moreover, bone conduction headphones allows patients with hearing defects to be considered for sound therapies as well.

REDUCED SIDE EFFECTS

As combinational medication is commonly prescribed to treat hypertension, it also means that the risk of getting various side effects are higher as each drug has it own. According to study, it suggests that sound therapies does not elicit side effects as of now as it does not try to train the brain to do something but offer guidance to let the brain shift on its own.

PREM

Portable Resonative Electroencephalic Mirroring

01 What is PREM?

PREM is an alternative treatment plan for patients with hypertension that combines sound therapy and brain wave monitoring.

02 How does it work?

Using an in-ear EEG, a dominant frequency is obtained from brain activity monitoring and translated into an audible tone. The tone would then be played to the patient with changes according to the patient's brain activity.

03 How does it help?

PREM is set to reduce a patient's blood pressure by an average of 16mmHg with an average of 17.7 therapy session with reduced or without side effects being elicited unlike traditional medications.

04 Why does it help?

Patients with hypertension have dysfunctional patterns of the autonomic system which indicates unbalanced brain activity, PREM allows the brain to autocalibration or reset from stuck patterns.

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REFERENCES

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