

NeuroHealth in CTE

Envisioning a future where we restore functional independence and quality of life for people suffering from Chronic Traumatic Encephalopathy (CTE).

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'It is easy to design different, but difficult to design better', a motto Antara lives by. A speaker at the Rev2025 Conference, recognised by the Istanbul University and a Product Designer, she strives to build better and safer futures for the healthcare society.

40%

Brains from contact sport players who died before reaching 30, had CTE according to the National Institute of Health.

1 in 3

NFL Players show signs of CTE, according to Harvard Medical School.

14%

Chances of being diagnosed with CTE for every additional year of play in the NFL, says University of Glasgow.

What is CTE?

Chronic Traumatic Encephalopathy (CTE) is a progressive neurodegenerative disease that occurs in association with repetitive brain injury experienced in sports like the American Football (Stein, 2014). These injuries worsen over increased number of collisions, which leads to CTE development. Symptoms of CTE include aggression, lack of impulse control and mood swings.

30 yrs

And under is the age group for exhibiting earliest signs of CTE, according to Boston University.

34%

Former NFL Players acknowledge CTE, but refuse treatment as per Harvard Medical School.

68%

Of brains examined showed CTE pathology in only rugby and NFL players, says the National Institute of Health.

Barriers to current CTE consultation



Lack of positive self-perception in suspected CTE patients.



No existing biomarker to help treat the disease.



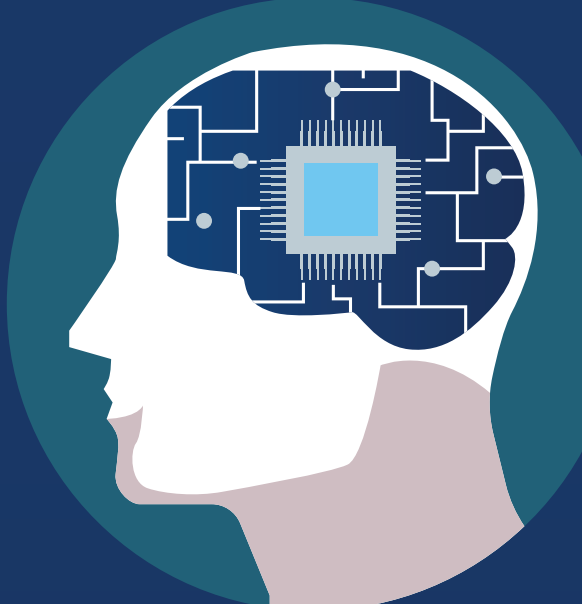
Lack of participation due to telehealth uncertainties.

The Future of Brain Health in Chronic Traumatic Encephalopathy (CTE)



Insights

'Deep Brain Stimulation' is a brain implant therapy used to treat diseases like Parkinson's.



Studies show Deep Brain Stimulation improves Parkinson's symptoms by 53%, compared to 4% with medication. Such procedures have helped improve quality of life (Brodsky, 2017).

#NEUROHEALTH
#THERAPY
#CTE

Methodology followed to create and build the outcome:

Understanding CTE.



Existing CTE treatment.



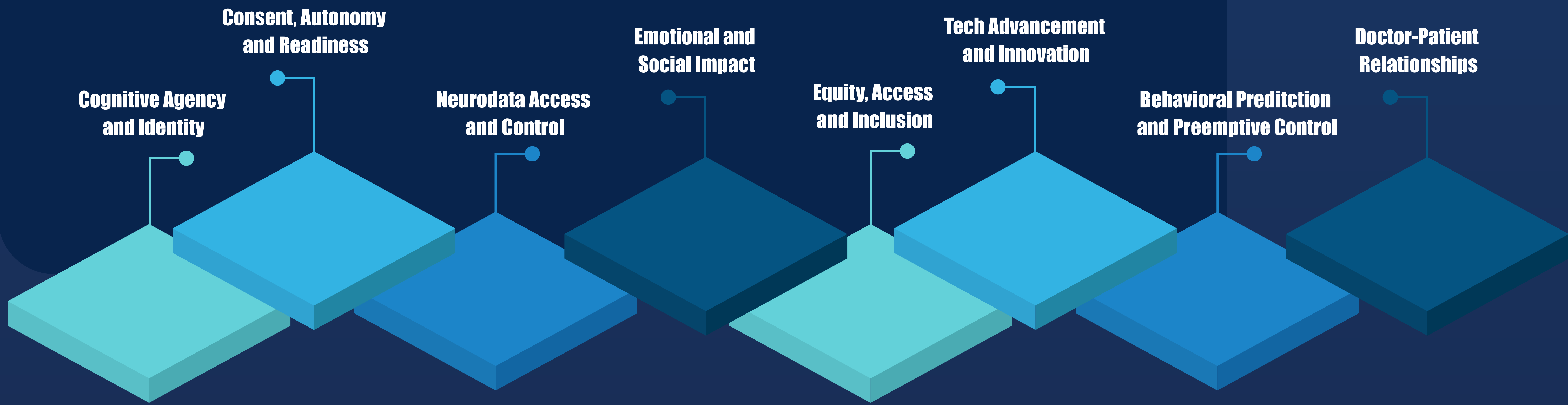
Interviews with surgeons and bioengineers.



Barriers to CTE consultation.



Risks to consider.



Brain Implant Therapy in Chronic Traumatic Encephalopathy (CTE)

By 2040, CTE is no longer a death sentence diagnosis that can only be delivered post-mortem. With widespread utilization of adaptive, ethically managed brain implants, at-risk individuals like athletes, veterans, and survivors of head trauma are empowered to detect and treat CTE before symptoms intensify. They personalize care in real time by treating symptoms like forgetfulness, mood swings and impulsive actions while preserving user autonomy. Neural information is governed by stringent rights-based models that allow individuals full control over how their information from their brain is utilized. There are many factors to consider when envisioning a future post CTE diagnosis like tech invasiveness, occupational hazards for sports like American Football and Combat, health and performance effects and more. It's proactive and reversible - integrated within public health programs and sports. Brain health is identified as a right, and implants are regarded as tools for strength.

Ethical Framework for CTE Futures

I propose to build an ethical framework that identifies and defines eight risk zones to consider for the ethical progression of using Brain Implant Therapy for CTE. Each risk zone within this framework outlines critical factors like patient control and agency to draw boundaries around safe and ethical use of invasive procedures in CTE Treatment. These zones can be used to segment the roles of different stakeholders and in understanding of the future of Brain Implant Therapy for CTE.



Reframing how society approaches CTE health.



Pushing boundaries for evolution of CTE treatment.



Advocacy for vulnerable groups like CTE patients.



Informing long-term thinking amongst various pillars of society.

REFERENCES

[1] Breton, A.M. et al. (2017) Research gaps and controversies in Chronic traumatic encephalopathy: A review, JAMA neurology. Available at: <https://pubmed.ncbi.nlm.nih.gov/28975240/> (Accessed: 29 June 2025).
[2] Turner, R.C. et al. (2013) Repetitive traumatic brain injury and development of chronic traumatic encephalopathy: A potential role for biomarkers in diagnosis, prognosis, and treatment?, Frontiers in neurology. Available at: <https://pubmed.ncbi.nlm.nih.gov/23335911/> (Accessed: 08 July 2025).
[3] Stein, T.D., Alvarez, V.E. and McKee, A.C. (2014) Chronic traumatic encephalopathy: A spectrum of neuropathological changes following repetitive brain trauma in athletes and military personnel, Alzheimer's research & therapy. Available at: <https://pmc.ncbi.nlm.nih.gov/articles/PMC3979082/#B65> (Accessed: 07 July 2025).