Emerging Electro-Therapies and Technologies for the Temporary relief of Involuntary Hand Tremors

Associated with Parkinsons' disease and other neurological conditions

DNB311: ID STUDIO 7: CAPSTONE

CRITICAL REPORT



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Authenticity & AI Statement

Authenticity Statement

This is to certify that to the best of my knowledge, the content of this report is my own work. This report has not been submitted for any subject or for other purposes. I certify that the intellectual content of this report is the product of my own work and that all the assistance received in preparing this report and sources have been acknowledged.



Your name: Zoe Evans

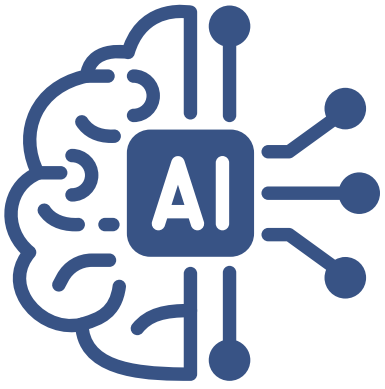
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Date: 26/8/26

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- Highlighting aspects that can be removed in original text to suit the word limit.
- Help re-structure Original content for better flowing paragraphs, AFTER content was written. No wording changed.
- From Manually Coded Transcripts, constructing Codex Tables from highlighted information/codes.



Your name: Zoe Evans

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Date: 26/8/26

Executive Summary

This report examines the physical, functional and emotional impacts that individuals with involuntary Hand Tremors (HT's) experience daily. The Emerging Technologies of Electro-therapy/ Electro technologies are investigated throughout this report to understand whether they could be a potential design intervention strategy for individuals with Involuntary Hand Tremors.

Primary Qualitative research consisted of 5 interviews with Caregivers/Support individuals of people with Hand Tremors. The purpose of these interviews was to gather understanding and perspectives into the daily proceedings of individuals with hand tremors to understand the frequency of daily challenges/activities. Due to the ethical considerations of this report, individuals directly suffering from Hand Tremors (HT's) were excluded from the interview process.
Alongside this, 17 published Archivable Observations were analysed to provide visual understandings around Task and Challenges and Emotional Reactions/Impact for individuals with Hand Tremors.

When analysing the data across all 5 interviews and 17 observations, it was made clear that Physical Hand Function was the most common, reoccurring theme present within the data, making up 37.3% of the data collected. This theme involved 3 Codes, Grip/Holding, Eating/ Drinking and Fine Motor Control. However, Emotional impacts were significantly noticeable throughout their direct relationship to Physical Hand Tremors and was labelled as the 2nd most significant theme.

The benchmarking section highlighted existing products; however, the information gathered in the research section highlighted the issues with current existing products. This allowed for many design inventions to be established, further supporting the development of Electro-therapeutic Devices for multi-use situations/tasks for Hand Tremors.

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SECTION 1.0 :

1.1 Introducing the Topic

1.2 Background

1.3Benchmarking

1.1 Introduction

1.1.1 Project Overview

IIn Australia, between 450,000 to 1,000,000 individuals are living and dealing with Hand Tremors (HT's). Ranging from the most forms being the Essential Tremor to neurological conditions such as Parkinsons Disease. (Essential Tremor) (ST Vincents Hospital Sydney,2026) (Parkinsons Australia,2026)

1.1.2 Project Aim

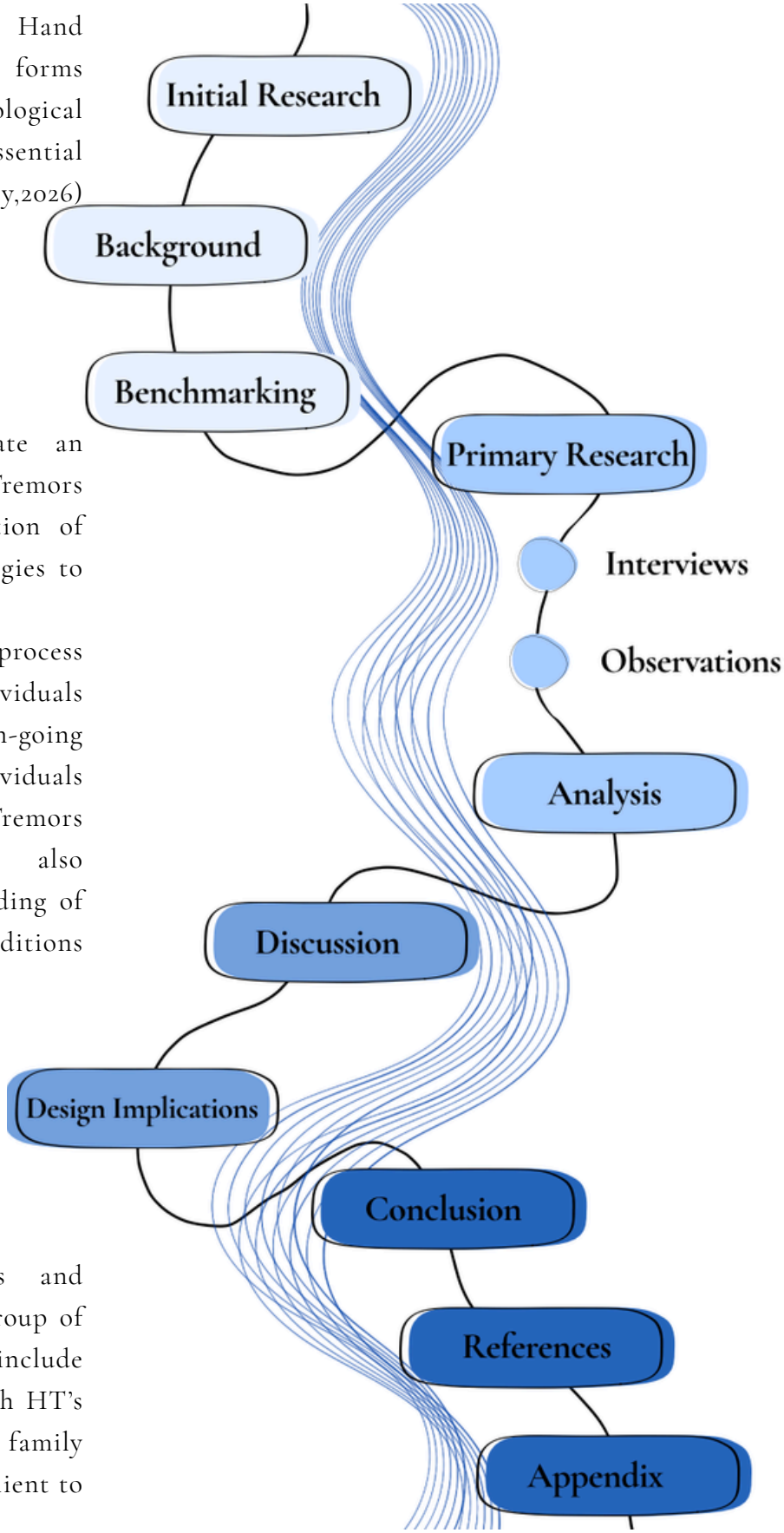
The aim of this report is to create an understanding into the impacts of Hand Tremors (HT's) on individuals and the integration of Emerging Electro-therapies and Technologies to create temporary relief for the individual.

This report follows the research process including Primary Interviews with Individuals who provide care and/or have (current) on-going interactions and relationships with individuals suffering from In-voluntary Hand Tremors (HT's).Archivable Observations are also conducted to provide a visual understanding of the impacts of HT's from neurological conditions such as Parkinsons Disease.

1.1.3 Ethical Note

Due to the Ethical Considerations and consensual issues surrounding the user group of this report, it has been decided to not include interviews from individuals suffering with HT's directly. It has been elected for caregivers/ family to be the expert representative for their client to deliver 'Carer' observations/insights.

Figure One: Project Summary



1.2 Background

1.2.1 What is a Tremor?

"A Tremor is a neurological condition that includes shaking or trembling movements in one or more parts of the body, most commonly affecting a person's hands."

HT's can be a constant movement, or it can occasionally happen, it depends on the severity/ status of their neurological condition. Tremors are often Involuntary movements.
There are 3 main categories of HT's such as Postural Tremors, Kinetic Tremors or Isometric Tremors.

Postural Tremor: Caused by holding arms out/ holding against gravity.

Kinetic Tremor: Caused by voluntary movements, when someone intentionally goes to perform an action/movement. Includes Intention Tremors and Task-Specific Tremors.

Isometric Tremor: Caused by voluntary muscle contractions that are not caused by movements. (NIH)National Institute of Neurological Disorders and Stroke, 2026)

Table One: Types of Tremors

Type of Tremors	What is it?
Essential Tremor	Most common Syndromes for Hand tremors. Mainly in both hands during actions, no other neurological symptoms
Dystonic Tremor	Happens in individuals with Dystonia, the disorder that involves the involuntary tightening of muscles. Any area of the body can be affected.
Cerebellar Tremor	A slow tremor of the limbs. Is worse at the completion of a purposeful movement.
Functional Tremor	Can occur in any form of tremor
Enhanced Physiologic Tremor	Small tremors in hands and fingers. Not caused by neurological disease, but more a reaction to drugs and alcohol.
Parkinsonian Tremor	Associated with Parkinsons Disease. All areas of the body
Orthostatic Tremor	Rapid muscle tremors, very fast shaking. Can be felt through the body.

(NIH)National Institute or Neurological Disorders and Stroke, 2026)

Original Table in Appendix, Regenerated with ChatGBT.

1.2.2 The Impacts of Hand Tremors

HT's can impact an individual's ability to perform daily activities that most individuals do sub-consciously. Simple tasks such as eating, drinking, personal care and overall handling of small objects, all become increasingly difficulty, often requiring assistive help. The severity of the tremors can cause significant discomfort and emotional harm, resulting in a decrease of independence. (Elan D, Louis, Duarte G, Machado, 2016)

1.2.3 Current Treatments

When approaching treatments for involuntary HT's, there isn't just one treatment/ solution that will work for every individual. The most common form of Involuntary Tremor treatments is oral Medication. However, the effectiveness varies by individual not necessarily eliminating the Tremors. Other Therapies, Surgical Procedures and Nerve Stimulation Devices are also treatments, each coming with their own limitations. (Essential Tremor,2026)

1.2.4 What is Electro-Therapies and Electro-Technology

Emerging Electro-Therapies and Technologies are proving to be a possible new intervention point for patients with HT's. There are 3 main Electro - therapy stimulations that are emerging throughout the field. These can be seen in Table One.

Electro-therapies are a pathway into the development of new treatments for involuntary HT's, due to them providing patients with a less-invasive option when compared with medications and surgical procedures.

1.3 Benchmarking

The following benchmarking section will cover what physical products exist on the market. This market analysis will allow understanding as to where Product/design intervention and implantation is needed, whilst understanding the effectiveness of the products. This analysis is vital in determining Limitations, Successes and Direction needed for the next development of assistive devices due to the Emerging Technological advancement required in these products.

1.3.1 Outline existing Products

As of 2026, there is very limited amounts of Electro-therapy/ technology associated products for individuals suffering with in-voluntary HT's. This section will compare attributes of designs to establish a clear intervention gap within the market. It will also look at HT's assistive devices, to understand characteristics that make them successful.

What currently exists:

In 2026, the Assistive product market consists of a wide range of products, all suited to specific actions, all with different, individual aims. Some products range from; Wearable devices, Online software programs, Action assistive products (Jar opener) and Personal Assistive Devices (stabilising Forks) and more.

On the market is a diverse selection of assistive devices, all designed with different product aims. The features of each design is displayed in the following graphs/tables to display the evaluation against the same criteria, Tremor Relief, Discreetness, Hand use, Duration, Future integration and costing.

This is crucial to helping develop strengths, weaknesses and design gaps within the products, helping later in the developmental process of determining significant design intervention points/market gaps.

Existing Electro-Technology specific devices

When analysing Electro-technological products on the market aimed at individuals with HT's / hand mobility issues, there are 4 devices proving most innovative and successful. These are.

Cala kIQ Plus; A Wrist Wearable Assistive Device that uses the Electro-therapy, Transcutaneous Afferent Pattered Stimulation to provide personalised electro-stimulation to provide a non-invasive temporary relief form for hand tremors.
(Draper, S, 2026)

Figure Two: Image of Cala kIQ Plus



(Cala,2026)

Felix Neuro AI; an AI developed Wrist- wearable Assistive Device, that uses sensors to deliver Electrical Nerve Stimulation to the hand, to reduce HT's in everyday activities.

Figure Three: Image of Felix Neuro AI



(FASIKL, 2026)

1.3 Benchmarking

EncoraXi: a Wrist Wearable Device that uses Mechanical Neuromodulation to the wrist to disturb tremor signals, to reduce tremors during activity.

VILIM Ball: this is a hand-held device that used Medical Vibrations to temporarily stabilise HT's during daily activities. (Healthport- VILIM Ball, 2026)

Figure Four: Image of EncoraXi



(ENCORA THERAPEUTICS, 2026)

Figure Five: Image of VILIM Ball



(Active hands-VILIM Ball, 2026)

Table Two: Existing Electro-technology Devices Comparison table

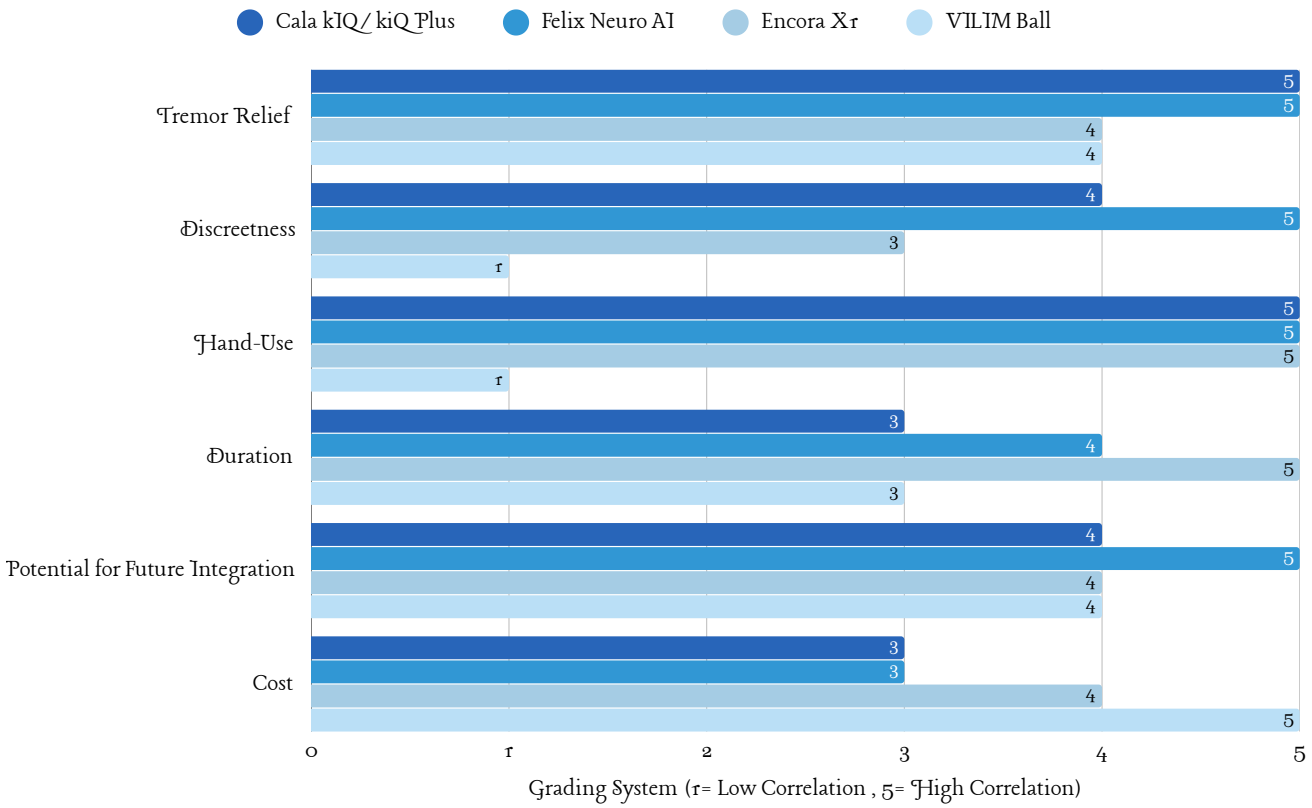
	Tremor Relief	Discreetness	Hand-Use	Duration	Potential for future integration	Cost
Cala kIQ/kiQ Plus	5	4	5	3	4	3
Felix Neuro AI	5	5	5	4	5	3
Encora Xi	4	3	5	5	4	4
VILIM Ball	4	1	1	3	4	5

Figure Six: Comparison Table Colour Coded Key

1: Low/Bad	2	3: Not Bad nor Good	4	5: High/Good

Benchmarking

Graph One: Electro-technology Comparison Graph

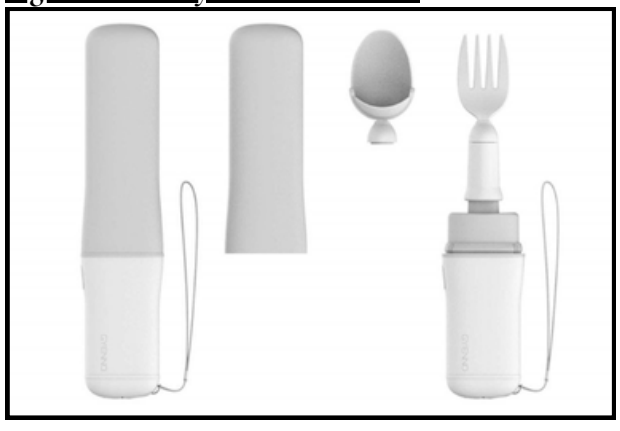


Existing Physical assistive devices

Some of the strongest Physical action supportive products consist of;

Gyenno Bravo Twist Parkinsons Spoon and Fork; an Electronically Stabilising Spoon that reduces the effect of tremors on the eating motion.

Figure Seven: Gyenno Bravo Twist



(Max Healthcare Equipment, Gyenno Bravo Twist Kit-Fork and Spoon, 2026)

Handsteady Cup: a Rotating Handled Cup that reduces spillage whilst drinking due to tremors.

Figure Eight: Hansdteady Cup



(DoAbility, Handsteady Drinking Aid Cup, 2026)

1.3 Benchmarking

Heavyweight ball pen; Weighted Pen that allows for more stability for low fine-motor skills.

Steadi-one: Magnetic Vibration Hand Stabilising Glove for hand tremors.

Figure Nine: Heavyweight Ball Pen



(PencilGripsPlus, 2026)

Figure Ten: Steadi-One



(Steadiwear, 2026)

Table Three: Physical Assistive Devices Comparison table

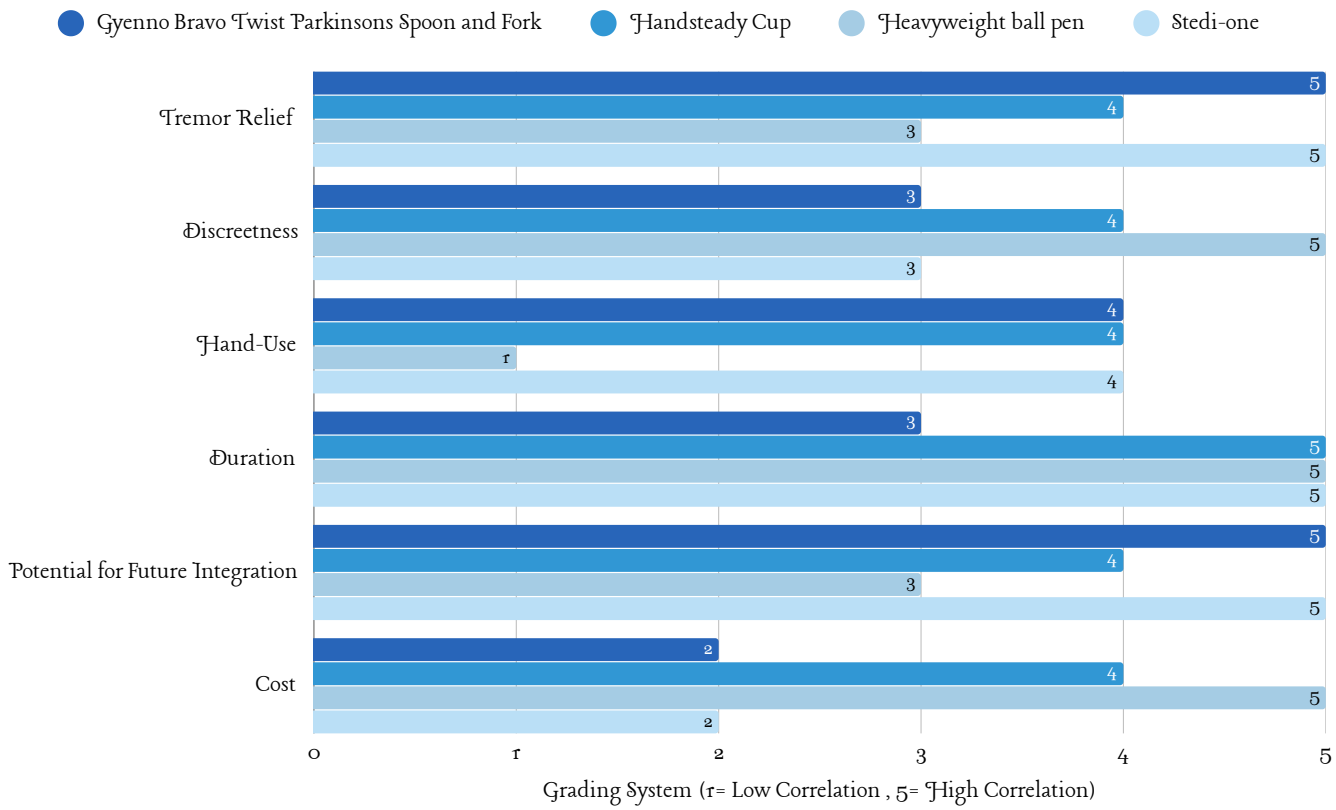
	Tremor Relief	Discreetness	Hand-Use	Duration	Potential for future integration	Cost
Gyenno Bravo Twist Parkinsons Spoon and Fork	5	3	4	3	5	2
Handsteady Cup:	4	4	4	5	4	4
Heavyweight ball pen;	3	5	1	5	3	5
Steadi-one:	5	3	4	5	5	2

Figure Eleven: Comparison Table Colour Coded Key

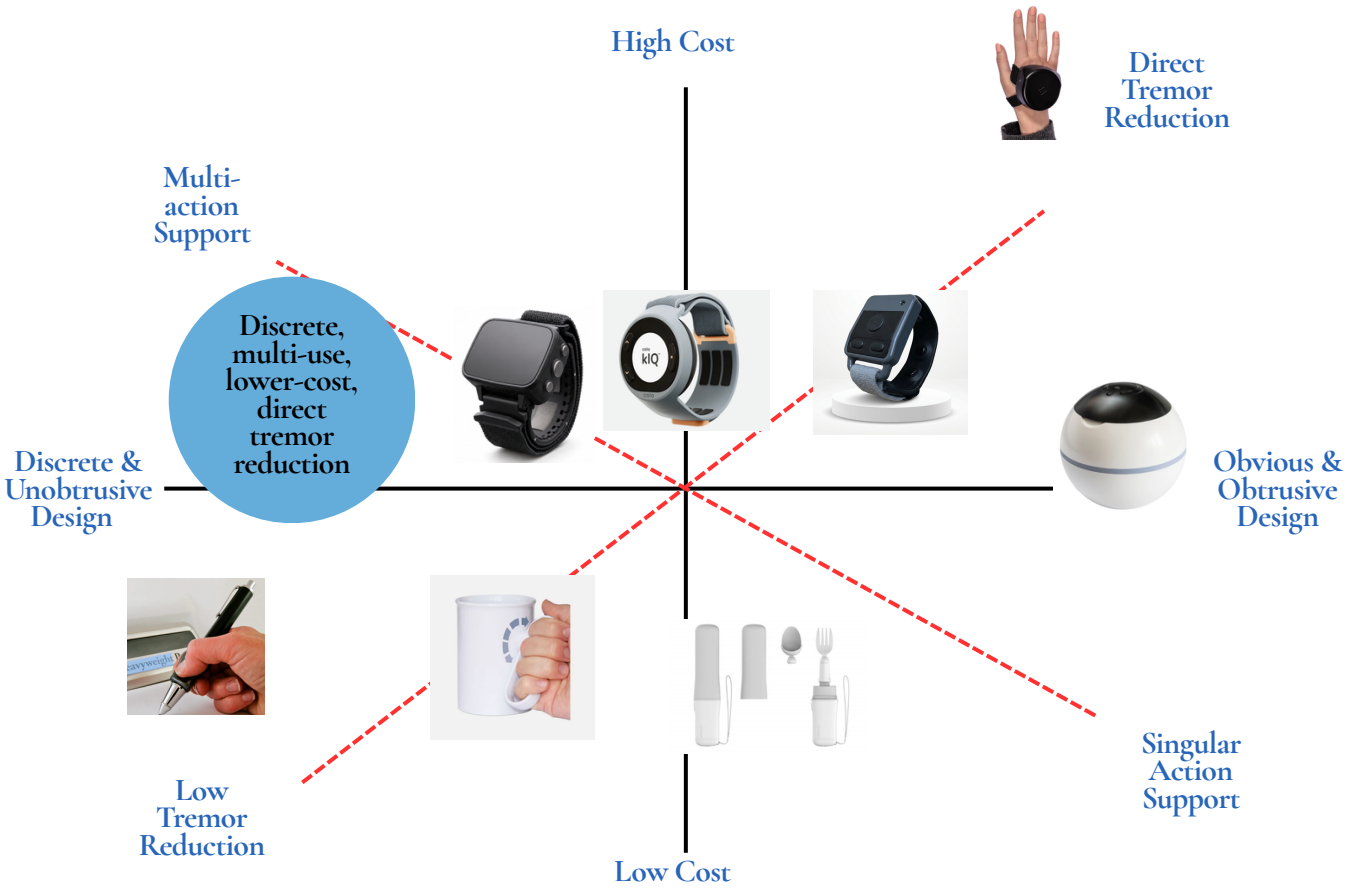
1: Low/Bad	2	3: Not Bad nor Good	4	5: High/Good

Benchmarking

Graph Two: Physical Assistive Device Comparison Graph



Graph Three: Existing Product Matrix Comparison



Benchmarking

Understanding the Benchmarking

This benchmarking analysis displays the clear in-difference between technologically advanced HT's devices against simpler, task-specific assistive devices. The benchmarking above confirms the demonstration of emerging Electro-technologies as the future of tremor management devices, by creating intervention of the tremor itself, easing different actions. However, all electro-technological devices are bulky, noticeable and expensive. This increases the correlation between the device and a medical product, further adding to the feeling of in-difference for the individual.

However, devices constructed for one task are often slimer, more affordable products on the market. However, the un-sustainable result of needing a different device for every different action, can prove to be an in-affordable cost, storage and strategy.

Finding Gaps within the Market

This creates advancements into the construction of new designs. Market gaps within the product market consist of.

Possible Gap One:

Unobtrusive, sleek electro-therapeutic devices: This includes devices that are slimmer, less noticeable wearable devices, with the intention of designing a solution to ease the tremor itself for a temporary period, to be able to conduct multiple tasks, in a more efficient 'normal' way.

Possible Gap Two:

Designs that are integrated into everyday lives; a combination of treatment and assisting in tasks.

Possible Gap Three:

AI integrated Long-wear devices; electro-therapy-based products with artificial intelligent detecting sensors, allowing for sub-conscious supports.

Possible Gap Four:

Assistive devices that don't look medical but have an effective function.

Overall, the benchmarking section allowed for a clear analysis of what already exists within the product market; however, this also highlighted the issues and limitations of the existing designs leading in significant market gaps and design intervention possibilities.

SECTION 2.0 :

- 2.1 Research
- 2.2 Analysis and Findings

2.1 Research

2.1.1 Methodology

The methodology for this report consisted of Primary and Secondary Qualitative data collection. This approach provided understanding into the daily life, daily struggles and needs of individuals with involuntary HT's. This allowed the collection of research/ design objectives with the intention of gathering knowledge, first-hand experiences and emotional influences of HT's.

The methodology was constructed through 2 methods of data collection. The first being In-Person and Online Interviews, which allowed for comfortable conversations whilst still answering questions required to influence the collection of valuable data and insights. The second method is the use of Published archivable observations. Due to the Ethical Considerations and restrictions of this research project and the market users, interviews and observations were unable to be conducted from anyone directly suffering from HT's. This increased the importance of gathering Archivable Observations to observe individuals suffering from HT's to help guide clearer perspectives. These processes were highlighting important as they allow for a detailed codex to be formed to begin a Conceptual Analysis and Relational analysis of the data collected.

2.1.2 Project Methods

Method One: Interview's

Interviews are a valuable step in the collection of Primary qualitative data. The process began by gathering the appropriate Consent, information, Participate and Image Release Forms to gather consent from elected interviewees.

Each interview consisted of an online or in person interview to help gather information and perspectives into issues. Five interview questions were developed and used in every interview to create guided conversations: a copy can be located in the appendix, and **Figure 11.** The interview was audio recorded, with a transcript provided for later analysis.

Figure Eleven: Interview Question Form

QUT

Interview Questions/ Script

DNB311 ID7 Capstone Design Project
QUT Ethics Approval Number #11424

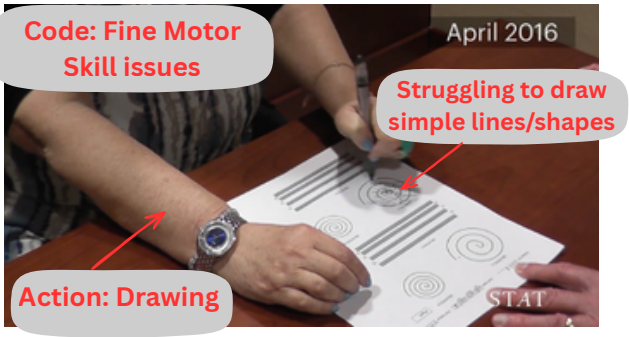
QUESTIONS:

- What connection do you have with Individuals with Hand Tremors?
- What are the most significant challenges/actions have seen your client/individual experience, when going about normal daily life/activities?
  - Have you noticed and specific frustrations?
- What current strategies and/or products, does your individual currently use to help manage their involuntary Hand tremors when participating in common daily tasks?
- Based on your experiences and observations, what would be an action/activity that would be best suited for a new assistive product to help your individual daily life/ what characteristic do you think will be most useful to ease a certain task for them?

Method Two: Archivable Observations

Archivable Observations are any Public Video, Image, Online/physical source that has been formally published. For this report, the specific observations collected were through online videos and personal blogs/panels to be able to visualise the impacts of HT's on everyday situations and actions.

Figure Twelve: Observation Visual Review



2.1 Research

2.1.3 Limitations to the Findings

Limitation One:

Due to Ethical Considerations, individuals suffering directly from HT's were excluded from the Interview portion of this task. The only First-hand knowledge was gained through the archivable observations and the accounts of the Careers. This does mean that the findings are made from observed and interpreted experiences rather than first-hand accounts.

Limitation Two:

Due to time and ethical considerations, there was only a small primary research sample. There were only 5 primary research interviews and 17 Archivable Observations. This does mean that the data is very limited.

Limitation Three:

The research based was open to all types of HT's. This does mean that indifferences between Medical Conditions such as Parkinson's may result in different outcomes. Everybody is impacted differently by HT's.

Limitation Four:

Electro-therapy is an under-researched and underdeveloped concept. There is very limited research on the long-term impacts of Electro-therapy. However, the existing research does show its potential in becoming an effective solution for variations of HT's so their opportunity to develop the technology may be crucial to providing a functional outcome for individuals.

Limitation Five:

The last significant limitation to this project is the ability to do hands-on user testing of Electro-therapeutic devices. Electro-therapy devices are costly and hard to source so testing these devices is difficult. It is also evident that all user testing in this project will be conceptual as ethical access is limited to testing on individuals with HT's.

2.1.4 Research Section Summary

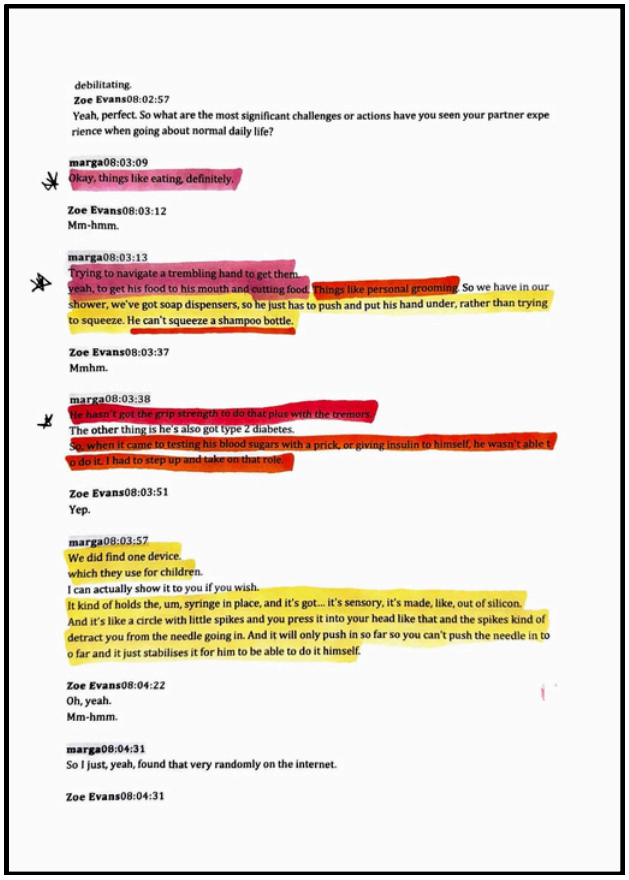
In summary, Interviews and Archivable Observations were used to develop a deep understanding into the Support perspective of involuntary hand tremors and personal, observational perspectives. This is vital into creating valid and research- based insights and opportunities.

2.2 Analysis & Findings

2.2.1 Section Overview

This section covers the analysis of the primary data collected throughout the Interview and Archivable Observation areas. In-order to understand and breakdown the data collected, it was vital to the content analysis to develop a Codex table to interpret and analyse data. This approach was taken to inductively develop the most beneficial codes to support the overall aim of this Project. The technique chosen to conduct this was an Open Coding Scheme. This scheme allows the manual breakdown of transcripts to colour-code and identify relevant and reoccurring actions/codes. This technique allows for the clear transition into a Conceptual and Relational analysis of the findings. This Coding Technique is visually represented using affinity mapping techniques creating consistent and clear Pie Charts and other graphs, depicting the Code frequencies and the relationships between codes, found throughout each interview.

Figure Thirteen: Coded Transcript



debilitating.
Zoe Evans08:02:57
Yeah, perfect. So what are the most significant challenges or actions have you seen your partner experience when going about normal daily life?

marga08:03:09
Okay, things like eating, definitely.

Zoe Evans08:03:12
Mm-hmm.

marga08:03:13
Trying to navigate a trembling hand to get them.
yeah, to get his food to his mouth and cutting food. Things like personal grooming. So we have in our shower, we've got soap dispensers, so he just has to push and put his hand under, rather than trying to squeeze. He can't squeeze a shampoo bottle.

Zoe Evans08:03:37
Mmhm.

marga08:03:38
He hasn't got the grip strength to do that plus with the tremors.
The other thing is he's also got type 2 diabetes.
So, when it came to testing his blood sugars with a prick, or giving insulin to himself, he wasn't able t
o do it. I had to step up and take on that role.

Zoe Evans08:03:51
Yep.

marga08:03:57
We did find one device.
which they use for children.
I can actually show it to you if you wish.
It kind of holds the, um, syringe in place, and it's got... it's sensory, it's made, like, out of silicon.
And it's like a circle with little spikes and you press it into your head like that and the spikes kind of detract you from the needle going in. And it will only push in so far so you can't push the needle in to o far and it just stabilises it for him to be able to do it himself.

Zoe Evans08:04:22
Oh, yeah.
Mm-hmm.

marga08:04:31
So I just, yeah, found that very randomly on the internet.

Zoe Evans08:04:31

2.2.2 Individual Interview Analysis

Interview One:

Interview one follows the accounts of an individual who provides care and support for their partner who suffers from HT's associated with Parkinsons Disease and other similar conditions. After discussion within this interview, it was clearly identified that there are key issues being experienced in their opinion, these included.

Key Issue 1 Identified:

Grip strength Difficulty and Fine Motor Skills; She explained that the impact of HT's made performing tasks such as opening lids and squeezing bottles difficult. She explained that" **He hasn't got the grip strength to do that plus with the tremors."**

Figure Fourteen: Codex Table Component

Physical Interaction	**Grip / Holding**	Difficulty holding objects	"Yeah, turning things, um...being able to hold things."
Physical Interaction	**Grip / Holding**	Grip affected by tremor	"We also have one that dispenses toothpaste… so there's no one screwing the tap, and you know he has trouble with his grip strength still."
Physical Interaction	**Grip / Holding**	Difficulty with strength + walking	"It's really just his strength now and his walking that he really struggles with at the moment."
Eating & Drinking	**Drinking / Eating**	Bringing food to mouth	"Trying to navigate a trembling hand to get… his food to his mouth."
Eating & Drinking	**Drinking / Eating**	Cutting food	"Trying to navigate a trembling hand to get… his food to his mouth and cutting food."
Eating & Drinking	**Drinking / Eating**	Eating as major challenge	"Okay, things like eating, definitely."
Eating & Drinking	**Drinking / Eating**	Difficulty eating socially	"He felt embarrassed, yeah, to go out and eat in public."

2.2 Analysis & Findings

Key Issue 2 Identified:

Difficulty Eating and Drinking: She explained the troubles associated with eating and drinking with involuntary HT's is an issue. "Trying to navigate a trembling hand to get his food to his mouth and cutting food".

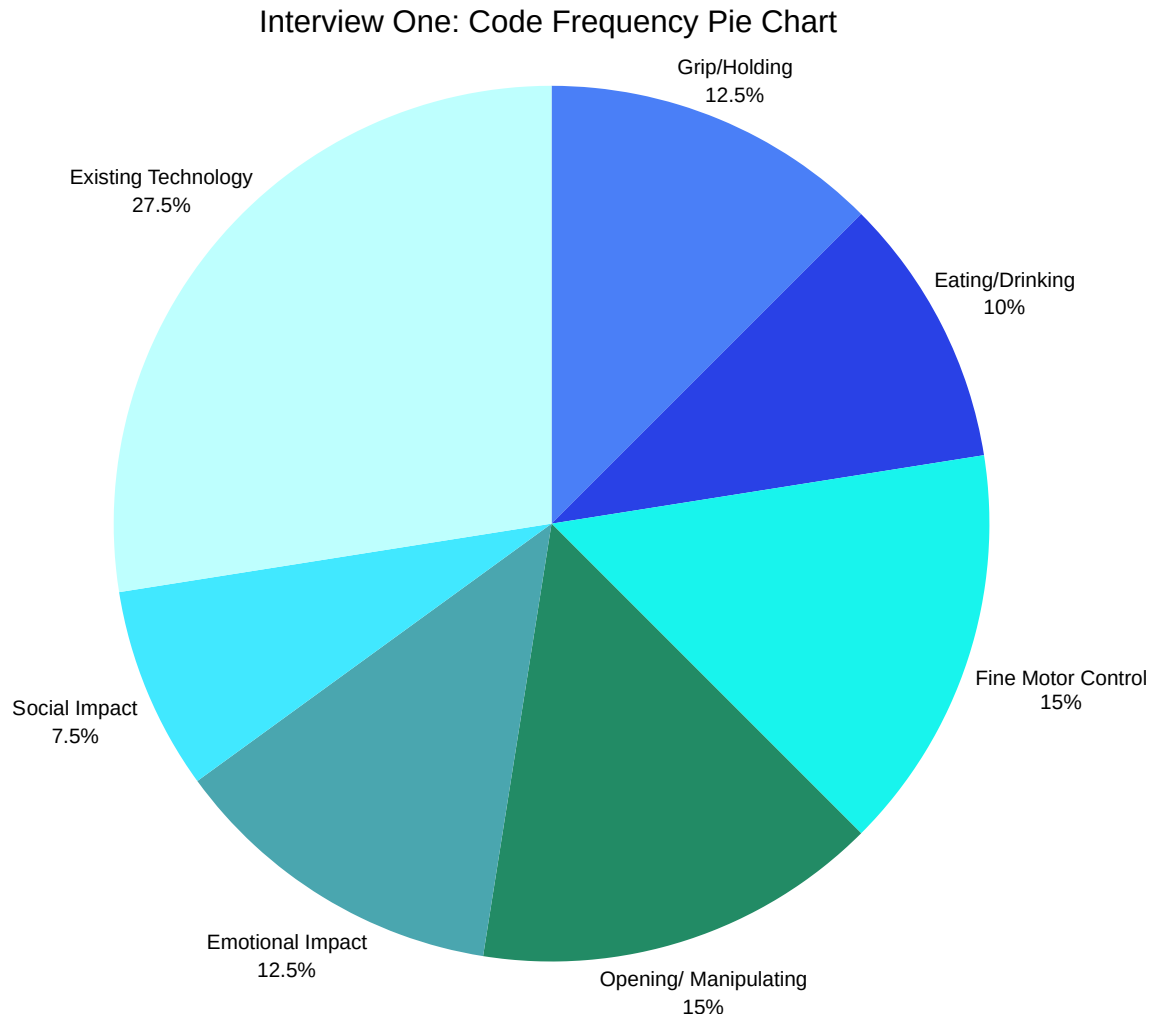
Key Issue 3 Identified:

The impact of Physical HT's has led to an increased sense of frustrations and self-consciousness when interacting within public environments. "**He felt embarrassed to go out and eat in public".** Other individuals have been recorded to make comments such as **"why are you shaking, are you nervous?"** When out in public. This has caused an increased loss of independence for the individual.

What does the Data Show?

Table 4 proves to be one of the strongest pieces of data collected. Displaying high frequencies of all codes such as Fine Motor Control 15%, Opening/manipulating 15%, eating and drinking 10% and Grip/Holding 12.5%. Using relational analysis, it's clearly showing the relationship between these codes within the data.

Graph Four: Interview One Code Frequency Pie Chart



2.2 Analysis & Findings

Interview Two:

The second interview followed a Support worker who worked with individuals with all types of HT's from neurological conditions. It was clear that similarities within interviews were rising.

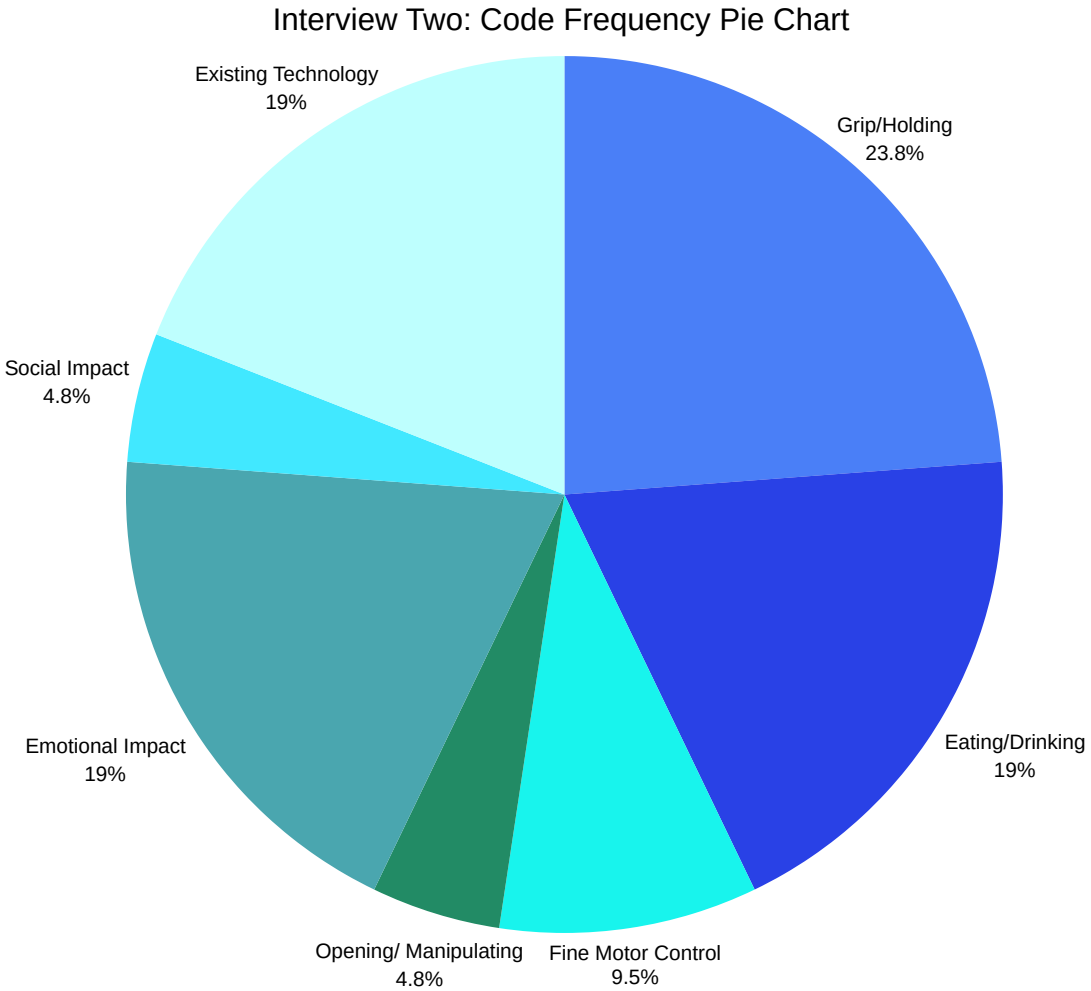
She explained that; **"one of my clients can't hold a fork normally. One of my other clients has lost most of her dexterity" , "if it's too heavy, they can't hold it, if it's in the wrong position, they can't hold or use it properly".**

She also goes to explain how there isn't currently assistive products suited to the specific requirements of her clients. She explained how **"we bend her spoons, they're quite curved to make life easier when she's holding it, it doesn't shake as much".**

What does the Data Show?

Table 5 proves to be the most differential set of data from the interview. The chart displays a high frequency of Grip and Holding 23.8%, then Existing Technologies, Eating/drinking and Emotional Impacts coming in at 19% each. There seems to be a relationship present between these codes.

Graph Five: Interview Two Code Frequency Pie Chart



2.2 Analysis & Findings

Interview Three:

In interview three, the Interviewee's Brother has consistent, yet not yet severe HT's. She describes the impact that his hand tremors are having on his daily life and mental health.

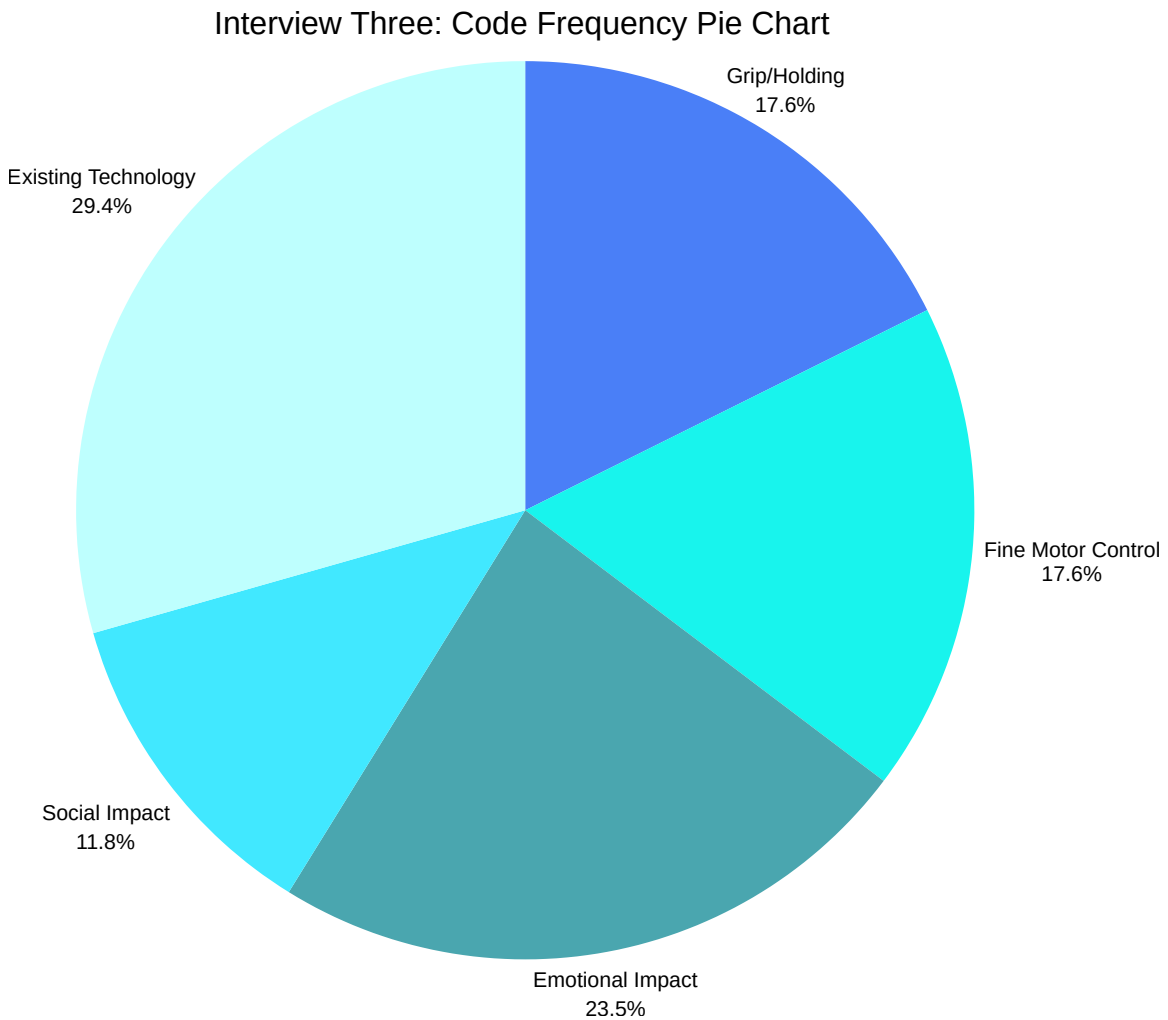
His hand tremors are affecting his relationship with certain tasks ultimately resulting in evidence of certain tasks. The individual is a skilled Architect who loves and is very talented at it. However, his consistent HT'shave resulted in a refrainment from doing the things he once loves. **"He is still able to write and draw, however it does appear scratchier"** she also explains that **"he refrains from drawing (which he is excellent at) due to the personal standards".**

It was highlighted that stress and anxiety levels have risen since the worsening of his tremors. This is problematic due to raised anxiety/ stress levels causes tremor symptoms to rapidly increase, creating an exhausting lop for the individual.

What does the Data Show?

Table Six shows a relatively balanced code frequency, with technologies (29.4%) and emotional impact (23.5%) scoring highest and most frequent. Grip/Holding and Fine motor control come in secondary to them, sitting at 17.6% which has become obvious in other interview frequencies too, highlighting the importance of this code.

Graph Six: Interview One Code Frequency Pie Chart



2.2 Analysis & Findings

Interview Four:

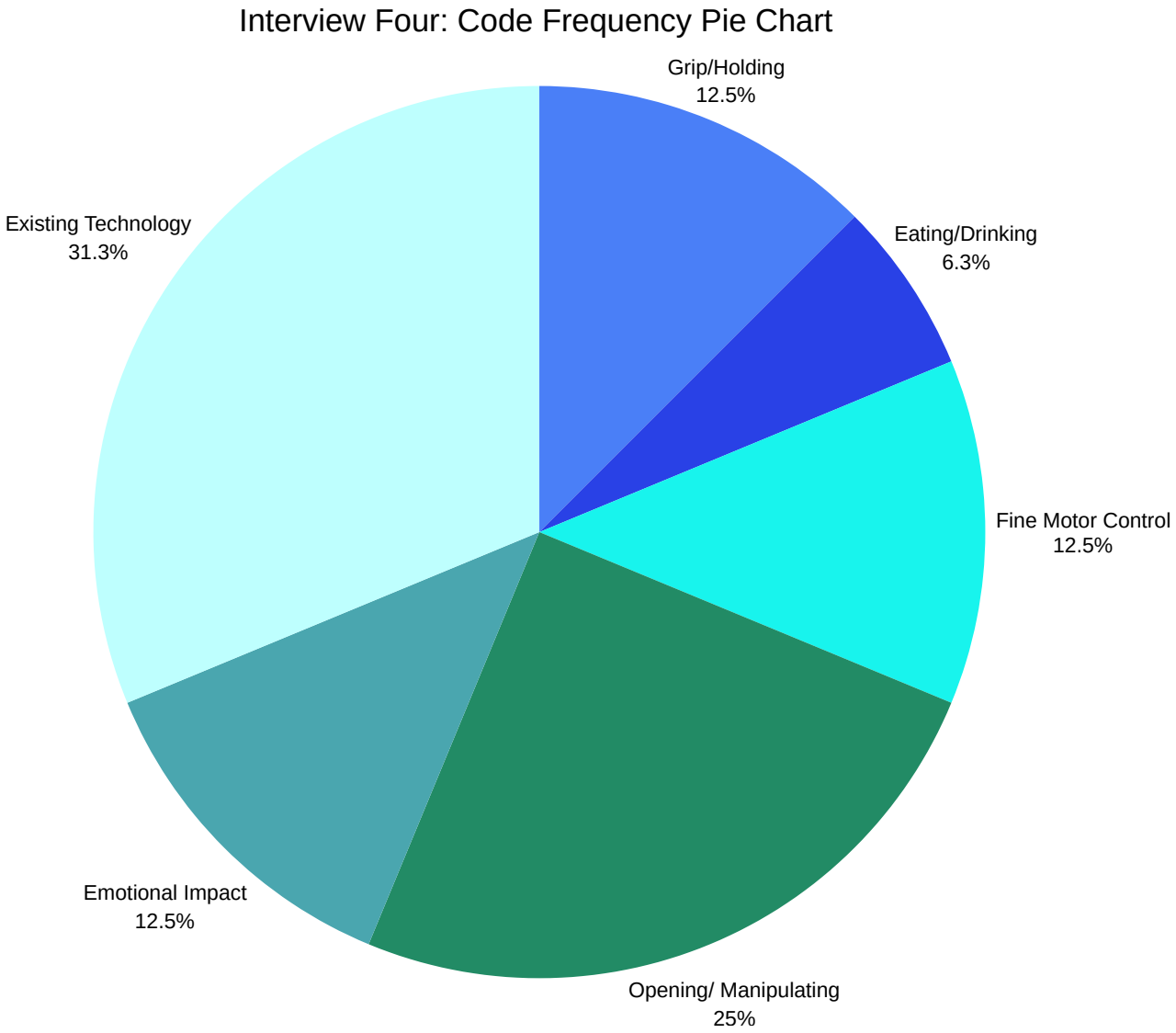
Interview four follows another independent support worker with a client suffering from dystonia. Their interview reveals the significant effect HT's have on the action of Preparing food and other sub-conscious daily tasks. He mentions "**Being able to do things around the kitchen such as clamp down an item an open it (tins) or cut it (fresh food).**"

It also demonstrates that existing medical tremor treatments and assistive products don't work for everyone and/or provide limited outcomes for some individuals.

What does the Data Show?

Table 7 displayed, the core issue of manually opening and closing items, with the code recurring for 25% of the data collected.

Graph Seven: Interview One Code Frequency Pie Chart



2.2 Analysis & Findings

Interview Five:

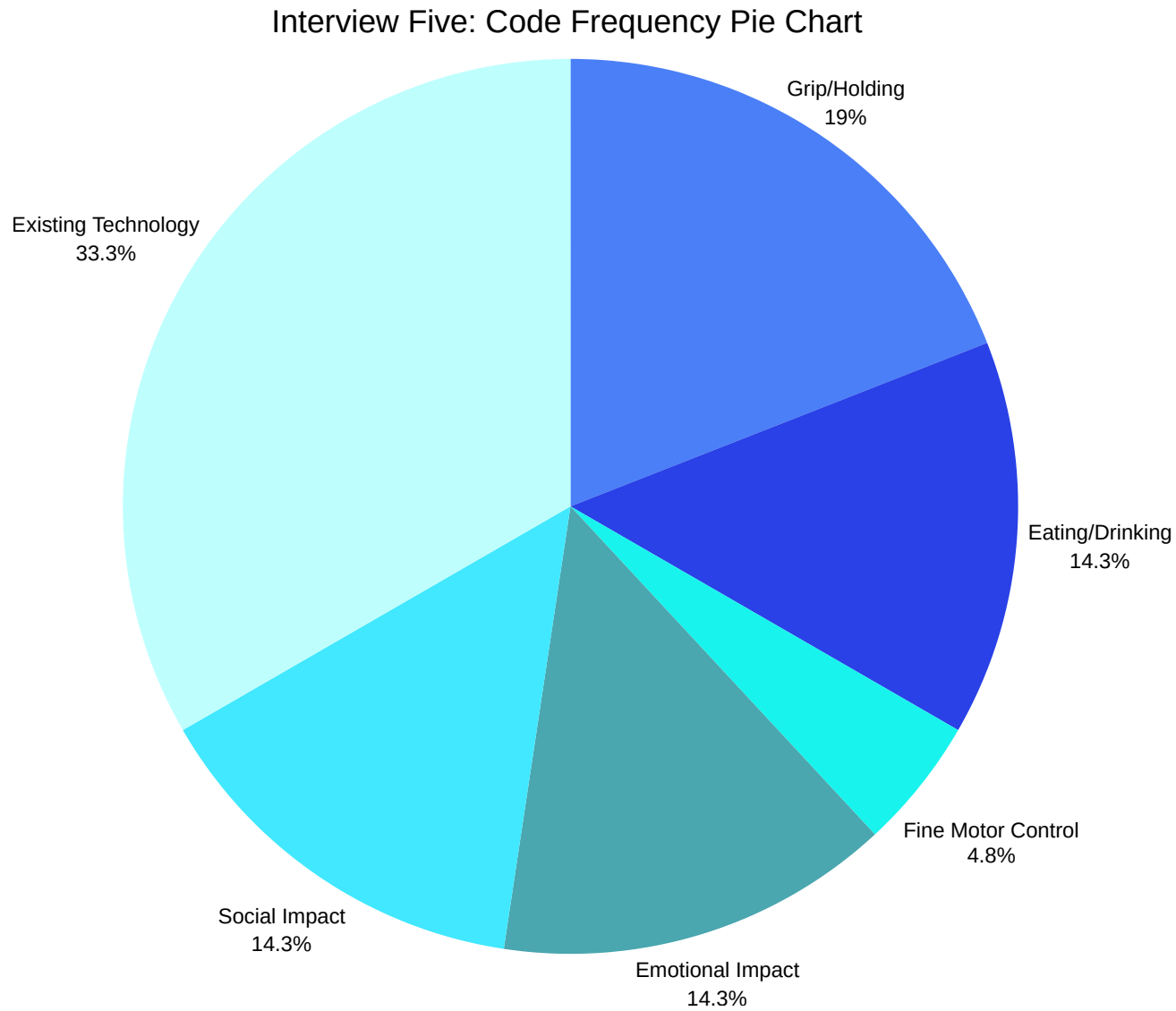
This interview follows the insights from a Nursing Student and their work with clients. This interview similarly highlights the importance of increasing independence within common daily activities such as Drinking and Eating.

This theme is closely associated with the Emotional Impacts. Explaining, **"when they struggle with it or need us to hold the cup, they feel 'stupid' or baby like"** creating a sense of decreased independence and confidence.

What does the Data Show?

When Understanding Graph 8, it can be analysed that emerging technologies were most significant for the need and use for these devices. The Codes Eating and drinking, Social Impact and Emotional Impact was all evenly mentioned 3 times (14.3%) throughout the Piece.

Graph Eight: Interview One Code Frequency Pie Chart



2.2 Analysis & Findings

2.2.2 Archivable Observation Analysis

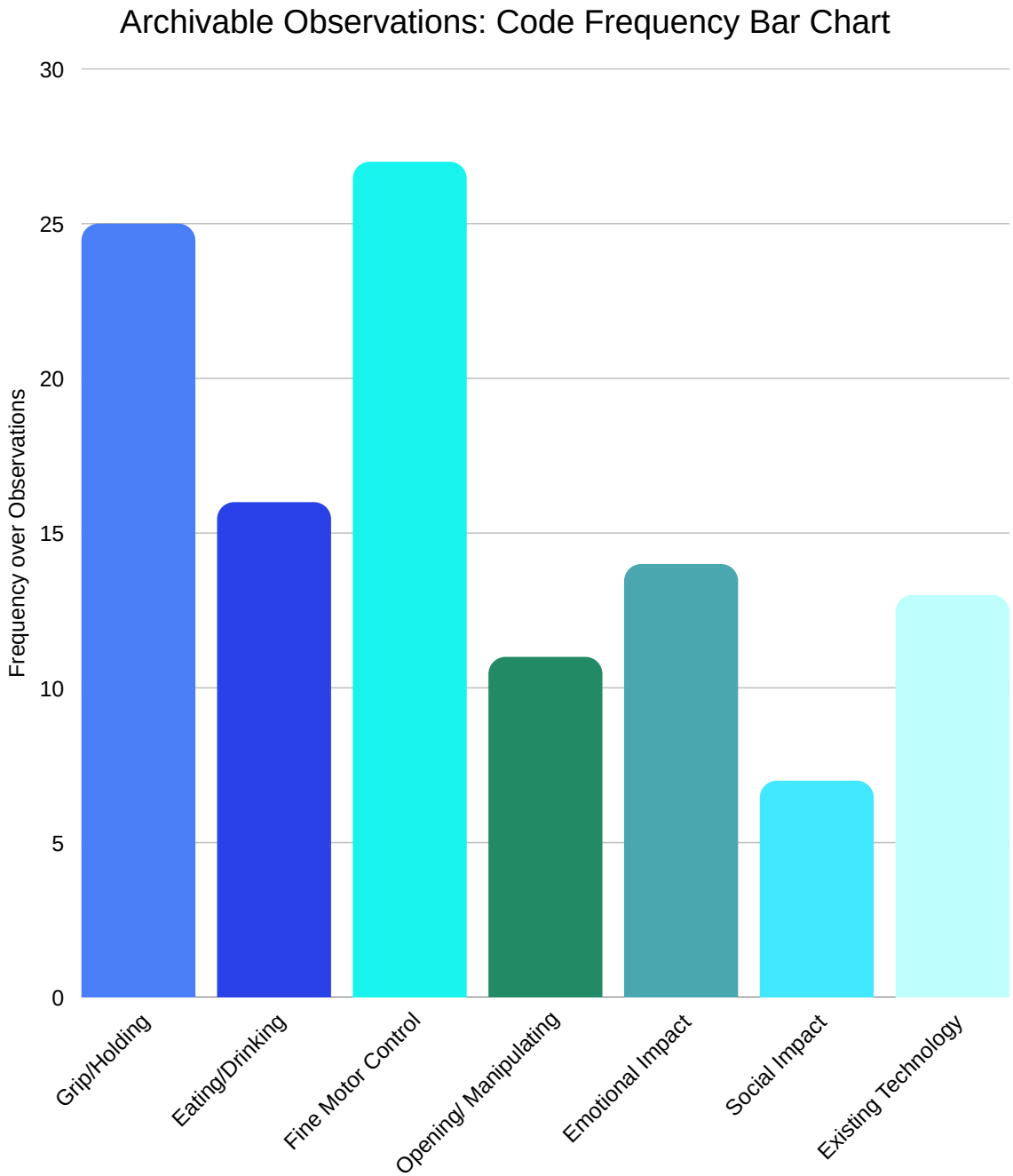
Archivable Observations:

Archivable observations gather an upper-hand when gathering an understanding of HT's. The theme of HT's reducing the ability to participate in activities is prominent "can't Cook", "Can't hold water cups" "takes your independence from you" were common and reoccurring themes present within the in Observations.

What does the Data Show?

Graph 9 displays the Frequency of codes within the Observations. The most significant features in this Bar Graph are the Fine Motor Control code was the highest reoccurring theme in the data, Grip/handlining was the 2nd most reoccurring theme, making up 42.3% of the observations, thus highlighting the Physical hand control and use as a problem within the data.

Graph Nine: Archivable Observations Code Frequency Bar Chart



2.2 Analysis & Findings

2.2.3 Collaborative Data Analysis

It can be clear that from a conceptual analysis, the main theme throughout the collated data is Physical Hand Function.

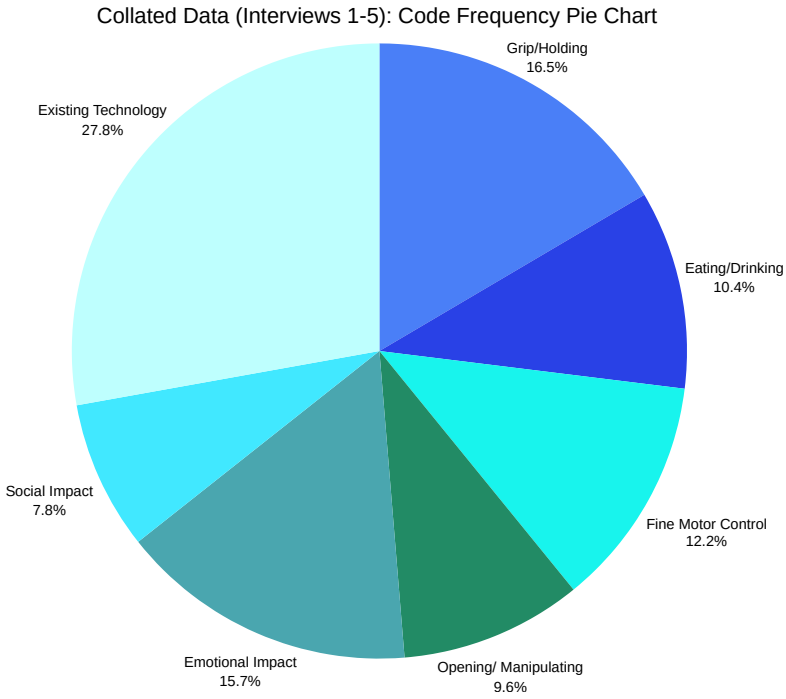
This is due to the frequency of codes Grip/Holding 19.3% and Fine motor Control 18%, making up 37.3% of the data out of 7 Codes/themes.

This information indicates the main concept being displayed is the difficulty of Controlling, using and stabilizing the hands to participate in everyday tasks.

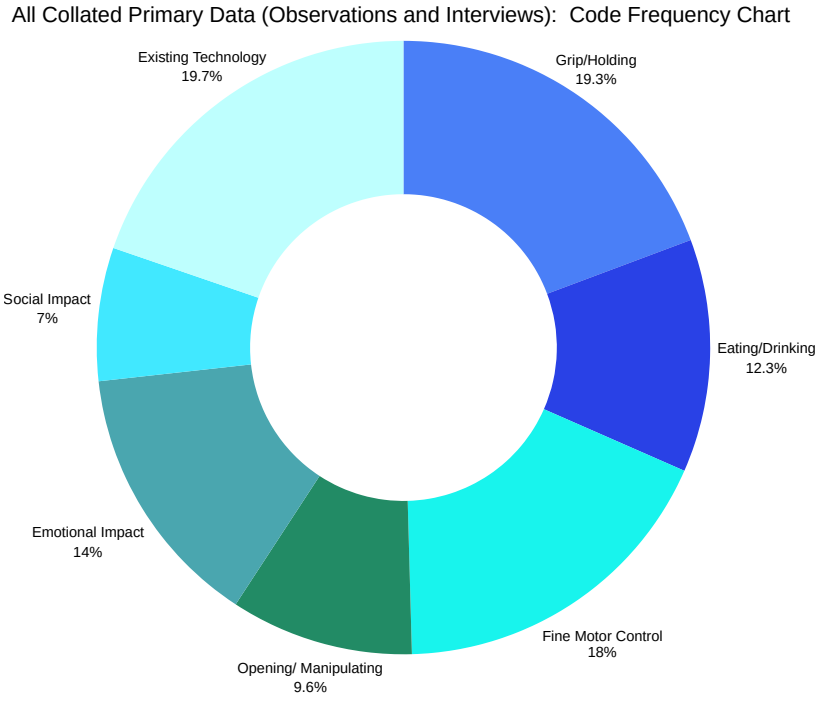
When looking at a more relational analysis, it's clear that the Physical difficulties are directly connected to functional and emotion impacts such as Eating and Drinking 12.3%, Opening and Manipulating 9.6% and emotional Impact being 14%.

This suggests a relationship where reduced hand function/control directly affects the individual's ability to perform daily task efficiently, thus directly leading to the emotional impact of not being able to complete tasks.

Graph Ten: Collated Interview data



Graph Eleven: All Collated Interview and Observation data



2.2 Analysis & Findings

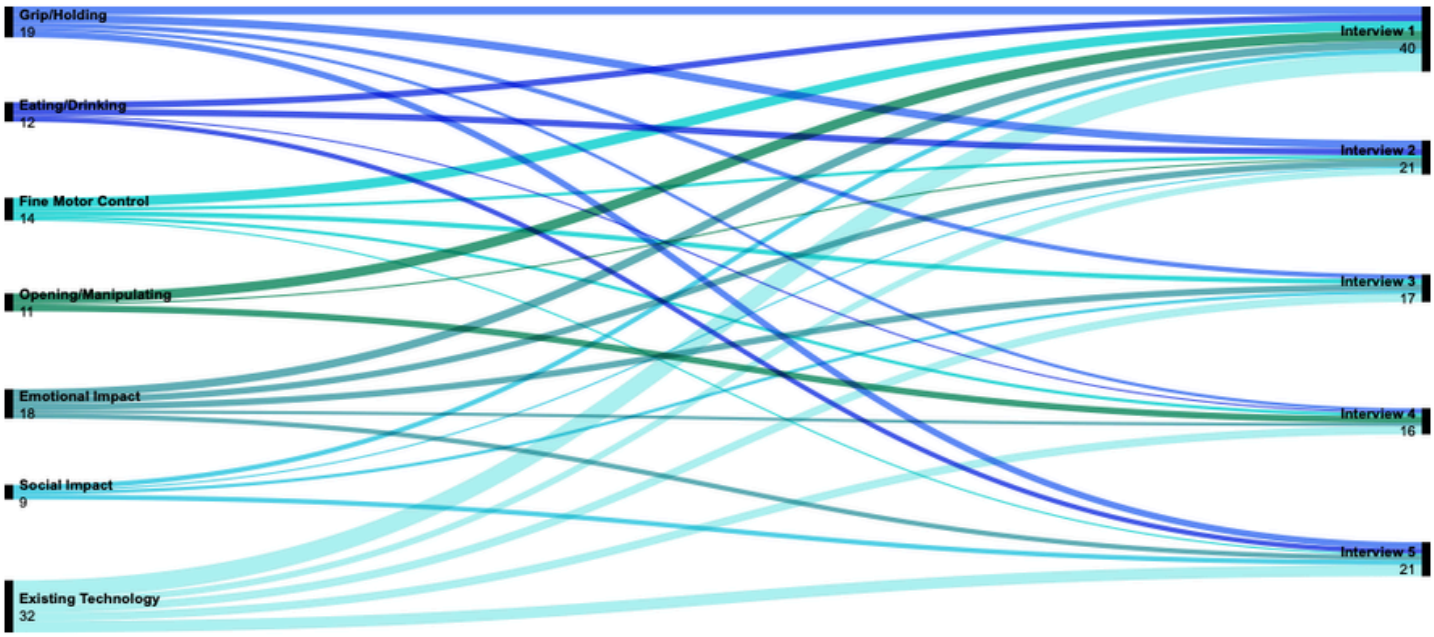
2.2.3 Collaborative Data Analysis

Existing Technologies represents 19.7% of the data, when analysing singular interviewee graphs as this highlights the use of existing technologies/ issues with existing technologies. This does suggest however that users are looking and wanting physical solutions to help ease these everyday frustrations, and it show that existing products haven't yet provided adequate relief for Hand-use Situations.

Table Four: Code Graph Data over all Data Collection

Code/ Action	Frequencies over Interviews and Observations
Grip/Holding	44
Eating/Drinking	28
Fine Motor Control	41
Opening/ Manipulating	22
Emotional Impact	32
Social Impact	16
Existing Technologies	45

Graph Twelve: Sandy Graph showing relationship connections from Theme/Code to Interview.



SECTION 3.0:

- 3.1 Discussion
- 3.2 Design Implications
- 3.3 Conclusion

3.1 Discussion

3.1.1 Section Overview

The aim of this section is to understand the primary data displayed within the analysis section, to gather insight as to why it's important to the development of Emerging Electro-technological Products for individuals with Hand-Tremors. The main recurrent codes within the Data were Grip/Holding, Eating/Drinking, fine Motor Control and Emotional Impact/ Existing Technologies. These codes can be split into 2 major themes of the data, Physical Hand Function (Grip/Holding, Eating/Drinking, fine Motor Control) and Assistive Technology and Emotional Wellbeing (Emotional Impact, Social Impact, Existing Technologies).

3.1.2 Major Themes

Theme One: Physical Hand Function:

The primary research identified Physical Hand Function as a present and dominant theme within the data, particularly through the challenges such as Grip/Holding, Fine Motor Control, Eating/Drinking and Manipulation of Objects. Fine Motor Control and Grip/holding represented a combined 27.3% of the collated data, demonstrating a challenge of decreased control and stability throughout the hands for individuals with HT's. These findings strongly support the literature discussed in the Background and benchmarking sections of this report which identifies eating, drinking, personal care, handling objects and technology being significantly difficult due to the impact of hand tremors. Therefore, the Primary and secondary data analysed proves a strong need for an improvement in functional hand control rather than addressing a single activity.

This relationship processes a strong understanding into the investigation of emerging electro-therapies. Types of Electro-therapies such as Peripheral Nerve stimulation, prove to be a possible innovation point due to their ability to reduce Hand tremors for the patient to perform normal activities, however the concept is very under-developed and requires extensive trialling. There is significant literature supporting the promising direction of incorporating electro-therapies into products to provide temporary relief of physical hand challenges associated with HT's.

Theme Two: Assistive Technology and Emotional Wellbeing.

Technologies and wellbeing emerged throughout the research. Existing technologies represented 19/7% of the collated data, while interviews displayed frustrations, shame, embarrassment and declining confidence in individuals due to their hand tremors. This proves a serious need for a product intervention to not only reduce the physical tremor, but to consider how the product impacts the emotional wellbeing of the individual, aiming to regain confidence for the user. Existing technologies/products consist of products aimed at one specific activity. Eating = Stabilising Fork that is significantly visually different to a standard fork already providing a strong in-difference between individuals.

The current technologies on the market are designed for one activity, Interview One proved this point by having multiple different devices in their household, however still not proving a deeper sense of declining confidence as these products were not providing enough help. In comparison, emerging electro-therapies provide a singular solution to a magnitude of devices. Electro-therapy focuses on the tremor itself, not the action with the tremor, currently represented by a chunky wearable design. Electrotherapeutic devices are chunky, obtrusive, medically designed, therefore the primary and secondary indicates an opportunity for a discrete, wearable electrotherapeutic intervention that targets the tremor reductions to support independence, confidence, functionality and increased confidence from the ability to perform daily activities with a sense of normality.

3.2 Design Implications

3.2.1 What do these findings mean for design?

The research has significantly identified multiple important implications for the development of the design of assistive products for individuals experiencing involuntary HT's.
Designs need to focus on hand function rather than one specific activity. The aim to control and help stabilise the hand itself; to ease the daily challenges associated with Hand tremors This is also more sustainable and cost-effective way to purchase one modular item, rather than multiple items. The data also represents the idea that the designs need to prioritise the maximum independence for the user, not just completing the desired task.

3.2.2 Possible Design Opportunities:

Design Opportunity One:
The possibility of developing a wearable electro-therapy device that aims to temporarily reduce tremors itself. There are very few products on the market that is equipped with the technology, that focuses on and doesn't alter the maximum use of an individual's hand.

Design Opportunity Two:
A multi-use Hand Stabilisation product for HT's, rather than a singular, activity specific design. This can help with the emotional impact of Hand tremors and low confidence whilst also being a more sustainable and cost-effective solution for individuals.

Design Opportunity Three:
Fine Motor Skills, multi-use device that doesn't look medical and/or has the most similar aesthetics to the original product. Crating as much 'normality' for the individual.

Design Opportunity Four:
Using AI integrated technology alongside Electro-therapeutic designs to create a smart, functional design. Using technology to notice changes and increases in tremors, indicating device to begin the electro-therapy, creating personalised stimulation rather than consistent.

Design Opportunity Five:
Electro-Therapy and Physical support Device. A combination of electro nerve therapy with physical hand/wrist stabilisation techniques.

3.3 Conclusion

This Report was conducted to develop an understanding of the Physical, functional and emotional impacts resulting individuals with involuntary Hand Tremors (HT's) experience daily, whilst investigating the viability of Emerging electro-therapies and technologies as a design intervention.

Primary data was conducted in the forms of Interviews with Careers of individuals with Hand Tremors and online, published Archivable Observations. The study consisted of 5 Interviews and 17 Observations. Through the analysis of interviews and archivable observations, Codes and Themes were analysed by understanding the frequency between them.

Physical Hand Function was the most significant theme present within the analysis scoring a cumulative amount of 37.3% of all the recorded frequencies and data. These findings further displayed the physical challenges associated with Hand tremors and their direct relationships with emotional reaction and impacts.

This investigation highlighted limitations and design gaps within the data, suited towards a new, functional design. Overall, there are many possible design opportunities present for the integration of Electro- Therapy and technologies for temporary relief of involuntary Hand Tremors.

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- 4.2 APPENDIX
- 4.3-4.7 Interviews
- 4.8 Observations

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