Getting Back In The Gym:

Designing for Confidence, Awareness and Safety in Resistance Training for New, Returning & Recovering Gym-Goers



ID STUDIO 7 | ASSESSMENT 1 – PART ONE: RESEARCH REPORT
KENNY TRAN | N11590653 |
TUTOR: RAFAEL GOMEZ
WORD COUNT: 4855

Table of Contents.

01 Introduction

Executive Summary 03

Introduction 04

02 Background

Psychological Barriers & The Fear of Re-Injury 05

Physical Regression & Biomechanical Risks 05

Motivation, Adherence & Behavioural Psychology 06

Potential Technological Interventions & Frameworks 07

03 Benchmarking

Intro to Benchmarking 07

Benchmarking Tables 08

Positioning Matrix 12

04 Research

Survey Analysis & Findings 13

Interview Analysis & Findings 15

05 Discussion & Design Implications

Discussion 16

Design Implications 17

Conclusion 18



Executive Summary.

This report explores the unique and critical challenges faced by new, returning and recovering gym-goers driven by psychological barriers, physical regression and an inherent desire for real-time guidance. Factors like the fear of injury, lack of confidence and the general shared struggle of being able to objectively judge their progress and gauge their efforts and capabilities act as a common link across gym goers that impact user-confidence and overall adherence for the long term, especially in the context of returning from an injury.

After carrying out an extensive overview over secondary literature, benchmarking and primary research data via survey and interviews, the findings reinforce the impacts that factors like kinesiophobia, the fear avoidance model and unconscious compensatory movement patterns have that commonly hinder the individual.

Current market solutions are vastly spread - providing specific benefits to specific needs such as smart-home gym systems, common gym accessories, or services/apps focused on fitness and wellbeing. Research and benchmarking analysis unveil a distinct market opportunity in an accessible solution that not only helps to cater to meet the physical needs of the user group but also psychological needs in encouraging intrinsic motivation and positive engagement to improve consistency - offering an incredibly strong opportunity for integration with professional input such as physiotherapists to provide a significantly personalised user experience with substantial value.

Overall, the findings establish core design implications that are centred around being able to provide real-time feedback/guidance and supporting intrinsic motivation and positive engagement while embracing interconnectivity between physiotherapists and gym goers beyond sessions. It seeks to translate these insights to go beyond just providing functional value, aiming to help mitigate the fear of re-injury or break negative behavioural loops all the while empowering users to rebuild physical confidence and progress and maintain lifelong positive habits within the space.

Statement of Authenticity.

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.

Kenny Tran
n11590653
12/09/2026

Statement of Use of AI.

I have utilised Generative AI in this report, Claude, to assist in some ways. The way I have used AI includes identifying areas of research during preliminary stages, editing the fluency of some written sentences and using OtterAI to assist in transcribing audio recordings of interviews.

Kenny Tran
n11590653
12/09/2026

Helping to Build Confidence, Awareness & Ensure Safety within the Gym...

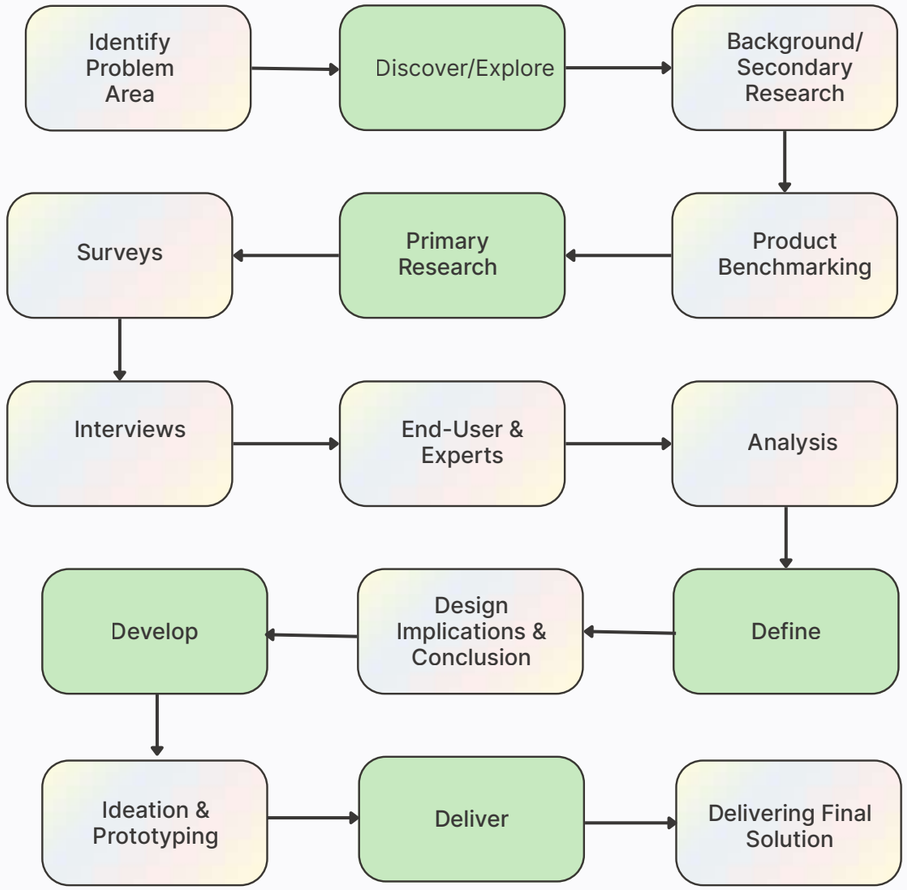


Introduction.

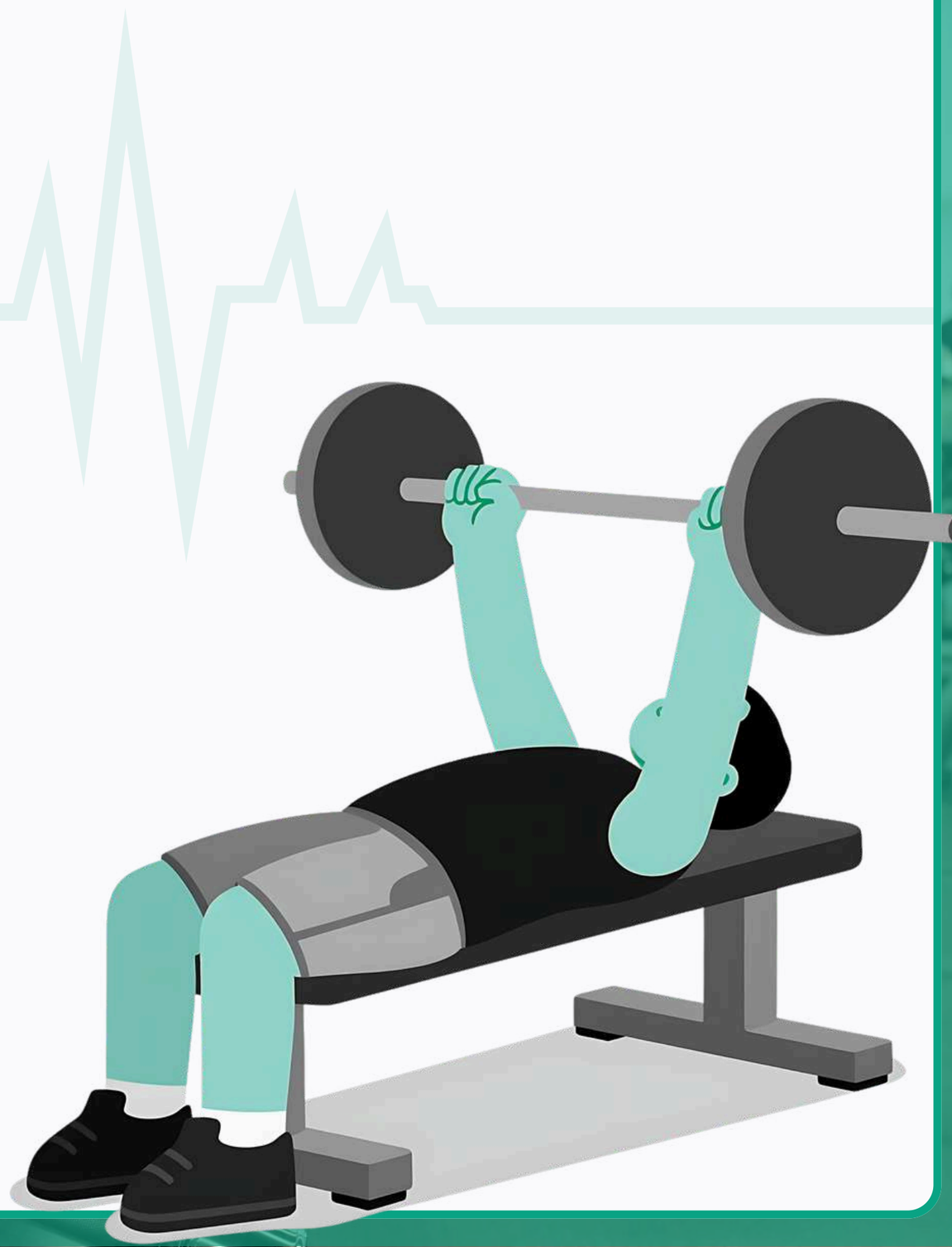
Heightened awareness of health and wellness along with the impact of social media and vast fitness options, have pushed forth a desire to better oneself - with gym activity transitioning from a niche activity to a widely embraced lifestyle choice among diverse crowds. Gyms are now seen as a way to holistically improve overall wellbeing with a shared value for improving oneself. Despite this, 32% of people quit the gym after their initial 1st or 2nd visit and 65% have less than 10 visits in a 16-month period (Radhakrishnan et al., 2020).

While generally attributed to a lack of knowledge, lack of access to a personal trainer and a lack of time, new, returning and recovering users face additional unique challenges such as fear of injury/re-injury, lack of confidence and struggle to objectively judge their progress, with users recovering from injury experiencing frustration over physical regression/rebuilding strength and new/returning users struggling to gauge their own effort & progress.

This project seeks to explore the context of resistance training, examining key needs and desires of new/returning/recovering individuals, understanding prominent issues that they face and exploring how to potentially create a solution that can help build confidence, awareness and ensure safety, recognising that each individual faces their own unique challenges. Figure 1 outlines the overarching approach/structure that the project has taken for this report.



Visual of Overall Project Structure



Background.

To understand how to address these issues, substantial research was carried out and grounded by evidence, identified a number of theoretical, clinical and behavioural factors that surround the context of returning to gym after an extended break or injury, exploring why individuals face high dropout rates during the critical transition from initial pain relief to strength rebuilding. A number of barriers and opportunities were identified, opening up gaps where a design intervention could be implemented to address the issue.

Psychological Barriers & The Fear of Re-Injury

Kinesiophobia and traumatophobia are both fears that may impact one's ability to go back to gym. **Kinesiophobia** is defined as an excessive, irrational and/or debilitating fear of physical movement that is rooted from the feeling of vulnerability due to a past injury or fear for reinjury.
Traumatophobia on the other hand is a more clinically used term that revolves around the irrational fear of physical injury or medical procedures and can potentially prevent individuals from performing physical activities (McCarthy, 2025). These are important factors to consider as the fear of re-injury can detrimentally play a significant role in the context of resistance training and can cause the individual to experience limitations in their everyday lives or face significant problems upon return to physical activity. It is also generally normal for people who've suffered an injury to limit their mobility, defined as functional or avoidant immobility, and while allowing the body to rest is critical in reducing inflammation and the tissue regeneration process - if immobilisation continues for an extended period, tissues will begin to atrophy and as a result muscle mass will be lost with the risk of the injury becoming chronic increasing (Sixtus Italia, 2023). Furthermore, there may be instances where **compensatory movement patterns are created** that then lead to more problems for the long term.

Following an injury, individuals frequently experience a number of negative thoughts, emotions and behaviours that can often determine both their immediate recovery and long-term physical capacity. As such the **Fear Avoidance Model** (FAM) describes this cognitive behaviour loop - how the fear of reinjury causes individuals to either avoid movements entirely or adopt alternative movements (compensatory patterns). This avoidance behaviour can contribute to the negative outcomes mentioned prior as well as heightening anxiety and as such highlight a need for a design intervention that can provide reassurance alongside physical support (Churchill, 2023).

Beyond these impacts - injuries can potentially **disrupt the individual's sense of identity,** especially if working out or playing sport is a **significant attribute of their lifestyle** due to factors such as **physical limitations, withdrawn capabilities** (e.g. sport/competition) and **psychological distress** (Liu et al., 2025). Athletes where their career is based on their athletic capabilities, struggle with the difficult shift in lifestyle which can be reminiscent in how gym can be a significant aspect to their lives intertwined with personal goals and as such when disrupted or regressed can **trigger emotional distresses** that mirror the psychological hurdles faced by athletes (Kvist & Silbernagel, 2022).

Physical Regression & Biomechanical Risks

Musculoskeletal pain can affect bones, joints, ligaments, tendons, and/or muscles, with the pain ranging from mild to severe and can be short to long term. It is **extremely common where virtually everyone experiences it at least once** - most often from a muscle strain, chronic musculoskeletal pain on the other hand is long-term and generally more significant. Musculoskeletal pain can significantly limit mobility and range of motion but also can cause fatigue, sleep disruptions and/or stiffness. As such recommended preventative measures are things like getting medical help at first signs of persisting pain, regular physical activity suited to individual, limiting repetitive movements, practicing good posture, regular stretching and correct lift techniques (Cleveland Clinic, 2023). Some of these common injuries and causes can be found in *Figure 1* on the following page.

As a way to alleviate that pain, the body can create new movement patterns known as **compensatory patterns** - however these new patterns can be dysfunctional and create an undesirable chain of events that **negatively impact the body long term** (Duncan, 2015). Compensatory patterns **increase the risk of injury by 2-3 times** in regions where movements are substituted as the body **trades short-term function for long-term vulnerability**. These compensations develop subconsciously and can be difficult to identify without specific assessment or viewing externally as the body makes it feel normal until symptoms start to show (simplmobility, 2026).

Compensatory movements should be approached as an adaptation metric to measure progress as they are the most common, subjective performance indicator that can be observed to show progress and progressively achieve better results in recovery (Alves et al., 2020). Furthermore, muscle atrophy and the degradation of tissue (McCarthy, 2025) can be an issue if the individual is immobilised/physically unactive for a prolonged period thus naturally leading to a regression in the amount of weight one can lift/exercise with that can make the act of going back to gym daunting combined with other factors mentioned prior.

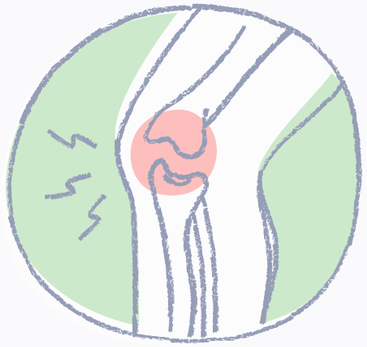


Figure 1: Common Injuries and Causes (Green, 2024)

Common Causes of Gym Injuries		***Most Common Gym Injuries***	
Improper Technique	*Lifting weights with incorrect form/posture places unnecessary strain on muscles/joints. Common in complex movements like deadlifts/squats where even slight misalignment leads to injury.*	***Muscle Strains and Tears***	*Typically caused by lifting weights too heavy or not warming up properly – muscle strains affect areas like lower back, hamstrings and shoulders.*
Overtraining	*Pushing too hard without adequate time for recovery can lead to injury. Too much weight too soon or skipping rest days will not give muscles enough time to recover and rebuild.*	***Joint Injuries***	*Incorrect form or excessive load can lead to injuries on joints – particularly shoulders, knees, wrists and lower back.*
Inadequate Warmup/ Cool-down	*Not warming up or skipping cooling down leaves muscles and joints vulnerable to injury. Warming up is crucial for preparing the body for stress while cooling down helps the body transition to recovery.*	***Tendinitis (short-term) or Tendinopathy (long-term)***	*Injuries that involve the muscle tendon like inflammation or irritation. Stem from overuse in repetitive movements, affecting areas like elbows, shoulders, knees, and achilles.*
Use of Inappropriate Equipment	*Weights/machines too advanced or unsuitable can cause strain/injury. Adjusting to suit individuals' needs & capabilities is crucial for avoiding injury.*	***Lower Back Pain***	*Poor or inadequate posture during lifting and lack of core stabilisation leading to lower back pain – prevalent in weightlifting, squats and deadlifts.*
Fatigue and Overexertion	*Pushing past fatigue or ignoring pain can lead to overexertion, increasing risk of injury. Crucial that the individual is aware and listening to their body to prevent injuries.*	***Knee Injuries***	*Having improper form or taking excessive load during squats, lunges, or running can cause knee injuries.*

Motivation, Adherence and Behavioural Psychology

Motivation is a significant aspect that not influences how an individual feels but how they function - a positive mindset about recovery can enable confidence in one's ability to handle loads, affecting how quicky they may progress as opposed to being held back by negative mindsets. The early phase of rehab/recovery runs on **relief-driven motivation** where each session delivers visible and tangible benefits such as progressive pain relief. The later phase however after about three weeks, it becomes dependent on **discipline-driven motivation** where pain is already improved but strength is not at full function - with **feedback and gains become slower and less immediate** as they rebuild strength, capacity and resilience. The main problem is that many people stop attending physio when they feel 70% better, leading to incomplete recovery and a **higher risk of re-injury within three to six months** as the tissue remains **vulnerable** (Head2Toe, 2016).

Figure 2: Common Barriers to Motivation (Head2Toe, 2016)

Common Barriers to Motivation		
Physical Barriers	***Practical Barriers***	***Psychological Barriers***
- Flare-ups, fatigue, and pain spikes after increasing activity. *- Body responds with discomfort when attempting to do more – naturally feeling discouraged. (fear & avoidance)*	*- Time pressure for busy professionals, childcare commitments and/or commuting.* *- Financial constraints and scheduling difficulties.* *- Struggle to find the time affects commitment.*	*- Fear of pain or previous negative rehab/training experiences.* *- Low confidence and frustration when progress isn't linear.* *- Mental health plays a significant aspect in this, with stress, anxiety and low mood affecting motivation.*
Practical Strategies to Boost Motivation		
- Break rehab into short, realistic milestones such as creating feasible fortnightly milestones that enable frequent wins – boosting morale, confidence and motivation. - Track progress objectively to allow user to stay engaged and motivated (e.g. reps, more steps, less pain, etc.) - Make rehab fit around the user's routine to reduce guilt and build the habit of consistency. - Use accountability and support as having someone that will consistently ask about progress can provide the nudge needed while providing social support for morale. - Celebrate small wins and reframe setbacks – helping to motivate the individual despite discouraging weeks while maintaining a positive mindset through inevitable bumps in the recovery.		

The underlying issues of exercise adherence stem from the inherent value perceived versus the effort that the individual is willing to put in for it. High drop-out rates typically result from a person's **reluctance to invest effort** due to the costs of effort involved such as fatigue or pain or external factors like time/money that outweigh long-term benefits of going to gym. It requires both **physical and mental effort** and as such the individual's attitude has a strong impact on motivation. Positive emotions derived from current actions or anticipated in the future play a significant role in how people decide to engage or persist in goal-seeking behaviours and as such it can be beneficial to **identify immediate value** that can be gained to serve as **additional motivation** and helping **maintain effort over time** (André, 2024).

Individuals can often struggle and become **stuck in a negative loop** that can be detrimental to recovery (Kim, 2025). As such some strategies/interventions that exist to help tackle these issues are: Mindfulness-Based Stress Reduction Therapy (MBSR) (American Psychological Association, 2019), Acceptance and Commitment Therapy (ACT) (Lifeline, 2025) and Motivational Enhancement Therapy (MET) (CUIMC, 2019) as well as frameworks such as **mental imagery** proving to have positive effects on performance and recovery (Slimani, 2016).

Potential Technological Interventions and Frameworks

Gamification while highly prevalent in general fitness applications, have mostly been applied to focus on aerobic and cardiovascular training with **application in resistance training receiving little attention.** A study that examined the effectiveness of gamification of resistance training with wearable sensors saw that it can be a powerful tool for optimising training effectiveness and motivation while providing **real-time feedback in form, tempo** and essential factors for muscle hypertrophy and strength building. As such game-like elements should be incorporated such as **challenges, rewards, leaderboards,** and real-time feedback for more **enjoyable engagement** (Au et al., 2025)

Recent studies have shown promise in **haptic technology developments** within the wearables segment. Haptic patches as seen in figure 3, have been studied upon athletes and outlined that they may be a useful strategy for athletes who've been prevented from daily training to improve athletic performance and **neuromuscular functioning** (Taporco, 2026). It has also been studied in locomotion training as a wearable haptic feedback system, finding it to be an **effective method for improving posture** by providing **real-time haptic feedback** based on **existing model data** and has been recommended for highly repetitive tasks (Demircan, 2020).



Figure 3: An Example of a Haptic Wearable Patch

Benchmarking.

To identify the general standards and potential opportunities or gaps for design, product benchmarking was carried out against relevant competitors within the market/field involving a wide range of **24 products** in total. To ensure a wide scope, benchmarking was conducted across 5 categories that either classified what kind of product it is or what purpose it serves, being; **digital/smart gym systems, velocity & biomechanical trackers, wearable health & recovery, targeted physical support/load management** and **interactive/positive engagement.** This was to provide a better grasp of how the target user can be effectively addressed from not only a utilitarian perspective but also any psychological/emotional aspects that may come into play - specifically prevalent in the apps in how they encourage positive engagement. These products were **benchmarked against a set of criteria from a scale of 1-5** with some being n/a if not relevant. The criteria was: Cost Accessibility, Safety & Injury Mitigation, Reassurance/User-Confidence, Engagement & Habit Adherence, Functional Utility, Portability/Lifestyle Fit, Ease of Use, Perceived Value, Customisation and/or Personalisation, Aesthetic, and Features.

The benchmarking showcased a range of products from two extremes, with one side leaning heavily into **smart system capabilities** while the other focused on more **straight-forward benefits** or **supporting the individual** in their goals. There was a common trend where **the more capabilities a product had in supporting the individual the more expensive it was** - with some products being restricted to rehab/professional use like the TENDO unit (Tendo Sport, 2023) and NEOFECT smart balance system (Rehab Technology, 2026) where casual gym goers likely do not see them as necessary for their needs. The following page showcases all of the products organised into the categories mentioned and benchmarked.

In-Text Reference Code	
[a]	(Speediance Australia, 2023)
[b]	(Lifespan Fitness, 2026)
[c]	(Rehab Technology, 2026)
[d]	(BodyPark, 2026)
[e]	(Tendo Sport, 2023)
[f]	(Plaza, 2025)
[g]	(GymAware, 2024)
[h]	(STANCE, 2026)
[i]	(Wavewear, 2026)
[j]	(Whoop, 2026)
[k]	(Xiaomi, 2026)
[l]	(Maker, 2021)
[m]	(Long, 2024)
[n]	(Speediance Australia, 2023)
[o]	(Wilson, 2026)
[p]	(PTP Fitness, 2025)
[q]	(Wilkes, 2023)
[r]	(Selwynn, 2020)
[s]	(Garage Gym Reviews, 2026)
[t]	(Speediance Australia, 2023)
[u]	(Moscaritolo, 2020)
[v]	(Grannell, 2021)
[w]	(Productivity Directory, 2025)
[x]	(Clever Fox, 2023)

Figure 4: In-Text References for Benchmarking

Table 1: Benchmarking of Digital/Smart Gym Systems

Digital/Smart Gym Systems	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance/User-Confidence	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Speediance Gym Monster 2 [a] 	An all-in-one system that uses motors to generate different weights while also providing smart tracking and coaching. RRP $4799 - $6999	2	4	4	4	5	1	3	4	4	3	5	**39**
Lifespan Fitness Reformer 2 [b] 	A treadmill specifically built for injury recovery, seniors and low-impact mobility. Prioritises security and user comfort through various safety features ensuring the fear of re-injury is reduced. RRP $1200	3	5	4	2	4	1	4	3	3	3	2	**34**
NEOFECT Smart Balance System [c] 	Dynamic training platform that helps improve balance and posture through interactive tasks and real-time feedback. $32500	1	4	4	4	3	1	2	2	3	2	2	**28**
Body Park Atom [d] 	A pocket 'companion' coach that involves real time tracking of full-body movement & AI processing of exercises acting as a personal trainer. Versatile mounting options and adjustability. Provides real-time feedback. $330	4	4	3	4	4	5	4	5	4	5	4	**46**

Table 2: Velocity & Biomechanical Trackers

Velocity & Biomechanical Trackers	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
TENDO Unit [e] 	Linear positioning transducer used in sports performance and strength training to measure bar speed, power output, and force in real-time, while also detecting fatigue and optimising load adjustment. Predominantly available for professional athletes.	1	n/a	2	2	3	2	2	3	1	1	1	**18**
VITRUVE Barbell Velocity Tracker [f] 	Connects directly/indirectly to barbell bar to track velocity and fatigue during sets while also analysing range of motion and power. Approx. $587	3	2	3	3	3	4	5	3	2	2	2	**32**
FLEX Barbell Velocity Tracker [g] 	A portable wireless velocity-based training sensor that attaches to the end of a barbell to measure performance. Visualises data in real time displaying live bar path tracing and positioning through bluetooth app connectivity. Approx. $730	3	3	3	4	4	5	5	3	2	3	3	**38**
STANCE BarSpeed Tracker [h] 	A clip on gadget that gets strapped onto the bar to track speed on every rep for squats, bench presses and deadlifts. Allows for the user to see their rate of progress. Boosts confidence by showing progressive data weekly. Approx. $183	5	3	4	4	4	5	5	4	3	4	4	**45**
TracME Body Tracking Sleeve [i] 	A smart wearable that tracks movement and powered with physio tech and AI insights. With sensors it tracks joint angles in real time - providing data needed to maintain proper form. Only tracks reps with proper posture to ensure better form and consistent results. Approx. $380	3	4	4	4	4	5	5	4	4	3	4	**44**

Table 3: Benchmarking of Wearable Health, Haptic & Recovery

Wearable Health, Haptic & Recovery	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Whoop Strap [j] 	A strap/wristband that tracks daily recovery, cardiovascular and muscular strain, sleep performance, and stress levels, translating data into personalized insights and coaching through an app. Wristband is free as it is subscription-based, approx. $299 per year.	2	1	3	4	3	5	4	3	5	2	3	**35**
Xiaomi Smart Band 9 [k] 	A very budget friendly fitness tracker that is praised for being an entry-level fitness wearable that balances performance metrics with extreme affordability. Around $50	5	1	2	3	3	5	5	5	5	3	4	**41**
Polar H10 Bluetooth & Heartrate Mon 	Monitors heart rate with maximum precision and connects heart rate with variety of training devices through bluetooth. Provides info on recovery and tools to optimise training (polar sport watch required) RRP $150	4	2	2	2	2	3	3	2	2	2	2	**26**
SmartCuffs 4.0 [m] 	An automated blood flow restriction (BFR) training device that safely restricts blood flow out while letting blood flow in. Helps prevent muscle loss by tricking brain and muscles into thinking you are lifting massive weights. $950 for a single cuff.	1	4	3	2	3	4	3	3	1	2	2	**28**
Speediance PowerGrip [n] 	Smart cable handle that is part of the Speediance Gym Monster, allowing for hands-free weight adjustments, workout tracking and haptic feedback during training. Strictly add-on that cannot be used independently from Gym Monster.	1	4	3	2	4	1	4	2	3	2	3	**29**

Table 4: Benchmarking of Targeted Physical Support & Load Management

Targeted Physical Support & Load Management	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Resistance Bands [o] 	Elastic bands that come in a variety of colours and different tensile strengths - allowing to easily scale as recovery progresses. Commonly used in rehab to rebuild strength and improve range of motion + muscle health. Around $30 - with the option to buy sets or individual bands.	5	5	4	n/a	3	5	4	5	3	1	n/a	**35**
Resistance Platform System [p] 	Compact portable home gym/product that simulates traditional free-weight exercises by incorporating stackable resistance bands. Allows for highly adjustable weights and ease on joints. RRP $330	4	4	4	n/a	5	3	4	4	4	3	3	**38**
Quickdraw Adjustable Dumbbell [q] 	A dumbbell that allow for multiple weight options out of a singular dumbbell, saving space compared to a full set of dumbbells. Fast and easy to change between weights. $680-$1650 depending on weight range.	2	3	3	n/a	4	1	4	4	4	3	3	**31**
Bench Press Sling [r] 	A wearable resistance band that assists with bench presses, dips and pushups to ensure injury free workouts. Offers three different resistance levels and relieves shoulder pain by preventing elbow flare. Approx. $40-$80	5	5	5	3	3	4	4	4	2	1	n/a	**36**
Dmoose Weight Lifting Hooks [s] 	A popular gym accessory that helps address grip fatigue during lifts - especially when grip strength is struggling to keep up with other muscle growth. Using a hook shape it reduces forearm and wrist strain while allowing the user to focus on the muscles instead of the grip. Approx. $50-$60	5	4	4	2	3	5	4	5	1	2	n/a	**35**
Speediance Squat Belt [t] 	Provides lumbar support to ensure proper spinal alignment during heavy lifts. $6499 - The main product of the Gym Monster ecosystem.	2	5	4	4	4	1	3	2	2	2	3	**32**

Table 5: Benchmarking of Interactive & Positive Engagement/Habits

Interactive & Positive Engagement/Habits	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Centra X Stealth Balance Board [u] 	A balance board that works out the core by gamifying it to boost motivation. Can use similar elements to promote encouragement. RRP$100-$160, optional subscription for more games in app - free version available that offers 4 games.	5	3	3	5	3	2	4	4	3	4	3	**39**
Streaks App [v] 	A to-do list that helps form good habits. Encourages motivation in the form of streaks that get extended each day a task is completed. Uses visual rings like apple watch, and records long term data that encourages streaks to keep going. Helps to stay motivated by viewing task statistics and track results easily. One time upfront purchase - $9	5	n/a	3	5	2	5	5	5	5	4	4	**43**
HabitShare App [w] 	App that allows you to share habits with friends for extra motivation & accountability - incorporating a social network feature. Features scheduled reminders and flexible custom habits for specific goals. 100% free app.	5	n/a	3	5	2	5	5	5	5	3	4	**42**
CleverFox Fitness Journal Pro [x] 	A tracking log journal that allows users to comprehensively map out their workouts, nutrition and daily wellness habits. A good benchmark to observe how it supports good habits and motivation through layout. Around $60 with cheaper versions available such as ones focused on workouts.	5	n/a	2	4	2	4	5	4	4	3	3	**36**

Table 1: Benchmarking of Digital/Smart Gym Systems

Digital/Smart Gym Systems	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance/User-Confidence	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Speediance Gym Monster 2 [a] 	An all-in-one system that uses motors to generate different weights while also providing smart tracking and coaching. RRP $4799 - $6999	2	4	4	4	5	1	3	4	4	3	5	39
Lifespan Fitness Reformer 2 [b] 	A treadmill specifically built for injury recovery, seniors and low-impact mobility. Prioritises security and user comfort through various safety features ensuring the fear of re-injury is reduced. RRP $1500	3	5	4	2	4	1	4	3	3	3	2	34
NEOFECT Smart Balance System [c] 	Dynamic training platform that helps improve balance and posture through interactive tasks and real-time feedback. $32500	1	4	4	4	3	1	2	2	3	2	2	28
Body Park Atom [d] 	A pocket 'companion' coach that involves real time tracking of full-body movement & AI processing of exercises acting as a personal trainer. Versatile mounting options and adjustability. Provides real-time feedback. $330	4	4	3	4	4	5	4	5	4	5	4	46

Table 2: Velocity & Biomechanical Trackers

Velocity & Biomechanical Trackers	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
TENDO Unit [a] 	Linear positioning transducer used in sports performance and strength training to measure bar speed, power output, and force in real-time, while also detecting fatigue and optimising load adjustment. Predominantly available for professional athletes.	1	n/a	2	2	3	2	2	3	1	1	1	18
VITRUVE Barbell Velocity Tracker [f] 	Connects directly/indirectly to barbell bar to track velocity and fatigue during sets while also analysing range of motion and power. Approx. $587	3	2	3	3	3	4	5	3	2	2	2	32
FLEX Barbell Velocity Tracker [g] 	A portable wireless velocity-based training sensor that attaches to the end of a barbell to measure performance. Visualises data in real time displaying live bar path tracing and positioning through bluetooth app connectivity. Approx. $730	3	3	3	4	4	5	5	3	2	3	3	38
STANCE BarSpeed Tracker [h] 	A clip on gadget that gets strapped onto the bar to track speed on every rep for squats, bench presses and deadlifts. Allows for the user to see their rate of progress. Boosts confidence by showing progressive data weekly. Approx. $183	5	3	4	4	4	5	5	4	3	4	4	45
TracME Body Tracking Sleeve [i] 	A smart wearable that tracks movement and powered with physio tech and AI insights. With sensors it tracks joint angles in real time - providing data needed to maintain proper form. Only tracks reps with proper posture to ensure better form and consistent results. Approx. $380	3	4	4	4	4	5	5	4	4	3	4	44

Table 3: Benchmarking of Wearable Health, Haptic & Recovery

Wearable Health, Haptic & Recovery	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Whoop Strap [j] 	A strap/wristband that tracks daily recovery, cardiovascular and muscular strain, sleep performance, and stress levels, translating data into personalized insights and coaching through an app. Wristband is free as it is subscription-based, approx. $299 per year.	2	1	3	4	3	5	4	3	5	2	3	35
Xiaomi Smart Band 9 [k] 	A very budget friendly fitness tracker that is praised for being an entry-level fitness wearable that balances performance metrics with extreme affordability. Around $50	5	1	2	3	3	5	5	5	5	3	4	41
Polar H10 Bluetooth & Heartrate Mor 	Monitors heart rate with maximum precision and connects heart rate with variety of training devices through bluetooth. Provides info on recovery and tools to optimise training (polar sport watch required) RRP $150	4	2	2	2	2	3	3	2	2	2	2	26
SmartCuffs 4.0 [m] 	An automated blood flow restriction (BFR) training device that safely restricts blood flow out while letting blood flow in. Helps prevent muscle loss by tricking brain and muscles into thinking you are lifting massive weights. $950 for a single cuff.	1	4	3	2	3	4	3	3	1	2	2	28
Speediance PowerGrip [n] 	Smart cable handle that is part of the Speediance Gym Monster, allowing for hands-free weight adjustments, workout tracking and haptic feedback during training. Strictly add-on that cannot be used independently from Gym Monster.	1	4	3	2	4	1	4	2	3	2	3	29

Table 4: Benchmarking of Targeted Physical Support & Load Management

Targeted Physical Support & Load Management	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Resistance Bands [o] 	Elastic bands that come in a variety of colours and different tensile strengths - allowing to easily scale as recovery progresses. Commonly used in rehab to rebuild strength and improve range of motion + muscle health. Around $30 - with the option to buy sets or individual bands.	5	5	4	n/a	3	5	4	5	3	1	n/a	35
Resistance Platform System [p] 	Compact portable home gym/product that simulates traditional free-weight exercises by incorporating stackable resistance bands. Allows for highly adjustable weights and ease on joints. RRP $330	4	4	4	n/a	5	3	4	4	4	3	3	38
Quickdraw Adiustable Dumbbell [q] 	A dumbbell that allow for multiple weight options out of a singular dumbbell, saving space compared to a full set of dumbbells. Fast and easy to change between weights. $680-$1650 depending on weight range.	2	3	3	n/a	4	1	4	4	4	3	3	31
Bench Press Sling [r] 	A wearable resistance band that assists with bench presses, dips and pushups to ensure injury free workouts. Offers three different resistance levels and relieves shoulder pain by preventing elbow flare. Approx. $40-$80	5	5	5	3	3	4	4	4	2	1	n/a	36
Dmoose Weight Lifting Hooks [s] 	A popular gym accessory that helps address grip fatigue during lifts - especially when grip strength is struggling to keep up with other muscle growth. Using a hook shape it reduces forearm and wrist strain while allowing the user to focus on the muscles instead of the grip. Approx. $50-$60	5	4	4	2	3	5	4	5	1	2	n/a	35
Speediance Squat Belt [t] 	Provides lumbar support to ensure proper spinal alignment during heavy lifts. $6499 - The main product of the Gym Monster ecosystem.	2	5	4	4	4	1	3	2	2	2	3	32

Table 5: Benchmarking of Interactive & Positive Engagement/Habits

Interactive & Positive Engagement/Habits	Description	Cost Accessibility	Safety & Injury Mitigation	Reassurance	Engagement & Habit Adherence	Functional Utility	Portability/Lifestyle Fit	Ease of Use	Perceived Value	Customisation/Personalisation	Aesthetic	Features	Total
Centra X Stealth Balance Board [u] 	A balance board that works out the core by gamifying it to boost motivation. Can use similar elements to promote encouragement. RRP$100-$160, optional subscription for more games in app - free version available that offers 4 games.	5	3	3	5	3	2	4	4	3	4	3	39
Streaks App [v] 	A to-do list that helps form good habits. Encourages motivation in the form of streaks that get extended each day a task is completed. Uses visual rings like apple watch, and records long term data that encourages streaks to keep going. Helps to stay motivated by viewing task statistics and track results easily. One time upfront purchase - $9	5	n/a	3	5	2	5	5	5	5	4	4	43
HabitShare App [w]	App that allows you to share habits with friends for extra motivation & accountability - incorporating a social network feature. Features scheduled reminders and flexible custom habits for specific goals. 100% free app.	5	n/a	3	5	2	5	5	5	5	3	4	42
CleverFox Fitness Journal Pro [x]	A tracking log journal that allows users to comprehensively map out their workouts, nutrition and daily wellness habits. A good benchmark to observe how it supports good habits and motivation through layout. Around $60 with cheaper versions available such as ones focused on workouts.	5	n/a	2	4	2	4	5	4	4	3	3	36

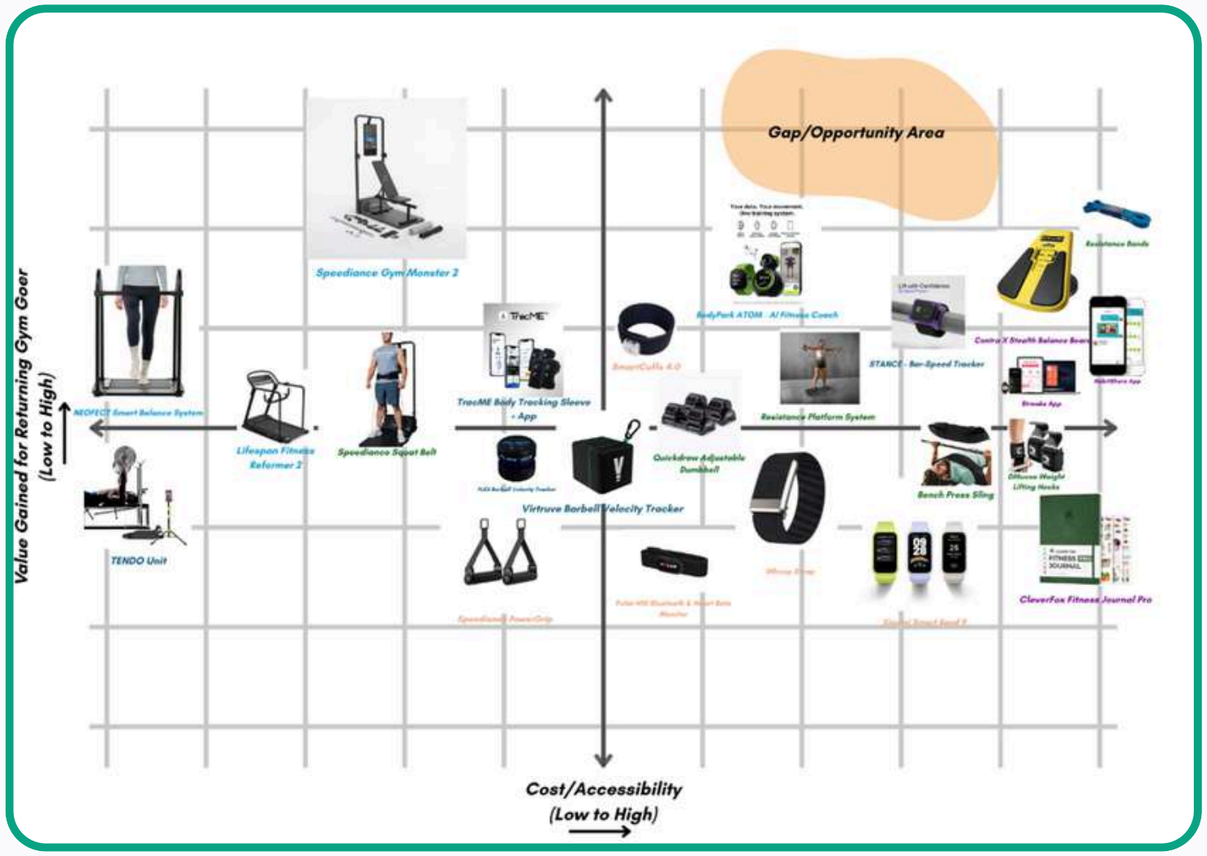
Benchmarking.

There was a notable amount of tracker products that either tracked the velocity of one's performance or their biomechanical movement – showcasing the **growing technological trends within the fitness industry**, particularly in **being able to track one's performance**. Smart gym systems like Speediance's Gym Monster 2.0 provided immense value for the user through sheer features – yet were held back by its **high upfront cost and home-gym application**. The top **products that performed the highest** in the benchmarking were products that **managed to provide great value for their customers in relation to their price** with a common trend of using data tracking that yielded strong positive engagement. **The BodyPark Atom** was the **standout product scoring the highest (48/55),** driven by its **strong balance of real-time movement tracking, AI coaching, portability** and its **mid-tier pricing** (BodyPark, 2026) that can provide strong value to not only newcomers but also existing gym goers who require tools to improve form/technique and advice. Other trackers that performed well were the **STANCE Bar-Speed Tracker (45/55)** and **TracME Body Tracking Sleeve (44/55)** that integrate real-time data tracking to create **progressive data and insights** that can prove to be **beneficial to the user's confidence and progress.**

The Streaks App and HabitShare App **offer unique perspectives in addressing the challenges** gym goers face by **integrating long-term data tracking** and **social networking accountability** to encourage not only **positive daily engagement** but also forming **consistent habits** that help **mitigate the fear-avoidance loop**. The user-experience of the proposed solution should take strong aspiration for how these products have engaged with the user.

All the benchmarked products were then placed into a positioning matrix against two variables being cost/accessibility and the inherent value the product provides for the user, in efforts to identify a core gap/opportunity within the market for a design solution. As seen in Figure 5, products that provided incredible functional value were generally held back by costs and space requirements such as the Gym Monster 2.0 appealing to the home-gym audience while more affordable accessories/products are highly accessible and budget friendly but lack the nuanced benefits/value a gym goer may need for their unique challenges that they face. As mentioned prior, BodyPark Atom showcases a strong position of delivering high-value at a mid-tier price point and as such **the key opportunity area** would be to **deliver a high-value physical/behavioural support solution highly accessible and beneficial to the everyday or returning gym-goers.**

Figure 5: Positioning Matrix of Benchmarked Products



Overall these products showcase how different approaches can be taken to drive strong and positive engagement within the gym during highly vulnerable phases such as returning from injury or break – with key insights involving being able to leverage technology to track progression to drive user motivation and confidence that addresses both the physical and psychological needs.

Research.

To expand upon background research, primary research was carried out in the form of a survey and interviews. By carrying out primary research it allows new insights and perspectives to be uncovered that could either reinforce existing research or expand upon it, allowing to set the scope and general direction the design phase should follow. An online survey was sent out seeking to collect data relating to gym goers while semi-structured interviews were conducted with both experienced gym goers and physiotherapists. Human research ethics protocols were followed, obtaining informed consent from all survey respondents and interview participants prior to data collection.

Participants were specifically selected based on characteristics that related to the field of research such as **targeting individuals with experience in resistance training/gym, injury recovery or professional clinical practice** to ensure utmost relevance in sample data. To collect strong data that can provide deep insights for the research area – a number of questions were carried out seeking to collect both qualitative and quantitative data. These types of questions included; **structured questions** that enabled simpler data collection and analysis being supported by an understanding of the expected responses, a mix of **ordinal and interval questions** to understand user preferences and frequency habits, and **non-structured questions** that enabled respondents to potentially explore new ideas and aspects within the research area (Science Buddies, 2012). After filtering out irrelevant respondents the survey ended up with **23 responses**.

The **semi-structured interviews** were chosen as an important data collection tool for qualitative data collection and as such was carried out with **two professional experts being physiotherapists** that offered technical and clinical expertise **and two frequent gym goers** that offered personal insights behind behavioural and psychological perspectives. **Two sets of questions were created,** one for the physiotherapists and the other for gym goers, while being semi-structured to not only answer predetermined questions but also enable opportunities to dig deeper into responses and ask follow up questions that allowed to create a rapport and shared understanding of the topic area for the interview (McGrath et al., 2019). Two of the interviews were carried out in person and the other two carried over a call that were all transcribed live using Otter.AI. These interviews were then thematically analysed through coding the transcripts to analyse and identify reoccurring concepts such as themes, issues, words/phrases while analysing the relationships among these coded concepts.

Analysis & Findings - Survey.

After carrying out the survey a number of findings could be identified that either reinforced or provided context behind the background research. It should be noted that naturally, this survey does not reflect the larger population but rather at a smaller scale and should not be fully relied upon but rather seen as a sample of it. With a sample size of 23 respondents, majority of the respondents (77%) were aged 18-24 and were male (78%) as seen in figure 6, thus some responses may reflect this split such as in figure 4 when asked what their primary goals for gym were, the top response was muscle building (40%) followed closely by general health and fitness (30%). Majority of respondents noted that their last break was less than two weeks long, with work/academic commitments being the primary reason for the break (40%) as seen in figure 7.

Figure 6: Age Demographics

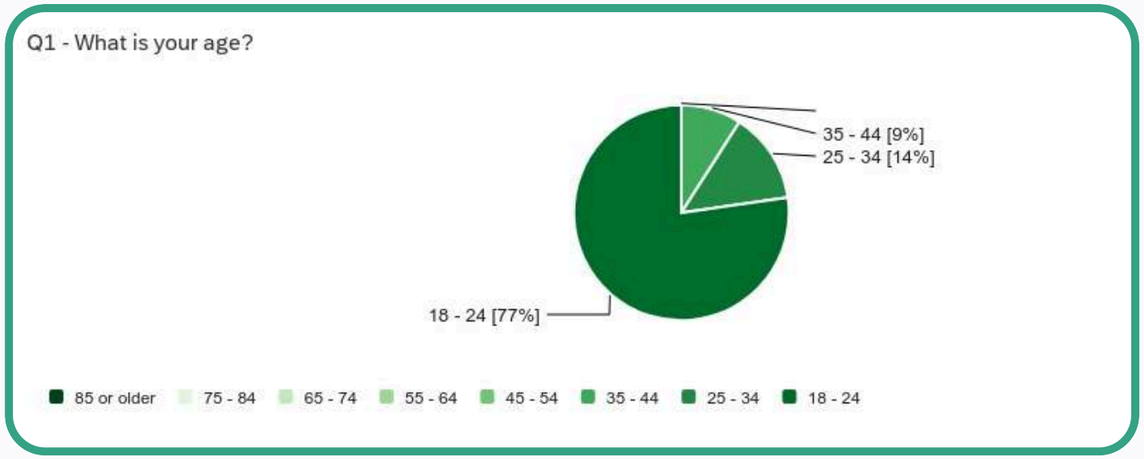


Figure 7: Primary Goals for Going to Gym

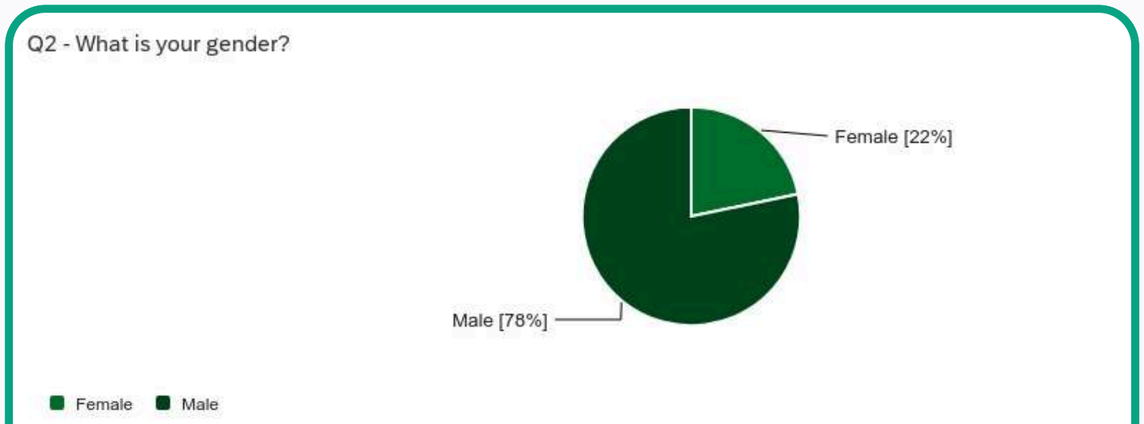
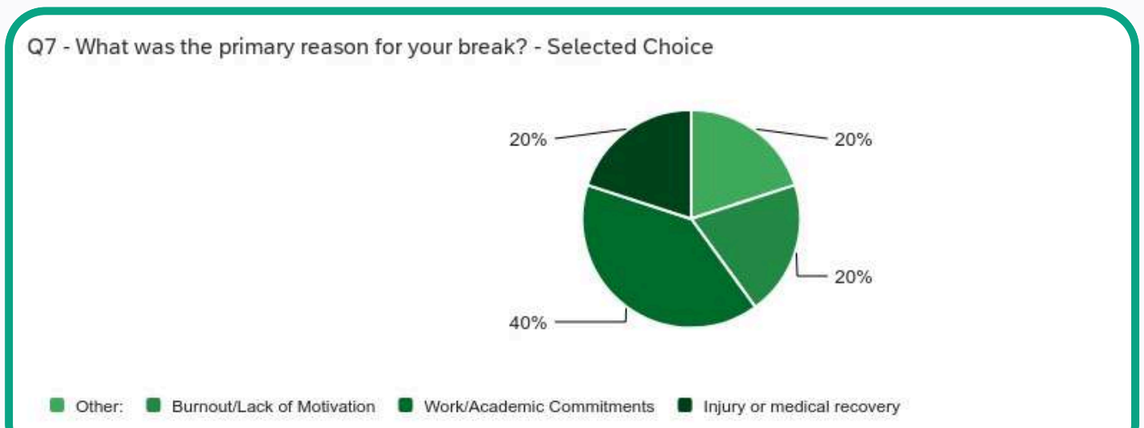


Figure 8: Primary Reason for Taking a Break from Gym



Analysis & Findings - Survey.

Through the survey it was found that most respondents are **occasionally hesitant to perform specific exercises** and rarely compare themselves to others at the gym, with the wider majority sometimes feeling frustrated about their progress. Furthermore, in one of the questions asked, respondents were able to share what injuries they've experienced that limited their ability to partake in gym and as a result - provided a plethora of different injuries that affected different areas of the body, showcasing the grand scope of trying to address injuries and as such should cater a more generalised approach focused on recovery, forming positive habits and promoting motivation/safety.

An interesting insight that unveiled itself from this data collection was that many gym goers **prefer visual formats when seeking out guidance or information**, dominantly leaning towards Youtube followed by social media and observing other gym goers as seen in figure 9, while majority respondents saying they would quickly search up an image/answer when faced with uncertainty in form/technique as seen in figure 10. Additionally, they were given the opportunity to rate from a scale of 1 to 5 on the difficulty of going back to gym after taking a break, with 1 being extremely easy and 5 being extremely difficult which resulted in the **majority rating it as 4 out of 5 being 'somewhat difficult',** seen in figure 11. This difficulty can stem from users frequently highlighting how injuries, pain and the mental burden of physical regressions sets them back more than the recovery time itself - meaning anxiety around lost mobility, physical capability and fear of re-injury is a highly relevant barrier.

Figure 9: What Gym Goers mostly use for Form & Technique Guidance

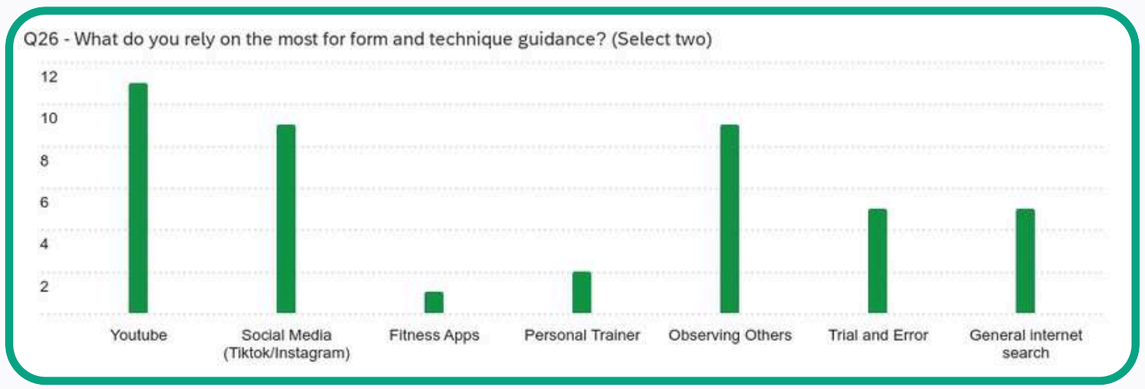


Figure 10: What Gym Goers do when Uncertain with Form & Technique

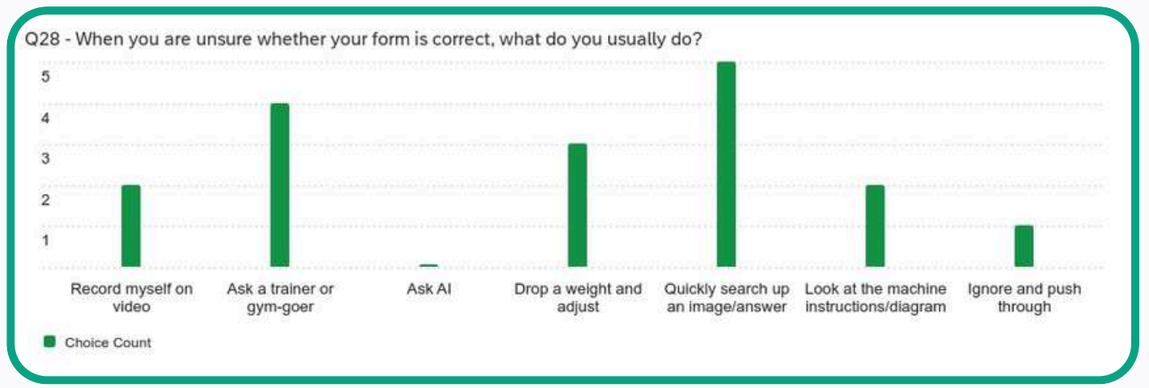
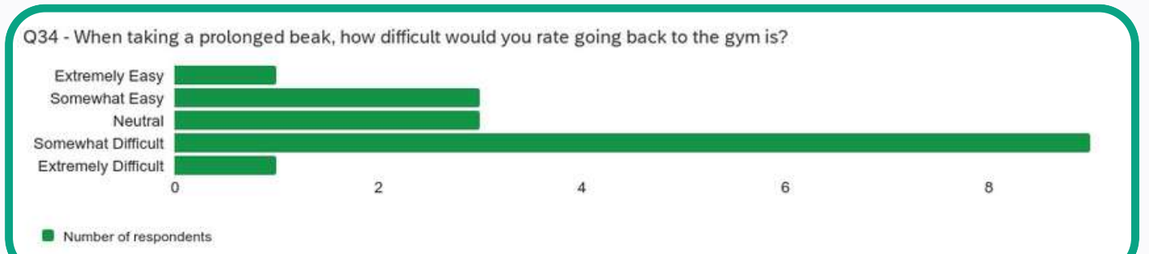


Figure 11: How Gym Goers Rate the Difficulty of Going Back to Gym after a Long Break



Many users express a strong reliance and desire for professional support that could work in hand alongside their workouts through coaching, assess workouts and provide advice - showcasing **a need for being able to understand not only different techniques and forms but provide suggestions catered for the individual** to encourage progress. Furthermore, many express a desire for **clear visibility over their improvements** in strength, range of motion and physical capabilities to combat discouragement - **especially when results are not easily visible**. Discouragement can also be reduced through key drivers of motivation and encouragement, in particular many expressed having social and accountability support systems like friends and partners helped maintain focus.

Analysis & Findings - Interviews.

Key findings from the interview stemmed from frequent conceptual themes that came up frequently in the form of codes. These themes and corresponding codes can be found in *Appendix A*. From the interviews there was strong prevalence of concepts such as kinesiophobia and fear-avoidance in the psychological distress and frustration that physically regressing might bring, highlighting how it not only often acts as a barrier for taking that initial first step in going back to gym out of fear of injury - but also negatively affects the individual as they are not able to reap benefits of physical activity for their cardiovascular and mental health. Reinforcing this further is that the disruption to routine naturally results in a loss of the initial momentum and motivation, where people can become stuck in a negative loop and lose discipline.

Furthermore, across the interviews there was a common issue of compensative movements and being unaware of bad form

"There's compensation everywhere... when you have bad form and you don't know... you can really stick to it because it's comfortable for you and your body adapts to it."

"You mostly just think, oh, if I'm able to do the task, then I'm doing it right."

This tends to stem from a common issue identified from difficulty in identifying their physical capabilities and desiring suggestions/feedback for what is best for them where sometimes their own eagerness can be detrimental

"Started getting knee pain... due to me lifting too heavy of a weight too soon."

"Some people get so enthusiastic and they overdo it."

As such the inherent value for real-time guidance is something that is frequently expressed across all interviews.

"Would be quite helpful... knowing if I need to fix something in the moment."

"...having someone there, like in real time, be able to critique you helps with motor learning patterns."

"If I had something that would've told me, hey, your knee is not at 100%... you should be lifting this amount of weight."

"I kind of wish that they'd (patients) have continued advice about their form or a corrector in some way to continue on."

Beyond these they've shared effective strategies and positive mindsets that help drive intrinsic motivation, such as reframing goals and setting realistic expectations to help mental focus.

"Comparing with yourself... you can kind of know your limits...what a good and a bad day is for you."

While also adopting digitally native practices in efforts to improve form and technique such as Youtube, social media and/or recording themselves and reviewing it.

"When I get stressed about my form on an unfamiliar or old movement, I will film myself."

"...rewatch the video to see if my form is good."

The physiotherapists also mentioned an important aspect to consider which was the level of input that professional physiotherapists may have involving the design - especially in issues regarding overexertion as they express concerns and advice over implementing features that allow recommendations from client-specific sessions so that the user is able to do the recommended exercises and avoid any risky movements, while acting as a way for physiotherapists to ensure their patients are on track.

Other Relevant Quotes:

- "A lot of patients are just kind of scared of going back because they either don't want to reinjure themselves, don't want another injury...or trying to take it really cautiously."
- "Having some time out... you lose a bit of that momentum and that motivation as well."
- "Nearly every patient I see, there'll be some type of compensation."
- "When you have bad form, and you don't know... you can really stick to it because it's comfortable for you and your body adapts to it."
- "A lot of the younger patients would push themselves too hard."
- "Some people get so enthusiastic and they just overdo it."

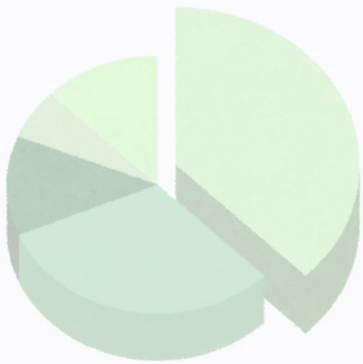
"We see like a million patients a day... getting a really good documentation of their progress like where they're at and when they're at as well so we can look back at it too."

Discussion

To fully grasp and understand the different gaps, opportunities and insights relevant for developing a solution that promotes confidence, awareness and safety, primary research data and background research was thoroughly examined and compared. Existing literature & research establishes concepts such as kinesiophobia, traumatophobia and the fear avoidance model that act as barriers for individuals in exercising and returning to gym - primarily driven by the fear of re-injury and the frustration of physically regressing. This becomes further reinforced by evidence from the survey and interviews where many of the respondents and interviewees expressed feeling occasionally hesitant, frustrated over progress and having to regress along with an overarching shared fear for re-injury that makes the daunting experience of going back to gym and feeling a lack of progress a shared experience that is commonly shared by many.

Furthermore, it's been highlighted that the most common injuries outside of external factors tend to stem from factors such as improper technique, overtraining, and subconscious compensatory movements that not only increase risk of getting another injury shortly after but also are difficult for the individual to detect or realise. Data from primary research suggests that while the use of social media and the internet has made access to information on form/technique easier, **compensations is still seen relatively everywhere** and is even more problematic as **many users tend to stick to these bad forms** simply due to it **feeling natural and comfortable** as their body makes it a habit.

Technological innovations do show promise in the context of positively supporting the individual through things such as gamification and haptic technology being used as feedback, while lacking implementation in resistance training contexts. Benchmarking has shown diverse growth that helps to address the various challenges but users lack a central tool that can be relied upon and provide value by addressing the multitude of needs and problems an individual may have. Many respondents **express that they wish they had a companion or tool that would help monitor their form and technique** with **physiotherapists wishing the same for patients outside of their care** while also expressing **a unique opportunity in being able to capture a log of progress that would help the physiotherapist** in managing patients. Benchmarked products have shown that the technology and concept can exist, with the BodyPark Atom illustrating the closest idea to a companion but there is **notable opportunity in better addressing the core needs and unique challenges** that the user group face. Furthermore, it was frequently seen how many **gym goers already use digital formats** in efforts to learn more about their form and technique and as such there is **opportunity in enhancing that practice.**



Design Implications

Value for Real-Time Feedback/Guidance

With an opportunity to not only integrate but also enhance common practices carried out by gym goers, the design should seek to feel natural in both ease of use and provide enough inherent value to the user. In order to best address the unique challenges faced while also promoting confidence, body awareness and safety, the core design should be based upon the ability to provide the user with real-time feedback, allowing the users to make corrections in quick succession as opposed to post-set when reviewing video footage or consulting a physiotherapist.

Encouraging Intrinsic Motivation and Positive Engagement – User Experience

Furthermore, additional features focused on providing intrinsic motivation and positive engagement should be embraced as the core user experience for the design solution as a means to help alleviate the negative feedback loops that commonly trap individuals – celebrating small milestones to keep engagement for consistency and reduce the burden of not feeling any progress.

Professional Input for Credibility & Personalised Connection/Engagement

As recommended by the interviewed physiotherapists, there is a huge opportunity to implement features or alternative modes that are dedicated to injury recovery or rebuilding strength while an alternative mode can appeal to more generalised needs. As such the design should at some level integrate the option for professional input from physiotherapists to not only provide credibility but also add a deeper layer of personalisation that can help drive intrinsic motivation and stronger engagement over foreseeable progress. By implementing this there's an opportunity to extend beyond benefitting and supporting the individual gym goer but also potentially alleviate the burdens of physiotherapists who see hundreds of patients and thus may lack the tools to personally engage with their patients at a deeper level that they may desire.

Integrating Technology to Provide Beyond Functional Value

Naturally to provide meaningful insights that can help benefit the user – the design will need to integrate and expand upon existing technologies, relying on technologies that allow data to not only be captured and logged but also meaningfully used in ways that can positively impact the user experience beyond purely functional benefits, relying on existing apps that focus on wellbeing and tracking habits to understand how to best approach the user. Technological innovations briefly covered should be explored to see the potential positive impact it may have in this design context, with gamification seeing potential use in driving positive engagement while wearable haptics as a potential avenue to explore in providing real-time feedback.

Provide meaningful support to the user

By capitalising these core opportunities identified, the fear-avoidance behaviours and impact of kinesiophobia can be significantly reduced – offering users a way to positively engage back with gym and continue to retain that engagement while providing them a supportive tool to help counter the negative connotations associated with physical regression and injury.

Conclusion

Gym activity has become a widely embraced lifestyle choice among diverse crowds and with a heightened awareness of health and wellbeing along with the impact of social media and vast options - returning gym goers from an injury or extended break face unique challenges that not only have physical needs that need to be met but also psychological needs in regard to their motivation and being consistently positively engaged. With psychological barriers, physical regression and a lack of real-time accessible guidance, there are a number of hurdles that stand in the way of positively engaging.

Extensive review over literature, competitor benchmarking and primary research with surveys and interviews have only reaffirmed the prevalence of these struggles that are being faced and as such unveil just how important this opportunity for design can be for the individual. Existing solutions within the market struggle to address the number of unique challenges faced and as such revealed a distinct gap to create a solution that not only provides functional value but also value from a user-experience perspective, bridging the gap from traditional casual fitness tools with clinical care/input from physiotherapists.



References.

Alves, T., Carvalho, H., & Lopes, D. S. (2020). Winning compensations: Adaptable gaming approach for upper limb rehabilitation sessions based on compensatory movements. Journal of biomedical informatics, 108, 103501.

American Psychological Association. (2019). Mindfulness meditation: A research-proven way to reduce stress. In American Psychological Association. APA Publishing. https://www.apa.org/topics/mindfulness/meditation

André, N., Grousset, M., & Audiffren, M. (2024). A behavioral perspective for improving exercise adherence. Sports Medicine-Open, 10(1), 56.

Au, C. Y., Sng, C. M. N., Heng, J., Nguyen, T. T., Yeo, J. C., & Bhagat, A. A. S. (2025). Gamifying Resistance Training with Wearable Sensors. Sensors, 25(9), 2662.

BodyPark. (2026). BodyPark ATOM The World's First Pocket AI Fitness Companion. BodyPark Tech. Bodypark.Fit. https://bodypark.fit/

Churchill, R. (2023). Responses to Musculoskeletal Injuries: Examining the Fear Avoidance Model in an Exercise Population (Doctoral dissertation, Rosalind Franklin University of Medicine and Science).

Cleveland Clinic. (2023). Musculoskeletal Pain: What It Is, Symptoms, Treatment & Types. In Cleveland Clinic. Cleveland Clinic Journal of Medicine. https://my.clevelandclinic.org/health/symptoms/musculoskeletal-pain

Clever Fox. (2023). Fitness journal PRO. Clever Fox®. Clever Fox. https://cleverfoxplanner.com/products/fitness-journal-pro

CUIMC. (2019, February 11). Motivational enhancement therapy | ColumbiaDoctors - New York. Columbia University Irving Medical Center. ColumbiaDoctors. https://www.columbiadoctors.org/treatments-conditions/motivational-enhancement-therapy

Demircan, E. (2020). A pilot study on locomotion training via biomechanical models and a wearable haptic feedback system. Robomech Journal, 7(1), 19.

Duncan, L. (2015). Movement compensation: The body's response to pain. In Duncan Sports PT. Duncan Sports Therapy and Wellness. https://www.duncansportspt.com/2015/03/movement-compensation/

Garage Gym Reviews. (2026). DMoose weight-lifting hooks | garage gym reviews. Garage Gym Reviews. Garage Gym Reviews. https://www.garagegymreviews.com/equipment/dmoose-weight-lifting-hooks

Grannell, C. (2021, September 14). App of the week: Streaks review. Kelsey Media. Stuff. https://www.stuff.tv/review/app-of-the-week-streaks-review/

Green, E. (2024, September 2). How physiotherapists can help with gym injuries. Melbourne Physio Clinic. https://www.melbournephysioclinic.com.au/blog/gym-injuries

GymAware. (2024, September 24). Flex - world's best barbell tracker. VALD Performance. GymAware. https://gymaware.com/product/flex-barbell-tracker/

Head2Toe. (2026). Motivation in physiotherapy: Turning short-term relief into long-term results | head 2 TOe. In Head 2 Toe. head2toe. https://www.head2toe.com.au/motivation-in-physiotherapy-turning-short-term-relief-into-long-term-results/

Kim, J. M. (2025). Returning to sports after injury: How to overcome your fear. In Hospital for Special Surgery. SAGE Publications. https://www.hss.edu/health-library/move-better/fear-of-reinjury

Kvist, J., & Silbernagel, K. G. (2022). Fear of movement and reinjury in sports medicine: relevance for rehabilitation and return to sport. Physical therapy, 102(2), pzab272.

Lifeline. (2025). Acceptance and commitment therapy (ACT) | Lifeline. In Lifeline. Lifeline Australia. https://www.lifeline.org.au/get-help/support-toolkit/techniques-and-guides/acceptance-and-commitment-therapy-act

Lifespan Fitness. (2026). Reformer safety rehabilitation treadmill. Lifespan Fitness. Lifespanfitness. https://www.lifespanfitness.com.au/products/reformer-2-safety-rehabilitation-treadmill

Liu, S., Noh, Y. E., & Kim, J. (2025). Athletic identity and sport injury: a systematic review and meta-aggregation. BMC psychology, 14(1), 111.

Long, Z. (2024, April). Smart cuffs BFR review. The Barbell Physio. The Barbell Physio. https://thebarbellphysio.com/smart-cuffs-bfr-review/

Maker, R. (2021, December 17). Polar H10. DC Rainmaker. DC Rainmaker. https://www.dcrainmaker.com/2021/12/polar-monitor-review.html

McCarthy, P. (2025). Fear of Injury: A comprehensive guide to understanding and overcoming kinesiophobia. In Dr Paul McCarthy. Dr Paul McCarthy. https://www.drpaulmccarthy.com/post/fear-of-injury-a-comprehensive-guide-to-understanding-and-overcoming-kinesiophobia

McGrath, C., Palmgren, P. J., & Liljedahl, M. (2019). Twelve tips for conducting qualitative research interviews. Medical teacher, 41(9), 1002-1006.

Moscaritolo, A. (2020, August 24). Stealth core trainer. Ziff Davis. PCMag Australia. https://au.pcmag.com/digital-life/68212/stealth-core-trainer

Plaza, J. V. (2025, May 14). ▷ Barbell velocity tracker for strength training | vitruve. Vitruve. Vitruve. https://vitruve.fit/blog/barbell-velocity-tracker/

Productivity Directory. (2025). HabitShare. Productivity Directory. Productivity.Directory. https://productivity.directory/habitshare

PTP Fitness. (2025). PTP fit. Fitness System United. PTP Fitness. https://ptpfit.com/products/resistance-platform-system?srsltid=AfmBOoqorRQLqcloaJyMiRbf6yCoWGE1R811Gi91NtlVH-cS0rhc04HU

Rehab Technology. (2026). NEOFECT smart balance system. Rehab Technology. Rehabtechnology. https://rehabtechnology.com.au/products/neofect-smart-balance-system

Science Buddies. (2012, June 14). Designing a survey. Science Buddies. Science Buddies. https://www.sciencebuddies.org/science-fair-projects/references/how-to-design-a-survey

Selwynn. (2020, August 19). Review of the original bench press slingshot by Mark Bell. WordPress. Wynn Strength & Health. https://wynnstrength.wordpress.com/2020/08/19/review-of-the-original-bench-press-slingshot-by-mark-bell/

simplmobility. (2026). Compensating movement patterns: How your body works around restrictions. In simplmobility. SimplMobility. https://simplmobility.com/blog/compensating-movement-patterns

Sixtus Italia. (2023). Kinesiophobia Fear of movement: what is kinesiophobia? - Sixtus Italia. In Sixtus Italia. Digital Agency Lotrèk. https://www.sixtusitalia.com/we-care/kinesiophobia-fear-of-movement-what-is-it/

Slimani, M., Tod, D., Chaabene, H., Miarka, B., & Chamari, K. (2016). Effects of mental imagery on muscular strength in healthy and patient participants: A systematic review. Journal of sports science & medicine, 15(3), 434.

Speediance Australia. (2023). Speediance gym monster 2. Speediance Australia. Speediance.com.au. https://speediance.com.au/products/speediance-gym-monster-2-classic

Speediance Australia. (2023). Speediance PowerGrips. Speediance Australia. Speediance Australia. https://speediance.com.au/products/speediance-powergrip

Speediance Australia. (2026). Speediance. Speediance Australia. Speediance. https://www.speediance.com/products/speediance-weight-lifting-belt

STANCE. (2026). Stance fitness. Stance Fitness. Stancefitness. https://stancefitness.co/

Taporco, J., Adelman, A., Park, R. A., Konhilas, J., Hurwtz, P., & Sakr, M. (2026). Improvement of athletic performance with haptics: results of the POWER-UP Trial. The Journal of sports medicine and physical fitness, 66(3), 355-361.

Tendo Sport. (2023, August 5). TENDO unit | your intelligent weight training | overview. Tendo Sports Machines. TENDO Sports Machines and Technologies. https://www.tendosport.com/products/tendo-unit/overview/

Wavewear. (2026). TracME upper body tracking AI workouts [2 sleeves + app]. Wave Company. WaveWear. https://wavewear.cc/products/tracme-upper-body-tracking-sleeves

Whoop. (2026). WHOOP | unlock human performance & healthspan. WHOOP. Whoop. https://www.whoop.com/au/en/?srsltid=AfmBOorZLotTwfp1EyXG0tBf1XcJHlQqEGR2lqyGExFDfeWKGNF3_kt8

Wilkes, C. (2023, October 26). Expert-tested: REP QuickDraw Adjustable Dumbbells Review (2026) | garage gym reviews. Garage Gym Reviews. Garage Gym Reviews. https://www.garagegymreviews.com/rep-quickdraw-adjustable-dumbbells-review

Wilson, J. (2026, January 15). Resistance band guide: What to know before using. CareFocusDaily. CareFocusDaily. https://carefocusdaily.com/fitlife/resistance-bands-guide-pros-downsides

Xiaomi. (2026). Xiaomi smart band 9 pro - Xiaomi Australia. Xiaomi. Xiaomi. https://www.mi.com/au/product/xiaomi-smart-band-9-pro/