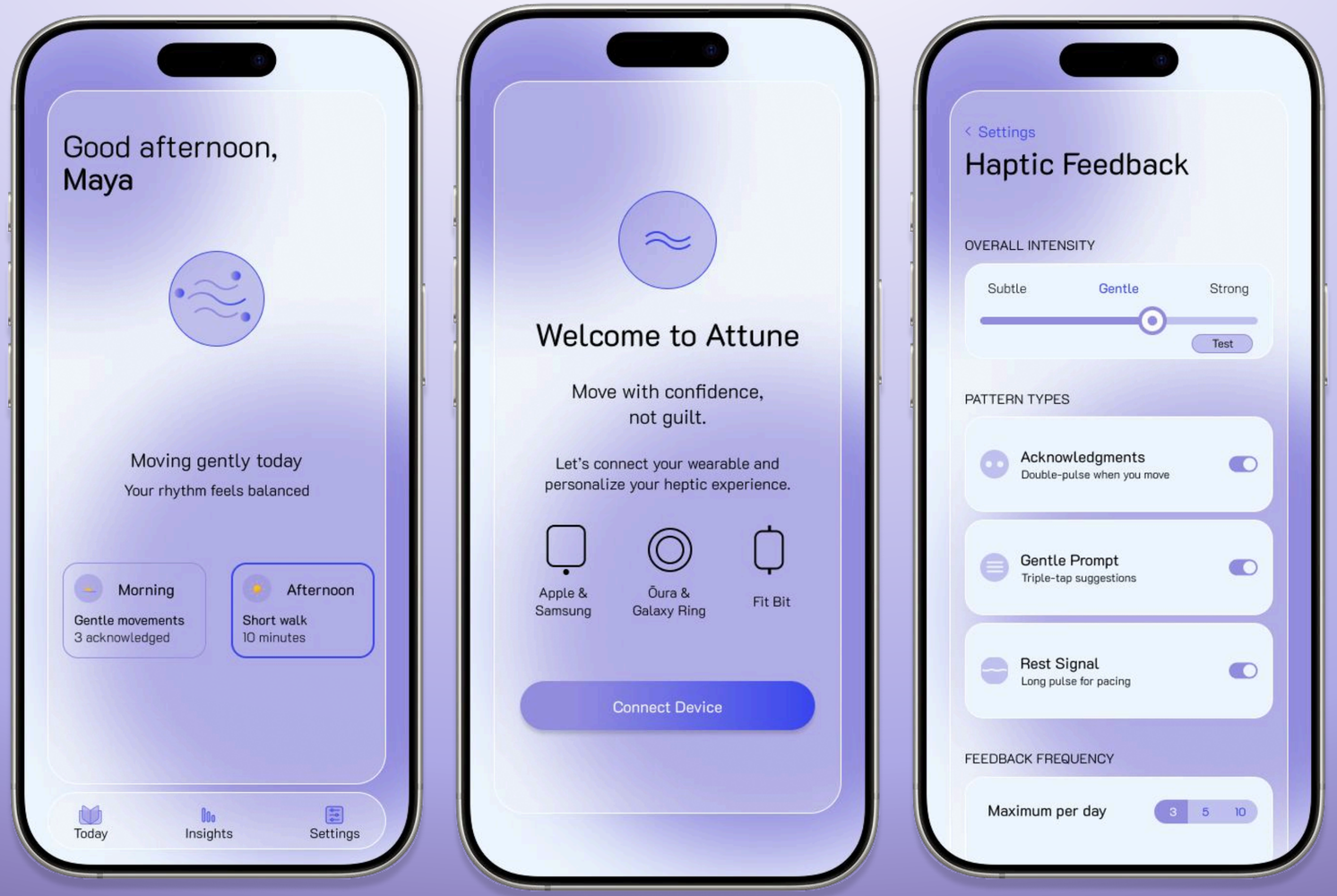
# Welcome to Attune

Move with confidence, not guilt.



PROBLEM

# Traditional fitness tracking assumes able-bodied movement patterns often demoralizing those with chronic conditions.

**20%**

of adults in America live with chronic pain; more than 50 million people

Studies found lower interoceptive accuracy in chronic pain populations compared to controls

Scoping review identified Wearable research focuses on movement data, not real-time embodied guidance

“It creates pressure, fear of not hitting the goal leads to disappointment.”

“I realize too late that I shouldn’t have kept going.”

“I would be more motivated if effort was recognized even when progress isn’t obvious.”

## Why Attune Matters

Current wearables fail chronic pain users by measuring deficit instead of capacity.

Attune transforms existing devices with haptic feedback that celebrates effort on difficult days and guides movement during windows of wellness. Replacing judgmental metrics with compassionate, embodied support that meets people where they are.

Sources: CDC; Mehling et al., Pain / ScienceDirect (2024); PubMed scoping review on wearables & chronic pain (2023)

# INSIGHTS

1

### Pain and capacity fluctuate throughout the day

Chronic pain is not static: stiffness, pain, and mobility change based on time of day, activity, and environment.

“It starts stiff and gets worse as the day goes on.”

“Too cold makes me stiff; too hot makes me swell.”

2

### Users struggle to know when it’s safe to continue or stop

Movement decisions are often made through hindsight, leading to both under use and overexertion.

“I realize later I could have kept going — or shouldn’t have.”

“Extended walking makes me wish I hadn’t pushed it.”

3

### Numeric goals and streaks create pressure, not motivation

Performance metrics increase self-judgment and discourage engagement.

“It creates pressure — fear of not hitting the goal leads to disappointment in myself.”

4

### Effort is rarely recognized, even when it matters most

Users want validation for trying, not just visible progress.

“I wish effort was recognized even when progress isn’t obvious.”

5

### Pain and capacity fluctuate throughout the day

Chronic pain is not static: stiffness, pain, and mobility change based on time of day, activity, and environment.

“It starts stiff and gets worse as the day goes on.”

“Too cold makes me stiff; too hot makes me swell.”

# An Accessibility-First Movement Companion

Haptic guidance in the moment, not metrics to judge yourself by later

CONCEPT

## Input Layer

### Apple Watch
Series 4+
- Taptic Engine
- Full pattern support
- Variable intensity

### Samsung Galaxy
Watch 4+
- Standard vibration
- Simplified patterns
- Good support

### Fitbit
Sense, Versa, Charge
- Basic haptics
- Core patterns
- Limited intensity

### Oura Ring
Gen 3+
- Limited haptics
- Acknowledgment only
- Form factor constraints

### Garmin
Select models
- Basic haptics
- Standard patterns

**Sensor Data**
(HR, HRV, accel, temp)

## Attune Software Platform

### ATTUNE SOFTWARE PLATFORM

**1. SENSOR DATA PROCESSING**
- Accelerometer: Movement detection & classification
- Heart Rate & HRV: Stress and recovery indicators

**2. ML PATTERN RECOGNITION**
- Movement classification (stretch, walk, stand, rest)
- Pain pattern learning (flare-up detection, capacity windows)

**3. ADAPTIVE HAPTIC ENGINE**
- User preference learning (intensity, timing, frequency)
- Context-aware prompting (low-pain window prediction)
- Pattern selection (acknowledgment, prompt, rest, learning)

🔒 On-Device Processing
All data stays local
Privacy-first architecture

☁️ Optional Cloud Sync
Multi-device continuity
Encrypted backup

### KEY INNOVATION
Universal haptic language that works across any wearable hardware
Transforms existing devices from tracking tools into adaptive support systems

**Haptic Commands**
(pattern, intensity, timing)

## Output Layer

### Acknowledgment Pattern
Trigger: Movement completed
Feel: Gentle double-pulse (500ms)
Intensity: 30-40% (subtle, affirming)
Emotional tone: Warm, "I see you"

### Gentle Prompt Pattern
Trigger: Low-pain window detected
Feel: Soft triple-tap (700ms)
Intensity: 35-45% (inviting, not demanding)
Emotional tone: "Might be a good moment"

### Rest Signal Pattern
Trigger: Approaching overexertion
Feel: Long descending pulse (2000ms)
Intensity: 40% → 20% (calming, protective)
Emotional tone: "Time to pace yourself"

### Learning Pattern
Trigger: Ambiguous user response
Feel: Questioning pulse (540ms)
Intensity: Variable (curious, collaborative)
Emotional tone: "What do you think?"

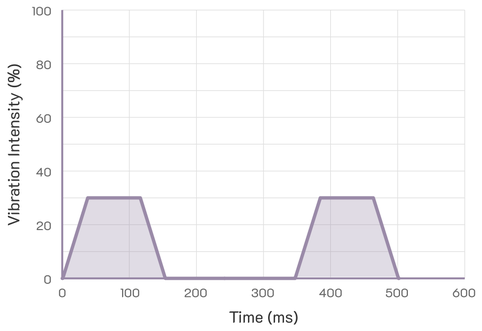
### Cross-Device Adaptation
- Patterns adapt to hardware capabilities (Taptic Engine vs basic motor)
- Intensity scaled per device motor strength
- Timing adjusted for form factor (watch vs ring vs band)

**Data Flow:** Sensor data → ML processing → Haptic commands

**Processing:** On-device ML • Privacy-first • Real-time adaptation

# Pattern library

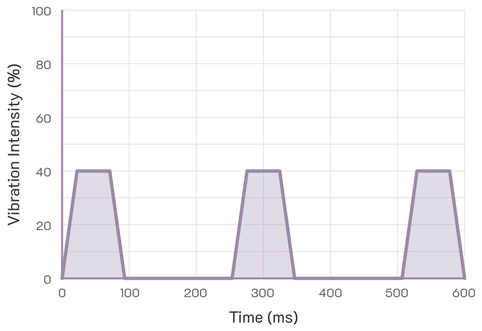
"The Gentle Nod" Acknowledgment Pattern




## Validates completed micro-movements and builds positive association with activity

The acknowledgment pattern activates within 2-3 seconds of completing deliberate body movements and position changes, but does not trigger for routine movements like grabbing a phone or typing.

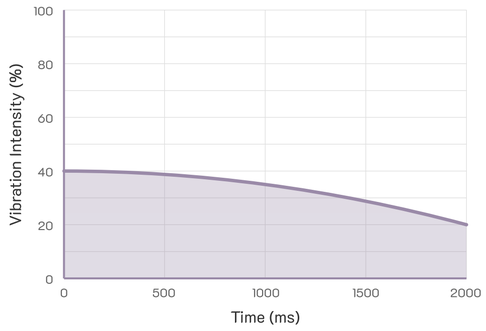
"The Invitation" Gentle Prompt Pattern




## Suggests movement during predicted low-pain windows without pressure

The invitation pattern only suggests movement after 60+ minutes of low activity, with a maximum of 3-4 prompts per day, and never triggers during designated rest mode or high-pain periods; the system learns from user responses and stops suggesting at times when prompts are consistently ignored.

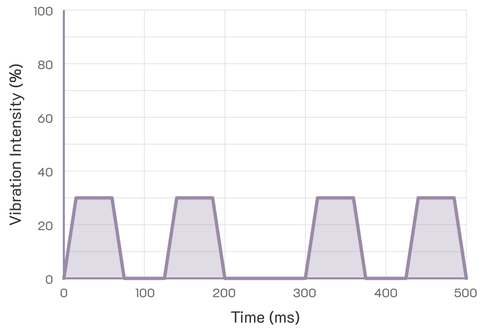
"The Exhale" Rest Signal Pattern




## Encourages pacing and prevents overexertion before pain escalates

The rest signal activates preemptively before pain typically spikes rather than reactively, offering a dismissible off-ramp suggestion that never interrupts deliberate exercise unless intensity seems unsustainable, while quietly tracking whether continued activity leads to next-day flares.

"The Question" Learning Pattern




## Collaborative signal that the system is learning and seeking input

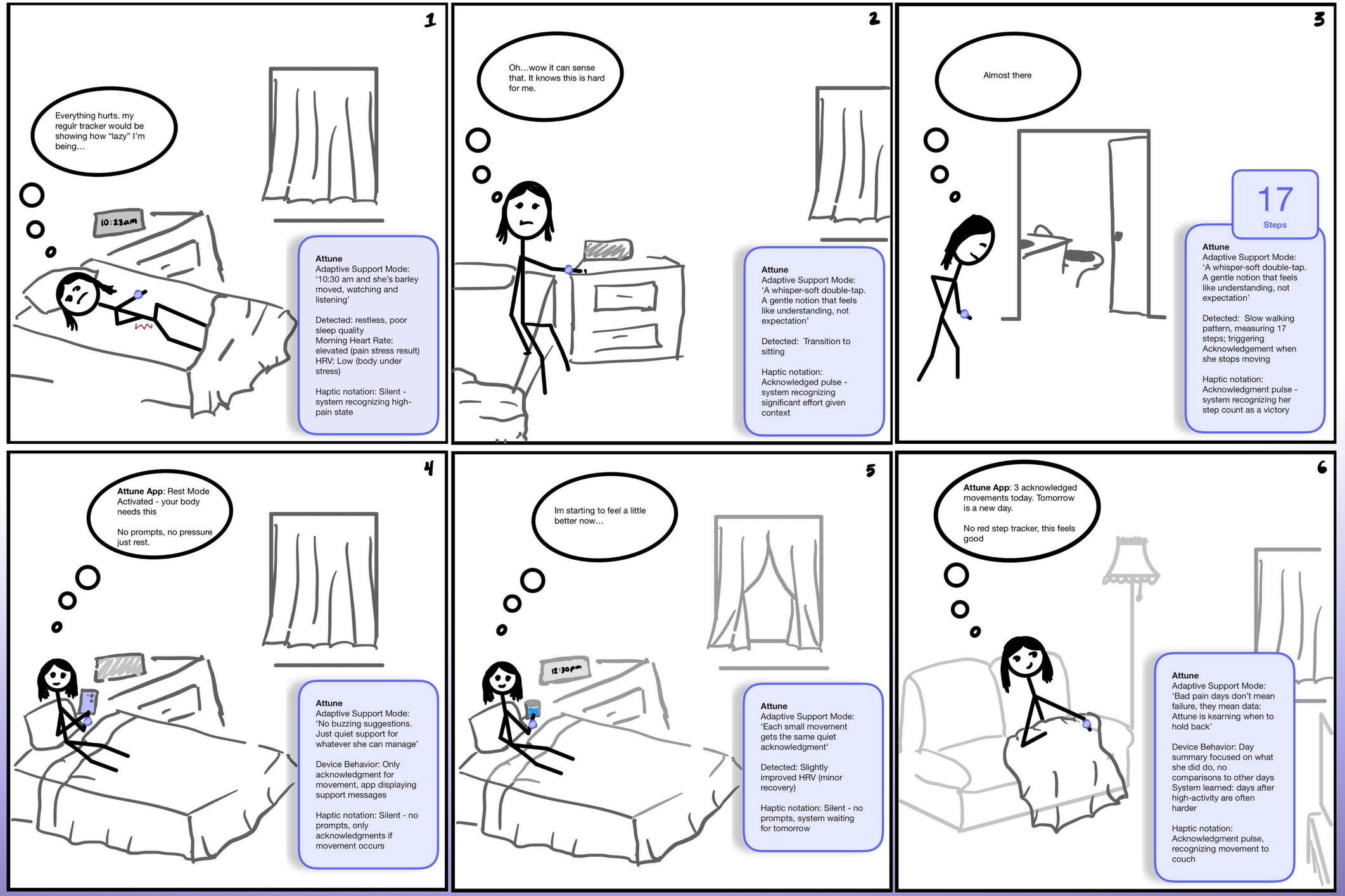
The learning pattern appears immediately after ambiguous or novel situations with an optional quick feedback mechanism (tap once for good, tap twice for not helpful), never triggering more than 2-3 times daily to avoid survey fatigue while creating two-way dialogue without requiring screen interaction.

**The first wearable system that asks 'what does your body need right now?'** instead of 'how much did you fail to do today?

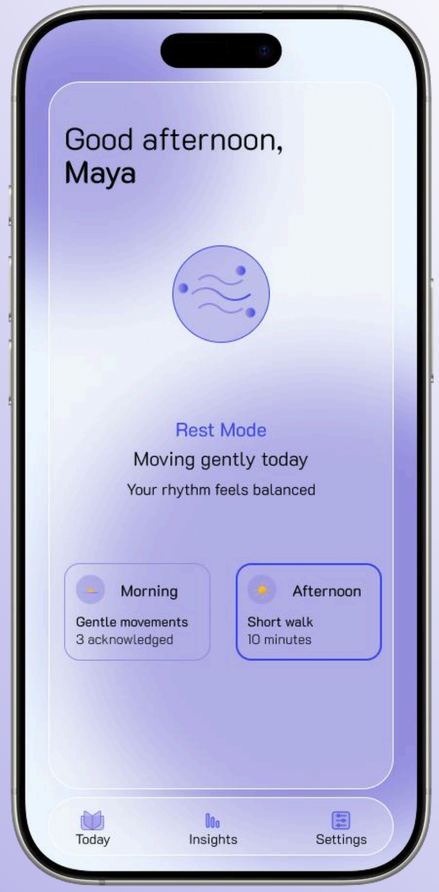
HAPTIC DESIGN

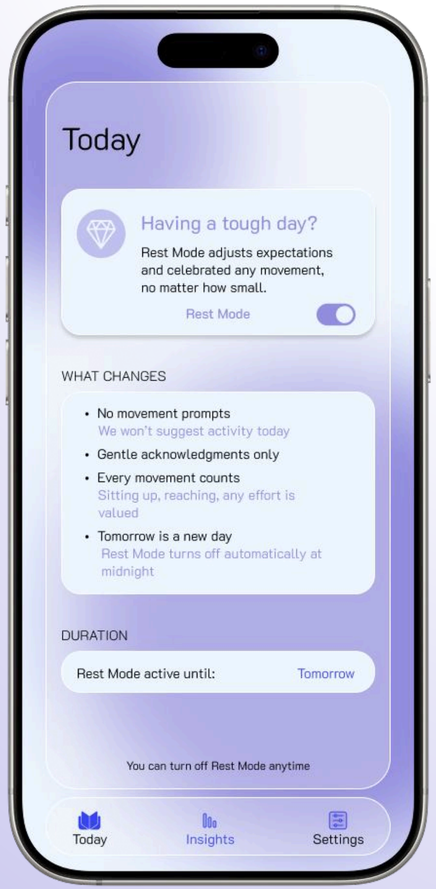
# STORYBOARD

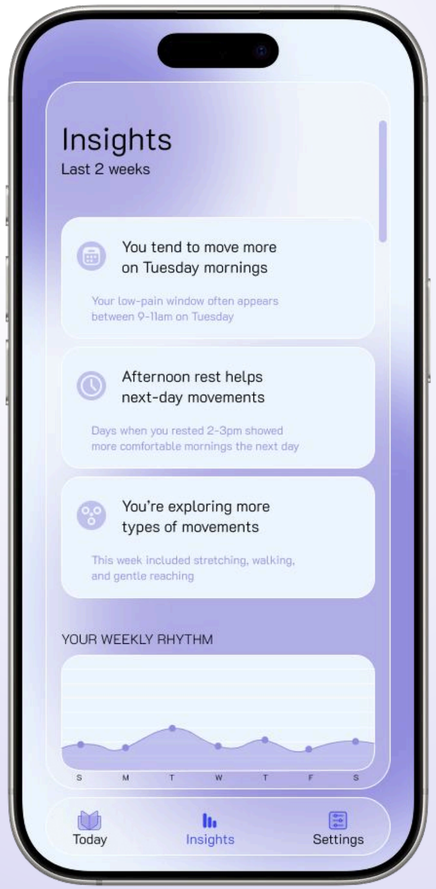
6 WEEKS WITH ATTUNE — FLARE UP DAY ADAPTIVE SUPPORT

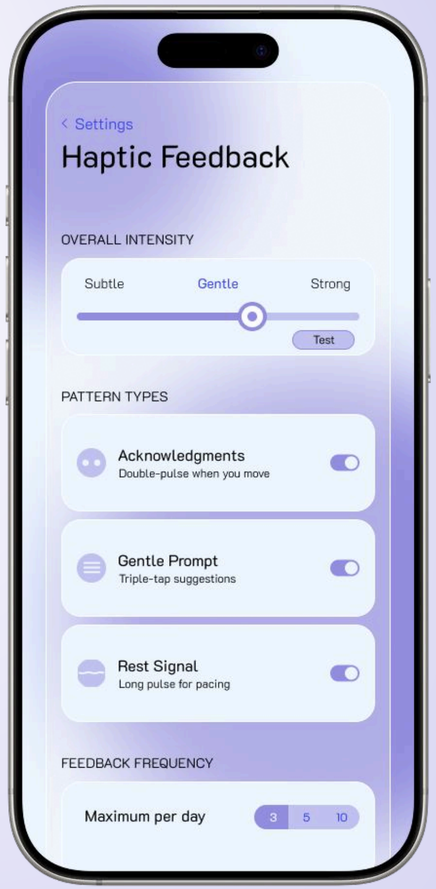



Welcome to Attune
Move with confidence, not guilt.
Let's connect your wearable and personalize your heptic experience.
Apple & Samsung
Ōura & Galaxy Ring
Fit Bit
Connect Device


Good afternoon, Maya
Rest Mode
Moving gently today
Your rhythm feels balanced
Morning
Gentle movements
3 acknowledged
Afternoon
Short walk
10 minutes
Today
Insights
Settings


Today
Having a tough day?
Rest Mode adjusts expectations and celebrated any movement, no matter how small.
Rest Mode
WHAT CHANGES
No movement prompts
We won't suggest activity today
Gentle acknowledgments only
Every movement counts
Sitting up, reaching, any effort is valued
Tomorrow is a new day
Rest Mode turns off automatically at midnight
DURATION
Rest Mode active until:
Tomorrow
You can turn off Rest Mode anytime
Today
Insights
Settings


Insights
Last 2 weeks
You tend to move more on Tuesday mornings
Your low-pain window often appears between 9-11am on Tuesday
Afternoon rest helps next-day movements
Days when you rested 2-3pm showed more comfortable mornings the next day
You're exploring more types of movements
This week included stretching, walking, and gentle reaching
YOUR WEEKLY RHYTHM
S M T W T F S
Today
Insights
Settings


Settings
Haptic Feedback
OVERALL INTENSITY
Subtle
Gentle
Strong
Test
PATTERN TYPES
Acknowledgments
Double-pulse when you move
Gentle Prompt
Triple-tap suggestions
Rest Signal
Long pulse for pacing
FEEDBACK FREQUENCY
Maximum per day
3
5
10


Rest Mode
Your body needs this
3 Acknowledgments


REST MODE
Tough day?
We'll adjust
Turn On
Not now


YOU'RE EXPLORING
More types of movement this week


Haptics
INTENSITY
PATTERNS
Acknowledgments
Gentle Prompt
Rest Signal

# Technical Implementation

## Feasibility

### Proven Technologies:

- Health Kit & Google Fit APIs
- Core Haptics Framework (iOS 13+)
- On-Device ML (Core ML, TensorFlow Lite)
- Bluetooth LE & Watch Connectivity
- Cross-Platform Development

### Development Considerations:

- ⚡ Pattern Recognition
- 🎯 Personalization
- 🔋 Battery
- 📱 Fragmentation
- 🧪 Validation

## Development Roadmap

### Phase 1: MVP

iOS + Apple Watch (Months 1-4)  Core: Basic haptic patterns, movement detection, manual testing, simple onboarding

- Goal: 10-15 beta testers, pattern refinement, ready for pilot

### Phase 2: Pilot

Adaptive Intelligence (Months 5-8)  Full pattern library, adaptive prompting, Rest Mode, pain pattern detection

- Goal: 40-60 participants, 12-week study, publishable findings

### Phase 3: Scale

Multi-Platform (Months 9-12)  Android + Wear OS, Fitbit, Garmin, insights dashboard, app store launch

- Goal: 1,000+ users, 4.5+ stars, revenue positive

## Impact & Next Steps

### Immediate Impact:

- 50M adults with chronic pain gain accessible movement support
- Evidence-based alternative to metric-driven wellness tech
- Replicable design framework for variable-capacity populations

### Questions For Future Research:

- Does haptic feedback reduce kinesiophobia more than visual metrics?
- Can predictive algorithms accurately identify low-pain windows?
- What's the optimal haptic vocabulary across different pain conditions?
- How does device form factor (watch vs ring) affect user trust?

# The End

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1 - 28 - 2026