**INVENTION DISCLOSURE FORM**

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**Note: Please create a separate box in case of more than 4 Inventors**

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| **1. Title**  What do you call the proposed invention? |
| VitaBelt |

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| **2. Brief Description of Proposed invention**  Please describe briefly what you consider to be the proposed invention. |
| 2.1. **Problem**  **A)** State the problem to be solved and how the proposed invention solves it. |
| Problem: Smart Therapy Belt to Relieve Tailbone Pain, Cervical Strain, and Leg Numbness. Solution: The Smart Therapy Belt addresses tailbone pain, cervical strain, and leg numbness using pressure, posture, temperature and heart rate sensors. Controlled by microcontroller, it provides personalized relief through heat, cooling, and vibration therapy, improving posture, reducing pain, and promoting muscle relaxation. |
| **b)** Statehow & when the problem statement came in to your mind. |
| This idea came to my mind while observing my grandmother and some friends who were struggling with tailbone pain, cervical strain, and leg numbness. Seeing how these issues disrupted their daily lives motivated me to find a solution that could provide real-time relief and improve their quality of life. By analyzing their problems and understanding their needs, I realized that a wearable therapy belt integrating smart technology could be an effective and practical solution. |
| 2.2. **Technical Proposed invention** (Provide the technical system to which the proposed invention applies.) |
| The proposed invention is an advanced wearable belt designed for tailbone pain relief and posture correction. The system integrates the following technical components:  **Auto Pain-Sensing System:**   * 1. Utilizes pressure sensors and temperature sensors to detect tension and pain points around the tailbone in real time.   2. Analyzes the severity of the detected pain to activate appropriate relief mechanisms.   **Massage Patterns:**   * 1. Embedded vibration motors offer customizable massage modes (pulses, waves, etc.) to relieve tension and improve blood circulation around the tailbone.   **Posture Analysis:**   * 1. Integrates accelerometers and gyroscopes to monitor and analyze the user's posture dynamically.   2. Provides real-time feedback through gentle alerts to encourage proper sitting and standing postures.   **Back Support Mechanism:**   * 1. Incorporates ergonomic padding and adjustable straps to support the tailbone and lower back effectively.   2. Helps maintain correct spinal alignment during prolonged sitting or physical activities.   **Smart Feedback and Recovery System:**  1. Tracks pressure, posture, muscle tension, and heart rate to provide real-time data.  2. Adjusts heat, vibration, or stimulation based on sensor feedback to target areas in need of relief.  3. Ensures efficient healing by providing immediate, personalized therapy to reduce discomfort and muscle strain. |
| 2.3. **Advantage** (describe what, specifically, makes the proposed invention different from state of the art.)  Avoid general statements that your proposed invention is "better." Please tell us why it is better, or what makes it better ( in terms of features , cost , efficacy etc ). |
| * Tackles **three common issues** (tailbone pain, cervical strain, and leg numbness) with one device, eliminating the need for multiple separate devices. * Provides **precise recovery time**, giving users a clear idea of how long to wear the device for optimal results. * Combines multiple therapeutic functions (heat, vibration, posture correction) into a single, **easy-to-use device**, reducing the hassle of managing different treatments. * Offers a **cost-effective solution** by consolidating the functionality of multiple devices into one, making it more affordable than purchasing separate products for each problem. * Designed to be **lightweight and easy to wear**, providing therapeutic benefits without compromising on comfort or convenience, suitable for everyday use. |

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| **3. Inventive Step** |
| 3.1. Where does the ‘Novelty’ of the proposed invention lie? ( Mention the Innovative features of the proposed invention) |
| The novelty of the proposed invention lies in its ability to **address three common health issues**—tailbone pain, cervical strain, and leg numbness—simultaneously through a single wearable device. Unlike existing products that require separate devices for each condition, this device integrates **multiple sensors** (pressure, posture, EMG, temperature, and heart rate) to continuously monitor the user’s body and provide **adaptive therapy**. The real-time adjustment of **heat, vibration, and muscle stimulation** based on sensor data ensures **personalized care**, making the device more effective and efficient. Additionally, the use of **advanced heat technology** eliminates the need for bulky heating pads, offering **targeted relief** without compromising on comfort or mobility |
| 3.2. What is the contribution of the proposed invention in the technology domain? |
| This device will impact the **wearable health technology domain** by integrating **multiple sensors** to provide **real-time adaptive therapy**. It uses sensor data to adjust heat, vibration, and muscle stimulation, offering **personalized, effective treatment**. This innovation advances how wearable devices can monitor and adjust care autonomously, making pain management more **efficient and accessible**. It enhances **autonomous healthcare**, allowing users to manage recovery at home without relying on frequent doctor visits, and sets the stage for more **intelligent, self-regulating health solutions** in the future. |
| 3.3. Is there any visible output which can showcase improvements over the existing solutions? |
| Yes, The device offers **measurable improvements** over existing solutions by combining multiple therapies into one compact, easy-to-use system. It provides users with **real-time adjustments** to heat, vibration, and muscle stimulation, ensuring more **effective and personalized recovery**. Unlike traditional devices that require separate treatments for each issue, this device simplifies the process and saves users both **time and cost**. Its ability to track and display **precise recovery times** also enhances the treatment experience, offering a **more responsive and efficient solution** compared to current methods that lack this level of interaction. |

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| **4. State of the Art**  *Describe the most similar, already known, solutions (prior art) you are aware of.* |
| 4.1. What do you consider to be the closest item of prior art? (This may have a similar function or may be missing an important function which is provided by the proposed invention.) |
| ****Closest item of prior art:****   * Existing wearable devices, such as posture correction belts, EMS devices, and massagers, cater to **individual problems** but fail to provide a **comprehensive solution** for multiple health concerns simultaneously. * These devices operate with **fixed functionalities**, lacking the ability to adapt therapy dynamically based on user-specific needs or conditions. * Unlike the proposed invention, they do not integrate **smart multi-sensor feedback** or offer **personalized recovery tracking**, limiting their overall effectiveness. * The absence of **real-time adjustments** and combined therapy in these prior solutions makes them less practical and versatile for addressing diverse medical issues efficiently. |
| 4.2. How the similar problem has been addressed in the prior art? Indicate the disadvantages of approaches used. |
| * Existing solutions like **heating pads, EMS devices**, and **posture correction belts** primarily address **single issues**, such as pain relief, muscle recovery, or posture alignment, without providing an integrated solution for multiple health concerns. * These devices lack the ability to make **real-time adjustments** based on user condition. For example, leg numbness or tailbone pain cannot be detected or immediately addressed in current devices. Unlike the proposed invention, which sends **instant alerts** to the user’s phone and **self-adjusts the belt**, these devices are static and require manual intervention for adjustments. * Current market devices also do not offer **customizable therapy** to target specific problems. The proposed device's **button-based interface** enables users to activate therapy for particular issues, such as activating relief for tailbone pain while keeping other therapies off. This level of customization is missing in existing solutions, which generally offer **one-size-fits-all treatment**. * Most devices on the market are **single-function**, addressing only one problem at a time. For example, heating pads focus solely on heat therapy, while EMS devices only target muscle recovery. In contrast, the proposed device is an **all-in-one solution** that addresses multiple health problems like tailbone pain, cervical strain, and leg numbness, offering a more **comprehensive and efficient treatment**. * While current solutions may be effective, they are often **bulky, complex, and inconvenient**. The proposed device is designed to be **user-friendly**, with a **simple, easy-to-wear design**, making it ideal for individuals of all ages, from the elderly to young adults, ensuring **greater comfort and ease of use**. |
| 4.3. Please provide references to any research articles including articles, brochures, textbooks you may have. |
| **Wearable Health Devices—Vital Sign Monitoring, Systems and Technologies**   * Authors: A. Pantelopoulos, N. Bourbakis * DOI: 10.1109/TITB.2010.2045003 * https://www.researchgate.net/publication/309477605\_Wearable\_Health\_Devices-Vital\_Sign\_Monitoring\_Systems\_and\_Technologies   **Electrotherapy for Pain Management**   * Authors: P. Taylor, L. Mannheimer * PubMed Central ID (PMCID): PMC6211234 * https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6211234/   **Advancements in Heat Therapy for Pain Relief**   * Authors: Physiopedia Contributors * Article ID: Heat\_Therapy * https://www.physio-pedia.com/Heat\_Therapy   **Customizable Wearable Devices for Multi-Health Applications**   * Highlights innovations in wearable devices that provide solutions for multiple health issues. * https://link.springer.com/article/10.1007/s12553-020-00441-7 |
| 4.4. Please share any inspirations or ideas, available online, forming a basis or methodology for this proposed invention. |
| 1. Devices like **Thermacare** offer customizable therapy intensity. A similar interface could enable users to target specific issues like tailbone pain or numbness. 2. Drawing from the ease of use in **Fitbit** and **Apple Watch**, the focus can be on comfort and accessibility, ensuring the device is ideal for users of all age groups.   These inspirations provide a foundation for creating a **multi-functional, smart, and user-friendly therapy device** that addresses multiple health concerns effectively. |

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| **5. Benefits** | | |
| 5.1. What benefit, or advantage might this proposed invention give in the overall product? | | |
| * This device is user-friendly design and comfort make it accessible for people of all age groups, enhancing widespread market adoption * Combining multiple therapies into one device reduces the need for separate products, offering cost savings for consumers. * The device addresses common health issues like tailbone pain, cervical strain, and leg numbness, making it appealing to a large and diverse market. * As a reusable, durable wearable, it lowers long-term healthcare costs compared to frequent doctor visits or multiple therapy sessions. * The technology can be easily scaled for mass production, keeping manufacturing costs low and ensuring feasibility for large-scale distribution at an affordable price. | | |
| 5.2. What use do you envisage the proposed invention being put to other than the current implementation? | | |
| Features | Prior Art (Mention already existing Patent / Publication detail ) | Proposed Invention |
| **Multi-Therapy Functionality**: Combines heat therapy, electrical muscle stimulation (EMS), and posture correction in one device.   * **Real-Time Feedback**: Provides adaptive feedback via phone alerts and self-adjusting capabilities to enhance recovery and therapy. * **Customizable Interface**: Allows users to select specific treatments for issues like tailbone pain, cervical strain, or leg numbness with a simple button interface. * **User-Friendly Design**: Easy to wear, ensuring comfort and accessibility for users of all ages. * **Cost-Effective Solution**: Offers a single device to address multiple problems, reducing the need for various products and services. | **TENS Devices**: US Patent 4881753A - Electrical nerve stimulation for pain relief.   * **Posture Correction Devices**: US Patent 20190063499A1 - Wearable device providing real-time posture feedback (e.g., **Upright Go**). * **EMS Devices**: US Patent 9248144B2 - Muscle stimulation for recovery (e.g., **Compex**). * **Heating Pads**: Thermacare and similar devices use heat for localized pain relief, but lack multi-functional capabilities. | Combines heat therapy, EMS, and posture correction into one device, addressing more than one problem at once.   * **Real-Time Adaptability**: Unlike prior devices, it offers **instant feedback** and **self-adjusting capabilities** based on the user's needs, enhancing therapeutic outcomes. * **Customizable Treatment Modes**: Users can select different modes for specific issues (e.g., back pain, muscle tension), a feature not found in most current market solutions. * **Comprehensive and Easy-to-Use**: An all-in-one solution designed to be user-friendly, offering convenience and comfort for all users, from the elderly to young adults. * **Cost Efficiency**: By offering a single, multi-functional device, it reduces the need for multiple separate therapies or products, providing a cost-effective solution. |
| 5.3. What do you see as the market for the proposed invention? | | |
| The market for the proposed invention is broad and diverse, catering to various user groups with common health concerns. Potential markets include:   1. **Elderly Population**: As many elderly individuals suffer from tailbone pain, cervical strain, and leg numbness, the device would offer a convenient solution for pain management and recovery at home, reducing the need for frequent doctor visits or therapy sessions. 2. **Office Workers**: Individuals who spend long hours sitting and experience back pain, poor posture, or muscle stiffness would benefit from the posture correction and muscle stimulation features of the device. 3. **Athletes and Fitness Enthusiasts**: The device could also appeal to athletes, offering muscle recovery, injury prevention, and rehabilitation for sports-related strains and injuries. 4. **Chronic Pain Sufferers**: People with chronic conditions such as arthritis, fibromyalgia, or sciatica who require ongoing pain relief and muscle recovery could find significant value in a customizable, all-in-one therapy solution. 5. **General Health and Wellness Market**: With growing awareness of the importance of posture and prevention of musculoskeletal issues, the device can cater to individuals focused on general health maintenance and injury prevention. 6. **Medical and Rehabilitation Centers**: The device can also be marketed to healthcare providers, clinics, and rehabilitation centers as part of a comprehensive treatment plan for managing musculoskeletal disorders and promoting faster recovery. | | |

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| **6. Detailed Description of Proposed Embodiments**  Please describe one or more ways of implementing the proposed invention here in detail.   * The belt integrates posture, pressure, and temperature sensors to deliver tailored therapy for tailbone pain, cervical strain, and leg numbness. * Features advanced heat technology and EMS therapy to provide muscle relaxation and pain relief with precision. * A three-button interface allows users to select targeted therapy modes for specific issues, enhancing usability and efficiency. * Real-time feedback and recovery tracking are provided via a mobile app, offering actionable insights and posture correction guidance. * Safety features like auto-shutoff and self-adjusting mechanisms ensure adaptability, user comfort, and prevention of overuse. |
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| **7. Limitations**  Please list any possible limitations of the proposed invention that you are aware of |
| * 1. Are there any situations in which the proposed invention is not applicable? |
| Yes, there are certain situations where the proposed invention might not be applicable:   1. **Severe Medical Conditions**: For individuals with severe or complex medical conditions such as advanced spinal cord injuries, fractures, or severe neurological disorders, the device may not provide sufficient therapeutic support and should not replace professional medical treatment. 2. **Pregnant Women**: Pregnant women should avoid using the device, especially the heat therapy and electrical muscle stimulation functions, as these could potentially harm the fetus. 3. **Severe Allergic Reactions**: Users with severe allergies to materials used in the device (e.g., certain fabrics, sensors, or conductive materials) may not be able to use it comfortably. 4. **Open Wounds or Skin Conditions**: The device should not be used on areas with open wounds, skin infections, or severe rashes, as it could irritate or worsen these conditions. 5. **Pacemaker Users**: Individuals with pacemakers or similar implanted devices should avoid using electrical stimulation features, as they may interfere with the pacemaker's function |
| 7.2. Under what circumstances might the proposed invention not work? |
| * **Improper Usage**: If the user does not follow the recommended guidelines for wearing or operating the device, such as not positioning it correctly or using the wrong treatment mode, it may not provide the intended therapeutic benefits. * **Battery or Power Issues**: If the device's battery is depleted or there is a malfunction in the power supply, it may not function properly, leading to a lack of therapy or real-time feedback. * **Improper Fit**: If the belt is not worn properly (e.g., if it is too loose or tight), the sensors may not be in the correct position, and the therapy might not be effective. * **Environmental Factors**: Extreme temperatures, moisture, or external physical damage (e.g., dropping the device) could interfere with the device's functionality or lead to wear and tear. |

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| **8. Drawings**  Please provide the drawings/photos of the prototype. |
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| **9. Additional Information**  If have more information please mention here. |
| 9.1. Is your Prototype ready? (Yes/No) |
| No |
| 9.2. Estimated cost & timeline to complete prototype of the invention. |
| 35000 – 40000 & 12weeks(3months) |