

“Development of Acupuncture Point Integrated Back Pain Relief Jacket “

Author:

- 1.Mr. Niteen Shivaji Mali (HOD Mechanical Dr. D. Y. Patil Polytechnic, Kolhapur.)
2. Mr. Sachin Sadashiv Patil (Lecturer, Mechanical Dr. D. Y. Patil Polytechnic, Kolhapur.)
3. Atharv. S Tike (Student Third Year Mechanical Dr. D. Y. Patil Polytechnic, Kolhapur.)
4. Prem. T Patil (Student Third Year Mechanical Dr. D. Y. Patil Polytechnic, Kolhapur.)
- 5.Abhiraj. S Hakke (Student Third Year Mechanical Dr. D. Y. Patil Polytechnic, Kolhapur.)
6. Madhav. S Kumbhar(Student Third Year Mechanical Dr. D. Y. Patil Polytechnic, Kolhapur.)

Abstract: In his paper the focus is given to Chronic musculoskeletal pain which affects the life of human. The proposed system focuses on the design and development of an innovative wearable solution—an acupuncture point-integrated jacket. This wearable device is engineered to provide continuous, targeted, and non-invasive pain relief by applying controlled stimulation to key pressure points aligned with the body’s musculoskeletal structure.

Key Words- Acupuncture point, Jacket, Nodes, fabrics, Pressure, Posture Corrector Belt

1. Introduction:

Chronic musculoskeletal pain is a significant global health concern, affecting nearly 10% of the world’s population and often leading to reduced quality of life and long-term dependence on pharmacological treatments. Conditions such as back pain, shoulder pain, and muscle-related disorders not only impact physical well-being but also hinder daily activities and productivity. As the prevalence of such conditions continues to rise, there is a growing need for effective, non-invasive, and sustainable pain management solutions. Acupuncture has been widely recognized as an effective non-pharmacological approach for pain relief, working through the stimulation of specific acupoints in the body. By targeting these points, it is possible to alleviate pain and improve overall physiological function (1). Integrating this traditional therapeutic method with modern wearable technology presents an innovative opportunity to enhance accessibility and usability. Smart textiles have emerged as a significant area of innovation, offering applications across various fields, including healthcare, sports, the arts, military, and aerospace. The European Commission's Sixth and Seventh Framework Programs played a key role in advancing research and development by providing substantial funding for smart wearable systems focused on personal health monitoring. These programs also supported projects aimed at integrating sensors, energy sources, data processing, and communication technologies directly into clothing, enabling the development of intelligent wearable garments (2). Wearable technology is increasingly used to monitor older adults and individuals with chronic conditions in home and community settings. This review highlights current clinical applications, including health monitoring, safety, home-based rehabilitation, treatment assessment, and early disease detection. It also briefly discusses the enabling technologies, such as sensors, communication systems, and data analysis, along with the integration of wearable and ambient sensors for continuous monitoring (3).

2. Problem Definition: Back pain, shoulder pain, and muscle tissue disorders significantly reduce quality of life and often lead to long-term dependence on pharmacological treatments. These conventional treatments may provide temporary relief but can result in side effects, increased healthcare costs, and reduced long-term effectiveness. There is a growing need for a cost-effective, non-invasive, and sustainable solution for pain management. Existing methods often lack continuous support and ergonomic adaptability for daily use.

3 Objective of Project:

- To identify and map effective acupuncture points for relieving back, shoulder, and muscular pain.
- To design a jacket that ensures proper alignment of pressure nodes with targeted acupoints.
- To ensure comfort, safety, and ergonomic design for long-duration usage.
- To develop a cost-effective and reusable pain relief solution.
- To create a system that provides continuous and non-invasive pain management without reliance on medication.

4. Material Used in Jacket:

4.1 Cotton Fiber

- Material Type: (natural) cellulose fibre
- Properties: Soft, breathable, lightweight, skin-friendly
- Moisture Absorption: High absorbency (keeps skin dry and comfortable)
- Thermal Comfort: Good ventilation, prevents overheating during long usage
- Hypoallergenic: Suitable for sensitive skin, reduces irritation risk
- Durability: Moderate strength, can withstand regular wear and washing
- Role in Jacket:
 - Inner lining for comfort
 - Provides smooth contact with skin
 - Enhances wearability for long-duration use

4.2 Rubber Nodes

- Material Type: Flexible rubber
- Properties: Soft, flexible, durable, non-toxic
- Elasticity: High flexibility for body contour adaptation
- Pressure Application: Provides controlled and uniform pressure on acupressure points
- Skin Safety: Non-irritant and safe for prolonged skin contact
- Durability: Resistant to wear, heat, and deformation

Design Specification:

- Small rounded nodes positioned at specific acupressure points
- Shape optimized for effective stimulation without discomfort
- Role in Jacket:
 - Core therapeutic component
 - Stimulates acupressure points for pain relief

- Helps reduce back, shoulder, and muscle pain

4.3 Stretchable Posture Corrector Belt

- Material Type: Elastic fabric (nylon + spandex blend)
- Properties: Stretchable, durable, lightweight
- Adjustability: Velcro/strap-based adjustable fitting
- Support Function: Maintains proper spine alignment and posture
- Compression Control: Provides adjustable pressure on back muscles
- Ergonomics: Designed for comfortable long-term wear
- Durability: High tensile strength and flexibility
- Role in Jacket:
 - Holds nodes firmly against acupressure points
 - Ensures consistent pressure application
 - Improves posture while relieving pain

5. Principle and Working Steps: The proposed Acupuncture Point Integrated Back Pain Relief Jacket works on the principle of acupressure therapy combined with ergonomic wearable design. Instead of using needles (as in traditional acupuncture), the system applies controlled mechanical pressure on specific acupressure points using silicone nodes embedded in the jacket.

In this jacket pre-identified acupressure points related to back pain, shoulder pain, and muscle tension are targeted. Rubber nodes act as pressure applicators. A stretchable belt mechanism ensures consistent and adjustable pressure. Thus, the jacket provides a continuous, non-invasive, drug-free pain relief solution.

Step 1: Identification of Acupuncture Points

Step 2: Jacket Design and Alignment

Step 3: Integration of Silicone Pressure Nodes

Step 4: Wearing the Jacket

Step 5: Activation Using Stretching Belt Mechanism

Step 6: Pressure Application on Acupressure Points

Step 7: Pain Signal Reduction

Step 8: Continuous Therapeutic Effect

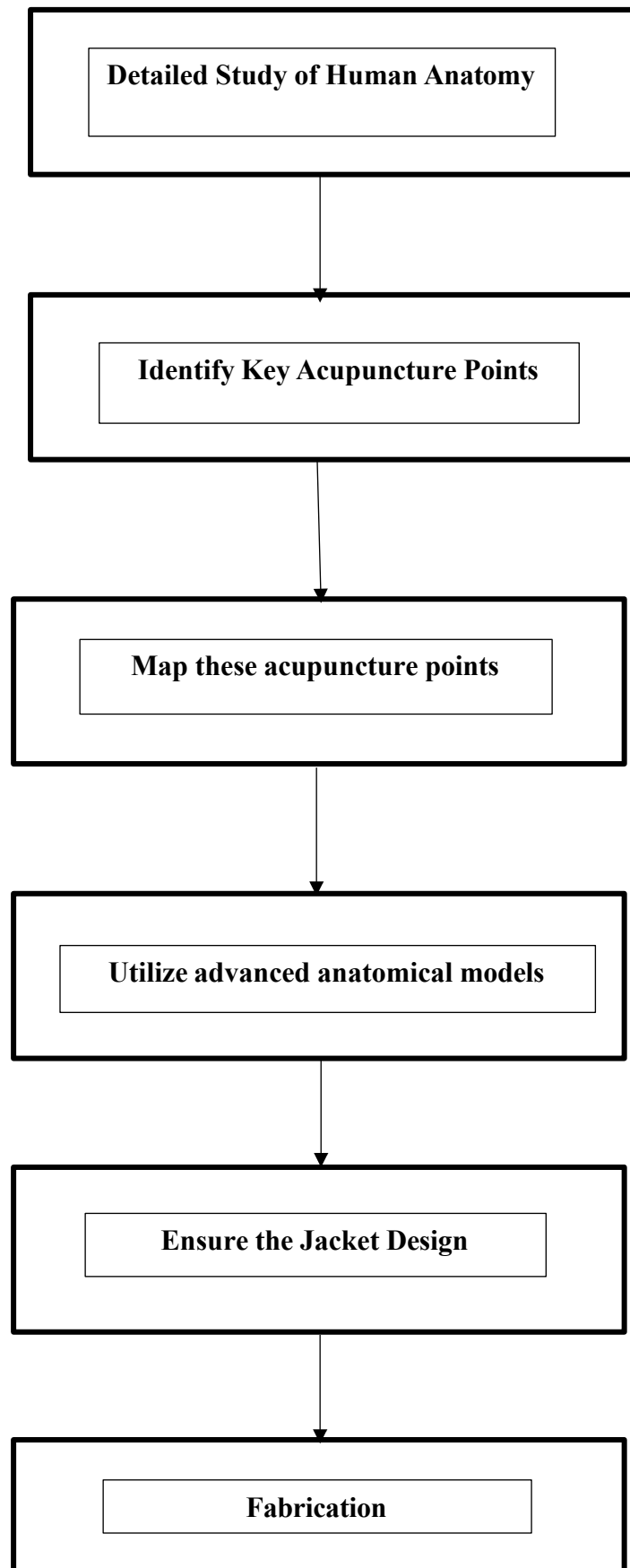


Fig No 1 Block Diagram of Steps involved

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