

# Non-Invasive Therapy System with Temperature Detection of Varicose Veins

[<sup>1</sup>] A. Josephin Arockia Dhivya, [<sup>2</sup>] Soniya A, [<sup>3</sup>] Janani, [<sup>4</sup>] Jaya Rubi, [<sup>5</sup>] Dr. Kishore Kanna

[<sup>1</sup>] [<sup>4</sup>] [<sup>5</sup>] Assistant Professor, Department of Biomedical Engineering,

Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, Tamil Nadu, India.

[<sup>2</sup>] [<sup>3</sup>] Student, Department of Biomedical Engineering, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, Tamil Nadu, India.

Corresponding Author Email: [<sup>1</sup>] a.dhivya.se@velsuniv.ac.in, [<sup>2</sup>] soniya.as014@gmail.com, [<sup>3</sup>] mhjananibairav26@gmail.com, [<sup>4</sup>] jayarubiap@gmail.com, [<sup>5</sup>] kishorekanna007@gmail.com

**Abstract**— During these days many people suffer with varicose veins which results in serious problems like inflammation or swelling of veins, blood clots etc. so for the prevention of varicose veins using non-invasive methods we propose a light weight and wearable device at affordable cost. To make this concept possible we have used Arduino Controller as the brain of our project. We use NTC thermistors for measuring the temperature of the patient in the affected area and also in the normal body. To obtain pressure variations we use microcontroller pressure simulator and for providing vibrations compression stocking with micro motors are used. The method includes continuous monitoring of temperature of the affected area when the temperature of the affected area becomes more than the normal body temperature. If improper blood flow is detected, we apply vibrations automatically to make the blood flow properly.

**Keywords**— Varicose, non – Invasive therapy, Swelling, Temperature Detection.

## I. INTRODUCTION

Varicose veins are known as enlarged veins which are enormous, swollen and turned. It will usually happen instantly under our skin on legs. Specifically, there is no reason for it. Varicose veins usually affects people who stands a lot in their job like teachers, nurses and policemen, this happens when the patient is not held in any activity or if the patient is stout. It can likewise be passed down with ages and also during pregnancy period. It can happen because of the activity of gravitational power on the blood streaming upwards. We include invasive treatments like laser therapy, sclerotherapy, radio frequency ablation and ambulatory phlebectomy. The existing non-invasive treatments are whole body vibration, using compression stockings and doing exercises. When varicose veins go undetected, it gets aggravated and causes a lot of pain to the affected patient we make them ready to surgical methods to cure them.

## II. LITERATURE SURVEY

This journal focuses on producing thermal imaging of the varicose veins with software to detect the area at which varicose veins located and its size. Calibrated using FLIR ONE pro in required range of temperature. [1]

This paper focuses on vascular endothelial cells for the construction of convolutional neural network. It uses Google-Net's inception model at first to process data layer and extracts multi-scale features of the images. MFM activation is used that improves extraction capabilities. [2]

This journal works on prevention of varicose veins at early stage with sensors and raspberry pi, this analyses the output data from the sensors used and compared with raspberry pi. Peltier module activates the relay driver circuit and the temperature gets changes continuously with A7

processor(32-bit). [3]

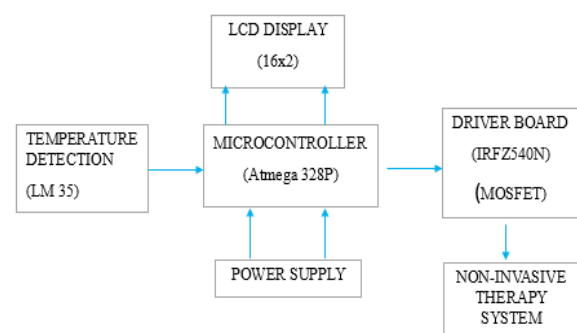
This paper works on Embedded and IOT combinations on non-invasive treatment, cost efficient and no damage to skin is given by peltier crystal and mechanical vibrator and it is very easy to use. [4]

This journal focuses for early detection of varicose veins on continuous monitoring of temperature and pressure in targeted area. Once it exceeds its threshold value, the vibrator module switches ON, preventing accumulation of blood. [5]

## III. METHODOLOGY

In this System, we will be using Arduino Microcontroller as the brain of this project and to visualise the values of the sensor we will be integrating 16 \* 2 Lcd Display to the microcontroller along with that temperature sensor is connected to the analog port of the microcontroller to measure the changes in the temperature and BC547 is connected to activate the vibration motors for the therapy and a power supply is connected, this is how all the components are integrated and Embedded 'C' Programming language is used to implement the above said concept.

## IV. BLOCK DIAGRAM



**ARDUINO UNO BOARD**

It is also called as microcontroller, and an electronic platform used on both hardware and software system. It is considered as brain of controlling system.

**LCD DISPLAY**

With this LCD display we can see the temperature values of the varicose veins patients and note down the readings.

**TEMPERATURE SENSOR**

It is used to measure the temperature changes of the internal and external environment. It can convert the input into electronic output.

**VIBRATION MOTOR**

It is used for receiving the output in the vibrational form. It is generally used for converting electrical energy into vibrations, to provide non-invasive therapy.

**POWER SUPPLY**

It supplies electrical energy to the circuit, hence it is used by every electronic device to perform its function. It is the main part of the circuit device.

**V. WORKING**

In this circuit Arduino microcontroller (Atmega328p) is used. It has both analog and digital port. All digital modules are connected to digital port. LCD display is connected to digital port of microcontroller. It works on 0 and 1 condition. Analog port is connected to temperature sensor. Then we fixed a threshold value to be 33-37.8 degree with software Embedded 'C'. When a patient with varicose veins falls under this value, the vibration motor vibrates in order to provide Non-invasive therapy for the varicose patients. When the value proceeds or exceeds no vibrations takes place. At below 33 degree the patient body becomes cool, and if vibration is given, it provides no relief.

**VI. RESULT AND DISCUSSION**

Here by we recommend that this device provides a optimistic Non-invasive therapy for the varicose patients. For those who has temperature value to be between 33-37.8 degree celcius.

**20-30 AGE GROUP**

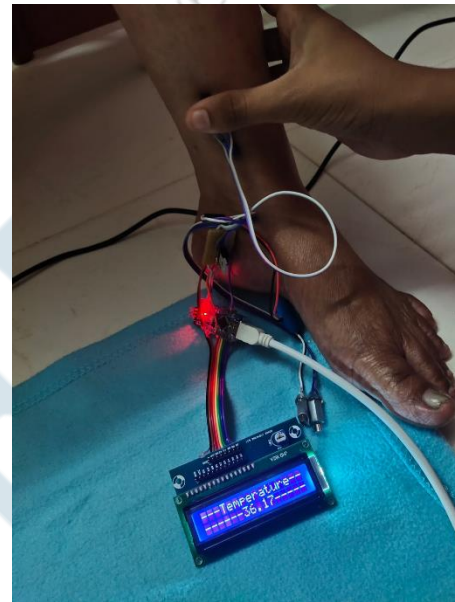
AGE	GENDER	TEMPERATURE
29	MALE	35.68
28	FEMALE	34.21

**30-40 AGE GROUP**

AGE	GENDER	TEMPERATURE
37	FEMALE	37.15
39	FEMALE	36.66

**40-60 AGE GROUP**

AGE	GENDER	TEMPERATURE
48	MALE	39.10
47	FEMALE	41.08
59	MALE	37.63
57	FEMALE	38.12



**VII. CONCLUSION AND FUTURE WORK**

In this project, we propose a proof-of-concept level sensors-based solution which can be embed to the real walking aid and used to measure the information like temperature using temperature sensor (thermistors). There is no proper solution for varicose veins patients. So this device provides a Non-invasive therapy for varicose veins patients into the affected area only. It is done with vibration motor, that gives vibration. This avoids the accumulation of blood and enhances blood flow properly of the affected area. In future, we can design a crutch tool to aid this abnormality.

**VIII. ACKNOWLEDGMENT**

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