Design and Development of Implant Tooth Pressure Measurement for Dental Application

Ms. Vaishali S. Mali[1], Mr. Desai P. B.[2]

[1]Student, E&TC Dept. of AMGOI Engineering, Maharashtra, India
[2]Professor, E&TC Dept. of AMGOI Engineering, Maharashtra, India

---***---

Abstract- *Now a days technology is very advanced even in the medical field. In day to day life there are many patients of the accidental cases in dental field also. As there are two main types of the tooth replacement to get the tooth like original back. Two main different types for the replacement of the tooth as follows: Fixed bridge type and Implantation method. In Fixed bridge type method, we are supporting teeth from front and back side to support the replaced teeth. In Implantation method, Titanium rod is get fixed into the replaced teeth by drilling. Sometimes we have to drill in angular position which we have to implant the tooth. In both of the above cases, i.e. Fixed bridge and implant method, when the patient bites, the pressure will act on opposite arc, this bite pressure is average male bite pressure 150 ponds for molar & 57 ponds for incisors. Female bite pressure 108 ponds for molar & 57 ponds for incisors according to W. H. O. (world health organization). Now our project concept is to measure the bite pressure and how much force is applied that we have to check as per the standards of W. H. O. given. If bite pressure is not sufficient at both the sides of our jaws , or pressure is not symmetrical then there will be pain or an injury may occurs. The instrument with which these records were made comprises a pair of steel arms, which are normally spread apart by spring tension. Each arm is equipped with a rubber pad on which the biting is done. When the patient bites the pad, the levers are forced towards each other and cause an index needle to travel over a graduate arc which shows the force of bite in ponds. one of the difficulties that had to be contended with was that the full power of the muscles cannot be exerted until the jaws are nearly closed. This difficulty is get overcome in our device as the sensors are used to measure the total pressure occurred on the teeth.*

Key Words: ARM, LabVIEW, PC, LCD, Force Sensor

1.INTRODUCTION

Now a days technology is very advanced even in the medical field. In day to day life there are many patients of the accidental cases in dental field also. As there are two main types of the tooth replacement to get the tooth like original back. Two main different types for the replacement of the tooth as follows: Fixed bridge type and Implantation method. In Fixed bridge type method, we are supporting teeth from front and back side to support the replaced teeth. In Implantation method, Titanium rod is get fixed into the replaced t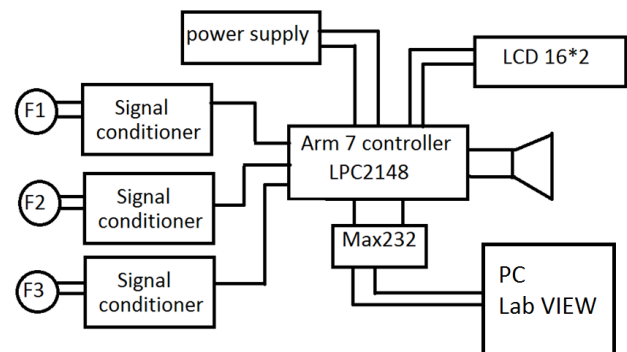eeth by drilling. Sometimes we have to drill in angular position which we have to implant the tooth. In both of the above cases, i.e. Fixed bridge and implant method, when the patient bites, the pressure will act on opposite arc, this bite pressure is average male bite pressure 150 ponds for molar & 57 ponds for incisors. Female bite pressure 108 ponds for molar & 57 ponds for incisors according to W. H. O. (world health organization). Now our project concept is to measure the bite pressure and how much force is applied that we have to check as per the standards of W. H. O. given. If bite pressure is not sufficient at both the sides of our jaws , or pressure is not symmetrical then there will be pain or an injury may occurs. The instrument with which these records were made comprises a pair of steel arms, which are normally spread apart by spring tension. Each arm is equipped with a rubber pad on which the biting is done. When the patient bites the pad, the levers are forced towards each other and cause an index needle to travel over a graduate arc which shows the force of bite in ponds. one of the difficulties that had to be contended with was that the full power of the muscles cannot be exerted until the jaws are nearly closed. This difficulty is get overcome in our device as the sensors are used to measure the total pressure occurred on the teeth.

2. System Design

2.1. Methodology

In this system, force occurred on the teeth and jaws for testing of our replacement of the teeth get easy with the help of the ARM 7 controller as well as LabVIEW on our PC.

Fig 1. Block Diagram of Detection of exact pressure measurement in dental application
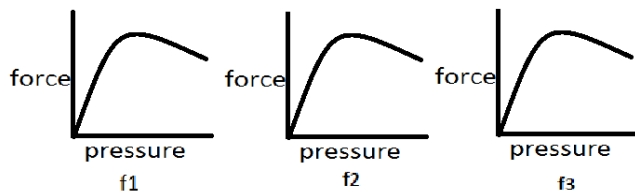
Fig. 2 Graph we get on the PC

2.2. System Components

2.2.1 Arm 7 controller

ARM makes 32-bit and 64-bit RISC multi-core processors. RISC processors are designed to perform a smaller number of types of computer instructions so that they can operate at a higher speed, performing more millions of instructions per second (MIPS). By stripping out unneeded instructions and optimizing pathways, RISC processors provide outstanding performance at a fraction of the power demand of CISC (complex instruction set computing) devices.

2.2.2 LCD

We are going to use 16×2 alphanumeric Liquid Crystal Display (LCD) which means it can display alphabets along with numbers on 2 lines each containing 16 characters.

2.2.3 Force Sensors

Flexi force sensors can measure force between almost any two surfaces and are durable enough to stand up to most environments. Our sensors are available off-the-shelf for prototyping or can be customized to meet the specific needs of your product design and application requirements. The Flexi Force sensor acts as a force sensing resistor in an electrical circuit. When the force sensor is unloaded, its resistance is very high. When a force is applied to the sensor, this resistance decreases. The resistance can be measured by a multimeter, then applying a force to the sensing area.

2.2.4 LabVIEW

The graphical approach also allows nonprogrammers to build programs by dragging and dropping virtual representations of lab equipment with which they are already familiar. The Lab VIEW programming environment, with the included examples and documentation, makes it simple to create small applications. This is a benefit on one side, but there is also a certain danger of underestimating the expertise needed for high-quality G programming.

3. CONCLUSIONS

This development is very useful for to overcome the excess pressure on the related teeth as well as the other teeth. We also can overcome the injury occurred by these problems of the patient without any bite of the replaced teeth.

REFERENCES

[1] Chiranjeevini Kumari B. and Rajasekar K., Implementations of "SMS based Heartbeat monitoring system using PSoC Microcontroller", 2230-7109, International Journal of Electronics and Communication technology, (2011).

[2] Alexandros Pantelopoulos and Nikolaos G. Bourbakis, "A Survey on Wearable Sensor-Based Systems for Health Monitoring and Prognosis ", IEEE Transactions on systems, man, and cybernetics—part c: applications and reviews, vol. 40, no. 1, January 2010.

[3] Charles V. Trappey ,Amy J.C. Trappey ,C.S. Liu "Develop Patient Monitoring and Support System Using Mobile Communication and Intelligent Reasoning", Proceedings of the 2009 IEEE International Conference on Systems, Man, and Cybernetics Sa Antonio, *TX, USA - October 2009*

[4] Chaya Khandelwal S. and Manish Patil M., Implementation of Patient Monitoring System GSM Technology, International Journal of Electronics and Communication technology , 18-24 (2013)