

## A DEVICE MADE TO MEASURE AND CONTROL BITE FORCE OF HUMAN SUBJECTS IN RECORDING EMG ACTIVITY OF MUSCLES OF MASTICATION

L.N. PALLEGAMA<sup>1</sup>, R.W. PALLEGAMA<sup>2</sup>, M.A.M. SITHEEQUE<sup>3</sup>,  
V.S.WEERASINGHE<sup>4</sup>, A.W. RANASINGHE<sup>3</sup>, A.P.N. SOMARATNE<sup>1</sup>

<sup>1</sup> *Department of Civil Engineering, Faculty of Engineering,* <sup>2</sup> *Department of Basic Sciences*

<sup>3</sup> *Department of Oral Medicine and Periodontology, Faculty of Dental Sciences and*

<sup>4</sup> *Department of Physiology, Faculty of Medicine, University of Peradeniya*

Electromyographic activity (EMG) of muscles of mastication is recorded for various research and clinical activities related to masticatory complex. Integrated EMG activity as well as the degree of biting force generated depend on the number of motor units involved in contraction of the muscles. Therefore, in recording EMG activity of muscles of mastication the bite force has to be controlled. Further, subjects must have a visual feedback to control and maintain the bite force during the recording period.

The objective of the present study was to design and prepare a reusable and reliable electronic device that can be used to control and measure the bite force of human subjects in recording EMG activity of muscles of mastication. This prepared transducer consists of a stainless steel bite piece that can withstand the bite force of humans within the elastic limit of the material. A strain gauge (KFG-10-120-C1 L5 M3S) was attached to the outer surface of the stainless steel bite piece to measure the strain that is directly proportional to the bite force. The strain gauge was connected to a bridge circuit and the resultant signal was passed through an amplifier and then fed to an analogue multimeter. The multimeter reading provided the visual feedback required by the subject.

The EMG activity of masseter and anterior temporalis was recorded in ten dentulous young adults while maintaining the bite force with this transducer. The visual feedback given through the multimeter was sufficient for subjects to maintain the bite force during the recording period. The bite piece of the transducer was placed in between upper and lower incisors on each subject and they were asked to maintain four different loads using the visual feedback. The EMG activity was recorded under four different loads in all subjects.

The recorded EMG activity was proportional ( $\gamma = 0.9$ ) to the bite force and it can be concluded that with the aid of this device the bite force of human subjects can be satisfactorily controlled in recording EMG activity of muscles of mastication.