ABSTRACT
There are many forms of alternative medicines for treatment of any type of ailment, applied kinesiology being one of them. It is a scientific technique in which claims to diagnose illness or choose treatment by testing muscles for strength and weakness. A widespread use of applied kinesiology in dentistry has resulted in a complete reevaluation and understanding of patient’s overall health and well-being. Concepts of structural integration, selection of materials for restoration, adjunctive therapies, equipments used for joint vibration analysis, have been described in this article. Review of literature has shown positive response by many dentists for this natural type of medicine. This article presents a review in which applied kinesiology and its uses in dentistry are reviewed and analyzed.

Keywords: Applied kinesiology, Manual muscle testing, TENS.

INTRODUCTION
Modification of the motor system in diagnosing and treating as well as understanding the causes of musculoskeletal dysfunctions is a topic of growing importance in healthcare. It leads to a variety of conservative and non-invasive treatments which involve joint manipulations or mobilizations, myofascial therapies, cranial techniques, meridian and acupuncture skills, clinical nutrition and dietary management, and various reflex techniques.  

Muscle reflex test phenomenon is one of the most common tests used to practice applied kinesiology. This is commonly referred to as manual muscle testing. The basic conceptual model of health in applied kinesiology is an equilateral triangle known as the triad of health (Fig. 1). The three sides denote structure, chemical and mental elements of a human body which could affect muscle strength, thereby affecting human health. The three aspects controlling human health are interrelated, for example, a chemical imbalance could affect the proper function of an organ, which might then weaken a muscle, or create a hypertonic muscle, thereby precipitating a structural or postural imbalance. The mental side of the triad is equally important in applied kinesiology. For example, it is a common occurrence that chronic negative emotional states of mind can deplete the body’s vitality, lower its resistance, making way for illness to strike.

Dr Goodheart identified ‘five factors’ into which therapeutic techniques could be divided which in turn could affect muscle strength. These are the nervous system, the cerebrospinal fluid system, the lymphatic system, the vascular system, and the acupuncture meridian system.

The International College of Applied Kinesiology was established in 1974 where therapeutic treatments are based on the original studies of Kendall and Goodheart. The organization has members from multidisciplinary medicine including medical doctors, osteopaths, dentists, psychologists, and other healthcare providers.

REVIEW RESULTS
Applied kinesiology has its roots in observations made by Goodheart, a chiropractic physician, in Detroit, Michigan. Goodheart’s observations regarding muscle balance, muscle strength and muscle weakness conflicted with the earlier theory that muscle spasm was the primary cause of pain. According to Goodheart, weakness of any muscle causes the contralateral, antagonistic or opposing muscles to contract, thereby causing pain. When a muscle contracts without the normal antagonistic response, it is

Fig. 1: Triad of health
the weak or inhibited muscle that needs to be facilitated, thereby restoring muscle balance and relieving secondary muscle spasm.2

In 1930s, Goodheart supported the theory by Frank Chapman which related discrete, tender, nodules in specific areas of the body to a specific diagnosis. Stimulation of Chapman’s lymphatic reflexes was accompanied by a strengthening response in a specifically identified weak muscle, as determined by manual muscle testing.3,4 Goodheart introduced chinese medicine in applied kinesiology and published an article in which the use of digital pressure was advocated on acupuncture points. Adequate stimulation was observed as measured by manual muscle testing, hence eliminating the need for acupuncture needles, simplifying the applied kinesiology techniques for healing.

In a clinical study Goodheart and Fletcher5 in support of the triad of health theory demonstrated that chemical element from the triad of health played an important role in depicting health of an individual. Fletcher observed that neural pathways from the mouth to the brain impacted muscle activity. Schmitt and Leisman6 in 1998 also showed a high degree of correlation between applied kinesiology procedures used to identify food allergies and serum levels of immunoglobulins for those foods. Blood drawn showed that patients had antibodies to the foods which were found to be allergenic through applied kinesiology assessment.

In support of this adjunctive method for treatment, Cuthbert and Goodheart in 2007 reviewed more than 100 studies related to manual muscle testing and the applied kinesiology chiropractic technique that employs the same. There was evidence for good reliability and validity in the use for patients with neuromusculoskeletal dysfunction. Good validity was demonstrated by observational cohort studies, and randomized controlled trials.7

Chambers et al, in 2009 observed that exercise performance was improved with mouth rinsing by carbohydrate rather than saccharine, supporting the specificity of oral receptors, in this instance distinguishing carbohydrates from sweetness.8 Observing the change in muscle function after a patient ingests a nutritional entity is a frequently used method of nutritional testing in applied kinesiology.

Melzack and Wall suggested a neurologc explanation of the phenomena of ‘therapy localization’.9 According to this explanation through the nerve fibers associated with touch, the body’s answer is registered by a change in muscle strength, as identified by the manual muscle testing response.

**DISCUSSION**

Applied kinesiology offers dentistry strong reasons for the practice of this medical specialty as it is able to show substantial effects on the total health owing to minute changes within the oral cavity. In clinical dentistry, energy testing using muscle testing techniques along with kinesiological testing can be a valuable aid to diagnoses, and a way to discover how dentistry affects other areas of the body or the whole body in general.

Stomatognathic system and the rest of the body exists as integral components of our neuromuscular system and can never function without the influence of agonists and antagonists. The use of applied kinesiology helps to diagnose a disruptive influence present within the stomatognathic system. It can also be used in combination with other clinical skills to correct the source of dysfunction.6

Any malocclusion is always associated with altered cervical neuromuscular function and postural mechanics. This results in a tendency for neck problems, such as cervical subluxation or fixation. A cervical fixation arising as a result of stress or injury may alter the occlusion, and can even lead to undue stresses on masticatory system. Cranial-sacral system, which involves the meningeal membranes as a functional link between the physiologic micromotion of the bones of the cranium and pelvis is affected by this closed kinematic system of the body. The term, Lovett Brother10 is used to describe the compensatory response to displacement or rotation of a component of the skeletal chain.7

Use of applied kinesiology can be done in various fields of dentistry. The advances made previously in orthodontics and orofacial orthopedics can be related to dental somatic integration. The need to integrate the function of the mouth with the rest of the body has led to a third generation of orthodontic appliances that treat the distortions of the mouth. These appliances are called light-wire functionals which are fitted to the dental arches and apply a continuous gentle force to the teeth and the bones of the face and skull.11

Applied kinesiology can be used for detection and treatment of cavitations. Dr GV Black, the father of modern dentistry, described cavitation also called NICO lesions process in 1915.12 Cavitations are formed by progressive disease process in the jawbone, which destroys the bone cells and produces a large cavitation area. They are seen in the third molar extraction region and can produce trigeminal pain, headaches and facial pain.12

Applied kinesiology recommends the use non vasoconstricting anesthetics to prevent cavitations, as vasocons-
trictors result in constriction of blood vessels resulting in reduced oxygen supply in that region. Diagnosis of cavitations using applied kinesiology can be made by a cavitat. Cavitat sonography diagnostic system is a unique computerized diagnostic instrument employing advanced sonar engineering (Fig. 2). By using pulsed ultrasound through the bone, an image is obtained that gives information which can be used to determine the amount of bone present in an area, as well as the relative health of the bone present.

Other adjunctive therapies used post surgically are the use of low level infrared laser therapy or Anodyne and hyperbaric oxygen. The frequency of light of 860 nm emitted by the diodes is used for the relieving pain, healing of the tissues. An Anodyne unit is placed with the pads on the affected area. It helps to increase the circulation to the area being energized.

Ozone can be used in periodontal therapy, to eliminate bacteria in root canal teeth, to eliminate microorganisms before cementing a crown or a dental filling. Ozonated water is effective for sore throats, ulcers, abscesses and periodontal problems. Irrigation of a surgical site with Ozone water speeds healing and helps in remineralization of the bone in extractions, cavitational surgery, and implant surgery. Injection of Ozone gas into the temporomandibular joint helps to reduces the inflammation and stimulates new cartilage growth. Ozon therapy greatly increases the odds of healing cavitations without surgery. For periodontally compromised patients a custom tray that fits snugly over the teeth and gums can be made with Ozone gas passed into the tray for a period of time every few months to help maintain periodontal health and prevent decay.

Applied kinesiology can help to choose a biocompatible restoration. Material incompatibilities are caused by immune mechanisms, primarily type I, that is acute response and type IV, that is delayed response. Kinesiologic testing evaluated the energetic state of the body along the acupuncture meridians and in the auric field of the body and found out decline of energy levels which confirmed that composites and amalgam are not biocompatible. Amalgam incompatibility with the body using applied kinesiology is readily done with different types of bioenergetic response testing, such as contact reflex analysis and electrodermal screening. Several side effects, such as impaired renal function and mercury allergy are often seen with amalgam restorations. Diamond-Lite is a material introduced by International College of Applied Kinesiology which is a biocompatible material invokes no response from the body and is totally inert. Holistic dentistry prefers to conserve the enamel of the tooth and use of an onlay over crown is advised. Gold has traditionally been the material of choice, though with advances in ceramic and bonding technology, the cosmetically superior ceramic onlay to prevent the loss of enamel can be advocated.

The temporomandibular joint is the most utilized joint in the body moving about 1500 to 2000 times daily in activities of talking and chewing. Within the field of applied kinesiology, multiple techniques are currently being utilized to treat patients either presenting with temporomandibular joint syndrome complaints or structural dysfunction inflicted by trauma.

The transcunature electrical nerve stimulation (TENS) and other devices for treatment of temporomandibular disorders are predominately used for nerve related pain acute and chronic conditions by sending electrical impulses across the surface of the skin and the nerve strands. It is generally used for reducing pain associated with temporomandibular joint disorder. The TENS units used in neuromuscular dentistry are different from those used in chiropractic and other applications, where the goal is to block pain signals. Dental TENS units actually work to relieve the root cause of pain and provide a good starting place for long-term treatment. Bio-TENS is a low frequency TENS unit which delivers a mild electrical impulse to the muscles that move the jaw. In addition to relaxing the muscles, it sets up ideal muscle function by increasing blood flow (Fig. 3). A similar device known as the myomonitor is used to help relax the patient’s muscles and stimulates the trigeminal nerve and the facial nerve using a very mild electrical impulse.

A healthy occlusion is essential to support balance within the cranial-sacral system and throughout the neuromuscular and myofascial systems of the body. Any imbalance will be reflected functionally, structurally, and energetically in the body. To establish a healthy occlusion, the Biopak system, a computer-assisted analysis device that is used to record the position of the
mandible is used (Fig. 4). The Computerized Jaw Tracker utilizes a magnet placed in front of lower front teeth and a sensor array to measure and record this ideal position in three dimensions (Figs 5 and 6).

Muscle activity is measured by recording the amount of electrical activity in individual muscles by the Eight Channel Electromyograph. Decreased muscle activity indicates that the mandible is at its true rest position (Fig. 7).

Joint vibration analysis is a quantitative process that measures the absolute intensity and frequency of the vibratory waves emanating from the joints as it is exercised throughout its full range of motion (Fig. 8). The vibratory waves are measured using sensitive microphones worn over the joints. Utilizing vibration transducers called accelerometers, a characteristic wave pattern is created for the various types of internal joint vibrations. This electronic device helps to answer the validity of a dental treatment and its effect on the internal health of the temporomandibular joint.

Certain appliances, such as orthotic device is developed to keep the jaw muscles in their rest position allowing them to remain at their ideal length helping the pain to dissipate and the temporomandibular joint to heal. Appliances, such as pure power mouthguard, developed by neuromuscular dentistry applies the principles of balancing and aligning mandible. It helps in stabilizing the mandible, achieving maximum power, strength and performance from entire body.

**CONCLUSION**

Applied kinesiology in medical discipline should be used as an aid in the detection of biochemical, mental, or structural imbalances in the body. In summary, the validity of numerous studies which have been critical to applied kinesiology appears in many instances to be no greater than several of the randomized controlled trials, cohort studies, case control studies, and case studies for the supports of applied kinesiology.

The observed response is correlated with clinical history and physical exam findings and, as indicated, with laboratory tests and any other appropriate standard diagnostic methods. Applied kinesiology procedures are not intended to be used as a single method of diagnosis and the examination should enhance standard diagnosis, not replace it.
Fig. 7: The eight channel electromyography

Fig. 8: Joint vibration analysis

REFERENCES