DEFINING MUSCLE ENERGY: A MULTIDISCIPLINARY APPROACH

David Son, DO, MPH, Carter Newey, OMS-3, Kendi Hensel, DO, PhD, and Rita M. Patterson, PhD

Department of Osteopathic Manipulative Medicine
Texas College of Osteopathic Medicine
University of North Texas Health Science Center
Medical City Fort Worth

Introduction

Manual manipulation is predominantly practiced among three professions: osteopathic medicine, chiropractic, and physical therapy. One treatment modality involves a patient's muscle contraction in a specific position and direction against a practitioner's counterforce. It is known as Muscle Energy Technique (MET) by osteopathic physicians and Proprioceptive Neuromuscular Facilitation (PNF) by chiropractors and physical therapists. Because of this cross training among the manipulation providers, there is limited understanding of how each profession perceives and applies the treatment in clinical practice. The manipulation providers who have patients seeking treatment from multiple professions may have difficulty coordinating patient care.

Objective

The objective of this project is to compare different approaches and variations to manual manipulation by osteopathic physicians, chiropractors, and physical therapists that utilize the muscle function and physiology. In doing so, practitioners in each field will better understand terminology and variations in treatment, resulting in improved coordination of patient care.

Muscle Physiology

The Golgi tendon organ (GTO) and muscle spindles are the two proprioceptors that work together for muscle relaxation. The goal of this manipulative treatment is to activate proprioceptors to reset the muscles from their pathological state to normal strength, permitting release of impaired or altered function of the musculoskeletal system.

Autogenic Inhibition—Also known as Post-Isometric Relaxation (PIR). The GTO is located in musculotendinous junctions and senses tension. When an agonist muscle contracts for 5-7 seconds, the GTO is activated and inhibits muscle spindle activity, thereby allowing reflexive relaxation and stretching of the agonist muscle. This occurs because the GTO interrupts muscular contraction by sending signals to the spinal cord, which inhibit alpha motor neurons that innervate the agonist muscle.

Reciprocal Inhibition. The muscle spindle, located within muscle belly, senses stretch. Its activation causes contraction of the agonist muscle, thereby preventing rapid stretch. Activation of the muscle spindle sends signals to the spinal cord, which activate alpha motor neurons to contract the agonist muscle. Simultaneously, the spinal cord signals inhibit interneurons to prevent firing of opposing alpha motor neurons that innervate the antagonist muscle. Reflexive relaxation of the antagonist muscle occurs to allow further contraction of the agonist muscle.

Conclusion

Osteopathic Physicians, Chiropractors, and Physical Therapists use modified techniques using the same underlying principles of Autogenic Inhibition. Understanding each profession's modifications for muscle energy not only will facilitate better communication by each of these professions, but can also lead to the development of more advanced techniques that augment the scope of manual medicine.

References