A low-velocity, high-amplitude procedure for demonstrating osteopathic principles and concepts of technique

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A low-velocity, high-amplitude manipulative procedure that is useful in teaching and demonstrating basic characteristics of technique, especially direct methods, is described. Because the operator controls the velocity of motion, the student has less anxiety than with high-velocity methods. The technique allows progressive development of palpatory and segmental motion testing skills. With minor modifications, this procedure will permit the teaching of functional or muscle energy methods.

An increasing number of osteopathic physicians are teachers as well. One finds them in our colleges teaching formal courses and in hospitals, clinics, and private offices teaching osteopathic medicine "nose to nose" as preceptors and adjunct clinical faculty. Some of these physicians have sought a method for teaching manipulative techniques. What they desire is a means of bridging the gap between the student's level of knowledge and skills and what the teacher wants the student to master.

The procedure described is offered as a teaching vehicle for use by the curriculum teacher and the clinical preceptor. This direct-action technique possesses characteristics that foster learning of concepts and of other techniques.

Many of the techniques discussed in the osteopathic literature include direct action; they are used by almost every osteopathic physician. A number of these fall into the category of high-velocity, low-amplitude or thrust techniques^{1,2} and

the remainder are mostly muscle energy procedures.³

Another form of direct technique employs low-velocity, high-amplitude manipulation. This type is often termed "articulatory" in the osteopathic literature.* It is an especially useful method for teaching principles of direct technique and for demonstrating the characteristics of a well-designed procedure. Furthermore, it may be used in the treatment of a single vertebral dysfunction or a regional problem. Most often, a regional problem is easier to resolve with a segment-by-segment approach using this method.

Low-velocity, high-amplitude technique

Direct technique is defined as "engagement of the restrictive barrier carrying the lesioned component toward or through the barrier."⁴ Both thrusting technique (HVLA) and articulatory technique (LVHA) are in this category. Kappler¹ makes a clear distinction between these two methods. HVLA, he says, is a quick thrust (high velocity) carried through a short distance (low amplitude). The final motion of the classic lumbar roll is a good example of HVLA technique. Articulatory technique is one in which the rate of motion is slow (low velocity) and the distance the parts are moved is relatively great (high amplitude). Classic rib raising is a good example of articulating technique. We describe the latter category of treatment.

Our LVHA method is especially applicable to the

*Osteopathic terms will be found in the "Glossary of osteopathic terminology."⁴ The meaning of the terms "amplitude" and "velocity", commonly used by osteopathic physicians, are those presented by Kappler.¹ Wherever the word "barrier" is used, we refer to "pathological barrier," again as defined in the Glossary.

Fig. 1. Operator's body and hand position in relation to the patient.

upper thoracic and low cervical regions. In our model patient, an extended, sidebent left and rotated left second thoracic vertebral segment has been diagnosed. The typical findings supporting this diagnosis would include tenderness to pressure at the intervertebral level T2-3, especially in the region of the transverse processes and costotransverse articular regions. In the same regions, tissue texture changes would consist of edema, muscle contraction or hypotonicity, and/or other local changes in contrast to neighboring tissues. Palpation might also suggest a positional abnormality between T2 and T3 in which the left transverse processes are approximated and posterior when compared to their counterparts on the opposite side. Motion testing would demonstrate the following: T2 moves more easily into backward bending (extension); T2 moves more easily into left (than right) sidebending; and T2 is more readily rotated to the left than to the right. In terms of restriction, these findings indicate barriers to flexion, sidebending right, and rotation right. Using the following procedure, one can respond to these findings easily.

Management of barriers to sidebending and to

other lateral motion is a challenge unique to the upper thoracic region. One of the major advantages of this technique is that it permits the operator to deal fully with both sidebending and "transverse translation" in a controlled manner. In our example, direct technique will be used to treat the barrier to right sidebending, so the operator will wish to move the patient into right sidebending. Therefore, the operator will position the patient on his/her left side. Although one could treat the problem with the patient on the right side, there would be a limitation of motion imposed by the treatment table top, a limitation of control because the patient's head is passively lowered to the table, and a limitation of force, again because the head is lowered to the table. (This is a critical teaching point: The student must learn to look ahead to determine what patient position must be used to permit the maneuvers required for resolution of the problem.)

With the patient comfortably positioned in the left lateral recumbent position, the operator stands at the side of the table in front of the patient. He/she stabilizes the patient's thorax by placing his/her left axilla over the proximal lateral aspect of the patient's right humerus. Through his/her axilla and thorax, the operator exerts force toward the table top. Additionally, a small amount of force is directed toward the patient's feet. That caudad force further stabilizes the thorax of the patient.

The left hand is positioned to palpate the second thoracic vertebral segment and the surrounding soft tissues. This hand will monitor changes in position, motion, and tissue texture during the manipulative procedure. The left hand tells the right hand what to do to establish localization of force in relation to all barriers being treated. Localization of forces is the focal point of this exercise: Without it the rest of the procedure will be for naught.

The right hand of the operator is placed under (against) the left side of the face and head, including most of the temporoparietal region (Fig. 1). This hand thereby supports and controls the patient's head.

The operator can, with the right hand, introduce any of the following motions: flexion or extension; sidebending left or right; rotation left or right; and translation anteriorly, posteriorly, left, or right. Additionally, the right hand can be used to apply traction or compression to the region under treatment.

The operator then is ready to deal with the barriers restricting (preventing) flexion, sidebending right, and rotation right. Using the right hand, he/

she begins to move the patient's head and neck into right sidebending, then right rotation, and then flexion, all the time responding to the tissue and motion changes occurring under the left hand. "Fine tuning" of the motions induced by the right hand, and controlled by the left one, will lead to engagement of the barriers in all three major planes as well as the translatory planes, especially the transverse translatory plane. The motions are slow and deliberate, with the operator responding to palpatory findings and always seeking to gain the most exquisite localization of the forces being applied.

When both the patient and the operator are positioned and all forces are localized in all planes, the appropriate time to apply the activating force has arrived. A decision has been made to use articulating technique. Therefore, the operator applies slow, gentle, repeated force against all barriers. There is control of all motions in regard to direction, amplitude (distance), and velocity (speed) at all times during the maneuver, because there is time to sense and change any element of treatment in response to any change in the patient.

Through trial and error, the student learns the clinical value of careful localization. Success, which comes through the flexibility of this technique, provides positive feedback. The learner can stop, evaluate, and proceed appropriately after consciously "reading the tissues." He/she may evaluate the patient's response by using palpation and motion testing, and adjust position and forces as necessary before proceeding. All time and motion factors are completely in the hands of the operator.

One must remember that the application of passive motion testing is itself articulatory treatment. That is to say, as one tests to locate and evaluate the pathologic barrier to motion, one alters the barrier, even though that was not the primary purpose. This idea is particularly important in applying the technique in a functional style, which will be discussed later. We teach that the step after treatment is reevaluation (reassessment). The most efficient circumstance for evaluation of the patient is right where both he/she and the operator are at the end of the procedure. Of course, the operator would have felt changes occurring during the slow application of force as well. The reevaluation concerns itself with those elements used to make the original diagnosis, preferably by utilizing the same method of examination.

At this point the reader should understand, and even be able to perform, this technique. Successful performance requires attention to palpatory find-

ings and slow, smooth motions.

Other applications of LVHA technique

This LVHA technique has many characteristics that qualify it as an excellent teaching tool for other kinds of technique, for components of techniques, or for concepts such as localization of forces.

LVHA technique like that described here may be presented early in training. The student can be introduced to operator or patient positioning using this approach. Motion testing and the treatment of barriers in one or more planes can be presented through this method. The student can be introduced to localization of forces because he/she has complete control over rate and distance characteristics of motion. This feature has important application in the teaching of other kinds of technique as well.

LVHA technique focuses both diagnosis and treatment on a single vertebral segment—the one diagnosed as dysfunctional. This permits the learner to deal directly with the problem without going through the additional step of translation from what has happened to the upper of the two vertebrae involved to what must be done to its neighbor below. This additional level of abstraction obstructs, or at least hinders, the learning process. It is easier to deal with the palpation-motion response when one does not have to struggle with information clouded by an extra level of abstraction.

We have mentioned the valuable practice in development of palpation/motion sense that this technique affords. The speed of the procedure can be slowed further as needed to permit careful and complete evaluation of induced changes and to respond to them. All of the foregoing serve as invaluable training in localization of forces, which, in turn, lies close to the heart of all successful manipulative treatment.

LVHA can serve as the basic system for learning muscle energy techniques. Once the patient is positioned with forces localized, it is then simply a matter of using the appropriate patient participation and operator responses to perform the complete treatment as required. This is readily adaptable to the usual form of muscle energy technique described in the literature.³ The student readily learns to move from static positioning against a barrier (HVLA) to the repositioning after each cycle of patient force away from the barrier, then to wait for tissue balance before the operator moves the part toward the barrier.

Students universally exhibit apprehension while

learning the use of high-velocity technique. They are generally much more comfortable practicing muscle energy methods of treatment. LVHA methods help to bridge the gap between the two methods, especially for the beginner. He/she learns at the same time the central importance of localization of forces and how that localization reduces the amount of force required to resolve the somatic dysfunction without the superimposed worry about the irrevocable sudden thrust, which must be correct in terms of positioning, direction, and force.

By virtue of the careful palpation required to perform the LVHA technique described, the student qualifies himself/herself to move toward functional technique, which requires a still higher level of palpatory skill. Functional technique may be taught with the patient and operator in the positions used for direct low-velocity, high-amplitude technique, as already described. Bowles⁵ sensing of "dynamic neutral" is very much dependent upon the palpation and motion skills developed by the preceding exercises. The palpating hand is the "listening hand" and the supporting hand is the "motive hand".⁶ In this method, the head and neck are moved into a position that produces the dynamic neutral state, which then permits the body's inherent forces to work most efficiently to re-establish homeostatic function. It is necessary for the operator to pay close attention to palpation during this phase of the treatment, inasmuch as changes occurring initially demand repositioning of the patient to maintain the state of dynamic neutral.

The LVHA technique described is applicable from the midcervical region well down into the midthoracic vertebral levels. It may be modified readily to deal with problems of the low cervical spine. For instance, the positions of patient and operator would be unchanged except for the left hand of the operator. In this case it would be best to place that hand in a position where the specific cervical vertebra could best be evaluated and treated. The remainder of the technique is the same.

An important characteristic of this method permits us to teach students about efficiency in practice. When this technique is used, it is not necessary to have the patient or physician change position from examination to treatment. Examination, treatment, and reevaluation are all performed with both patient and physician in the same position. The concept of efficiency of movement, of melding phases of technique, is critical, perhaps more so today than ever before. For now we must

show young osteopathic physicians less time-consuming treatment methods that compare favorably with alternative treatments offered by machinery and drug manufacturing companies. We must demonstrate not only efficiency but efficacy, both working in a framework of time conservation.

Comment

This LVHA technique is not new to osteopathic medicine; many variations are found in the literature.^{7,8} It is a straightforward, easy to perform procedure that is efficient and effective. The following summarizes important attributes of the technique that make it applicable as a teaching method:

(1) It is a readily understood example of direct technique.

(2) Positioning is comfortable for both patient and operator.

(3) No changes in position are required to move from examination to treatment to reevaluation.

(4) The operator has full control of the velocity of motion, so that there is time for palpation, motion sensing, and force localization. Thus, students have less anxiety with this technique because "everything is under control all the time."

(5) Because motion and tissue texture changes are monitored throughout the procedure, development of palpatory skill is fostered.

(6) Careful localization of forces can be maintained throughout the procedure.

(7) The concept of barrier treatment can be readily demonstrated and understood.

(8) Motion is totally controlled by the operator. This permits continuing solution of disturbance in each plane of motion. The operator can make infinite changes in direction, speed, and force—all in one combined motion.

(9) The procedure can be employed to demonstrate and compare the principles of LVHA, muscle energy, and functional techniques.

(10) LVHA procedure is useful in the treatment of low cervical problems.

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Twelve practice affiliates and the Auxiliary to the American Osteopathic Association will be featured in a special AOA convention recap issue in February. Some of the noteworthy topics include stress management for health professionals, HMOs, physicians' families, treating depression, ergogenic aids in sports, designer drugs, treating chronic pain, and alcoholic polyneuropathy.

Other features will include a look back at the opening session with keynoter Art Linkletter and the joint session, sponsored by The Upjohn Company, on female disorders.

In case you didn't attend this year's convention in Las Vegas, *The DO* will also have plenty of photographs: some of special award winners, exhibits, affiliated group activities, and raffle winners.

JAOA

A correlation of palpatory observations with the anatomical locus of acute myocardial infarction

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