Activator Methods: An Update and Review

(Part One of Two)

By Malik Slosberg, D.C.

In the more than 20 years of its evolution, the Activator Methods chiropractic technique has developed both instrumentation and analysis to produce a clinically safe, non-traumatic, and systematic method of evaluation and treatment of manipulable joint lesions. We will review some of the distinctive characteristics of the technique in order to increase chiropractors' understanding and appreciation for this exceptional method of chiropractic care.

Instrumentation

The Activator adjusting instrument is a hand-held adjusting device designed to generate reproducible and controlled force, displacement, acceleration, and specific line of correction. The Activator attempts to eliminate the enormous variability inherent in manual adjusting. Ranges of force used in manual adjusting have been reported to be from 1.5 lbs. to 125 lbs. by Wood and Adams[2] and from 30 lbs. to 130 lbs. by Duell.[3] Such wide ranges will certainly affect the paraspinal structures in different ways and make evaluation of the effects of adjustment difficult to assess. Clinically, such wide ranges of force also make it difficult to provide consistency of care from doctor to doctor or, perhaps, even by the same doctor at different times of the day, or from day to day.

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Studies by Fuhr and Smith4 and Duell[3] have evaluated the characteristics of the Activator adjusting instrument and the thrust it generates and have reported that it produces a consistent and reliable controlled force (from 3 to 28 lbs., depending on the setting of the adjustment knob)[3], displacement (0.80 mm per revolution of the expansion control knob)[3] and acceleration (1.79 m/sec[2] in 2 msec)[3] within narrow ranges of variability. Furthermore, the duration of the Activator thrust, which is between 0.002 to 0.004 second[3], is approximately 15 to 40 times faster than the meric thrust produced by chiropractors skilled in that technique[3] and 100 to 200 times faster than the manual Thompson type of thrust.[3] The duration of the thrust generated by the Activator instrument has also been calibrated to be 5-10 times shorter than the stretch reflex, which takes 19-24 msec for the quadriceps in man.[3] Fuhr and Smith state that there was a latency of 17.5 msec between impact stimulation by the instrument's thrust and the EMG response when fired into the biceps tendon of a human.[4]

These data indicate that the stretch reflex of the intrinsic muscles of the spine may be unable to oppose the impact of the force produced by the Activator and therefore cannot resist its effect on contacted articulations. The inability for muscles to contract before the Activator thrust is completed reduces the functional tissue resistance, and therefore there is less inertia to overcome in order to initiate movement into a motion segment. In fact, the non-surgical placement of an accelerometer into the spinous process of a dog's thoracic

vertebrae recorded a rotational displacement of that vertebrae of 1.3 mm in response to an Activator thrust on that segment's transverse process.[4] Moreover, the inability of the stretch reflex in muscles to restrict movement at the contacted motion segment may enable the Activator thrust to have a very potent impact on the exquisitely sensitive muscular (muscle spindles and golgi tendon apparatus) and articular sensory receptors, which respond to increases in length of only a fraction of a micron with "tremendous numbers of impulses".[4] Such neurologic consequences may result in beneficial changes in afferent patterns from manipulable joint lesions, a reduction of pain, altered muscle tone, localized sympathetic activity, and increased mobility.[7,8,10]

Because force equals mass times acceleration (F=MA) and the Activator generates "tremendous acceleration"[4], it is able to produce substantial forces of up to 28 lbs. with very little mass.[3] Additionally, the Activator adjusting instrument has a controlled expansion of up to 5.6 mm. This enables it to provide an adjustive thrust in a neutral prone position without taking the motion segment to be adjusted to tension. Technically, this means that the passive motion needed to take a joint to its elastic barrier of resistance by twisting and torquing, as required by most manual techniques, and then thrusting in order to move a joint into its paraphysiologic space[11,12] may be unnecessary.

There is some controversy concerning the Activator adjusting instrument's ability to take a joint into the paraphysiologic space, because the gapping of a joint which occurs in the paraphysiologic space is associated with the production of an "audible" (articular noise), while an Activator thrust does not produce an audible. Although this controversy is not fully resolved, it should be noted that the duration of the audible is 0.04-0.06 second, according to Meal in a 1986 study[12], which is 10 to 40 times longer than the duration of the Activator thrust. So it is possible, although not yet documented, that the Activator thrust may propel the joint in the paraphysiologic space, but too quickly to produce any articular noise. It should also be noted that the gapping that occurs when a joint enters into the paraphysiologic space is in the range of 4.5 mm, according to Sandoz[11] and that the Activator adjusting instrument is capable of producing a thrust of 5.6 mm.

The ability of the Activator instrument to produce a controlled displacement in a neutral prone position, without torquing and stretching of the supportive paraspinal ligaments and joint capsules, reduces the risk of producing segmental instability, a possible consequence of repeated forceful manual thrusts[11,13], which may accelerate degenerative joint disease.[14] The ability to provide an adjustive thrust in a neutral prone position also eliminates much of the discomfort, resistance, fear and anticipation that often accompany manual adjustments. Additionally, it allows the chiropractor to provide adjustments to post-traumatic patients whose range of motion has been severely compromised and who are therefore unable to be taken to tension. Furthermore, because the force and expansion of the Activator adjusting instrument can be carefully controlled, the chiropractor can provide safe, low-force, short-excursion adjustments to osteoporotic or otherwise compromised articulations with a greater margin of safety.

Activator Methods Isolation Tests

Chiropractic employs many varied methods for evaluating manipulable joints' lesions. The Activator Methods adjusting technique has evolved a unique system for localizing and systematically evaluating spinal and extremity articulations. A recent article in this publication reviewed the isolation tests and the data upon which they are based.[15] The method employs prone evaluations of functional leg length inequality in conjunction with specific isolation tests. The tests consist of specific active movements by patients

in order to contract and stretch various muscles or muscle groups which originate from different areas of the spine. Normal muscles respond to such normal, innocuous movements by appropriately contracting briefly to perform the requested movement and then relaxing.[16,17] Such responses do not appear to alter relative leg lengths. However, when a muscle group is facilitated, then its response to stretch or contract may be both excessive and prolonged.[9,10] Such alterations of muscle response apparently affect the functional leg lengths and result in alteration of the relative leg lengths.

While the mechanisms by which altered muscle responses in the back affect leg length are unknown, but the response appears to be clinically reproducible. In a recent study, the inter-examiner reliability of an Activator Methods isolation test for upper cervical subluxation was assessed, and the statistical results indicate good reliability.18 Good reliability is uncommon for many of the chiropractic procedures used in determining areas of manipulable joint lesions when subjected to statistical assessments. Inter- and intra-examiner reliability of palpation has been studied in numerous articles, and many have concluded that the findings are unreliable.1[,20,21,22] Recent articles on inter- and intra-examiner reliability of radiographic evaluation have also been subject to study with mixed findings.[23,24,25]

One of the most interesting characteristics of the isolation tests is the apparent alteration in response after an appropriate adjustment. After such an intervention, repeating the same movement which produced the functional leg length inequality no longer causes an alteration in relative leg length, and the legs appear balanced. Thabe reports in a recent article[10] that in spinal articulations which are dysfunctional and fixated there is a resulting state of electromyographic activity at rest in muscles innervated by the posterior primary divison of the same segmental level. If a manipulative thrust is given, then the electromyographic activity in the muscles of the involved segment returns to normal baseline immediately. Thabe refers to this response to manipulative thrust as an "immediate phenomenon". The isolation tests, based on this phenomenon, are therefore not only useful in determining locations of manipulable joint lesions, but also for evaluating whether an appropriate adjustive thrust has been given. If an effective adjustment has been provided, the local facilitation will be reduced and the muscle response to the same movement which previously caused leg length inequality will no longer be excessive or prolonged, and the legs will remain balanced.

The isolation tests appear to be neurologically mediated. Previous research has demonstrated that the muscular facilitation involved in the abovementioned responses is related to subthreshold, periarticular, sensory input. When an anesthetic is injected into the associated articular structures, the excessive muscle reactivity diminishes or disappears.[11,12,21,26] Therefore, the isolation tests may be dynamic indicators of localized areas of altered sensory input from traumatized, inflamed or dysfunctional articulations and their reflexogenic muscular responses.

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