

Local Adaptation Syndromes Wholistic Solutions Depend on Contextual Thinking

By Leon Chaitow, ND, DO

Many years ago, the great Canadian researcher Hans Selye identified how stress affects the body, both generally and locally. His ideas have passed into general awareness, because whenever we say something such as "I feel stressed," we are describing Selye's representation of the interaction between the events of life (good and bad) and ourselves.

Stress (or rather individual stressors) is not necessarily negative; it's the **response** to stressors that can result in positive or negative outcomes.

Selye described stages in which an initial defensive/protective (fight/flight) alarm phase occurs in response to a stressor,¹ followed, if the stressor(s) continue to operate, to a phase of adaptation (resistance) which, when exhausted, leads to collapse (frank illness, death). The fact that the state of stress - even if due to the same agent - can cause different effects in different individuals has been traced to "conditioning factors" that can selectively enhance or inhibit one or the other stress effect. This conditioning might be endogenous (genetic predisposition, age or sex) or exogenous (treatment with certain hormones, drugs or dietary factors).

In this model, a spectrum of adaptive changes - many of which produce symptoms, some benign and others serious or sinister - are seen to emerge from a background of the interaction of variable (in degree, variety and chronicity) adaptive demands (stressors), superimposed on the individual's unique acquired and inherited biochemical, biomechanical and psychosocial characteristics, qualities and attributes (sometimes called polymorphism).²

The solutions to such problems (and most bodywork problems have backgrounds far more complex than might be obvious) are logical:

1. Reduce, modify or remove the adaptive (stressor) demands.
 2. Encourage better adaptation by enhanced functionality of the tissues that are being stressed.
 3. Treat symptoms in ways that do not add to the adaptive burden, while initiating comprehensive care that includes rehabilitation and preventive strategies.
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Note: In this model of care, it's important to recognize that treatment is itself yet another "stress," making it imperative that we tailor treatment to the patient's ability to respond.

Specifics

All of this might seem somewhat abstract and vague, even if it's interesting. What does it mean in relation to your daily interaction with your patients and their problems? To understand the message, it's necessary to take the general adaptation syndrome concept and reduce it to a local level - say the shoulder. In this way, GAS becomes LAS local adaptation syndrome. A painful, restricted shoulder problem might be seen to be responding (adapting) variously to postural and other imbalances.

Take someone whose posture involves carrying the head forward of its center of gravity, with shoulder protracted, so altering the position of each glenoid fossae in relation to the humerus, creating difficulties for the rotator cuff group of muscles. There also might be thoracic and/or cervical spinal restrictions, as well as overuse factor. Symptoms therefore might have evolved over time, as adaptation to the imposed demands have gradually exhausted the elastic and dynamic self-repair potential of the soft tissues (muscles, ligaments, capsules, etc.) involved.

We know the anterior glenohumeral capsule is structurally stronger than the posterior joint capsule, although functionally it's commonly exposed to greater cumulative trauma - particularly in those who use their arms in an overhead position (pitchers, racket sports players, volleyball players, painters and decorators, window cleaners).³⁻⁵ The tissues of anterior joint capsule will undergo creep, becoming unstable and inflamed and commonly, in due time, restricted in flexion.

This can be described in terms of the local adaptation syndrome as follows:

- An acute (alarm) phase would follow initial stress (perhaps excessive throwing action).
- During this phase, repair activity would be carried out, almost certainly involving some inflammation

and discomfort.

- Compensatory recruitment patterns would be used to minimize stress on the anterior capsule region; other muscles would be called on to work inappropriately, creating new stress patterns.
- A combination of repetitive microtrauma due to continued throwing activity, overlaid on a modified recruitment pattern, possibly overlaid on long-term postural stressors (forward head position, inhibited lower fixators of the scapula, excessive activity of some of the rotator cuff muscles, etc.), and evolution of myofascial trigger points, together with possible nutritional imbalances *may then lead to a situation where the damage rate exceeds the repair rate.*⁶
- Pain and greater restriction of movement become the dominant symptoms, leading to underuse of the arm, psychological distress, and further compensation/adaptation demands on other tissues and structures.
- Thus, wear and tear eventually produces a stage of virtual decompensation - the final phase of the local adaptation syndrome - a possible "frozen shoulder" scenario.⁷
- The potential for further adaptation in that shoulder to the imposed demands would have been exhausted, and other adaptations (involving overuse of the unaffected shoulder and more widespread postural changes) might become increasingly evident.

Action

So, what's to be done when this patient calls on your help? Solutions to such situations do not lie in local treatment of the painful and restricted area (anterior capsular strain), where little more than symptomatic short-term relief would be possible (for example, use of ice and lymphatic drainage). For the manual therapist to attempt to locally mobilise the glenohumeral joint into greater ease in flexion, without understanding the biomechanical rationale for the original local stress to the anterior glenohumeral capsule, would be both futile and probably harmful.

Wholistic thinking suggests there should be attention to the larger picture, including whole-body postural considerations, potential thoracic spinal restrictions and improved use patterns - as well as normalization, if possible, of the shortened and inhibited muscles and other soft tissues - including deactivation of trigger points and mobilization of the shoulder joint. In this broader clinical approach, consideration also would be given to nutritional features as well as to rehabilitation, including aspects of pain behaviour and altered patterns of use resulting from the condition.

Therapeutically, it is important to incorporate appropriately focussed use patterns into a rehabilitation process, building on the re-education and retraining potential of imposed demand.

Crenshaw, et al.,⁸ have described some of the adaptational demands relative to pitching in a professional baseball setting and, in doing so, demonstrate an appreciation of just such a comprehensive approach. An athlete inherently will adapt to the imposed demands of his sport, the physical requirements of the position played within the sport, and his exercise regimens, or else he will become prone to injury or inadequate performance. This philosophy is based on the specific adaptation to imposed demands (SAID) principle.⁹ Specific tissue (be it joint, muscular, tendinous, fascia, osseous, or ligamentous/capsular) will accommodate uniquely in each athlete.¹⁰⁻¹² And the bigger picture is acknowledged: Not only are athletes challenged physically, they must adapt to many other stressors as well. Mental, social, environmental and nutritional stressors, combined with aging, competition requirements, travel and sleep pattern disruption, all add to the athlete's adaptation burden.

In such a setting, treatment of the painful shoulder of the professional baseball player demands more than local attention. Medicine, modalities, manual therapies, psychological ease, nutrition and exercise are factors that can assist the body in obtaining the optimal healing environment. Utilizing the many tools available will give the practitioner the best results. Therapeutic modalities such as hydrotherapy, cryotherapy, moist heat, ultrasound, microcurrent, soft-tissue oscillation units and others can be used in combination with exercise and manual techniques to assist injury recovery. Examples of specific objectives could include lymphatic drainage, vasoconstriction, vasodilation, neural inhibition, etc.

Key Points

The messages I take from this sort of example can be summarized as follows:

1. Local dysfunction is seldom local.
2. Adaptational demands need to be recognized as features of almost all dysfunctional situations.
3. Reduction of adaptation demands, combined with enhanced functionality allows self-regulation to operate most efficiently.
4. Treatment must not add to the adaptive burdens of already exhausted tissues.

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