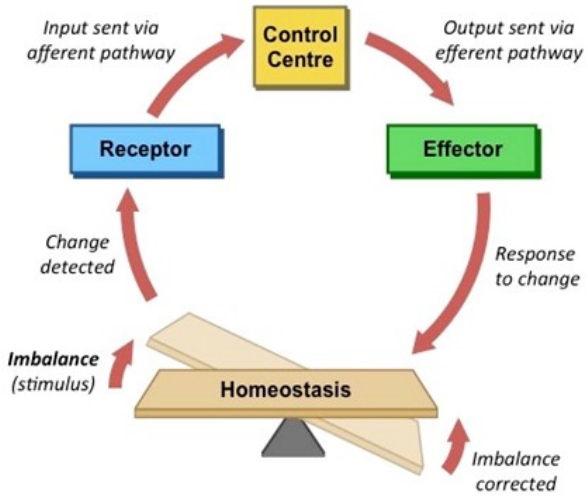
FINGERPRINT
VOLUME 22 FEBRUARY 2019

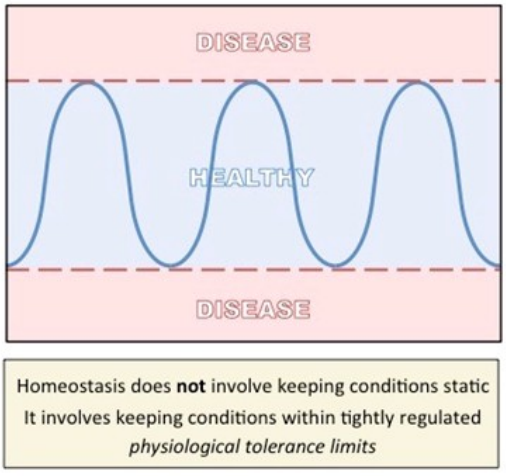
Homeostenosis: An Aging Concept for RMTs

by Debra Curties '84

Expanding Our Understanding of Homeostasis

We're all familiar with **homeostasis**: a set of processes through which body functions naturally return to equilibrium after activity, challenge or stress. Homeostasis maintains internal environment stability (temperature, blood sugar, blood pressure, metabolic rates, etc.) despite external environment fluctuations and the myriad activities occurring in our body tissues. Powered by feedback mechanisms and neuroendocrine controls, it ensures increased usage is followed by quick return to norms. All body systems have their homeostatic mechanisms, and they are integrated cooperatively as well. Maintenance of these physiologic rhythms is part of the body's regular work and consumes its share of available energy/resources.



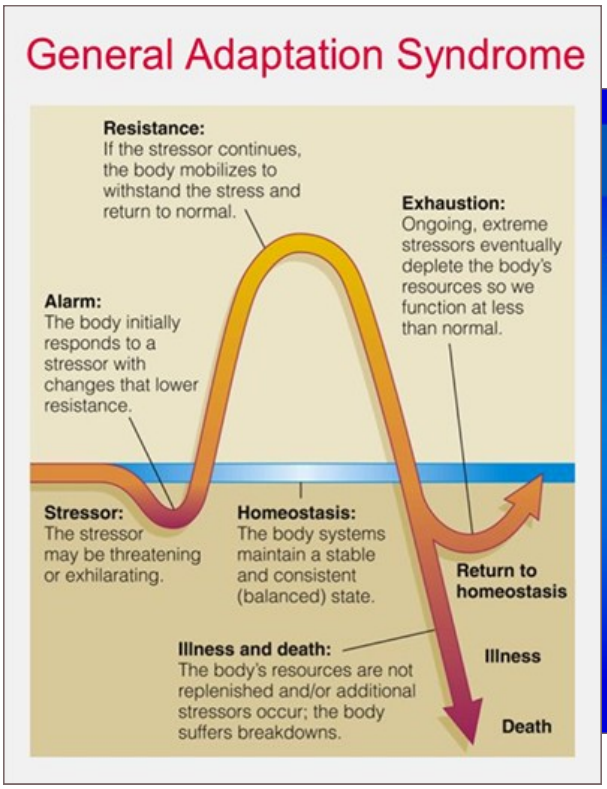


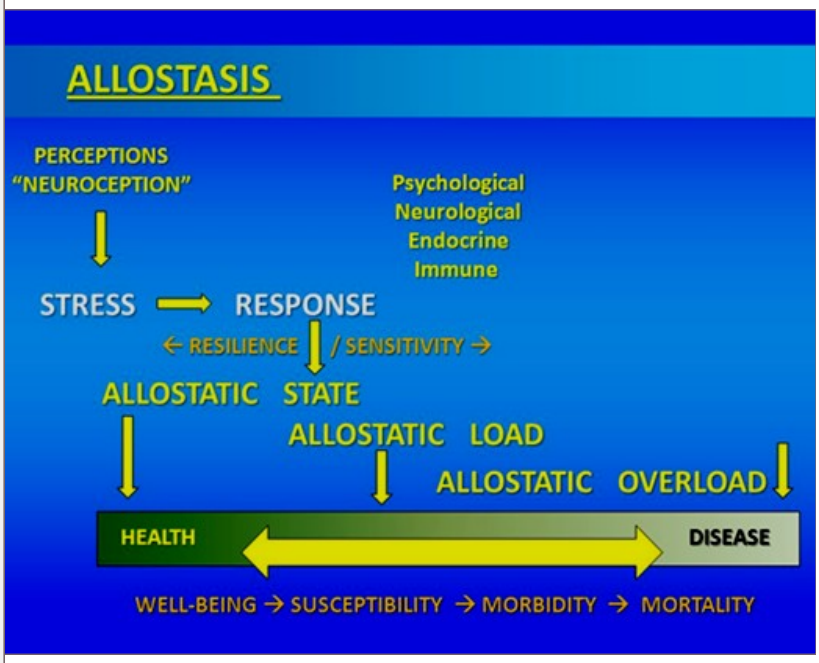
Reserve capacity, or *functional reserve*, is part of homeostasis. Under normal circumstances tissues do not work at full tilt – they have capability "in reserve" for meeting the needs of higher intensity situations. Most tissues' reserves at least double their functional capacity. Included in reserve is excess capacity (brain, heart) and very flexible repair and regeneration capabilities (most systems).

This is where age starts to come into play. The human body has near-perfect cellular repair and renewal strategies until the age of 35. After that, slow, progressive decline in the effectiveness of these mechanisms causes less resilience in all aspects of tissue life and function, leading to a characteristic set of changes that we recognize as the body aging.

Allostasis is a type of adapted homeostasis while under stress. The body subjected to stress uses homeostatic reserves to stay functioning. Once the sympathetic nervous system is activated by some type of "alarm," the body stays in that activated state (fight or flight) until the problem has been addressed or subsides. But this is meant to be short-term.

As we all know, we live in a world where prolonged stress is common. Selye described his "General Adaptation Syndrome" in which the body, after an initial shocked response, goes into successful adaptation to an extended stressor. This means maintaining elements of sympathetic activation to successfully "resist" the incapacitating effects of stress. After a while, though, what is involved in staying in this allostatic state – less restorative sleep, higher blood pressure, poor digestion, inhibited immunity, the wear and tear from increased adrenalin and cortisol, etc. – takes its toll and the person moves toward debilitation. The term *allostatic load* is used to describe a higher than well-tolerated stress level that risks compromising the person's health.

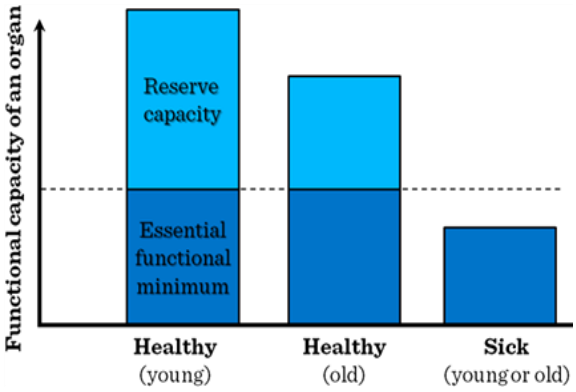




Homeodynamics, also called *homeodynamic space*, extends the concept of homeostasis to the ability to regain stability after perturbation or damage. Sometimes returning to normal is not possible because the tissue has been altered or other conditions in the body are no longer what they were. This means establishing a "new normal" with dynamic adaptation and reconfiguring of how things are working, a process that typically requires multisystem flexibility. Points of crisis challenge the body to resist succumbing to untenable dysfunction by mounting intricate, interrelated response strategies in order to regain control.

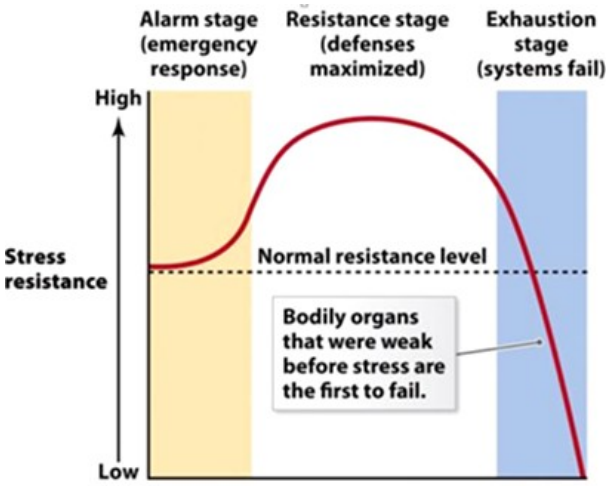
Over the course of our lives, we sustain injuries, surgeries, infections, diseases and other causes of tissue change, so our bodies accumulate a collection of homeodynamic modifications.

What is Homeostenosis?

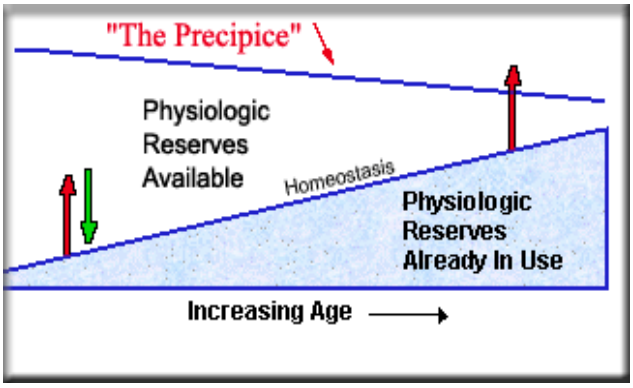


Homeostenosis is a relatively new term that expresses a fundamental concept in biogerontology. It describes the contraction of homeostatic resilience that comes with lifespan events and normal aging, and includes the following:

- *diminished physiologic reserves available to meet routine challenges to homeostasis*
- *progressive constriction of homeostatic and hemodynamic reserves in tissues/organ systems*
- *shortened allostatic stress resistance and reduced allostatic load tolerance*
- *increased tendency for stressors, including emotional and psychosocial ones, to induce dysfunction, illness or breakdown*
- *reduced ability to compensate for illness or increased physiologic demands (sicker quicker, slower to recover)*
- *increased susceptibility to multiple system dysfunctions associated with reduced reparative and regenerative potential in tissues and organs*
- *increased vulnerability to disease and crisis that occurs with advancing age*

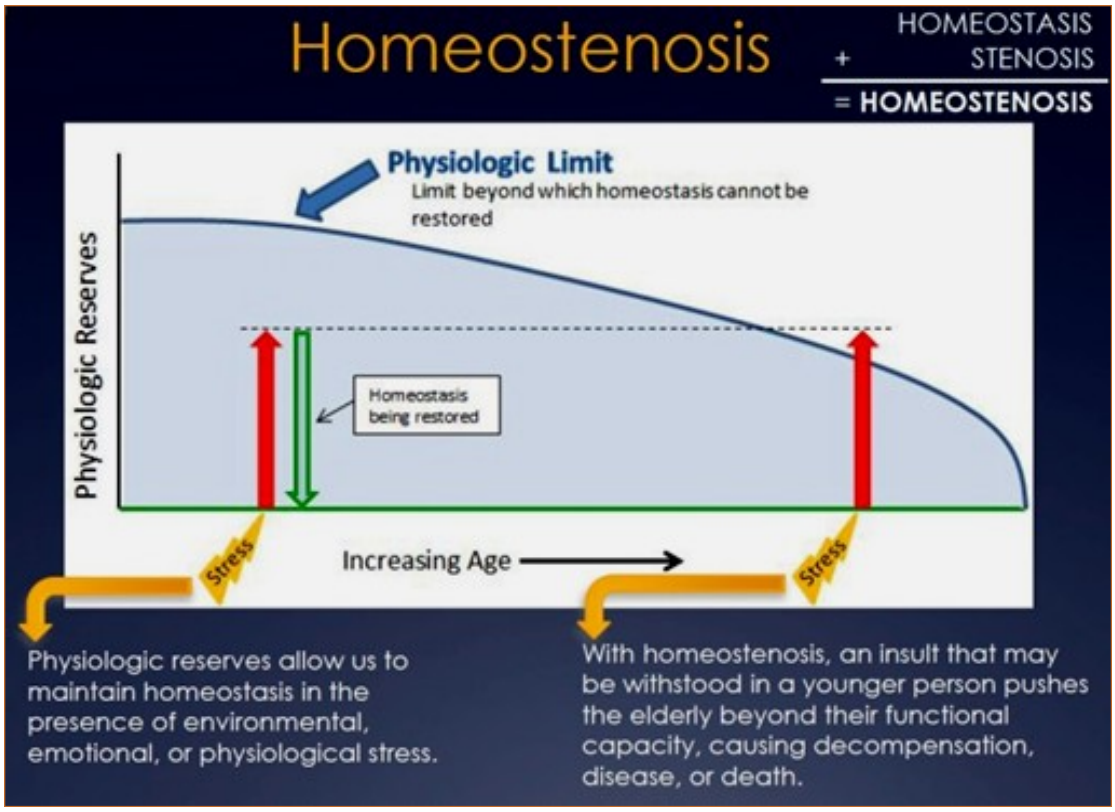


It is important to understand that homeostenosis is not illness. It does not produce characteristic symptoms and cannot be measured with a disease model. It is a shrinkage of reserves, in real terms, but also because the body is using more of its reserve capacities to function in everyday life.



Homeostenosis can be thought of as the part of the iceberg that is under the water. While diseases are more prevalent in the older body, it is also true that, because of homeostenosis, one can easily have an oversimplified view of what is causing an elderly person's symptoms.

Multisystem tissue and organ vulnerabilities, pre-disease conditions, latent pathology – these can all be clinically silent and then suddenly manifest as symptoms if the person's homeostatic reserve has been exceeded. This can happen because of a new injury, an infection, an emotional setback, a new medication, loss of a loved one, and so on. Similarly, if homeostatic resilience is optimized, people can maintain good health and spirits well into their elder years despite a range of potential issues in their bodies.



For this reason, the biogerontology mindset cautions against the traditional medical model of several different doctors diagnosing and treating disease after disease in elderly patients. While some specific disorders must be addressed because of their adverse impacts, it is becoming clearer that overuse of medications, surgery, and painful/taxing diagnostics and treatments is a real concern. This type of medical intervention can become an iatrogenic factor that overloads the person's homeostatic capacities and tips them into physical, emotional or cognitive distress.

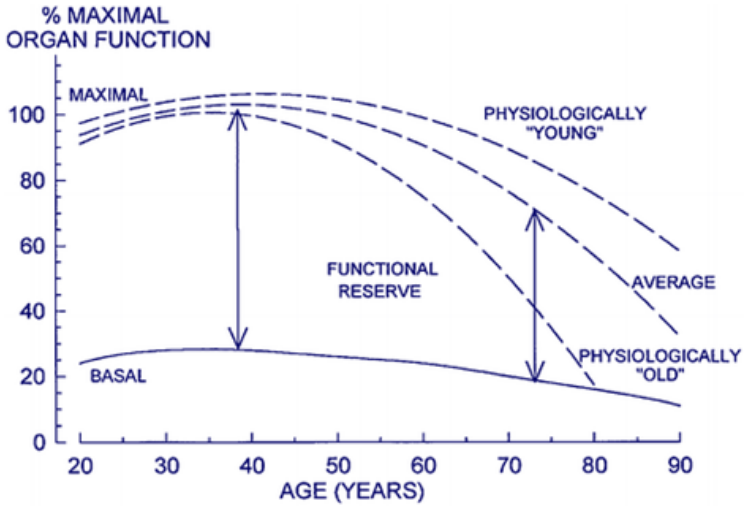
Ideally, as patients get older, promoting their maximal health involves medical intervention when necessary within a larger context of promoting healthy lifestyle and supporting functionality and engagement with life.

Can Massage Therapy Help?

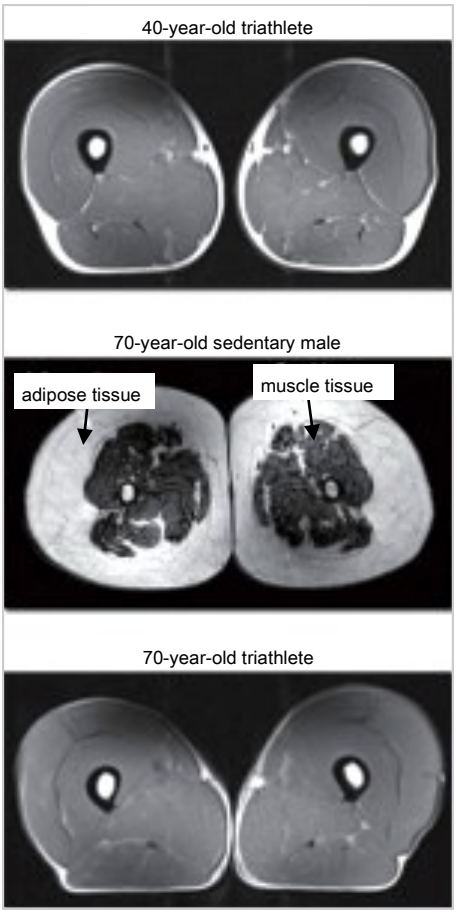
While there is no changing the fact that tissues develop more imperfections and shortcomings with age, it is also true that resilience can be optimized for each person. Let's entertain the concept of improving or maintaining an older person's homeostatic buoyancy as a goal of treatment. To start with, what are the common compromisers of this resilience?

- *chronic stress, high allostatic load*
- *poor sleep*
- *poor diet, malnutrition, dehydration*
- *chronic pain, overall volume of discomforts*
- *chronic/recurring inflammation, infection*
- *loss of muscle mass (sarcopenia), strength and stability*

- *lack of mobility and exercise*
- *polypharmacy*
- *loss of optimism/hope, depression*
- *loneliness, social isolation, lack of engaging activity*
- *smoking*
- *exposure to injuries, surgical or other procedures on the edge of their tolerance*



It's easy to immediately recognize that massage therapists – offering individually tailored direct treatment, self-care advice, the benefits of the therapeutic relationship, and well-considered referrals – can favourably impact a number of the items on this list.



There are also some interesting ideas for us to consider beyond our often over-conservative approach to working with older people. One is to de-couple the concepts of age and fitness. There is a lot of accumulated evidence that the benefits of regular exercise and good conditioning include enhanced homeostatic resilience well beyond age expectations – fit older people have a much lower "biological age" than their sedentary counterparts. If approached slowly and progressively, seniors can do much more rigorous training than we tend to think possible. (Consider Ruth Bader Ginsburg and her workout regimen: https://www.cnn.com/videos/us/2018/08/22/ruth-bader-ginsburg-exercise-routine.cnn)

Another is our potential role in "prehabilitation." It is especially true for the older population that engaging in a planned program to improve one's readiness to handle an upcoming stressor, for example a long trip or a surgery, is associated with better outcomes.

Understanding homeostenosis helps massage therapists recognize that what we do in encouraging whole-person wellness and improving ADLs/quality of life measures is very much what seniors need.