

BIOTENSEGRITY, A DIDACTIC TOOL FOR OSTEOPATHY

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The following propositions for the teaching of osteopathic mechanics inspired by biotensegrity are based on scientific, medical and philosophical principles in order to provide students with strong guidelines for their knowledge.

As early as 1874, Andrew Taylor Still emphasized that osteopath's hands are effectively making contact with the fascia and directly correlating touch with the internal homeostatic processes of the body : *'Find it, fix it and leave it alone'*. In just those eight words, he provided a work plan for osteopaths to follow and invited them to detect the most subtle tissue restrictions and loss of joint mobility in order to rebalance the fascial tissues and restore normal function.

In 1975, Donald Ingber, a cell biologist at Havard University used the mechanical principles of tensegrity architecture to explain how the distribution of tension-compression forces within the cytoskeleton is correlated with the metabolic effects of mechano-transduction and homeostatic process.

In 1975, Stephen Levin, an orthopedic surgeon in Washington DC, conceived the biotensegrity concept which relates the tensegrity model elastic behaviour to every structure of biological life, including the human body's fascial system, its structural hierarchy and mechanics. So that has emerged from his concept a new dynamical approach founded on non-linear laws of physics and geometry, where the mutually opposing forces of tension and compression, balance the body in a constant self-stress and this, since the embryonic period. Because of its self-stress, the tensegrity truss system reacts almost immediately to any perturbation applied on it and redistributes forces throughout the whole system from the macroscopic down to the cellular level.

The dynamism of tensegrity architecture is closely related to the body's physical reactivity; this allows us to better understand the body's internal mechanical regulation and how it :

- maintains its shape and stability,
- constantly deals with any imposed constraints,

- responds with a rebalancing process to the manual practitioners' hands.

Whatever technique or mechanical methods we use in our osteopathic practices, we are inevitably deforming the structure to some degree.

The deformation is then a source of information that spreads throughout the body and influences cells function, organisation and dynamism, and triggers specific metabolic processes. The body is conceivable as a whole, with subsystems that interact with even smaller ones, and use their tensegrity architecture to stabilize the structure by permanently rebalancing, this, with more or less harmony and adaptability. So that, pathological processes can be then considered as organizational disorders inside which altered patterns of tenso-compressional forces distribution are accompanied by inappropriate changes in the flow of information and in the homeostatic responses.

From an educational perspective, an understanding of the biotensegrity concept is essential, but perceptive tools are also needed. What this workshop will provide is :

- theoretical information and tensegrity models to understand the principles of biotensegrity and how it relates to body manual practices,
- awareness tools to perceive tension and compression, the two internal synergic forces of the body, their particular distribution inside the bone-myo-fascial system, the resulting self-stress dynamism and how internal and external forces influence the postural adaptation of the whole body.

Developing the practitioners' awareness to the specific tensegral distribution of forces will optimize their ability to feel :

- **which** elements support the reactivity of the whole body,
- **how** osteopathy acts mechanically inside the body and **what** happens during the transfer of mechanical information, thus enabling organs to recover their own place, tissues recover their elastic adaptability and cells to realize their optimum homeostatic potential.

As a consequence, practitioners will become increasingly clear about what they are doing during their own practices and how to provide information and dynamic transformation inside their patient's body, in the most adapted therapeutic way.