Mechanical Relationships in the Neurofascia: A Visual Schematic Model

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BACKGROUND: Anatomical studies show a potentially significant transmission of force between nerves and fascia -- especially in pathological tissues -- and yet both are generally studied as separate mechanical systems. A clear, three-dimensional model may create a gateway for the translation of disparate research findings into hands-on clinical practice. We explored 2 questions: 1) What are the general spatial relationships between nerves and deep fascial planes, and how are tension, excursion, and fluid pressure likely to be conferred from one system to the other? 2) Can these mechanical relationships be schematized for better assessment, engagement, and treatment in manual therapy?

METHODS: Three major regions were selected for investigation: Lumbar Plexus, Brachial Plexus, and Tibial Nerve. Fascial continuities in each region were identified from primary fascia research [1] and from clinically-oriented secondary texts [2,3]. These planes and local nerve tracts were labeled in digital cross-sections from the Visible Human Project, and digital elements were reconstructed as 3D computer models. These models were then examined for patterns in spatial relationship between neural axes and fascial planes.

RESULTS: We found that the neurofascial interface could be visualized and described using consistent spatial terms:

1. Planar (Neural axis & mesoneurium branching out within a bi-laminar fascial plane.)
2. Perforated (Neural axis passing through a tunnel and spreading into the new plane.)
3. Branching Planar (Neural Axis exists at multiple intersecting fascial planes, and branches into each of them.)

CONCLUSIONS: Visual schematics of nerve-fascia relationship can empower clinical assessment and palpatory engagement of these complex tissues. Such maps may also provide a useful linkage between existing clinical domains, such as neurodynamics, fascial tensegrity, and meridian systems.

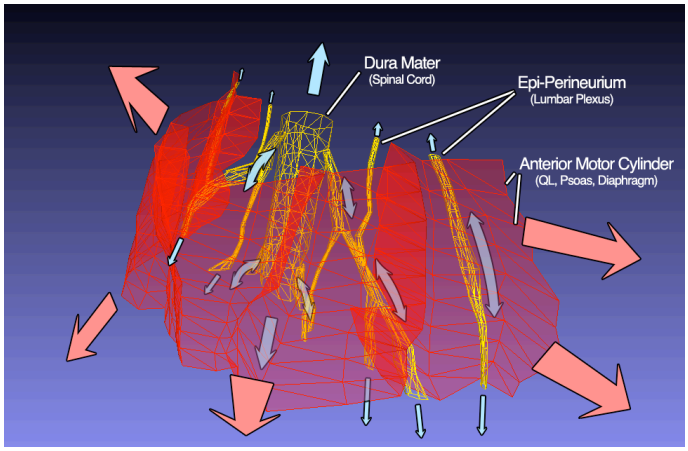

Fig. 1
Mechanical interface of the lumbar plexus and motor cylinder at L1-L2.

REFERENCES

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