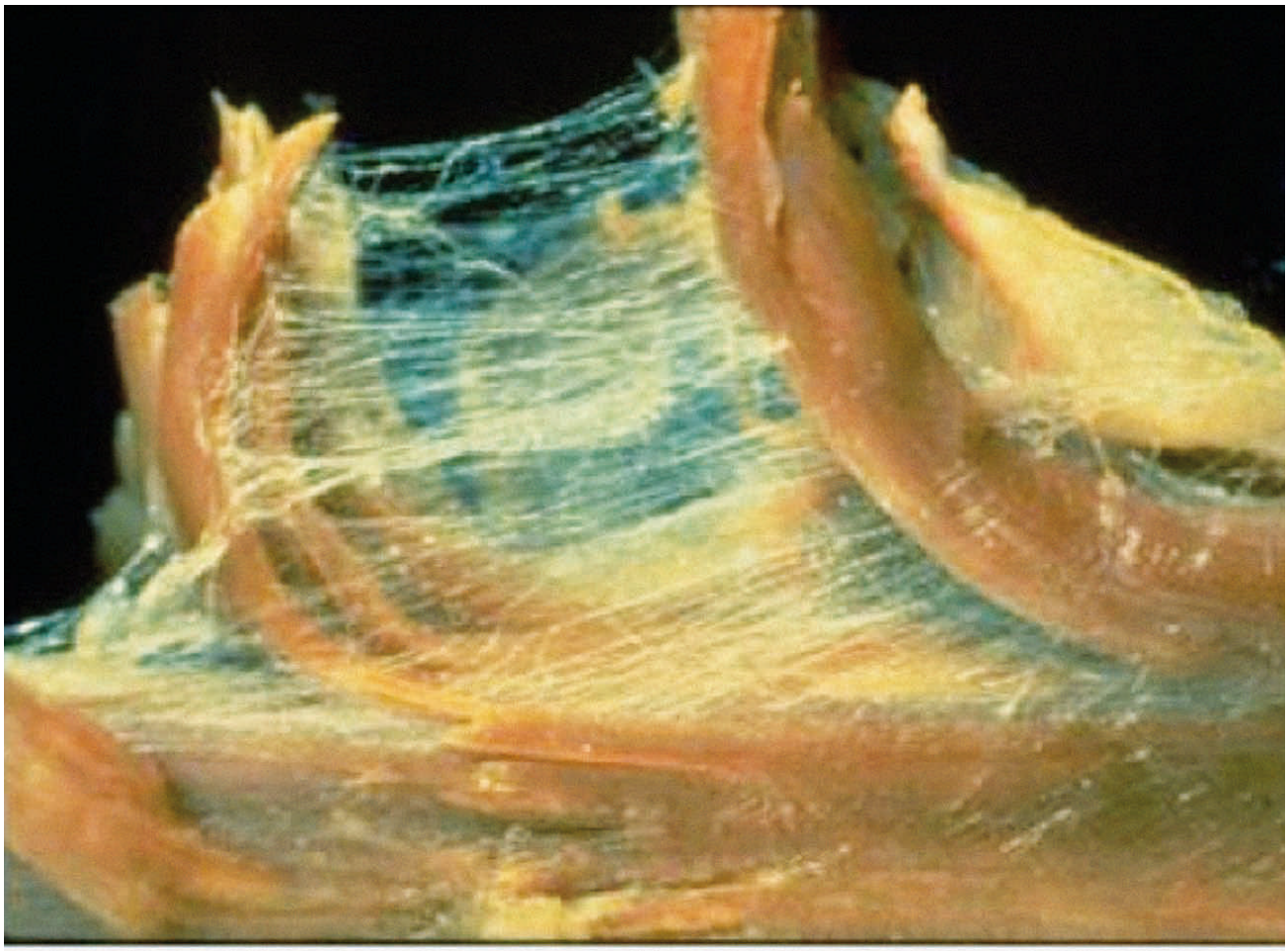
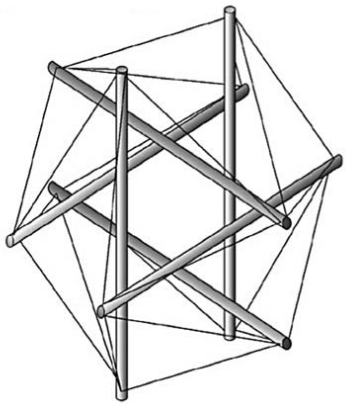
My fascia and I

Dr. med. Ulrich Piontkowski,
Functional orthopaedics practice in Bietigheim-Bissingen, Germany

Fascia both connects and separates all the parts of our body. Its definition is as blurred as our tissue boundaries. The notion that fascia is a simple muscle and body envelope that passively demarcates body structures has been radically changed and extended. In fact, fascia has been demonstrated to possess contractile properties and have its own innervation. Its roprioceptive functions for motion and posture within our body's web seem to revolutionise anatomy and medicine at the same pace as the Web 2.0 has changed our daily lives.

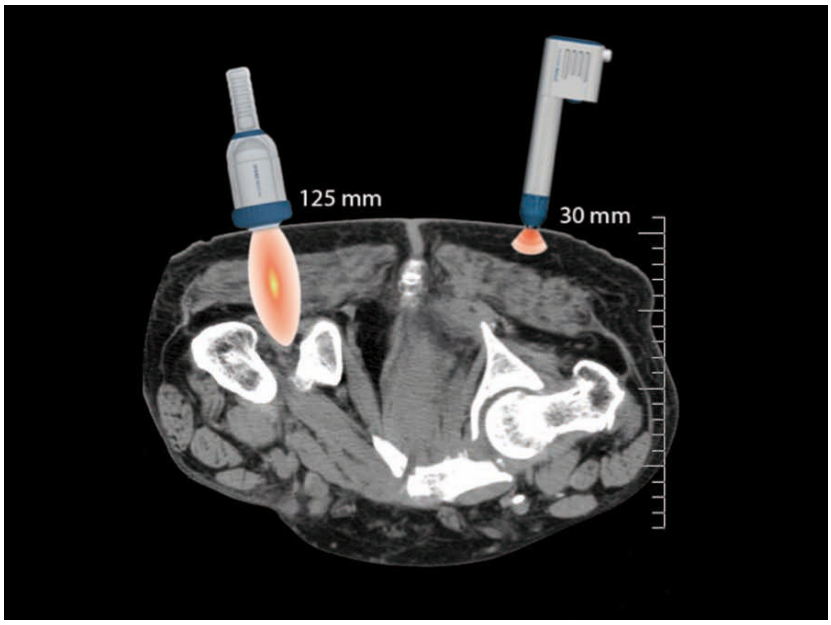


Fascia: The endomysium between the muscle fibres almost looks like "candy floss".



Tensegrity model of the dynamic fascial web

The fascial web is increasingly considered to constitute an organ of its own. This means it is involved in the causes and therapy of diseases, especially those affecting the musculoskeletal system. Rolfers, osteopaths and other bodyworkers have known that for a long time, but there has been no scientific evidence supporting this correlation. Lately, however, new diagnostic and therapeutic approaches based on extensive studies have been presented on recent congresses (World Congress of Fascia Research, Amsterdam 2009, World Congress of Low Back and Pelvic Pain, Los Angeles 2010). A characteristic feature of the fascial web is its continuity throughout the entire body, even within muscles (epimysium, perimysium, endomysium). Thanks to its proprioceptive elements, epimysial fascia is able to perceive and control motion. In case of injury, irritation or inflammation, the fascia experiences local, regional and partly referred loss of elasticity and forms granulation tissue (neocollagen) which causes stiffness and adhesion.

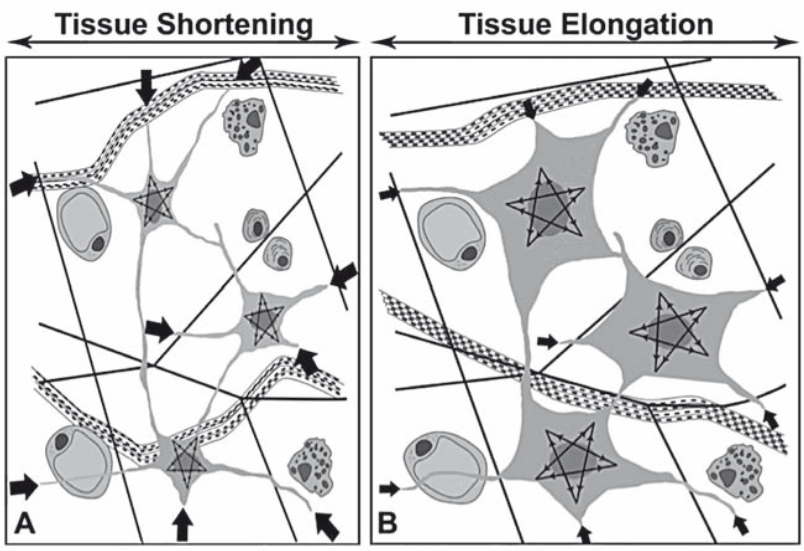


CT section of hip joint area with true-to-scale comparison of the penetration depths of radial pressure waves and focused shock waves

Each myofascia has small areas referred to as "coordination centres" by some authors. Upon irritation, these areas are able to control directly corresponding joints though changes in muscle tone. This is where the therapy comes in to restore the density of the ground substance and, consequently, fascial flexibility. Unimpaired sliding capability of the deep fascia between the muscles and individual muscle fibres is an essential requirement for physiological joint movement. The fascial activation technique is conventionally performed by exerting manual pressure at different levels and angles on the tissue with the finger tips or even elbow or knee.

Shock wave therapy

At our practice, the fascial activation technique is supported by the local and regional application of shock waves. Shock transmitters, which act as a "finger substitute" and can be adjusted at different angles relative to the tissue, enable us to reach and stimulate the "coordination centres" in the deep fascia. Very often, these "coordination centres" are identical with trigger points or acupuncture points. Initial imaging diagnostics for muscle thickness measurement and fascia localisation and exclusion of direct bleeding inside the muscles or local calcification is a must. Depending on the degree of fascial irritation, we use a combination of radial and focused shock waves. Apart from the traditional indications for shock wave therapy, focused shock waves have proved to be highly effective in the treatment of deep fascia stiffness. Changes in joint movement capability are documented between the therapy sessions to monitor the therapy success. Each individual session takes at least 30 minutes. The fascial sliding behaviour is also assessed manually during the therapy session.



Model of the dynamic response of fibroblasts to mechanical tissue stress with changes in size and dendrite length for information transmission.

Ulrich Piontkowski

> Medical specialist for orthopaedics, sports medicine and chirotherapy

> Functional orthopaedics practice in Bietigheim-Bissingen, Germany

> Specialties: conservative orthopaedics, shock wave therapy and osteopathy

network

> Treatment of competitive athletes such as soccer players, handball players and track-and-field athletes

This is done by placing the radial shock transmitter at an inclined angle on the skin surface to simulate manual techniques such as the hook-on type stroking technique in order to mobilise superficial subcutaneous fascia.

Fascial microlesions

Unspecified low back pain as one of negative consequences of our upright posture is closely correlated with the orientation and function of the dorsolumbar fascia. A perfectly upright posture and the speed of motion depend on the stiffness of this particular fascia. Overstrain that is specific to various types of contact sports that involve sudden changes of direction of the upper part of the body relative to the pelvis and flexion and torsional stress of the fascia cause fascial microlesions at cell level, which are additive and eventually lead to abnormal behaviour, muscle shortening and pain. Loss of information in the fascial web, changes in contractility and formation of trigger points in muscles are some of the consequences.

In her recent project work, Helene Langevin describes that evidence of changes at cell level can be found after manual stretching of the fascia: the myofibroblasts in the shortened tissue have a dendritic structure, which explains stiffness of the fascial layers owing to the reduced cellular response in the web. After exposure to mechanical stress, which may also be generated by shock waves, the microtubuli inside the cells expand and enable improved intercellular response of the myofibroblasts. The fascial web is thus restored to its full function. This dynamic fibroblast response and changes in cellular and tissue biochemistry explain changes in posture, normal motion and sports.

Conclusion

At our practice, we have many years of experience in the treatment of athletes suffering from acute and chronic pain, which is often the cumulative result of chronic strain. Thanks to the use of combined shock wave therapy and ultrasound imaging systems, we have been able to increase diagnostic precision and improve therapy results.

■■ubpio@aol.com

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