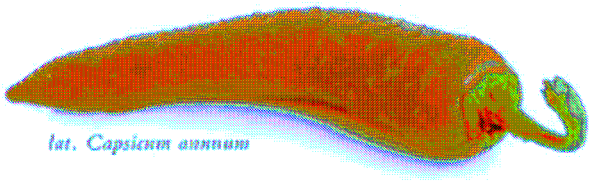

lat. Capsicum annuum

RED CHILI PEPPERS – OR THE SECRET OF THE SOOTHING EFFECT OF MODERN SHOCK WAVE THERAPY WITH THE ORIGINAL SWISS DOLORCLAST® METHOD →

> Red chili peppers contain capsaicin. At first this substance overwhelms the so-called C nerve fibers responsible for transmitting pain but then disables them for an extended period of time. Everybody knows the feeling – first, the mouth is on fire, then it feels completely numb

> Research has indicated that shock wave therapy works the same way. When activated, the C nerve fibers release a specific substance (substance P) in the tissue as well as in the spinal cord. This substance is responsible for causing slight discomfort during and after shock wave treatment. However, with prolonged activation, C nerve fibers become incapable for some time of releasing substance P and causing pain

> Less substance P in the tissue leads to reduced pain. But there is more: less substance P also causes so-called neurogenic inflammation to decline

> A decline in neurogenic inflammation may in turn smooth the way to healing – together with the release of growth factors and the activation of stem cells in the treated tissue

SIMON LOCKE, MICHAEL HUO, BRISBANE, AUSTRALIA

WHY DO MANY PATIENTS BENEFIT FROM RADIAL SHOCK WAVE THERAPY, BUT OTHERS DO NOT?

TAKE-HOME MESSAGE

> As a clinician, I want to know which patients will and who will not benefit from RSWT treatment; analyzing responses to treatment indicates who improves with treatment and what their risk of improvement is.

BACKGROUND

> The benefits of RSWT in various tendinopathies and fasciopathies are well documented. However, there are still a number of patients who do not benefit from treatment. Identifying those patients who do not improve is still difficult for a clinician. How do patients get better? Are successive treatments associated with continuous decreases in pain? Is it possible to identify non responders using demographic data and response rates to treatment?

MATERIALS AND METHODS

> This was a clinical audit of 62 patients, treated by the same clinician. We used a pain intensity measure (Numerical Rating System – NRS) for pain when patients first rose in the morning and for the previous day. Clinical diagnoses included mid Achilles tendinopathy (n=13), insertional achilles tendinopathy (n=17), and plantar fasciopathy (n=28). Four patients had incomplete data at follow-up, and n=58 complete sets were available for analysis. Outcome measures included substantial response (>50% reduction NRS), moderate response (30–49%), and no response. For patients with plantar fasciopathy, a patient reported outcome (PRO) was also analyzed.

RESULTS

> The average age was 54 years, and 62% were female. Symptom duration averaged 9 months, and follow-up duration 8 months. Initial pain first thing in the morning was 6.2 (95% confidence interval [CI] 5.7–6.8). Collectively, 65.5% (95% CI 52.7–76.4) achieved a substantial reduction in NRS, and 6.9% (95% CI 2.7–16.4) a moderate reduction. Non-responders accounted for 27.6% (95% CI 17.7–40.2) of all patients. This equates to a treatment effect size of 2.56 in patients with a substantial response, and 0.03 in non-responders. Demographically, there was no difference between substantial responders and non-responders. The pattern of NRS score reduction during treatment discriminated between substantial responders and non-responders. "All and much better" in the PRO analysis also corresponded to a pain reduction of 50%.

CHRISTOPH SCHMITZ, NYON, SWITZERLAND

MOLECULAR AND CELLULAR MECHANISMS OF RADIAL SHOCK WAVE THERAPY

TAKE-HOME MESSAGE

> The current knowledge about the molecular and cellular mechanisms of action of radial and focused shock waves can serve as basis to develop innovative treatment strategies for various diseases of the musculoskeletal system, the skin, and other organs in the near future.

CURRENT KNOWLEDGE ABOUT MOLECULAR AND CELLULAR MECHANISMS OF RADIAL SHOCK WAVE THERAPY (RSWT)

> The molecular and cellular mechanisms of RSWT are still largely unknown. However, a recent study on transgenic mice showed that RSWT can induce the formation of new capillaries and increase the functional vessel density in injured tissue. These effects are known to be mediated by (focused) extracorporeal shock wave therapy (ESWT) as well. It is therefore hypothesized that RSWT and ESWT share key molecular and cellular mechanisms of action in tissue. This is most probably due to the fact that both radial and focused shock waves can produce (inertial) cavitation (at least in experimental settings in water).

CURRENT KNOWLEDGE ABOUT MOLECULAR AND CELLULAR MECHANISMS OF EXTRACORPOREAL SHOCK WAVE THERAPY IN GENERAL

> For ESWT, several molecular and cellular mechanisms of action were reported in the international peer-reviewed literature. Among them, the most important are (i) depletion of substance P from free nerve endings, (ii) increased production and release of growth factors such as bone morphogenetic protein (BMP), vascular endothelial growth factor (VEGF) and proliferating cell nuclear antigen (PCNA), (iii) stimulation of angiogenesis and promotion of capillarization, (iv) proliferation of adult stem cells, (v) new bone formation, and (vi) tissue regeneration. Very recently, ESWT-induced expression of lubricin in tendons and septa was reported.

VALUE PROPOSITION OF IMPROVED KNOWLEDGE ABOUT MOLECULAR AND CELLULAR MECHANISMS OF RSWT

> Detailed knowledge about the molecular and cellular mechanisms of action of RSWT in tissue can serve as the basis to develop innovative treatment strategies for various diseases of the musculoskeletal system, the skin, and other organs. For example, the treatment of insertion tendinopathies with both platelet-rich plasma injections and RSWT appears promising from a theoretical point of view, and first clinical trials have been started in this regard.