

# INFORMATION SHEET

## Inflammation: Evaluation and Treatment

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### *The problem is...*

When soft tissues are stressed they produce a group of chemicals called **inflammatories**. These include **histamine**, **bradykinin**, and **prostaglandin**. These chemicals are designed to provoke specific physiological responses, which are supposed to be part of the healing process. Ideally, these chemicals are broken down as soon as they are produced by *enzyme* action in the blood. If the blood supply is inadequate and these chemicals build up sufficiently, they produce adverse reactions that may not only slow healing but also increase soft tissue stress. In such circumstances, *histamine* increases *swelling*, *bradykinin* increases tissue *sensitivity*, and *prostaglandin* increases *pain*.

**Histamine** affects circulation in the inflamed soft tissues by opening the arterioles, and thus the capillaries, while simultaneously closing the venules leading away from the capillaries. This has the effect of promoting swelling while at the same time, if *deep* tissues are affected (tendons, ligaments, joint capsules, or fascial layers), increasing skin resistance right over the inflamed deeper tissues. When the capillaries are engorged, dilating around and in inflamed tissues, the capillaries in the skin just over those deep tissues reciprocally constrict, increasing surface skin resistance to the passage of electrical current.

**Bradykinin** does not *hurt* overtly, but it does have the effect of making the involved tissues sensitive. This sensitivity increases and can affect adjacent tissues as the **bradykinin** builds up and spreads out. By rule of thumb, the tissues will remain sensitive (easily irritated) for two weeks after all the pain is gone. In that period, the tissues remain *tender* and easy to irritate and re-inflame.

**Prostaglandin** is an organic acid that burns the tissues it contacts. If allowed to remain in the area long enough its burning action causes the body to respond as if it had been burned. Trying to heal the burn, it floods the area with collagen in the form of *collagen fibrils*, which would ordinarily collect to form a scar matrix. As there is no scar matrix to form, these *fibrils* start sticking tissue layers together, becoming what are called **adhesions**. These **adhesions** cause these tissue layers to “catch” as they try to slide over one another. This increases tissue stress and provokes more inflammation, thereby becoming a self-perpetuating process. **Adhesions** are the source of most of the chronic problems seen in orthopedic, physical medicine and the chiropractic fields.

### ***Fixing the problem...***

The **first step** in “fixing” the problem is to precisely determine the *location of the inflammation(s)*. In our setting, this is done by performing a *Differential Skin Resistance (DSR) Survey*. The instrument involved, the **DSR** monitor, measures the skin resistance to a passage of electricity through it. A relatively high skin resistance has been found to correlate to inflammation of the deeper tissues just under the zone of high skin resistance. The **DSR** monitor provides, for the first time, an objective means of measuring deep tissue inflammation. In the hands of a skilled and experienced practitioner, it is precise and nearly 100% accurate when used to detect sites of inflammation.

The **second step** in the process is to soften whatever *adhesions* exist in the involved tissues. This can be accomplished by passing a high voltage, low amperage, medium high frequency electrical current (sometimes called “Russian Stimulation”) through the tissues. Alternatively, the adhesions can be softened by applying high amplitude (1.8 to 2.0 W/cm<sup>2</sup>) ultrahigh frequency sound to the inflamed zone.

The **third step** is to **break** whatever *adhesions* exist in the involved tissues. This involves mobilizing the tissue layers by exerting a shearing force on the individual *collagen fibrils* within the soft tissues, sufficient to cause the fibrils to “break”. This is generally accomplished by picking up the tissues and forcefully rolling (or pinching) them between the fingers. This process is generally uncomfortable, but does afford the advantage of giving almost instantaneous, albeit (sometimes) temporary, relief of some or all the constant chronic pain. In the long term, *adhesion breaking* gives you the chance of *permanently* getting back normal ranges of motion and comfort that other procedures may only temporarily provide you. If the *adhesions* remain unbroken, the pain will eventually come back.

The **fourth step** is to stop the production of *prostaglandins* by introducing an effective anti-inflammatory directly into the involved tissues. In our setting, we drive ibuprofen into the tissues utilizing ultrahigh frequency sound (ultrasound), in a process called *phonophoresis*. The effect is generally immediate with a general decrease in the degree of overt pain. In some rare cases, the desired decrease in pain has occurred overnight or (in a few cases) in a day or two. Alternatively, cold laser may be applied to the inflamed zone(s). This is performed to “cool off” the manipulated zone by effectively facilitating enzyme destruction or denaturing **all** inflammatories remaining in the stressed tissues.

The **fifth step** is directed at increasing capillary circulation in the involved tissues. This is usually accomplished through judicious use of various forms of electrical stimulation and/or vibration. If capillary circulation is facilitated (increased), enzyme action in the blood will complete the destruction of the inflammatory chemicals, and relief will come a good deal faster than otherwise. Indeed, some forms of electrical stimulation will not

only increase capillary circulation but will also inhibit the formation of *adhesions* in the involved tissues.

***As a patient, what you can do to be part of the solution...***

- Apply **topical ibuprofen** to inflamed zones that have been identified before you go to bed at night and when you get up in the morning. It may also be useful to apply it before and after you engage in any strenuous activity that will affect the involved tissues.
- If additional relief is necessary, a 10-minute crushed ice pack (crushed ice in a damp towel) may be applied at two-hour intervals. Hot baths, hot showers, Finnish saunas, or hot Jacuzzi soaks may also be useful, but **localized heat applications must be avoided**. Localized heat sources include hot packs, heating pads, or heating lamps. They are a problem because they pull the blood from the deep tissues and bring it up to the surface, further reducing enzyme action and facilitating the increase of inflammatory chemical build-up.
- Mechanical vibration of the tissues associated with the inflamed zone may be helpful. It can effectively increase capillary circulation in the involved tissues. Mechanical vibration delivered at 60 to 120 Hz. should be applied to the origin, insertion, or tendon of the muscle(s) associated with the inflamed zone for 2 minutes. The amplitude (strength) of the vibration should be relatively high but should also be tolerably comfortable.
- Be careful to avoid stressing involved tissues for roughly two weeks. It takes two weeks for the tissues to outlive the sensitizing effects of *bradykinin* and to “toughen up” to a normal level of toughness.

