

# EVALUATION: DIFFERENTIAL SKIN RESISTANCE SURVEY

A differential skin resistance (DSR) survey is the measurement of skin resistance to evaluate and establish the presence of deep soft tissue inflammation (below the level of the skin). It has been found that an overlying **zone** of relatively high skin resistance will mark the site of deep tissue inflammation. These **zones** occur precisely over the site of an inflammatory process that is occurring in the involved deep tissues. Such **zones** have consistently been correlated with subdermal inflammation of fascial, tendinous, muscle, and joint tissues.

The source of the correlation between relatively high skin resistance and deep tissue inflammation is still unknown. However, it has been postulated that the effects on circulation within the skin and deeper tissues produced by the chemicals derived from the reaction of irritated or stressed soft tissues (prostaglandins, histamine and bradykinin), may affect an increase in the skin resistance right over the inflamed area. They apparently do this through a mechanism that is the **reverse** of what is triggered by the local application of heat (hot packs, heating pads, focal hot air). That is, when heat is applied to a localized area of skin it will cause the capillaries in the dermal layers to dilate while capillaries in the deeper tissues directly under the heat source constrict. This mechanism or process is used to shunt blood from the deeper tissues up to the surface tissues. It is the body's attempt to maintain core temperature by "cooling" the blood in this manner. The body apparently acts from the supposition that the surface tissues are cooler than the deeper tissues because of their proximity to the air (supposedly cooler than the deeper tissues). A side effect of this mechanism is the simultaneous lowering of skin resistance underlying the localized heat source. If interpreted correctly, the effect of the heat produced by the inflamed deep tissues stimulates the capillaries to dilate in and around the inflamed tissues, causing a reciprocal constriction of the capillaries in the skin just above, causing a consequent rise in the skin resistance in the area affected.

A DSR survey is performed with a galvanic skin resistance monitor (GSR). The GSR is designed to quantitatively monitor the resistance to the passage

of a small current of electricity passed through and over the skin. Essentially, it is the same GSR monitor used to find acupuncture points or that used as a therapeutic instrument in some biofeedback therapy clinics (it's also used as one of the elements in the Lie-detector). The DSR survey is the newest and most commonly available noninvasive objective evaluation tool for the determination of deep soft tissue inflammation. Although it has not yet made its way into periodical literature, it has shown itself to be invaluable in the clinical setting. It appears to be remarkably accurate as a measure of inflammation occurring in the soft tissue of the musculoskeletal system (nearly 100% when competently performed). Such inflammations include capsulitis, bursitis, tendonitis, fasciitis, synovitis, myelitis, radiculitis, arthritis and synovial tunnel syndromes. The DSR survey may be used, not only as a preliminary evaluation tool, but also as a method of documenting condition improvement. Generally, the high skin resistance zones will shrink in size and finally disappear as treatment is successful.

The GSR used for DSR survey generally employs audio and visual feedback modes. Such instruments (designated here as a DSR zone finder) must be able to measure resistance levels in the micro-ohm range, though the resistance may be measured in terms of how much current gets from one electrode to the other as microamperes or mamps. Physically, the DSR zone finder communicates with the patient's skin through two insulated wire electrode cables (as illustrated above). Ideally, the electrode cables connect with two identical electrode handles, fitted at the end with hollow brass or steel tips. These hollow tips should be just large enough to allow the insertion of a paper stick tipped with cotton (a cotton swab tip). In use, these cotton tips are moistened with water and pressed against patient's skin, to serve as electrodes for the small electrical current (called a trickle current) that passes over and through the skin from one electrode to the other. The instrument registers how much of the current passes between the two electrodes. This is a measurement of **skin resistance**. Comparisons of skin resistance measurements taken from various areas of the body comprise a DSR survey.



**DSR survey of the wrist, performed to determine the possible presence of inflammation**



**A commercially available DSR zone finder**

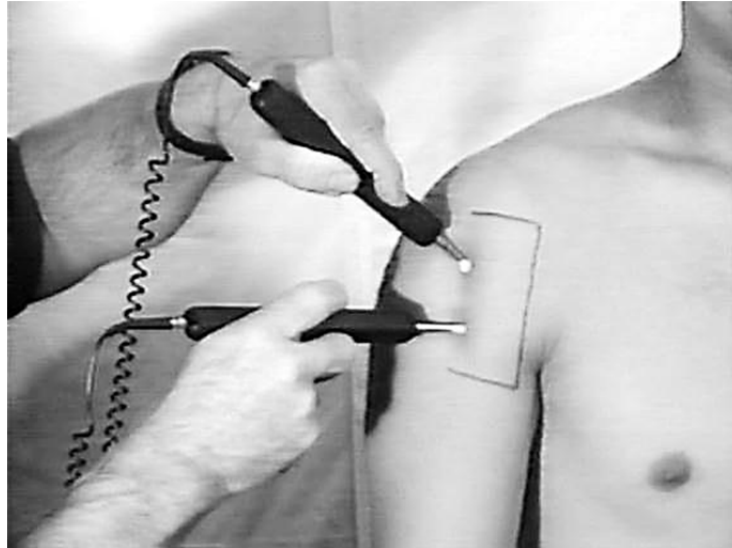
Performing a DSR survey:

- Rub down the patient's skin with alcohol or a dry towel to remove any oils present on the skin and to otherwise breakdown the natural skin resistance.
- Place the electrode tips together and calibrate the zone finder to the maximum (100%) point of the meter.
- Position the electrode tips about four cm apart. Press them against the patient's skin using an unvarying, firm and equal pressure, simultaneously pushing into and stretching the skin (make sure that water is not allowed to bridge between the two tips; only maximum readings will be obtained if it does).
- Read the meter. A **normal** reading will range be between 75 to 100% of the maximum meter reading. An **abnormal** or **high** reading will generally range from 0 to 65 % of the maximal meter reading, and 65 to 75% is generally considered a "gray zone", indicating that a "hot zone" (an abnormally high skin resistance area) is being approached.
- Keep the electrodes parallel to one another and move them systematically in and around the area suspected of being inflamed. They should be moved one cm at a time, first in an inferior to superior direction and then in a medial to lateral direction. This is performed to establish the encompassing limits of the zone of high skin resistance. Mark the limits of relative high skin resistance with a non-toxic substance that will show up against the patient's skin (a surgical marking pen has proven to be

ideal; its marks generally remaining visible throughout the treatment process).

- Once a zone of high skin resistance has been established, the degree of inflammatory entrenchment (how serious, and roughly how old it is) may be estimated. This is accomplished by increasing the probing and spreading pressure of the electrodes on the skin beyond that used to establish the zone. The increased pressure will not markedly affect the skin resistance over seriously inflamed tissues and the skin resistance will remain high, giving a consistently low reading. Over less seriously inflamed tissues, the increased pressure will cause the skin resistance to drop to relatively normal levels (producing a higher reading). The bigger the drop in the resistance and the more sustained the drop, the less entrenched or old the inflammation may be.

When performing a DSR survey over a joint, the joint should first be "**open**" and then "**closed**" for the survey to be accurate (for example, the knee joint is open when it is flexed to 90° and closed when fully extended). For unknown reasons, an inflammation will only reveal itself to DSR survey if there is a clear line (unobstructed by bone) between the inflamed tissues and the skin surface being surveyed. It should also be noted that if phonophoresis is to be used to treat such an inflammation, the chances of a successful treatment increase if application is made with the joint in the same state (**closed** or **open**) that produces the positive DSR findings.



**DSR Zone Survey over the biceps tendon region**



**DSR Survey over the piriformis muscle region**

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