

Massage has many definitions and is employed by many practitioners of various backgrounds. The working definition used in this chapter is that massage is the manipulation of the soft tissues of the body. The use of massage has been well received in the human field and, despite a paucity of research, it has continued to be developed and explored. Massage is now incorporated along with the medical management of human patients for pain relief and cases of decreased mobility. It is used as a prevention measure and in the management of competitive athletes. It is also incorporated into most chiropractic, physical therapy, and osteopathic manual therapy approaches.

Biomechanics of Connective Tissue

Massage must be directed toward a specific purpose and should be aimed at promoting physical and psychological change. The main constituent of connective tissue is collagen. Its function is to resist axial tension, and it exhibits a stress-strain behavior. Microscopically, collagen fibers are arranged in bundles and have a crimped appearance. Type I collagen is in the dermis and fascia and gives support and resistance to tension. The basal lamina of epithelial tissue contains type IV collagen, which supports the epithelial cells. Hydrogen cross-links are formed between chains and between molecules, giving stability at fibril levels, assisting in the formation of collagen fibers. They allow the tissue to function under mechanical stress. The orientation of the fibers depends on the stresses to which the fibers are subjected; connective tissue must be pliable, yet very strong. A stress-strain curve demonstrates the behavior of biologic materials. When a longitudinal stress is applied to collagen, the tissue responds by elongation, which occurs in the toe region of the curve. Elongation occurs as a result of straightening of the crimped fibers, and probably also as a result of some interfibrillar sliding and shear of ground substance, which flows between the collagen fibers. Massage produces most of its effects in the toe region of the stress-strain curve. Care should always be taken to not overstretch the tissues and to avoid damage to the internal structure of connective tissue fibers. Therefore the end feel of the tissues must be understood to avoid damage to connective tissues.

Lymphatics

In humans, one tenth of the tissue fluid is removed by the lymphatics. Understanding lymphatic anatomy, physiology, and function is necessary for successful massage. The rate of flow is determined by the interstitial fluid pressure and lymphatic pump activity.

Increased lymphatic flow is caused by the following:

- Increased capillary pressure
- Increased plasma osmotic pressure
- Increased interstitial fluid pressure
- Increased capillary permeability

Circulatory Effects

The pressure of the massage itself increases pressure within the tissues. Pressure gradients are created between the tissue spaces and vessels. As the hands are moved, changes in tissue pressure occur, creating fluctuating pressure differences between one area of tissue and another. It is believed that fluid moves constantly from tissues to vessels and back again, as it flows from areas of high pressure to areas of low pressure.

Tissue Movement

As the hands move along the superficial tissues, pressure to the tissues increases, and layers of tissue are moved. A light glide causes movement of the epidermis. If friction is maintained between the therapist's hand and the patient's skin, the epidermis moves with the hand and is gently stretched. There will also be some movement of the dermis because of the traction between the two layers. More pressure with friction, although still very light, results in traction between the dermis and the subcutaneous tissues. The end-feel of the stroke is when this traction reaches its limit and all layers are stretched.

Therapeutic Effects

Massage is generally enjoyed by small animal patients and helps to relieve distress, anxiety, and discomfort. There are many postulated effects of massage reported in the literature. Unfortunately, many of these have not been substantiated by systematic scientific investigations.

If a hand is placed over the surface of a dog's skin, heat is felt between the two surfaces. If the hand is placed on the skin and held still, this heat increases. Rubbing over the surface of the skin causes friction, and this results in an even greater increase in heat. Heat is a form of energy, and some schools of massage, particularly those grounded in Eastern practices, use the energy field that exists around the body. This is sometimes referred to as an electromagnetic radiation around the entire body. It is felt as heat and can be felt a small distance from the body. Some also believe that other forms of energy fields run through the body, along specific pathways known as meridians. These are used in acupuncture and reflex therapy treatments.

Effects on Muscle

Massage may also affect skeletal muscles. Muscles have a natural resting tone that may be increased in postural muscles by external influences, such as cold or stress. This occurs because of the interaction of the muscle spindle and the central nervous system. Stretching a muscle may stimulate the muscle spindle and cause a reflex muscle contraction while reflex inhibition of the antagonist occurs.