Physiological Effects of Massage

# Effects upon musculoskeletal system

It comprises of bones and joints. The skeletal muscles attach to bones and produce movement at joints. The connective tissue (superficial fascia and deep fascia) beneath the skin wraps the muscles and encapsulates the body. Muscles form one half of the bulk of the body and receive one fourth of all blood.

Connective tissue is **‘THIXOTROPIC’** in nature.

With regular exercise, physical labor, stretching, proper hydration and good nutrition promotes gel state of connective tissue whereas sedentary lifestyle, poor hydration, poor nutrition, little physical movement, tissue trauma causes the thickening of gel state.

Massage act as a substitute to exercise and increases the blood supply of a muscle in such a way that it produces suction or pumping effect in the blood vessels supplying them.

The massage techniques lift, twist, compress, vibrate and stretch the tissue mechanically stir the ground substance and raise energy levels in tissue leading to greater range of motion, enhanced cellular metabolism, decreased fascial tension leading to better posture and less risk for injury, pain and lethargy.

1. **Massage decreases muscle tension in hypertonic muscles**: Tone in a muscle is at rest helps in maintain posture. Too much tone is called as ‘Hypertonia’. When palpated hypertonic muscles are rigid, dense and resistant to passive movement. Thus brings muscular imbalance leading to postural adaptations leading to painful conditions
2. **Massage promotes muscular balance, which leads to better posture.** The proprioceptor technique of massage use sensory organs distributed in muscle and tendon (Golgi tendon organ and muscle spindles) to reset the muscle length and tone
3. **Massage reduces muscle spasms**-Muscle spasms are involuntary sustained contraction of a muscle. Massage techniques including direct pressure, agonist contraction, proprioceptor technique helps in reducing muscle spasms
4. **Massage excites muscular contraction**: A smart blow (percussion) upon a muscle excites muscle and produces contraction.
5. **Massage increases electro-excitability:** Experiments show that smaller number of mA of current is required to cause contraction of muscle after massage than before.
6. **Massage decreases muscle soreness, muscle fatigue and muscle recovery time in athletes**
7. **Massage increases flexibility and range of motion**:
8. **Massage reduces adhesions in muscle tissue and fascia**
9. **Massage strengthens weakened muscle tissue**
10. **Massage encourages Nutrition and development of muscle**: the increased blood supply of muscle induced by massage naturally improves nutrition which leads to actual increase in size of muscular structure in period of 2-3 months.
11. **Massage promotes healing from soft-tissue injury**: Different massage techniques are used to promote healing from soft tissue damage. Lymphatic drainage massage reduces leg oedema in patient with distal tibio-fibular fracture.

# Effects upon Body cells

Massage promotes healthy fluid movement in the body and this enhanced movement of fluid supports healthy cell function by delivering nutrients, hydration, oxygen, antibodies and hormones. They also remove toxic foreign waste materials from the cell body.

# Effects upon integumentary system

It includes skin and its appendages such as hair, nails and skin glands. It is the largest and heaviest organ making 7percent of body weight. Skin houses receptors of pressure, touch, heat, cold, movement and vibration. Thus skin becomes primary medium of communication Massage therapist by touching the subjects body confirms the position, size, area of tension, its ability to feel pain or pleasure and its ability to change. Skin and brain develops from ectoderm and becomes functional at 6 weeks. Thus touching stimulates the brain activity. Hence massage therapist triggers the parasympathetic responses through touch. Some mechanical benefits include:

1. **Massage desquamates skin cells:** The movement of therapist’s hand over the surface of skin supports the process of desquamation/exfoliation (constant replacement of dying epithelial cells) which leads to improvement of appearance and condition of skin.
2. **Massage increases local circulation to skin:** Massage stimulates the local area and increases circulation, which brings fresh nutrients to skin and aids in removal of waste products. The skin warmed by therapist’s hand adds to client’s relaxation.
3. **Massage stimulates sebaceous glands:** Massage technique stimulate the sebaceous glands, improving the secretion of sebum (an oily lubricant that conditions the skin and hair to prevent drying) which leads to improvement in softness, suppleness and elasticity of skin.
4. **Massage lubricates skin**: The oils and creams used for lubrication during massage nourishes and conditions the skin and helps in preventing the skin from drying out, improves elasticity, texture and appearance.
5. **Massage increases scar tissue mobility:** Massage movement to the scar tissue during remodelling and mature stages of tissue healing ensures alignment of the collagen fibers so that scar tissue remains mobile.

# Effects upon Nervous and Endocrine System

1. **Massage changes the levels of chemical messengers in the body, which influences both physiological and psychological functions:** Chemical messengers mediate the exchange of regulatory information and allow cells to communicate with one another. The regulation of physiological functions relies on these intercellular messengers.

These chemical messenger include: Hormone, Neurotransmitter, Neuropeptides, Neurohormone

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| --- | --- | --- |
| S.No | Chemicals | Effects |
| 1 | Substance P | Decreased by massage |
| 2 | Cortisol | Reduced by massage |
| 3 | Epinephrine | Reduced by massage |
| 4 | Growth Hormone | Increased by massage |
| 5 | Nor epinephrine | Levels are balanced |
| 6 | Oxytocin | Levels are balanced |
| 7 | Serotonin | Usually increased or balanced |

1. **Massage activates the parasympathetic nervous system response, sending the body into rest and recovery mode**. High negative stress level in modern lifestyle triggers the body to enter fight or flight mode mediated by sympathetic nervous system. The parasympathetic system balances the sympathetic nervous system
2. **Massage supports the biological rhythms of the body-** Biological rhythms such as heart rate, respiratory rate, waking, sleeping cycles, urinary excretion of potassium, menstrual cycle, body temperature changes are normalised by Massage. External factors provide timing cues that affect body’s entrainment. Rapid changes in environment can cause biological rhythm to temporarily get out of phase with each other.

# Effects on Digestive and urinary system

* **Digestive System**: Massage activates the parasympathetic nervous system and promotes rest and relaxation. Thus, promotes digestion coz when body is relaxed digestion improves. Regular massage can be important intervention for chronic digestive disorders. In constipation, use of massage technique on abdomen from left to right in a circular motion assist the movement of colon contents towards rectum. Research study has shown that abdominal massage improved bowel function in patients with spinal cord injury.
* **Urinary System**: Massage increases blood volume and filtration in the kidneys. The parasympathetic nervous system response promotes urine production, leading to increased urination after massage.

# Effects on Respiratory System

1. **Massage loosens mucus in lungs and aids mucus expulsion**: Postural drainage technique in different position facilitates mucus movement or coughing technique can be used in combined form also. Tapotement technique on the back along with vibration and shaking help to loosen mucus in the lungs and increase airway clearance for better lung function.
2. **Massage improves respiratory function**: massage improves indicators of respiratory function including reduced shortness of breath and increased oxygen saturation levels, thoracic gas volumes, peak flow, forced expiratory volume and forced vital capacity.
3. **Massage decreases laryngeal tension**: The acoustic measure of voice have shown significant improvement after one massage session

# Effect on Lymphatic and Immune System

1. **Massage increases lymph circulation:** Movement of lymph relies on pulse of arteries that run parallel to lymph vessels, on respiratory movements and on pumping action of skeletal muscles. Massage techniques mechanically move lymph fluid through lymph vessel network in much the same way that they support venous return.
2. **Massage decreases oedema:**  Massage techniques like light rolling and pumping techniques are used to encourage fluid out of swollen area in direction of lymph flow and towards areas with many lymph nodes.
3. **Massage helps to manage lymph oedema:**. Manual lymphatic drainage ,massages technique developed by Emil Vodder, a Danish physical therapist. The technique includes gentle stretches of skin and focused techniques that gently pump or roll fluid along the lymph paths to lymph collecting ducts. It is usually combined with application of compression bandage to limit further fluid accumulation.
4. **Massage boosts immune function:** Research on massage for people living with cancer on HIV demonstrates that massage increases the number and activity of white blood cells improving the general immune function.

# Physiological effects and benefits

* **Massage reduces Anxiety**: Massage decreases anxiety when given either alone or in combination with aromatherapy for patients about to undergo different types of surgeries or for people living with cancer.
* **Massage reduces Depression**: Massage research indicates that massage changes serotonin and dopamine levels in the body, associated with decreased with decreased depression and increased well being. In one study, acupuncture and healing touch were combined and resulted in improved quality of life and enhance mental health outcomes.
* **Massage reduces aggression and behavioural disorders in children and teens**: A study of 17 aggressive adolescents, 20 minute massage sessions delivered twice a week for 5 weeks lowered the adolescent feeling of anxiety and hostility. Massage therapy decreased hyperactivity scores more than relaxation therapy in another study of 28 ADHD adolescents.
* **Massage improves sleep**: From young children to elderly, research shows that massage induces sleep or improves sleeping patterns in variety of situations from preschool environments, to hospice environments, to mental health facilities, to hospital.
* **Massage changes brain wave pattern**: Moderate pressure massage induces delta brain wave activity and a decrease in alpha and beta brain wave activity. When massage and music are combined, it significantly reduces right frontal lobe activation.