

## Biological Effects of Class IV Laser Therapy

1. **Accelerated Tissue Repair and Cell Growth.** Photons of light from lasers penetrate deeply into tissue and accelerate cellular reproduction and growth. The laser light increases the energy available to the cell so that the cell can take on nutrients faster and get rid of waste products. As a result of exposure to laser light, the cells of tendons, ligaments and muscles are repaired faster.
2. **Faster Wound Healing.** Laser light stimulates fibroblast development (fibroblasts are the building blocks of collagen, which is predominant in wound healing) in damaged tissue. Collagen is the essential protein required to replace old tissue injuries. As a result, LT is effective on open wounds, scars and burns.
3. **Reduced Fibrous Tissue Formation.** LT reduces the formation of scar tissue following tissue damage from cuts, scratches, burns or surgery. Scar tissue is the primary source of chronic pain.
4. **Anti-Inflammation.** Laser light has an anti-edemic effect as it causes vasodilatation, but also because it activates the lymphatic drainage system (drains swollen areas). As a result, there is a reduction in swelling cause by bruising or inflammation.
5. **Anti-Pain (Analgesic).** Laser therapy has a high beneficial effect on nerve cells which block pain transmitted by these cells to the brain and which decreases nerve sensitivity. Also, due to less inflammation, there is less edema and less pain. Another pain blocking mechanism involves the production of high levels of pain killing chemicals such as endorphins and enkephalins from the brain and adrenal gland.
6. **Improved Vascular Activity.** Laser light will significantly increase the formation of new capillaries in damaged tissue; that speeds up the healing process, closes wounds quickly and reduces scar tissue. Additional benefits include acceleration of angiogenesis, which causes temporary vasodilatation, an increase the diameter of blood vessels. More blood flow equals faster healing and less pain.
7. **Increased Metabolic Activity.** Laser therapy creates higher outputs of specific enzymes, greater oxygen and food particle loads for blood cells. The damaged cells can repair and regenerate faster.
8. **Improved Nerve Function.** Slow recovery of nerve functions in damaged tissue can result in numbness and impaired limbs. Laser light will speed up the process of nerve cell reconnection and increase the amplitude of action potentials to optimize muscle action and reduce nerve pain.
9. **Immunoregulation.** Photons are absorbed by chromophores (molecule enzymes) that react to laser light. The enzyme is activated and starts the production of ATP, which is the major carrier of cell energy and the energy source for all chemical healing reactions in the cells. Long lasting pain relief occurs.
10. **Trigger Points and Acupuncture Points.** Laser therapy stimulates muscle trigger points and acupuncture points on a non-invasive basis, providing musculoskeletal pain relief.