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Recent Advances in Physical Therapy for Arthritis Management and How Advanced Physical Therapy Techniques Can Prevent Progression

By

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WHAT IS ARTHRITIS

Arthritis is the swelling and tenderness of one or more joints. The main symptoms of arthritis are joint pain and stiffness, which typically worsen with age. The most common types of arthritis are osteoarthritis and rheumatoid arthritis

Osteoarthritis causes cartilage — the hard, slippery tissue that covers the ends of bones where they form a joint — to break down.

Rheumatoid arthritis is a disease in which the immune system attacks the joints, beginning with the lining of joints.

OSTEOARTHRITIS

The most common type of arthritis, osteoarthritis involves wear-and-tear damage to a joint's cartilage — the hard, slick coating on the ends of bones where they form a joint.

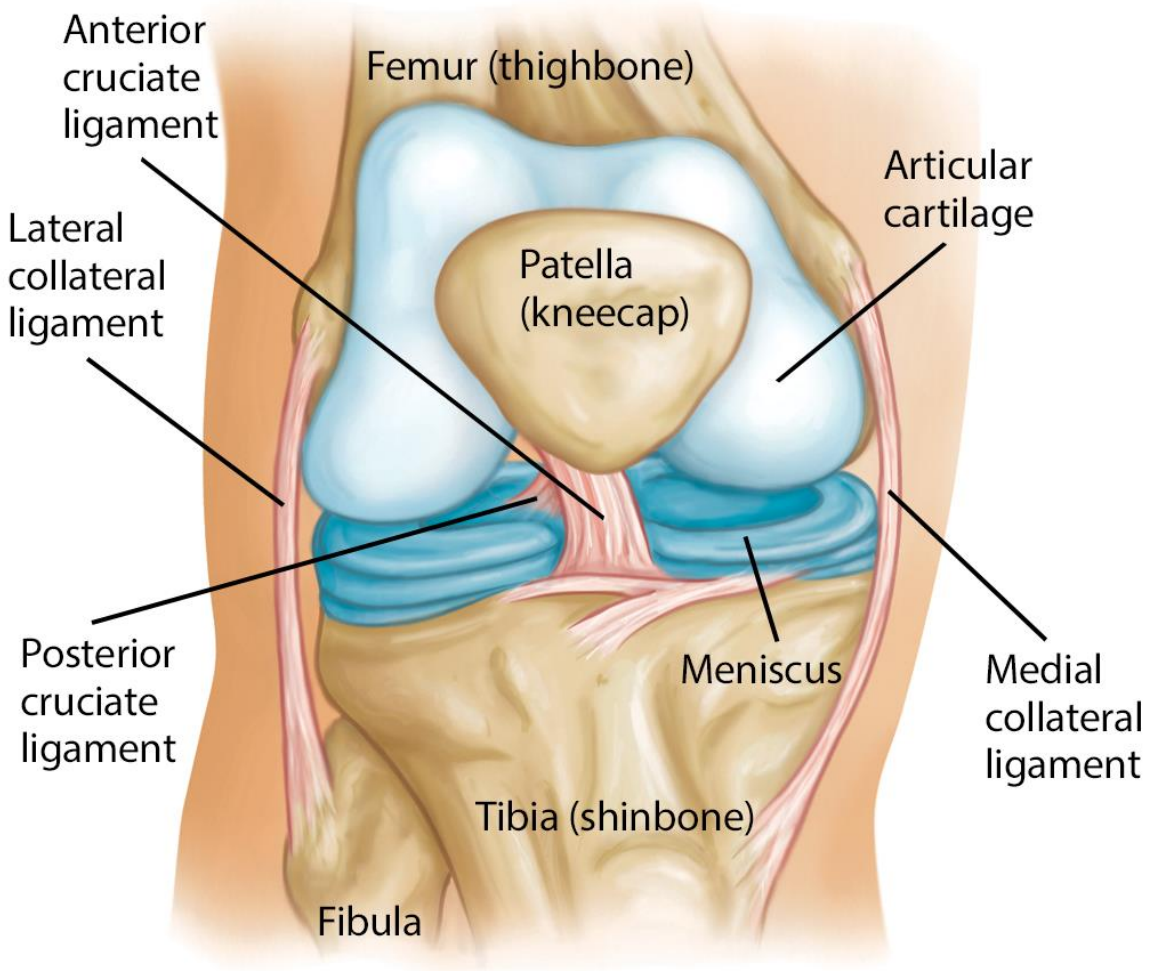
Cartilage cushions the ends of the bones and allows nearly frictionless joint motion, but enough damage can result in bone grinding directly on bone, which causes pain and restricted movement. This wear and tear can occur over many years, or it can be hastened by a joint injury or infection.

Osteoarthritis also causes changes in the bones and deterioration of the connective tissues that attach muscle to bone and hold the joint together. If cartilage in a joint is severely damaged, the joint lining may become inflamed and swollen.

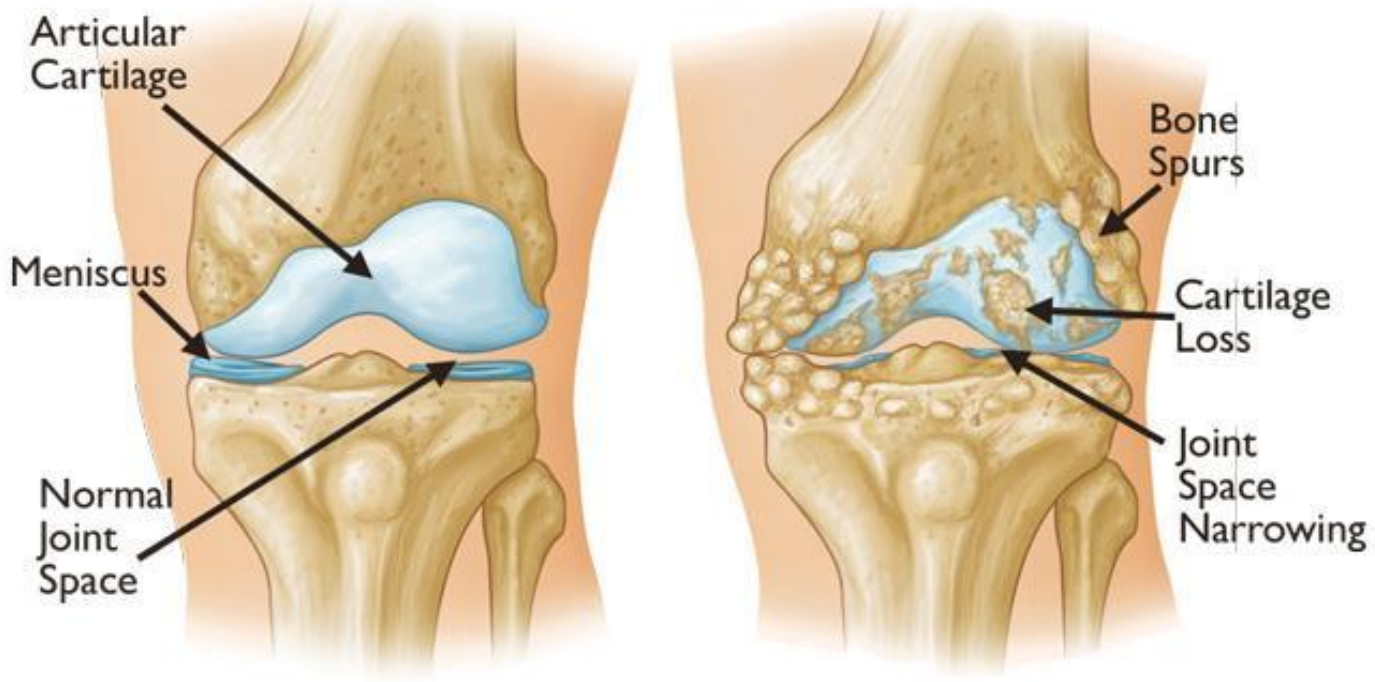
RHEUMATOID ARTHRITIS

In rheumatoid arthritis, the body's immune system attacks the lining of the joint capsule, a tough membrane that encloses all the joint parts. This lining (synovial membrane) becomes inflamed and swollen. The disease process can eventually destroy cartilage and bone within the joint.

NORMAL JOINT



ARTHRITIC JOINT



SYMPTOMS OF ARTHRITIS

Generally, the pain develops gradually over time, although sudden onset is also possible. There are other symptoms, as well:

The joint may become stiff and swollen, making it difficult to bend and straighten

Pain and swelling may be worse in the morning, or after sitting or resting.

Vigorous activity may cause pain to flare up.

Loose fragments of cartilage and other tissue can interfere with the smooth motion of joints. The joint may lock or stick during movement. It may creak, click, snap, or make a grinding noise (crepitus).

Pain may cause a feeling of weakness or instability.

Many people with arthritis note increased joint pain with changes in the weather.

CONSERVATIVE MANAGEMENT OF ARTHRITIS

- Medications
- Injections
- Physical Therapy
- Home/Gym Exercises

RECENT ADVANCES IN PHYSICAL THERAPY MANAGEMENT OF ARTHRITIS

Conventional Physical Therapy involves soft tissue massage, electrical stimulation, therapeutic ultrasound, exercises and stretching.

Recent advances in Physical Therapy takes a regenerative approach that provides long lasting results from worsening of arthritis

CARTILAGE PHYSIOLOGY

Chondrocytes are the cells responsible for cartilage formation, and they are crucial for the process of ossification, which is useful for bone development.

Extracellular matrix (ECM) of bone is a complex, dynamic structure that provides both physical support and biochemical signals for bone cells.

Apoptosis is a cell removal process that is important in maintaining homeostatic mechanisms in the development and sustaining cell population. The apoptosis of chondrocytes is believed to play an important role in OA progression due to poor chondrocytes self-repair abilities to maintain the extracellular matrix (ECM).

CARTILAGE PHYSIOLOGY

Apoptosis of chondrocytes, or programmed cell death of cartilage cells, is a normal biological process involved in cartilage development and maintenance. However, excessive chondrocyte apoptosis is implicated in the pathogenesis of osteoarthritis (OA). It can contribute to cartilage degradation and joint dysfunction.

Apoptosis in Normal Cartilage:

Apoptosis is a natural process that eliminates unwanted or damaged cells, helping to maintain tissue homeostasis. In healthy cartilage, chondrocytes undergo apoptosis to remodel the tissue and remove old or damaged cells.

Apoptosis in Osteoarthritis:

In OA, chondrocytes undergo excessive apoptosis, which contributes to cartilage breakdown. The loss of chondrocytes, coupled with the release of damaging enzymes, leads to matrix degradation and joint damage.

CARTILAGE PHYSIOLOGY

Increased chondrocyte apoptosis in OA can lead to:

Reduced cartilage thickness and structural integrity.

Impaired cartilage repair and regeneration.

Joint pain and dysfunction.

CARTILAGE RE-GENERATION THROUGH PHYSICAL THERAPY

EPAT- Shockwave Therapy

Dry Needling Therapy

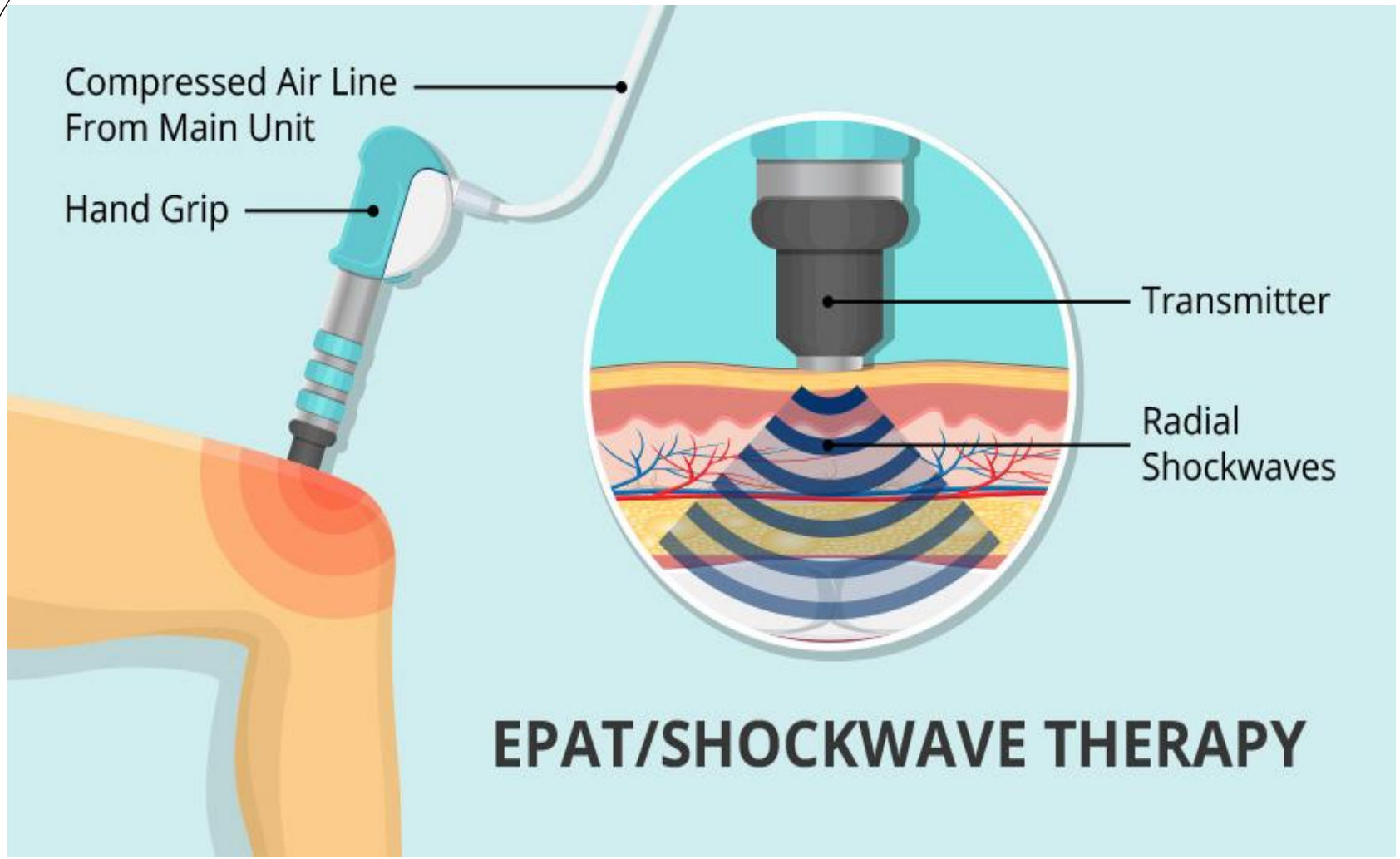
MLS Robotic Laser Therapy

EPAT- SHOCKWAVE THERAPY

EPAT (Extracorporeal Pulse Activation Therapy), also known as shock wave therapy, is a non-invasive treatment that uses high-energy sound waves to stimulate the body's natural healing processes. These sound waves penetrate the skin and soft tissues, promoting increased blood circulation, cell regeneration, and tissue healing

Recent studies have shown that ESWT can accelerate the healing of meniscal degeneration and plays a chondroprotective role in OA . EPAT treatment can increase the activity of chondrocytes and decrease cartilage fissuring, as well as chondrocyte apoptosis and it also has been proved that this effect is consistent and beneficial both in early or later stage of OA.

EPAT- SHOCKWAVE THERAPY



EPAT- SHOCKWAVE THERAPY

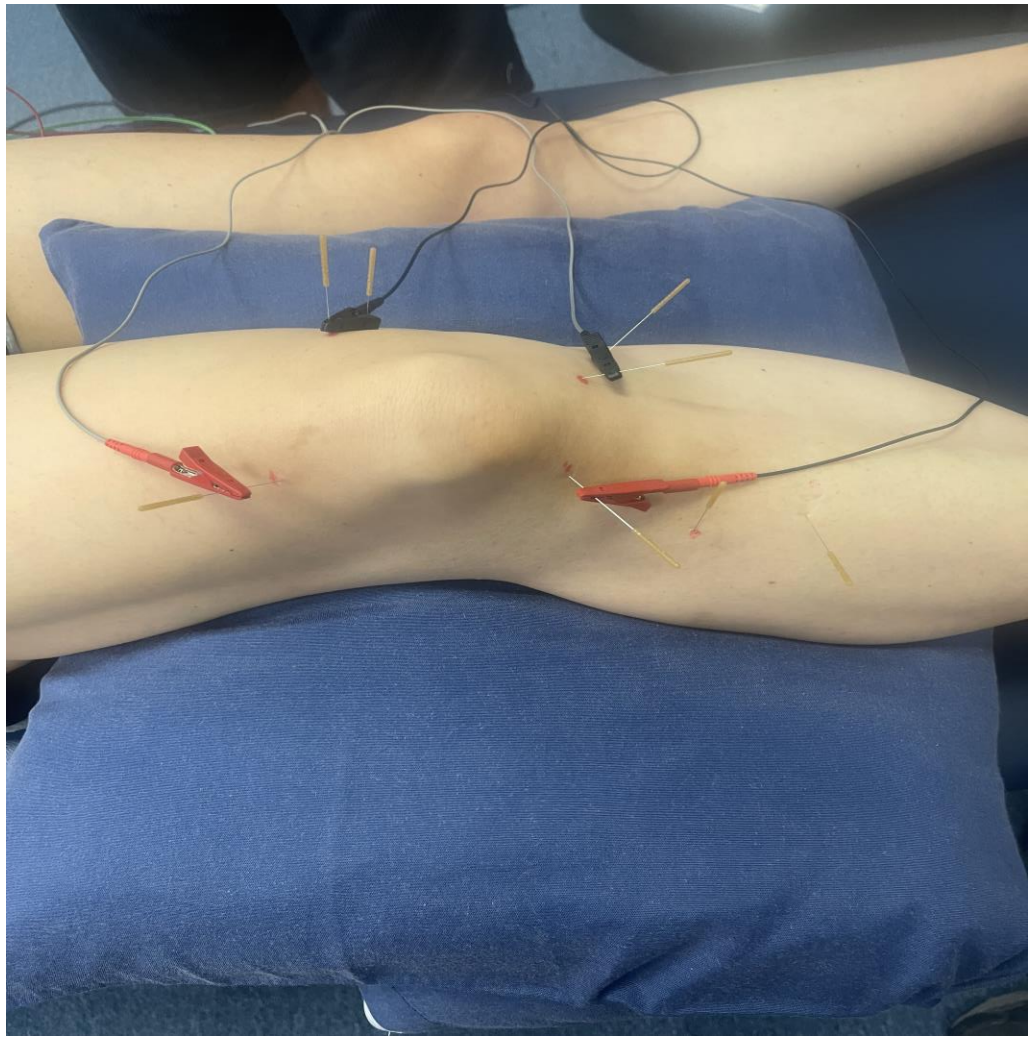
https://www.youtube.com/shorts/5Ue-3y76lZ4?feature=share

DRY NEEDLING

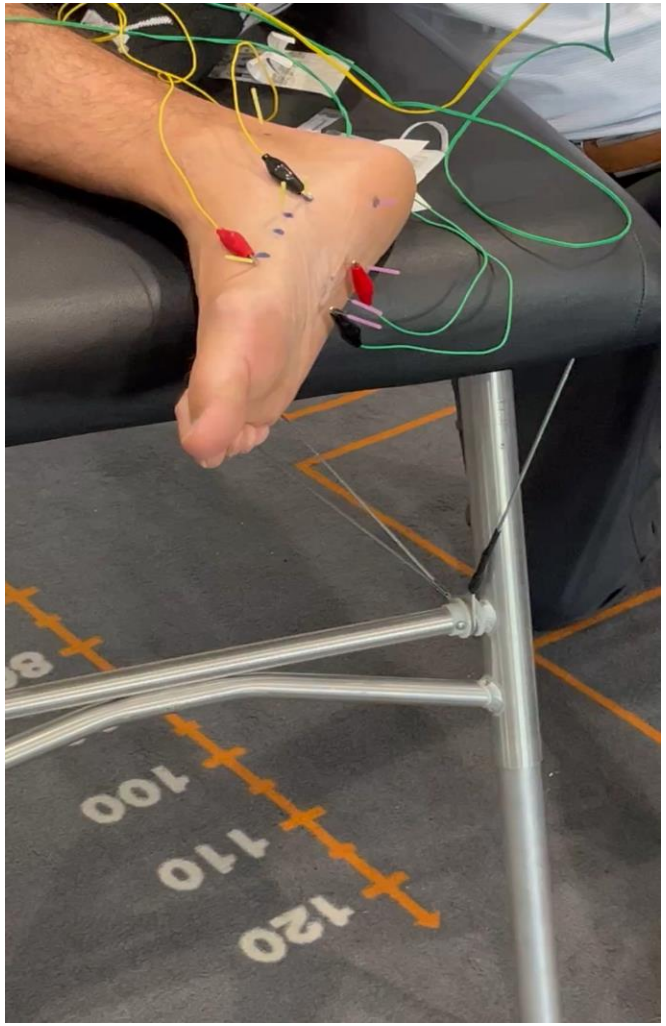
Dry needling is not a regenerative treatment in the same way that treatments like stem cell therapy or platelet-rich plasma (PRP) injections are. While dry needling can promote healing and pain relief by stimulating the body's natural healing response, it doesn't directly introduce new cells or tissues to regenerate damaged areas. Instead, it triggers a localized healing response through microtrauma and improved blood flow.

The microtrauma from dry needling encourages blood flow to the area, bringing in healing cells and promoting tissue repair.

DRY NEEDLING



DRY NEEDLING



MLS ROBOTIC LASER

MLS robotic laser therapy, also known as Multi-Wave Locked System laser therapy, is a non-invasive treatment that can help with cartilage regeneration and pain relief, particularly for conditions like osteoarthritis. It utilizes specific wavelengths of laser light to stimulate cellular activity, reduce inflammation, and promote tissue repair at the cellular level.

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, damaged cells are repaired faster.

MLS ROBOTIC LASER

TISSUE REGENERATION

Modulation of the inflammatory processes

Remodeling of the extracellular matrix

Induction of lymphatic and vascular regeneration

Stimulation of the endothelial function

Reduction of the edema re-absorption times

Prevention against the formation of scar tissue

MLS ROBOTIC LASER

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THANK YOU

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