OVERVIEW: PROGRESSIVE CLINICAL MODALITIES IN ADDRESSING ARTHRITIS SYMPTOMS

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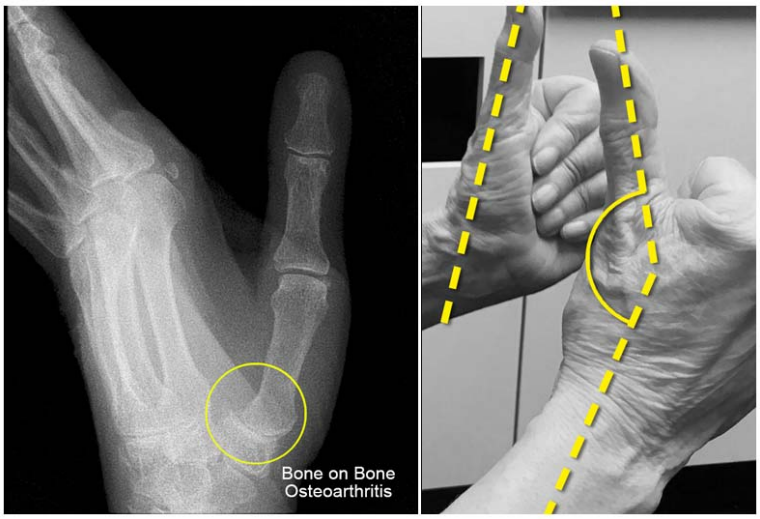


While arthritis starts as bone and cartilage degeneration, oftentimes the first reported signs are pain and swelling in the joint area. To clinically detect the root of the disorder, high resolution ultrasound is commonly recommended as an investigative approach as a quick, painless and non-invasive screening solution.[1] Ultrasound also allows us to more easily detect the presence of Synovial fluid in the joint cavities (ie. in the knee or shoulder cuff areas) without having to resort to more complex and costly solutions like MRI or CT scans. [2]

Identifying the location of the fluid helps the physician by conducting a needle intervention under ultrasound guidance preventing accidentally hitting the bone or injuring a blood vessel while sampling the fluid. With the same needle in place, steroids may be injected into the injured area as well- hence, the diagnostic treatment and study can be conducted within the same sitting. [3]

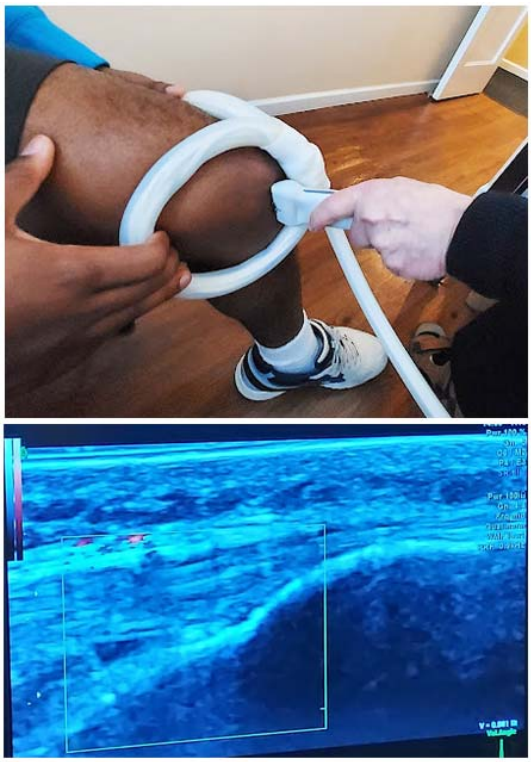
There are essentially two types of arthritis; there's the commonly recognized "bone on bone" OSTEOARTHRITIS which generally causes local symptoms that are mostly due to inflammation of the tendons and lining of the joints. Meanwhile, bone on bone is not usually what triggers the physical pain sensation; it's more likely due to the juxtaposed inflammation within the surrounding musculature.

The second type of arthritis is inflammatory arthritis, commonly known as RHEUMATOID ARTHRITIS. It is important to understand that rheumatoid arthritis in a given area (ie. the knee or the hand) is not a localized disease; it is a systemic disease that can affect many parts of the body-- including the spine, the shoulders, the hands, the knees or the feet. In other words, it could

Use of Ultrasound Elastography (L) records the effects of near-infrared laser therapy(R) of rheumatoid arthritis.

inflame almost any joint. While this is painful it may be associated with increased risk of cancer because the body responds to the stress of a diffuse disease creating abnormal cells. [4]

Some are healing cells and some are abnormal cells that can become cancerous. This means there is an increased risk of developing a tumor. This is indicative with disorders like psoriasis as this affects over 10% of the world's population. More than just a localized skin disease, psoriatic arthritis in the spine may alter the eye and s ER's elbow. There are changes in the, in the blood vessels that can lead to increased risk of stroke and slightly increased risk of developing malignancy with skin inflammation. This systemic manifestation is the whole body reacting to microvascular abnormalities.



While undergoing PEMF treatment, the subject's knee is monitored with 3D Ultrasound Blood Flow for the presence of Synovial fluid in joint cavities.

Current pain relieving modalities including medications, heating pads and over the counter topical solutions may offer temporary management to address the inflammatory process and the fluid collection once located. Additionally, non-invasive treatment technologies such as pulsed bioenergy neurostimulation (aka PEMF) and photobiomodulation (PBMT)- or near infrared & cold laser therapies. Within the past several decades, these modalities and other innovations are part of a growing market of consumer grade non-invasive devices that (now) offer quantitative results of efficacy and restorative care. Use of advanced ultrasound imaging plays a major role in tracking therapeutic progress and timely recalibration of these devices. [5][6]

Meanwhile, research and development of certain brands are now achieving medical-grade status through regulatory approvals in their restorative (healing) properties and the reduction of inflammation through the increase of vascular inflow leading to cell regeneration. [7]

REFERENCES

1) The Role of Musculoskeletal Ultrasound in the Rheumatoid Arthritis Continuum- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7305070/ Published online 2020 Jun 19. PMCID: PMC7305070

2) "Progress in imaging in rheumatology" - E Filippucci, L Di Geso, W Grassi | Nature Reviews Rheumatology, 2014•nature.com Nat Rev Rheumatol. 2014;10:628–634. https://pubmed.ncbi.nlm.nih.gov/25201383/

3) Role of ultrasound in osteoarthritis
https://www.elsevier.es/es-revista-revista-espanola-reumatologia-29-articulo-role-ultrasound-in-osteoarthritis-13020659#:~:text=During%20the%20course%20of%20the%20intermittent%20episodes%20of%20mild%20to,detecting%20the%20amount%20of%20effusion.

4) "EULAR definition of arthralgia suspicious for progression to rheumatoid arthritis"
https://pubmed.ncbi.nlm.nih.gov/27991858/ Ann Rheum Dis . 2017 Mar;76(3):491-496. doi: 10.1136/annrheumdis-2016-209846. Epub 2016 Oct 6.

5) Pulsed Electromagnetic Field (PEMF) Treatment Ameliorates Murine Model of Collagen-Induced Arthritis
Int J Mol Sci. 2023 Jan; 24(2): 1137. Published online 2023 Jan 6. doi: 10.3390/ijms24021137
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9862561/#:~:text=PEMF%20treatment%20at%2010%20Hz,17%2C%20or%20TNF%2D%CE%B1.

6) The Mechanisms and Efficacy of Photobiomodulation Therapy for Arthritis: A Comprehensive Review
PMCID: PMC10531845 PMID: 37762594 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10531845/
*Renlong Zhang and Junle Qu**

7) Image guidance and performance testing - R.Bard- https://angiofoundation.org/research_trials.html
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