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Gouty arthritis and cryotherapy in a manual practitioner: an imaging case review

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Gout is a common inflammatory joint disease typically diagnosed in the first metatarsophalangeal joint. However, its atypical involvement of axial and peripheral joints can pose challenges in its diagnosis and treatment. We present imaging findings of a 67-year-old male with long-standing polyarticular gout managed with pharmacological interventions and cryotherapy. This case explores the effects of cryotherapy as an adjunct for pain management in gouty arthritis, suggesting its potential therapeutic value in reducing inflammation and improving return to activities of daily living as well as an overview of technique alteration that manual therapists may employ.

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KEY WORDS: chiropractic, cryotherapy, diagnostic imaging, gout, gouty arthritis

Arthrite goutteuse et cryothérapie chez un praticien en thérapie manuelle: étude de cas d'imagerie

La goutte est une maladie articulaire inflammatoire fréquente, généralement diagnostiquée au niveau de la première articulation métatarso-phalangienne. Cependant, l'atteinte atypique des articulations axiales et périphériques peut compliquer son diagnostic et son traitement. Nous présentons les résultats d'imagerie d'un homme de 67 ans atteint d'une goutte polyarticulaire de longue date, prise en charge au moyen de traitements pharmacologiques et de la cryothérapie. Ce cas examine les effets de la cryothérapie comme traitement d'appoint de la douleur associée à l'arthrite goutteuse et laisse entrevoir son intérêt thérapeutique potentiel pour réduire l'inflammation et favoriser la reprise des activités de la vie quotidienne. Il présente également un aperçu des adaptations techniques auxquelles les thérapeutes manuels peuvent recourir.

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MOTS CLÉS: chiropratique, cryothérapie, imagerie diagnostique, goutte, arthrite goutteuse

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Case presentation

A 67-year-old male with long-standing polyarticular gout, first diagnosed in 2003, initially involving the first metatarsophalangeal joint, presented with gradual progression to the right shoulder, elbow, wrist, and hand. Pain was non-radiating and throbbing, rated 9/10 at peak and 5–6/10 on average. Flare-ups would occur more than twice yearly, lasting up to 1.5 months, with asymmetric swelling, erythema, warmth, and fevers up to 105°F requiring hospitalization. Managed by a rheumatologist, symptoms improved with cryotherapy, colchicine, and prednisone. Ice was applied for 15-minute intervals every two hours during the first two days, improving swelling, range of motion, and sleep. Uloric (febuxostat), elderberry, and tart cherry extract were ineffective. As a practicing chiropractor, the patient would modify adjusting techniques during flare-ups using drops, instruments, and thumb maneuvers.

Recent imaging of the right hand and wrist (Figure 1), right elbow (Figure 2), and bilateral foot series (Figure 3)

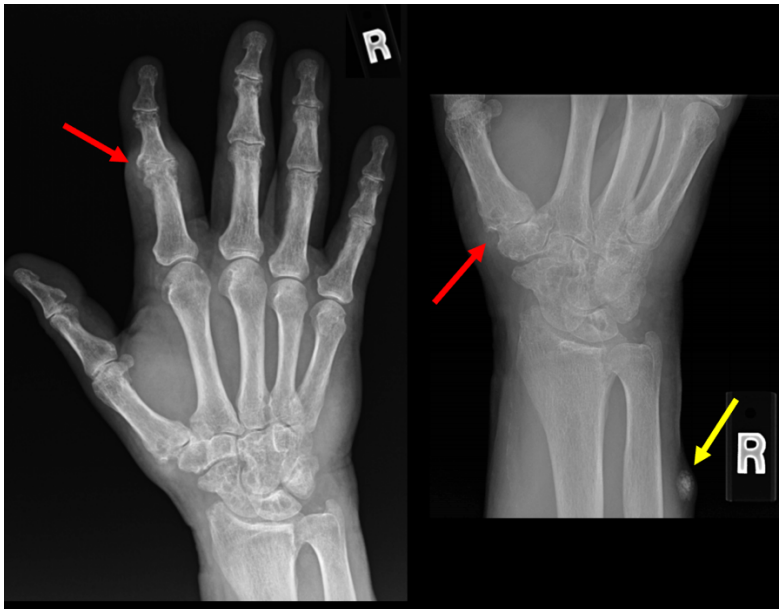

Figure 1.
PA right hand and PA right wrist radiographs. Eccentric erosions with overhanging margins and dense soft tissue swelling present at multiple joints, most notably the second proximal interphalangeal and first carpometacarpal joints (red arrows). A focus of tophaceous deposition with secondary calcification medial to the ulna (yellow arrow).

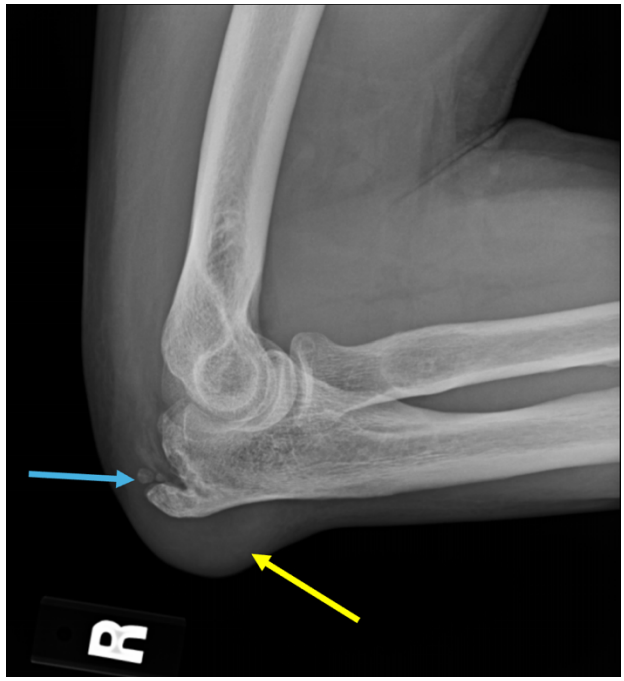

Figure 2.
Lateral right elbow radiograph. Olecranon bursitis (yellow arrow) with triceps enthesopathy and soft tissue calcification (blue arrow).

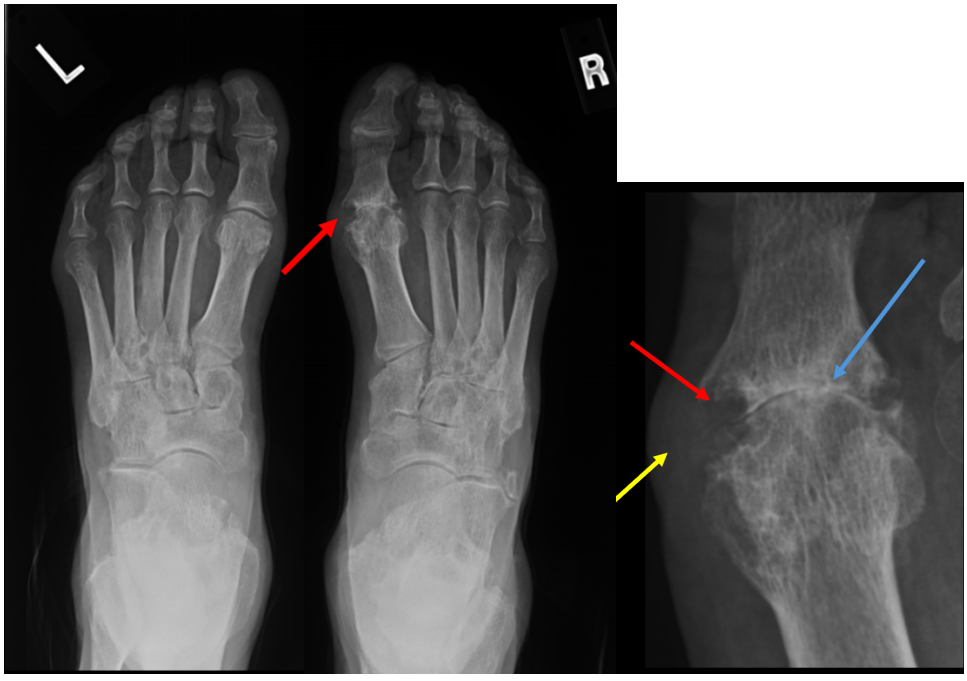

Figure 3.
Bilateral dorsoplantar foot radiographs with magnified view of the right first metatarsophalangeal joint. Asymmetric distribution of erosions with overhanging margins, most notably at the first metatarsophalangeal joint on the right (red arrow), dense soft tissue swelling (yellow arrow), and loss of joint space due to secondary osteoarthrosis (blue arrow).

demonstrated juxta-articular erosions with overhanging margins, soft tissue swelling, periarticular tophi, and diffuse degenerative changes, consistent with typical gout imaging findings.

Discussion

The pathophysiology of gout is marked by deposition of monosodium urate crystals within peri and intra-articular spaces as a result of hyperuricemia.[1,2] The crystals induce an inflammatory response characterized by the release of IL-1β by macrophages and monocytes, initiating a cascade rich with TNF-α and IL-6.[1,3] The cytokine milieu allows for further recruitment of immune and endothelial cells, promoting joint inflammation and damage.[4] This damage to the joint results in the key characteristics of the imaging findings of gouty arthritis as outlined in Table 1 and the differences in monoarticular and polyarticular gout flare-ups in Table 2.

Table 1.
Key radiographic findings of gout on x-ray and the typical anatomic location involved.[10]

Typical radiographic findings	**Typical anatomic location**
Juxta-articular erosion with overhanging edge	1st metatarsophalangeal (MTP) joint
Calcified soft tissue tophus	1st MTP joint Over the Achilles tendon
Bursitis	Olecranon bursa
Joint effusion	Tibiotalar joint
Soft tissue calcification	Prepatellar soft tissues

Table 2.
Key clinical differences to distinguish manifestations of monoarticular and polyarticular gout.[11,12]

Gout subtype	Key clinical distinctions
Monoarticular gout	• 85-90% of cases. • Abrupt and severe onset. • Primarily lower extremity joints. • First metatarsophalangeal joint commonly first involved.
Polyarticular gout	• 3-14% of cases. • Slow and gradual onset. • Initial lower extremities joint involvement and later upper extremity joint involvement. • More common in patients with longstanding disease.

Cryotherapy

Cold-induced neuropraxia, along with physiological effects such as vasoconstriction, myorelaxation, anti-inflammatory, and antioxidative responses, have been well documented with cryotherapy in conditions like rheumatoid arthritis and osteoarthritis.[5,6] While research on cryotherapy in gout remains limited, its application may yield similar therapeutic benefits. Cooling tissues to a depth of 2-4 cm reduces nerve conduction velocity and increases the activation threshold of nociceptors, thereby providing analgesic relief.[7] Contrary to common belief, cryotherapy can be safely used for extended durations and offers benefits beyond the acute phase of injury.[7] Studies have shown that cryotherapy can reduce arterial blood flow to the treatment area by up to 38% and soft tissue blood flow by 26%, contributing to reduced swelling and increased pain tolerance.[7] Furthermore, the development of tophi in gout has been associated with impaired movement and reduced muscle strength.[8] In an experimental gout-induced Wistar rat model, cryotherapy led to a significant restoration of muscle strength, returning to levels comparable to those observed prior to gout induction.[2] These findings suggest cryotherapy may aid in functional recovery by providing analgesic relief and decreased inflammation. In clinical application, chiropractors and other providers should consider incorporating it within multimodal pain management, educating patients on its benefits to enhance mobility and support return to daily activity.

Impact of gout on physical and manual tasks

Tophi in upper and lower limb joints alter joint mechanics, leading to gait changes, reduced muscle strength, and biomechanical foot impairments that limit daily activities.[8] Healthcare practitioners relying on strength and precision such as chiropractors, physiotherapists, and surgeons may need to modify clinical techniques during flare-ups to mitigate pain while ensuring optimum patient care. Chiropractors with reduced grip strength during flare-ups may need to utilize low-force adjustments, instrument-assisted methods, Thompson drop tables, or flexion-distraction protocols.[9]

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Key messages:

- Gout pathophysiology is driven by hyperuricemia leading to monosodium urate crystal deposition in peri- and intra-articular tissues which results in the characteristic imaging findings of gout.
- Imaging findings of gout consists of juxta-articular erosions with overhanging margins, soft tissue swelling, periarticular tophi, and diffuse degenerative changes later in the disease.
- Symptomatology of gout includes periodic flare-ups of joint pain, swelling, and erythema and may progress to systemic symptoms such as fever and fatigue.
- Cryotherapy produces cold-induced neuropraxia and physiological effects which may reduce pain, enhance mobility, and facilitate patient return to daily activities.
- Manual therapists diagnosed with gout may need to modify techniques during flare-ups.

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