Received: 7 April 2022 | Revised: 10 August 2022 | Accepted: 2 November 2022

DOI: 10.1002/ccr3.6740

CASE REPORT

Clinical Case Reports Open Access WILEY

A case of knuckle pad syndrome in a middle-aged man

Zachary Chandler[1] | **Kimberly Seamon**[1] | **Karishma Ramsubeik**[2] | **Gurjit Kaeley**[2]

[1]Division of General Medicine, Department of Medicine, UF COM – Jacksonville, Jacksonville, Florida, USA

[2]Division of Rheumatology and Clinical Immunology, Department of Medicine, UF COM – Jacksonville, Jacksonville, Florida, USA

Correspondence
Zachary Chandler, Division of General Medicine, Department of Medicine, UF COM – Jacksonville, Jacksonville, FL 32209-6511, USA.
Email: zachary.chandler@jax.ufl.edu

Abstract

Knuckle pads are benign papules, nodules, or plaques overlying joints and typically manifest at the proximal interphalangeal joints (PIPs). They may be confused with other dermatologic or rheumatologic diseases. Treatment options for primary knuckle pads are limited and acquired knuckle pads typically improve with withdrawal of the offending insult.

KEYWORDS

joints, knuckle pads, musculoskeletal system, nodules, ultrasound

1 | CASE DESCRIPTION

A 58-year-old man presented for the evaluation of joint deformity of the bilateral hands for several years. His past medical history included cervical spine stenosis with myelopathy. There was no history of joint pain or joint swelling, but he did report morning stiffness lasting several hours. He reported that his hands feel tight and this sensation was worse with use. His review of systems was otherwise unrevealing including no fever, chills, night sweats, malaise, visual changes, rash, oral ulcers, hair loss, dry eyes, dry mouth, photosensitivity, Raynaud's phenomenon, chest pain, dyspnea, diarrhea, hematochezia, hematuria, back pain, symptoms suggestive of dactylitis, Achilles tendonitis, or plantar fasciitis. There was no history of similar lesions in family members or family history of rheumatologic disease. He was previously employed as a school teacher and has since retired.

Vital signs were normal. Physical examination revealed a healthy-appearing middle-aged male with multiple subcutaneous nodules of the bilateral hands at the PIPs and DIPs without evidence of synovitis as displayed in Figure 1. There were dystrophic nails. There was no skin rash.

X-rays of the bilateral hands were obtained as displayed in Figures 2 and 3. Studies were remarkable for moderate first carpometacarpal joint osteoarthritis of the right hand. Rheumatoid factor and cyclic citrullinated peptide antibodies were negative.

Musculoskeletal ultrasound of the right hand was performed to evaluate for synovitis. There was no evidence for synovitis, tenosynovitis, or erosions of the dorsal wrist. The carpal and volar recesses were unremarkable. There was mild osteophyte formation with grade 1 synovitis of MCP 2 on dorsal, volar, and side views. The third and fourth fingers were unremarkable for synovitis, tenosynovitis, or erosions on dorsal and volar views. Thickened dermis of the second (Figures 4 and 5), third (Figures 6 and 7), and fourth fingers was seen on dorsal view with otherwise unrevealing images including no synovitis, tenosynovitis, or erosions. There was no evidence of synovitis, tenosynovitis, or erosions on dorsal and volar views of the long DIP of the second, third, fourth, and fifth fingers.

Patient was diagnosed with idiopathic knuckle pads on the basis of clinical history and musculoskeletal ultrasound. He was provided reassurance about the benign nature of the findings.

2 | CASE DISCUSSION

Knuckle pads are well-circumscribed smooth, firm papules, nodules, or plaques overlying the small joints of the hands and feet. They were first described in 1893 by Garrod but have been observed in the works of the sculpturist Michelangelo dating back to the 1500s.[1] They are benign fibromas and typically asymptomatic but may occasionally be painful. They typically present at the PIP joints rather than the MCP joints but can present in any of the small joints of the hands.[2] Less commonly, the feet and knees may be involved.

FIGURE 1 Image of the bilateral hands featuring multiple subcutaneous nodules overlying the PIPs and DIPs.

The pathophysiology has not been entirely elucidated, and knuckle pads are typically idiopathic. They are a fibromatous disease with fibroblast proliferation that then develops into fibrosis.[3] They typically manifest in the second and third decades of life.[4] They may be seen in a number of inherited syndromes including palmar fibromatosis (Dupuytren's disease), plantar fibromatosis (Ledderhose's disease), camptodactyly, epidermolytic palmoplantar keratoderma, Bart–Pumphrey syndrome, and acrokeratoelastoidosis of Costa.[2,5–7] They may also be secondary and acquired through trauma. Secondary knuckle pads are well-described among athletes such as in boxers and swimmers as well as in certain professions such as carpet layers.[8–10] Knuckle pads have also been described in patients with bulimia nervosa and obsessive–compulsive disorder.[11,12] The histopathology of secondary knuckle pads is distinctly different from primary knuckle pads and demonstrates hyperkeratosis with hypergranulosis and acanthosis.[4] It is histologically similar to callus.

Due to the appearance of the lesions and close association with joints such as the PIP, it may be clinically difficult to distinguish knuckle pads from other entities such as synovitis, rheumatoid nodules, Heberden nodes, or even gouty arthropathy. Knuckle pads may also be difficult to distinguish from other dermatologic diagnoses such as erythema elevatum diutinum, verruca, granuloma annulare, and pachydermodactyly.[13–16] Patients are often referred to rheumatologists for evaluation and undergo evaluation for rheumatologic disease such as in the case of our patient. Distinguishing knuckle pads from synovitis may be challenging on the basis of physical examination alone. Musculoskeletal ultrasound may be helpful to characterize knuckle pads, which have a distinct appearance on ultrasound.

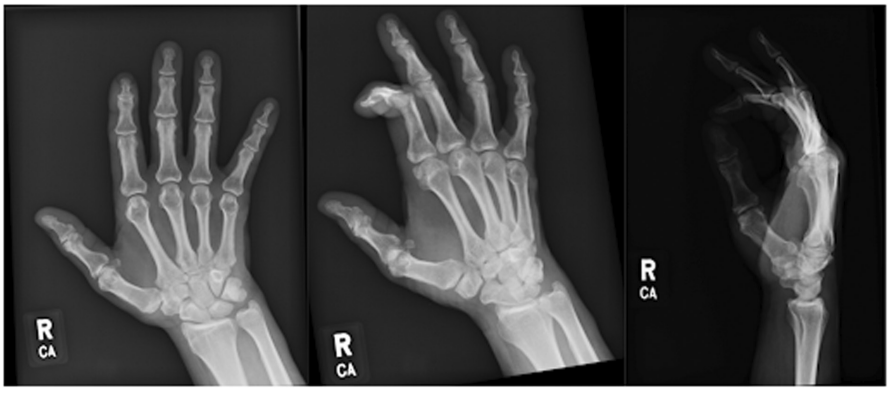

FIGURE 2 Radiographs of the right hand.

FIGURE 3 Radiograph of the left hand.

FIGURE 5 Transverse PIP of the 2nd finger with Doppler examination with thickened dermis superficially.

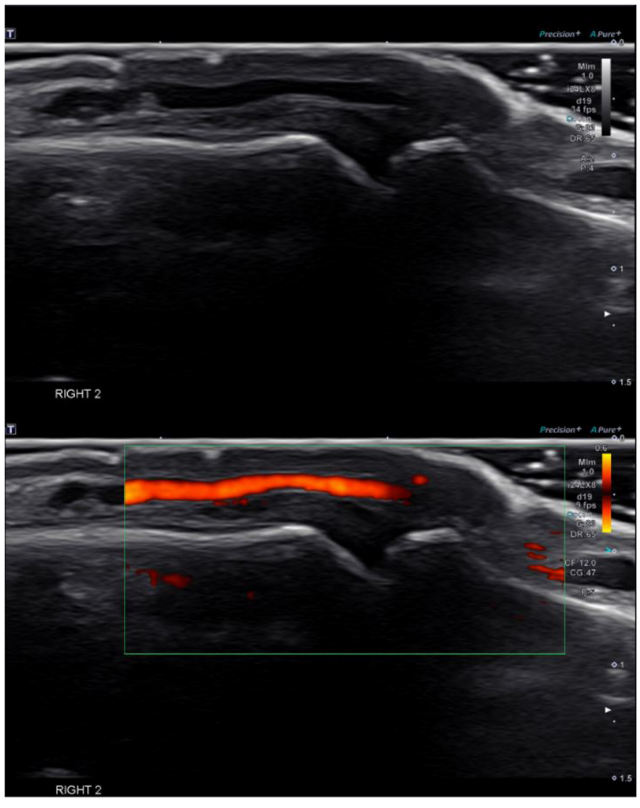

FIGURE 4 Right Long PIP of the 2nd finger with Doppler examination with thickened dermis superficially.

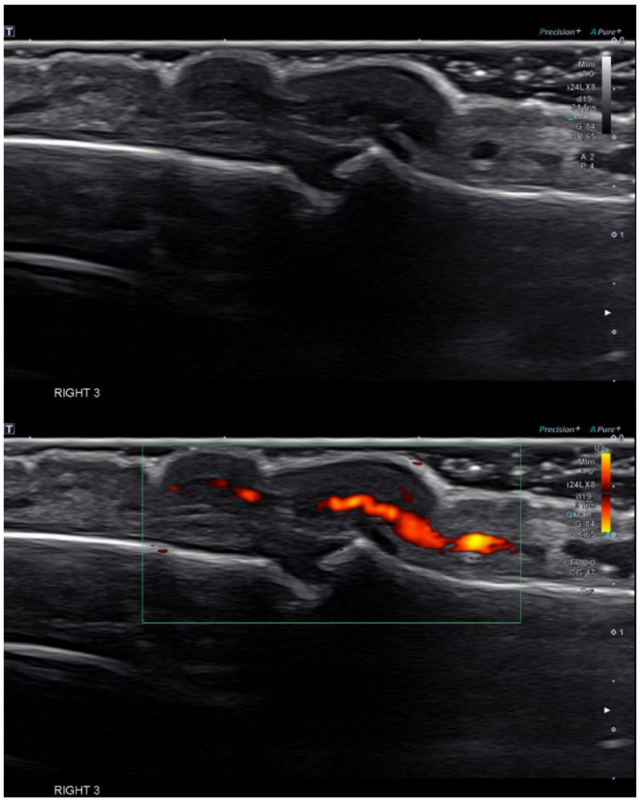

FIGURE 6 Right Long PIP of the 3rd finger with Doppler examination with thickened dermis superficially.

FIGURE 7 Transverse PIP of the 3rd finger with Doppler examination with thickened dermis superficially.

On ultrasound, primary knuckle pads will appear as subcutaneous hypoechogenic nodular thickenings. They typically have a dome shape with irregular borders and are noncompressible with the transducer. Power Doppler should be performed, which will reveal absent vascularization or only involvement of the periphery of the lesion. The adjacent soft tissue, tendons, and joints should not be involved. Rarely, MRI may be performed, which will demonstrate low-to-intermediate signal intensity on T1-W1 and T2-WI MRI.[4,17–20]

Treatment of knuckle pads may be challenging. They are benign, but some patients may desire intervention for cosmetic purposes in which case there are limited therapies. Some authors have described successful application of intralesional triamcinolone as well as fluorouracil, cantharidin-podophyllotoxin-salicylic acid, and topical high-dose salicylic acid and urea.[21–24] Acquired knuckle pads such as in the case of repetitive trauma should improve within months if the offending insult is removed.

3 | CONCLUSIONS

Knuckle pads are a rare, benign clinical entity and can be classified according to whether they are primary or secondary. They may be difficult to distinguish clinically from other rheumatologic processes such as synovitis, early psoriatic arthritis, or rheumatoid nodules. Musculoskeletal ultrasound may be helpful in establishing the diagnosis. The clinical course is benign, and therapeutic interventions are limited.

AUTHOR CONTRIBUTIONS

Zachary Chandler: Conceptualization; writing – original draft; writing – review and editing. **Kimberly Seamon:** Conceptualization; writing – original draft; writing – review and editing. **Karishma Ramsubeik:** Conceptualization; investigation; resources; supervision. **Gurjit Kaeley:** Conceptualization; data curation; software; supervision; visualization.

FUNDING INFORMATION

The author(s) received no financial support for the research, authorship, and/or publication of this article.

CONFLICT OF INTEREST

The authors whose names are listed above certify that they have NO affiliations with or involvement in any organization or entity with any financial interest or nonfinancial interest in the subject matter or materials discussed in this manuscript.

DATA AVAILABILITY STATEMENT

The original contributions presented in the case report are included in the article/supplementary material; further inquiries can be directed to the corresponding author/s. Deidentified data is available on request.

ETHICAL APPROVAL

An ethics approval was not required in our case due to reported data being part of the evaluation of patient and no patient interventions performed.

CONSENT

Written consent was obtained from the patient to publish his case.

ORCID

Zachary Chandler https://orcid.org/0000-0002-6707-9855

REFERENCES

1. Mackey SL, Cobb MW. Knuckle pads. *Cutis*. 1994;54(3):159-160.
2. Kelenjian S, Mattjie RA, Franz R, Biedermann T, Brockow K. Clinical features and management of superficial fibromatoses. *J Dtsch Dermatol Ges*. 2019;17(4):393-397. doi:10.1111/ddg.13808
3. Lagier R, Meinecke R. Pathology of "knuckle pads". Study of four cases. *Virchows Arch A Pathol Anat Histol*. 1975;365(3):185-191. doi:10.1007/BF00434037
4. Hyman CH, Cohen PR. Report of a family with idiopathic knuckle pads and review of idiopathic and disease-associated

knuckle pads. *Dermatol Online J*. 2013;19(5):18177 Published 2013 May 15.
5. Mikkelsen OA. Knuckle pads in Dupuytren's disease. *Hand*. 1977;9(3):301-305. doi:10.1016/s0072-968x(77)80121-6
6. Gönül M, Gül Ü, Hizli P, Hizli Ö. A family of Bart-Pumphrey syndrome. *Indian J Dermatol Venereol Leprol*. 2012;78(2):178-181. doi:10.4103/0378-6323.93636
7. Barrick C, Moran J, Oram C, Purcell S. Acrokeratoelastoidosis and knuckle pads coexisting in a child. *Cutis*. 2018;102(5):344-346.
8. Dickens R, Adams BB, Mutasim DF. Sports-related pads. *Int J Dermatol*. 2002;41(5):291-293. doi:10.1046/j.1365-4362.2002.01356_3.x
9. Cohen PR, Eliezri YD, Silvers DN. Athlete's nodules: sports-related connective tissue nevi of the collagen type (collagenomas). *Cutis*. 1992;50(2):131-135.
10. Kanerva L. Knuckle pads from boxing. *Eur J Dermatol*. 1998;8(5):359-361.
11. Calikoğlu E. Pseudo-knuckle pads: an unusual cutaneous sign of obsessive-compulsive disorder in an adolescent patient. *Turk J Pediatr*. 2003;45(4):348-349.
12. Nenoff P, Woitek G. Images in clinical medicine. Knuckle Pads. *N Engl J Med*. 2011;364(25):2451. doi:10.1056/NEJMicm1008915
13. Wahl CE, Bouldin MB, Gibson LE. Erythema elevatum diutinum: clinical, histopathologic, and immunohistochemical characteristics of six patients. *Am J Dermatopathol*. 2005;27(5):397-400. doi:10.1097/01.dad.0000175526.89249.be
14. Abeck D, Tetsch L, Lüftl M, Biedermann T. Extragenital cutaneous warts - clinical presentation, diagnosis and treatment. *J Dtsch Dermatol Ges*. 2019;17(6):613-634. doi:10.1111/ddg.13878
15. Piette EW, Rosenbach M. Granuloma annulare: clinical and histologic variants, epidemiology, and genetics. *J Am Acad Dermatol*. 2016;75(3):457-465. doi:10.1016/j.jaad.2015.03.054
16. Vincek V, Vause A, Vincek E, et al. Knuckle pads: an ancient disease frequently misdiagnosed because of minimal modern attention. *Dermatol Online J*. 2021;27(9):1-4. doi:10.5070/D327955139
17. Giovannini I, Callegher SZ, Errichetti E, Vita SD, Zabotti A. Knuckle pads mimic early psoriatic arthritis. *Reumatismo*. 2021;73:67-69.
18. De Keersmaeker A, Vanhoenacker F. Imaging features of knuckle pads. *J Belg Soc Radiol*. 2016;100:67.
19. Tamborrini G, Gengenbacher M, Bianchi S. Knuckle pads – a rare finding. *J Ultrason*. 2012;12:493-498.
20. Lopez-Ben R, Dehghanpisheh K, Chatham WW, Lee DH, Oakes J, Alarcón GS. Ultrasound appearance of knuckle pads. *Skeletal Radiol*. 2006;35:823-827.
21. Ketchum LD. The use of the full thickness skin graft in Dupuytren's contracture [Published correction appears in Hand Clin 1992 May;8(2):followi]. *Hand Clin*. 1991;7(4):731-743.
22. Weiss E, Amini S. A novel treatment for knuckle pads with intralesional fluorouracil. *Arch Dermatol*. 2007;143(11):1458-1460. doi:10.1001/archderm.143.11.1458
23. Hasbún C, Sandoval M, Curi M. A novel treatment for idiopathic knuckle pads with cantharidin-podophylotoxin-salicylic acid. *Pediatr Dermatol*. 2019;36(4):544-545. doi:10.1111/pde.13803
24. Sogliani D, Mura C, Tamborrini G. Successful treatment of idiopathic knuckle pads with a combination of high-dose salicylic acid and urea topical keratolytics: a case report. *Dermatol Reports*. 2021;13(1):9072. Published 2021 Apr 13. doi:10.4081/dr.2021.9072

How to cite this article: Chandler Z, Seamon K, Ramsubeik K, Kaeley G. A case of knuckle pad syndrome in a middle-aged man. *Clin Case Rep*. 2022;10:e06740. doi:10.1002/ccr3.6740