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**Case Presentation**

**Report of a Family with Idiopathic Knuckle Pads and Review of Idiopathic and Disease-associated Knuckle Pads**

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**Abstract**

Knuckle pads are a rare, frequently overlooked, thickening of the skin usually overlying the extensor surface of the proximal interphalangeal joints. They are well- circumscribed, benign lesions that generally do not require treatment. Idiopathic knuckle pads must be differentiated from similar appearing lesions or trauma-induced pseudo-knuckle pads. Knuckle pads have been observed in association with autosomal dominant conditions such as Bart-Pumphrey syndrome, Dupuytren's contracture, Ledderhose disease, and Peyronie's disease. To the best of our knowledge, idiopathic familial knuckle pads have not previously been described in the English language literature. We describe a sister and brother with familial idiopathic knuckle pads with no associated conditions.

**Keywords: Bart-Pumphrey, condition, Dupuytren, familial, idiopathic, knuckle, Ledderhose, pad, Peyronie, pseudo-knuckle, syndrome**

**Introduction**

Knuckle pads are a rare benign thickening of the skin on the extensor surface of the finger joints. Since Garrod first described the condition in 1893, little literature has been published on the disease [1]. We describe a 19-year-old woman with idiopathic knuckle pads whose 14-year-old brother also has knuckle pads and review the literature on this condition.

**Case Report**

A healthy 19-year-old woman without any personal conditions or familial syndromes presented with well circumscribed, thickened plaques on the proximal interphalangeal joints on all her fingers except her thumbs (Figures 1 and 2). The hypopigmented plaques were asymptomatic; they were not painful and they did not itch. The skin lesions had no effect on movement or sensation. The patient recalled that the flat-topped nodules had developed when she was 5 years of age and there was no prior source of trauma.

Correlation of the history and clinical presentation established a diagnosis of idiopathic knuckle pads. The patient's 14-year-old brother had developed similar lesions when he was 5 years of age. No additional investigation nor intervention was recommended.



**Figure 1.** Distant view of idiopathic knuckle pads on the dorsal fingers of both hands.



**Figure 2a.** Closer views of the right dorsal hand shows asymptomatic, prominent hypopigmented flat-topped nodules overlying the proximal interphalangeal joints.



**Figure 2b.** Left dorsal hand.

## Discussion

The first observations of knuckle pads were described by Garrod in 1893, but there are many older representations of knuckle pads in art. Most notably, Italian Renaissance artist Michelangelo featured knuckle pads in many of his works, including the Statue of David and the Sleeping Slave [1,2]. Although "knuckle pads" is now the most well known name for this condition, this rare disease has been previously referred to as helodermia, keratosis supracapularis, pulvinus, and subcutaneous fibroma [3].

## Epidemiology

Knuckle pads usually appear between 15-30 years of age and persist through adulthood [4]. Because the lesions are asymptomatic, they generally go unreported; hence, their exact prevalence is unknown. Mikkelsen, who has conducted the most complete epidemiological study to date in 1977, found that knuckle pads affected 8.8% of 1871 people evaluated in Haugesund, Norway [5].

## Clinical Presentation

Knuckle pads generally occur on the proximal interphalangeal joints, but have been noted on the distal interphalangeal and metacarpophalangeal joints. Indeed, in a few individuals, they have occurred on the thumbs and toes. They are discrete, freely-movable, thickened, callous-like plaques, which usually measure between 0.5-1.5 cm in diameter [6]. Hyperpigmentation or hypopigmentation has been observed. Although they are asymptomatic, cosmetic concerns often result in medical attention.

## Pathogenesis

Knuckle pads usually develop as individual lesions over months or years. They generally do not appear concurrently [4]. The lesions undergo a proliferative phase before a fibrotic stage. During the proliferative phase, the lesion grows towards the surface. During the fibrotic stage, there is a decrease in fibroblasts as they are replaced with collagen [7].

## Pathology

The main pathology features of knuckle pads are acanthosis with overlying hyperkeratosis. There are elongated rete ridges and a loosened stratum corneum [8]. The unencapsulated nodule consists of "plump" fibroblasts with normal nuclei, which are irregularly laid in loose bands of collagen [7,9]. The noncicatricial fibroblast proliferation has some capillaries. However, neither an increase of elastic fibers nor iron deposits are observed [9]. Huetson evaluated biopsies of knuckle pads using electron microscopy and observed spindle-shaped myofibroblasts [10]. Lopez-Ben et al. examined knuckle pads with ultrasound and saw "dorsal soft-tissue thickening with diffuse or focal hypoechoic areas [11]."

## Diagnosis

The diagnosis of knuckle pads is primarily based on the clinical morphology of the skin lesions; biopsy of suspected lesions may be considered to exclude conditions with similar appearing morphology. A history should be taken to determine if any trauma could have caused pseudo-knuckle pads. Once the diagnosis of knuckle pads is established, additional evaluation for associated conditions or syndromes should be considered. If necessary, an ultrasound can be used to test for synovial proliferation to rule out synovitis [11].

## Associated Conditions

**Table 1.** Conditions described in patients with knuckle pads.

Condition	Reference
Avitaminosis A	12
Clubbed fingers	15
Esophageal cancer	15
Glossitis	12
Oral leukoplakia	15
Phenytoin treatment	16
Pseudoxanthoma elasticum	13
Seborrheic dermatitis	12

**Table 2.** Differential diagnoses of knuckle pads

Disorder	Differentiating features
Cutaneous carcinoma[9]	Malignant tumor of the skin usually restricted to single digit
Dystrophic epidermolysis bullosa[4]	Severe subepidermal blistering
Epidermoid cyst[19]	Cystic lesion that is often caused by trauma
Epidermolysis bullosa acquisita[4]	Autoimmune-related subepidermal blistering
Erythema elevatum diutinum[7]	Red, purple, brown, or yellow nodules on extensor surface. Rare type of leukocytoclastic vasculitis
Erythropoietic protoporphyria[4]	Hyalin deposits in waxy scarring
Foreign body granuloma[7]	Immune response to foreign body
Gottron's papules[20]	Flat erythematous nodules as a result of dermatomyositis
Gouty Tophi[9]	Deposition of monosodium urate crystals
Granuloma annulare [19]	Inflammatory skin condition that causes ringed papules
Heberden's or Bouchard's nodes[9]	Bony growths on the knuckles
Reactive hyperplasia of the paratenon [19]	Hypertrophic scar tissue on the extensor tendon. The lesion moves with the extensor tendon.
Rheumatoid nodules[7]	Subcutaneous nodules associated with rheumatoid arthritis or rheumatoid nodulosis
Synovitis[11]	Inflammation of synovial membrane usually from synovial fluid buildup
Systemic lupus erythematosus[21]	Rheumatoid nodules may appear on knuckles in 5-7% of patients
Verruca vulgaris[20]	Human papillomavirus-associated changes in epidermal cells
Xanthoma[7]	Cholesterol and fat nodule in the skin

Knuckle pads have been associated with several disorders (Table 1) [12,13,14,15,16]. The majority of knuckle pad-related disorders are fibrosing conditions. Most notably, Dupuytren's contracture, the thickening of the palmar aponeurosis, is strongly linked to knuckle pads. Garrod observed this link in his original paper in 1983 and it remains the most frequently cited association [1].

Schwander reported that 20% of patients requiring surgery for Dupuytren's contracture also had knuckle pads [17]. In a subsequent study, Mikkelsen observed that knuckle pads were present in 44.3% of patients with Dupuytren's contracture. In this group of patients, the incidence of Dupuytren's contracture-associated knuckle pads was more than four times higher than in patients without Dupuytren's contracture. Knuckle pads have also been reported with Ledderhose disease, a related fibromatosis affecting the plantar aponeurosis, and Peyronie's disease, a similar fibromatosis of the tunica albuginea [5].

Conversely, Lopez-Ben et al. challenged the connection between knuckle pads and the fibromatosis diseases by comparing five individuals using ultrasound. They found that the hypoechogenicity was diffuse in knuckle pads of Dupuytren's contracture and marginated in the patients without the fibromatosis [11].

Dupuytren's contracture and the other aforementioned fibromatosis diseases may exhibit an autosomal dominant inheritance pattern. Consequentially, most patients who have hereditary knuckle pads- for example, two patients by Paller and Hebert- are associated with this triad of connective tissue diseases: Dupuytren's contracture, Ledderhose's disease, and Peyronie's disease [4]. In 1967, Bart and Pumphrey discovered a unique family in whom knuckle pads and palmoplantar keratoderma were present. In addition, the family also had sensorineural and conductive hearing loss and total leukonychia. They observed that this disorder, now called Bart-Pumphrey syndrome, spanned multiple generations through an autosomal dominant pattern [18].

In the largest review of individuals with knuckle pads to date, Morginson saw no familial pattern in his thirty patient series [6]. According to our review, there have been no reported instances in the English language literature of familial idiopathic knuckle pads that are not associated with either a fibromatosis or Bart-Pumphrey syndrome.

## Differential Diagnosis

Knuckle pads are benign and usually do not respond to treatment. However, it is important to differentiate knuckle pads from clinically similar appearing lesions that are either treatable or associated with more significant pathology (Table 2) [4,7,9,11,19,20,21]. In addition, it is helpful to establish the correct diagnosis of knuckle pads in order to avoid using treatments for morphologically similar diseases that are ineffective for knuckle pads.

A common condition that mimics idiopathic knuckle pads is knuckle pad-like calluses caused by repeated frictional trauma. The frictional trauma-caused calluses are also referred to as pseudo-knuckle pads or occupational knuckle pads. Examination of the lesions show the pathology features of a simple callous [19]. A complete history can usually elicit the related routine trauma that causes the calluses. Indeed, they have been linked to specific professions and activities that cause trauma to the knuckles. For example, occupational knuckle pads have been described in carpet layers on their right hands, sheep shearers on their left hands, and tailors on their right hands [22].

Pseudo-knuckle pads have also been called chewing pads and have been connected to obsessive-compulsive behaviors that involve rubbing or chewing on the knuckles [23]. Unlike idiopathic knuckle pads, these lesions have proven to be responsive to treatment with salicylic acid, lactic acid, or urea preparations. They also begin to resolve when the cause of repeated trauma is ceased [6].

## Treatment

There is no current consensus that treatment should be attempted because knuckle pads are asymptomatic. Until recently, there were no patients with idiopathic knuckle pads whose lesions responded to treatment. Excision of idiopathic knuckle pads is usually not recommended because of the high risk of scarring and recurrence [4].

Paller and Hebert recommended topical corticosteroids with occlusion. However, this treatment was not effective for the patients included in their report; for example, they described a patient who was unsuccessfully treated with 0.025% fluocinolone acetonide ointment over two months. In addition, they also described a patient whose knuckle pads had no response to treatment with salicylic acid gel under polyvinyl wrap for three months [4]. Allison and Allison reduced the size of a knuckle pad with carbon dioxide freezing and intralesional corticosteroid injection. However, the patient stopped treatment because of discomfort [4].

In 2007, Weiss and Amini described two individuals who experienced successful shrinking of their idiopathic knuckle pads after intralesional 5-fluorouracil. The investigators postulated the mechanism for improvement was related to the antimetabolite drug's ability to inhibit fibroblast proliferation [24]. This novel treatment could be the answer to cosmetic concerns and also to practical and functional issues such as difficulty wearing rings.

## Conclusion

A family in whom the siblings have idiopathic knuckle pads is described. To our knowledge, this is the first report of familial idiopathic knuckle pads without any associated condition or knuckle pad-related inherited disorders. The current literature on knuckle pads is reviewed. Taking a complete history is important to confirm the diagnosis of benign knuckle pads and to exclude other disorders that require treatment.

## References

1. Garrod AE. On an unusual form of nodule upon the joints of the fingers. *Br Med J* 1893;29:157-61.
2. Allison JR, Allison JR. Knuckle pads. *Arch Dermatol.* 1966;9:185-191. [PMID: 5910872]
3. Ronchese F. Knuckle pads and similar-looking disorders. *Giorn. Ital. Derm.* 1966;107:1227-1236. [PMID: 6014646]
4. Morginson WJ. Discrete keratoderma over the knuckles and finger articulation. *Arch Dermatol.* 1955;71:349-353. [PMID: 14349379]
5. Paller AS, Hebert AA. Knuckle pads in children. *Am J Dis Child.* 1986;140:915-917. [PMID: 2943155]
6. Mikkelsen A. Knuckle pads in Dupuytren's disease. *Hand.* 1977;9:301-305. [PMID: 608634]
7. Kodama BF, Gentry RH, Fitzpatrick JE. Papules and plaques over the joint spaces. *Arch Dermatol.* 1993;129:1044-1045. [PMID: 8352610]
8. Lagier R, Meinecke R. Pathology of "knuckle pads." *Virchows Arch A Pathol Anat Histol.* 1975;365:185-191. [PMID: 804749]
9. Huetson JT. Some observations on knuckle pads. *J Hand Surg.* 1984;9:75-78. [PMID: 6707508]
10. Lopez-Ben R, Dehghanpisheh K, Chatham WW, Lee DH, Oakes J, Alarcon GS. Ultrasound appearance of knuckle pads. *Skeletal Radiol.* 2006;35:823-827. [PMID: 16688449]
11. Singh PK, Pandey SS, Singh G. Knuckle pads. *Indian J Dermatol.* 1986;31:49-51. [PMID: 3443475]
12. Weiss E, Amini S. A novel treatment for knuckle pads with intralesional fluorouracil. *Arch Dermatol.* 2007;143:1458-1460. [PMID: 18025384]
13. Huetson JT, Wilson WF. Knuckle pads. *Aust. N.Z. J. Surg.* 1973;42:274-277. [PMID: 4521078]
14. Mackey SL, Cobb MW. Knuckle pads. *Cutis.* 1994;3:159-160. [PMID: 7813233]
15. Schwander, R. A special case of multiple, symmetric fibroma of the fingers. *Arch. Derm. Syph. (Berl.)* 1953;196:413-421. [PMID: 13125410]
16. Calikoğlu, E. Pseudo-knuckle pads: an unusual cutaneous sign of obsessive-compulsive disorder in an adolescent patient. *Turk J Pediatr.* 2003;45:348-349. [PMID: 14768804]
17. Bart RS, Pumphrey RE. Knuckle pads, leukonychia and deafness-a dominantly inherited syndrome. *N Engl J Med.* 1967;276:202-207. [PMID: 6015974]
18. Kingsley HJ. A case of knuckle pads. *Cent Afr J Med.* 1970;16:210. [PMID: 5483672]
19. Stankler L. Pseudoxanthoma elasticum with a knuckle pad. *Acta Derm Venereol.* 1967;47:263-266. [PMID: 4166063]
20. Koba S, Misago N, Narisawa Y. Knuckle pads associated with clubbed fingers. *J Dermatol.* 2007;34:838-840. [PMID: 18078411]
21. Ritter SB, Petersen G. Esophageal cancer, hyperkeratosis, and oral leukoplakia. Occurrence in a 25-year-old woman. *JAMA.* 1976;235:1723. [PMID:946469]
22. Pierard GE, Lapiere CM. Phenytoin dependent fibrosis in polyfibromatosis syndrome. *Br J Dermatol.* 1979;100:335-341. [PMID: 435394]
23. Christen-Zaech S, Chamlin SL. An 11-year-old girl with knuckle plaques. Knuckle pads. *Pediatr Ann.* 2007;26:459-460. [PMID:17824272]
24. Hahn BH, Yardley JH, Stevens MB. 'Rheumatoid' nodules in systemic lupus erythematosus. *Ann Intern Med.* 1970;72:49-58. [PMID: 5208132]