SCIENTIFIC ARTICLE

Dorsal Pads Versus Nodules in Normal Population and Dupuytren's Disease Patients

Ghazi M. Rayan, MD, Munawar Ali, MD, J Orozco, MD

Purpose There is ambiguity about using the term "knuckle pads" in Dupuytren's disease (DD). Clear definitions of dorsal knuckle pads and nodules are lacking and the prevalence of these 2 entities has not been determined. We sought to define these terms and investigate the distribution and frequency of dorsal knuckle pads and dorsal nodules in the normal volunteers and in DD patients.

Methods We assessed 50 consecutive study patients with DD and a convenience sample group of 50 control patients without DD for dorsal cutaneous pads (DCP) (ie, thickening, sclerosis, and loss of skin elasticity) and dorsal Dupuytren's nodules (DDN) (ie, solid tumor-like masses over the digital joints). Demographic information was collected for both groups, including the extent of the disease in DD patients. We examined both groups for the presence of dorsal lesions and their characteristics, and the DD patients for other local and ectopic Dupuytren's lesions and for the level of diathesis.

Results None of the control patients had DDN, whereas 9 DD patients had DDN ($p = .002$). Nine control patients had DCP, whereas 11 DD patients had DCP ($p = .803$) Among the 9 control patients with DCP, pads were predominantly over the proximal interphalangeal joints and tended to occur in men with physically demanding occupations, and in the dominant hand. The index and long fingers were most frequently affected. Six patients had only DCP, 4 had only DDN, and 5 had both DDN and DCP. In the control and study groups, the DCP characteristics and patients' demographic data were comparable. Patients with DDN were white men with physically undemanding occupations and had lesions over the proximal interphalangeal joints, most frequently in the index finger, with an average size of 6 mm. Neither DCP nor DDN were encountered in the thumb.

Conclusions Future studies should clearly distinguish between DCP and DDN. Although DDN are pathognomonic of DD, DCP demonstrates similar prevalence in normal and DD populations. *(J Hand Surg 2010;35A:1571–1579. © 2010 Published by Elsevier Inc. on behalf of the American Society for Surgery of the Hand.)*

Key words Dupuytren's diathesis, Dupuytren's disease, Garrod's nodes, knuckle pads, non-Dupuytren's disease.

In 1904, GARROD[1] PUBLISHED a brief communication titled "Concerning pads upon the finger joints and their clinical relationships," in which he described "pads or nodules" as "excrescences" confined to the dorsum of the proximal interphalangeal (PIP) joints that are usually painless, variable in size, and bilateral but asymmetrical. From this original account it seemed that Garrod was describing skin lesions rather than deeper

From the University of Oklahoma Health Sciences Center; INTEGRIS Baptist Medical Center, Oklahoma City, OK.

The senior author (G.M.R.) would like to thank Ms. Annette Kezbers for her assistance in preparing this manuscript.

Received for publication March 17, 2010; accepted in revised form June 1, 2010.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

Corresponding author: Ghazi M. Rayan, MD, Hand Microsurgery, 3366 NW Expressway #700, Oklahoma City, OK 73112; e-mail: ouhsgmr@aol.com.

0363-5023/10/35A10-0001$36.00/0
doi:10.1016/j.jhsa.2010.06.001

subcutaneous tumor-like growths that are akin to the palmar Dupuytren nodules. However, he occasionally called these lesions *nodules*, but more often referred to them as *pads*. Six of 12 patients he described with these pads had Dupuytren's disease (DD), and hence he suggested that their presence might be followed by the onset of DD. There is inconsistency and confusion in the literature today about using the term "knuckle pads" in DD. Since Garrod's initial description, any pathology, whether cutaneous thickening or subcutaneous nodules on the dorsum of the PIP and metacarpophalangeal (MCP) joints, has been labeled as knuckle pads. Occasionally the term "Garrod's node" is used interchangeably for the same purpose.[2–6] This confusion could be attributed to the lack of uniform terminology and to various textbooks' definitions of knuckle pads[2–4] that are skin lesions located on the dorsal PIP or MCP joints[5,6] and the more deeply located Dupuytren's dorsal nodules (DDN). Skoog[7] in 1948 used the terms "knuckle pads" and "dorsal nodules" interchangeably. In 1955, Morginson[8] described knuckle pads and suggested that a more accurate term would be "discrete keratodermas," but he did not correlate knuckle pads with DD. Although Mikkelsen[9] did not specifically use the term "dorsal nodules," it appears that his definition of knuckle pads included dorsal nodules. In a recent review article,[10] an attempt was made to differentiate between these 2 entities, but no studies have perused a differentiation between them.

We believe that a clear and concise distinction must be made between dorsal cutaneous pads (DCP) and DDN because the latter is pathognomonic of DD and the former is not. Previous publications have not determined the prevalence of these 2 entities. The purpose of this study was to investigate the distribution and frequency of dorsal knuckle pads and dorsal nodules in normal volunteers and among DD patients, and clarify their clinical relevance.

MATERIALS AND METHODS

We designed and conducted a prospective diagnostic study, between August 2007 and May 2008, of 50 consecutive study patients with a diagnosis of DD and another control group of 50 volunteer patients. These were seen in one practice setting and at the Veteran Administration Hospital in Oklahoma. Precise definitions and differentiations were made between DD and non-DD as well as between dorsal knuckle pads and Dupuytren's nodules. A hand fellow evaluated most patients; a fellowship-trained hand surgeon examined the rest.

DD versus non-DD

Non-DD is a common clinical entity that can be confused with DD. Clinical studies on DD must ensure homogeneous patient selection and exclude non-DD patients. Our study excluded patients with non-DD.

A patient with typical DD has the following characteristics: usually a white man of Northern European including Irish and Scottish ancestry, approximately 50 years of age, with bilateral progressive digital contracture at various rates; a patient may have more than one digit involved; and a patient with a positive family history with or without ectopic disease. Non-DD[11] is a clinical entity in which the patient has palmar fascial proliferation that usually follows trauma or surgery to the hand. The patient can be of any age, gender, or race, and may be diabetic with no family history of DD. The condition is unilateral and nonprogressive; usually only one hand is affected without digital involvement or contracture.[11,12]

Dorsal knuckle pads versus DDN

Dorsal Dupuytren's nodules[10] are defined as a subcutaneous, solid, firm, well-defined, tumor-like mass or a nodule 3 mm in diameter or larger, located over the dorsum of the PIP joint. The mass is seldom painful and becomes more mobile while the joint is in neutral position and less mobile during joint flexion. DCP, sometimes referred to as knuckle pads, are defined as painless thickening, sclerosis, and loss of skin elasticity and creases over the PIP or MCP joints, without subcutaneous nodules. To be designated as DCP, most (greater than 75%) of the skin over the PIP joint area should be affected. For the purpose of this study, the diagnosis of DDN and DCP was made based on the physical characteristics only, and symptoms were not used as criteria for diagnosis.

The control group consisted of 50 white men and women over the age of 20 years, who were seen consecutively for upper extremity conditions other than DD. The group included only patients who unequivocally had neither family history of DD nor findings of the disease by examination. Patients with non-DD were also excluded from this group. Examples of patients in this group were those with compression neuropathy or tendinopathy of the upper extremity.

We included in the DD group patients of both genders over the age of 20 years with typical DD, who presented for the first time, along with DD patients who underwent previous palmar or digital fasciectomy but no surgery on the dorsum of the hand. We excluded from this group patients with non-DD, those with recent

TABLE 1. Control and DD Group Demographics

	All Patients		Patients With DCP Only		Patients With DDN Only	Patients With DCP and DDN
	Control (n = 50)	DD (n = 50)	Control (n = 9)	DD (n = 6)	Control (n = 4)	DD (n = 5)
Age						
Mean	48	61	60	63	59	52
Range	18–92	29–82	36–92	57–78	57–61	48–65
Gender						
Male	22	42	5	5	3	5
Female	28	8	4	1	1	0
Hand dominance						
Right	49	42	8	6	4	4
Left	1	4	1	0	0	0
Ambidextrous	0	4	0	0	0	1
Occupation						
Physically demanding	18	10	5	0	1	1
Physically undemanding*	32	40	4	6	3	4
Hobbies						
Physical	20	7	3	0	0	0
Nonphysical	30	15	6	1	2	2
Not specified	0	28	0	5	2	3

*Includes retirees.

or remote trauma to the digits, those who had undergone surgery on their hands for reasons other than DD, those experiencing chronic inflammatory arthritic processes (rheumatoid arthritis or gout) or infection, and those with retained foreign bodies within the soft tissues of the digits.

Demographic and subjective assessment

We gathered information on all patients, including age, gender, hand dominance, occupation, and hobbies. Table 1 lists control and study patients' demographic data. If lesions (DCP or DDN) were present, patients were asked about symptoms of pain or dysfunction. Additional questions DD patients were asked about included ethnicity, ancestry, age at diagnosis of DD, presence of ectopic disease in the feet or male genitals, and family history of DD.

Objective assessment

Patients from both groups were examined for the presence of DCP, DDN, or both. The number and location of these lesions and their characteristics were all assessed. In addition, DD patients were evaluated for Dupuytren's palmar and digital nodules and cords along with contractures to the MCP and PIP joints and to the first web space. We also examined DD patients for ectopic disease in the feet and for diathesis. We used modified criteria for Dupuytren's diathesis described by Hindocha et al.,[13] including male gender, age of DD onset less than 50 years, bilateral DD, ectopic Garrod's "pads" nodes, and family history.

Statistical analysis

We compared prevalence proportions using Fisher's exact tests. Within-group associations between DCP and occupation (physical vs nonphysical), handedness, gender, and age were assessed using exact chi-square tests. Within-group associations between DDN, DCP, and Dupuytren's diathesis with palmar and digital nodules and cords or contracture to the digital joints were assessed using exact chi-square tests.

RESULTS

In the control group of the patients with physically undemanding occupations, 7 listed themselves as retirees.

None of the control patients had DDN; however, 9 did have distinct DCP (Table 1) and 5 of these had

TABLE 2. Control and DD Patients With DCP and DDN Lesion Characteristics, by Hand, Digit, and Joint*

	DCP Only		DDN Only	DCP and DDN
	Control (n = 9)	DD (n = 6)	DD (n = 4)	DD (n = 5)
Hand affected				
Dominant				
Right	7	6	4	4
Left	0	0	0	1
Nondominant				
Right	1	0	0	3
Left	1	0	3	0
One or both				
Unilateral	6	6	1	2
Bilateral	3	0	3	3
Sites				
Solitary	4	5	3	3
Multiple				
2 digits	1	1	0	1
3 digits	3	0	1	0
4 digits	0	0	0	1
5 digits	1	0	0	0
Digits				
Thumb	0	0	0	0
Index	5	1	3	5
Middle	6	3	2	5
Ring	4	1	0	1
Small	4	2	1	3
Joint				
PIP				
Right hand	4	4	1	1
Left hand	1†	0	2	0
Bilateral	3	0	1	4
MCP				
Right hand	1	2	0	1
Left hand	0	0	0	0
Bilateral	0	0	0	0

*Includes ambidextrous individual.
†DCP on nondominant hand.

multiple lesions (Table 2). The most frequently affected digit with DCP was the long finger (6 digits), followed by the index finger (5 digits); the least involved were the ring finger (4 digits) and small finger (4 digits). Unilateral DCP (Fig. 1) lesions were seen in 6 of the 9

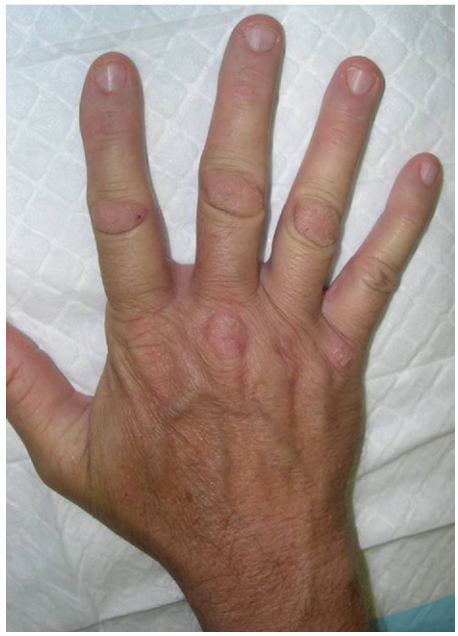

FIGURE 1: Dorsal cutaneous pads over the MCP joints of the middle and small fingers and the PIP joints of the index, middle, and ring fingers in a patient from the control group who does not have DD.

control patients (Table 2). The average size of the DCP in this group was 7 mm.

In the DD patient group, 20 of 40 retirees said that they had physically undemanding occupations. A total of 49 patients were white; 38 were of Northern European ancestry, one was of Lebanese extraction, one was Hispanic, and 10 were of unknown ancestry. Fifteen patients had a positive family history of DD and 35 were unaware of family history.

Both DCP and DDN were encountered in this group, with DCP (Fig. 2) being slightly more common than DDN. The DD patients were grouped into 3 categories: those who had DCP only, those who had DDN only, and those who had both DCP and DDN.

DCP patients

A total of 6 DD patients had DCP only. Of this group, 5 were listed as retirees (Table 1). All 6 patients were white; 3 did not know their ancestry and 3 were of Northern European background (Table 3). In all 6 patients, DD was seen in the same hand as the DCP, and in 3 patients DD was seen in the same digit as the DCP. Two patients were observed to have DCP at the MCP joint and 4 at the PIP joint; all 6 had it on the right hand. The most frequently affected digit with DCP was the long (3 digits) followed by the small (2 digits), index (1

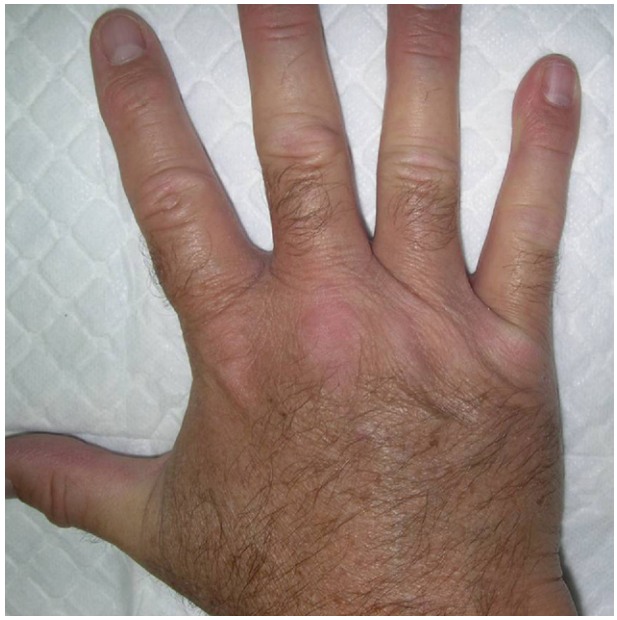

FIGURE 2: Palpable firm DDN on the ulnar side of the middle finger at the PIP joint, along with DCP over the MCP joints in a patient with DD.

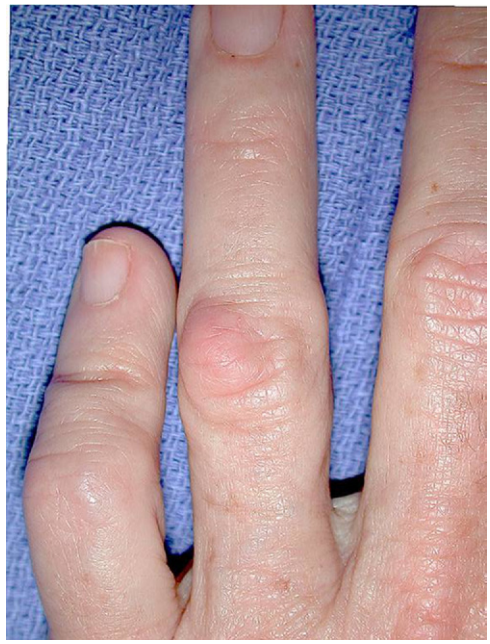

FIGURE 3: Visible, firm, painless DDN on the ring finger at the PIP joint.

TABLE 3. DD Patient Characteristics

	DCP Only (n = 6)	DDN Only (n = 4)	DCP and DDN (n = 5)
Ethnicity			
White	6	4	4
Hispanic	0	0	1
Origin			
Northern European	3	3	4
Mexican	0	0	1
Uncertain	3	1	0
Family history of DD			
Yes	4	2	3
No	2	2	2
Symptoms			
Asymptomatic	5	4	4
Symptomatic	1	0	1*
Age at DD diagnosis			
<40 y	1	1	2
>40 y	5	3	3

*Owing to pain associated with DDN.

digit), and ring finger (1 digit) (Table 2). We saw multiple DCP in one patient with 2 fingers involved. Unilateral DCP were seen in 6 patients. The average diameter of the DCP in this group was 6 mm.

DDN patients

Four of the DD patients had only DDN (Fig. 3). Table 1 lists demographic information for this group. All 4 patients were white; 3 were Northern Europeans and one was unsure of ancestry (Table 3). In 3 of 4 patients, DD was seen in the same hand as the DDN, and in 2 patients DD was seen in the same digit as the DDN. The most frequently affected digit with DDN was the index finger (3 digits), followed by the long finger (2 digits) and the small finger (1 digit) (Table 2). Three patients had a solitary DDN. We saw unilateral DDN in 3 patients. The average diameter of the DDN was 6 mm.

DCP and DDN patients

Five of the DD patients had both DCP and DDN. Table 1 provides demographic information. Of the patients who stated their occupation as not physical, 2 were retirees. Four patients with DCP and DDN were white (of Northern European origin) and one was Hispanic (Mexican) (Tables 3, 4). One patient reported pain owing to a DDN and the remainder with DCP and DDN were asymptomatic. All patients had DD in the same hand as DCP and DDN, whereas in 2 of 5 patients, DD was seen in the same digit as the DCP and DDN. However, none of these patients had DDN and DCP coexisting in the same anatomical region. The most frequently affected digits with DCP and DDN were the index and long fingers, each with 5 lesions, followed by the small finger (3 lesions) (Table 2). Solitary DCP and DDN

TABLE 4. DD Patient Characteristics

	All Patients (n = 50)	Patients With DCP Only (n = 6)	Patients With DDN Only (n = 4)	Patients With DCP and DDN (n = 5)
Ethnicity				
White	49	6	4	4
Hispanic	1	0	0	1
Origin				
Northern European	38	3	3	4
Mexican	1	0	0	1
Uncertain/other	11*	3	1	0
Family history of DD				
Yes	15	4	2	3
No/unknown	35†	2	2	2
Symptoms				
Asymptomatic		5	4	4
Symptomatic		1	0	1‡
Age at DD diagnosis				
<40 y	7	1	1	2
>40 y	43	5	3	3

*One patient was of Lebanese origin and 10 did not know the country of origin.
†Three patients were adopted and the family history of DD was unknown.
‡Owing to pain associated with DDN.

were seen in 3 patients. The average diameter of the DCP was 5.9 mm, and that of the DDN was 4.3 mm.

Of the 50 patients in the DD patient group, 26 had ectopic disease in the form of DDN, Ledderhose plantar nodules, or Peyronie disease. A total of 17 patients had only one site of ectopic disease (4 with DDN, 9 with plantar lesions, and 4 with penile disease). Of 9 patients who demonstrated multiple ectopic sites, 5 had DDN, 8 were observed with plantar fibromatosis, and 6 reported penile fibromatosis. Dorsal Dupuytren's nodules were associated with plantar nodules in 3 patients and penile fibromatosis in one patient, and involved both plantar and penile disease in one patient.

We used the modified criteria for Dupuytren's diathesis (described by Hindocha et al.[13]) to evaluate the 9 patients with DDN. Three patients met all 5 criteria, 4 patients met 4 criteria, one met 3 criteria, and one met 2 of the 5 criteria. McFarlane suggested that family history is the most unreliable of criteria when evaluating diathesis.[14] Removing the family history criterion and re-evaluating the 9 DDN patients, we found that 5 patients met all 4 remaining criteria and 3 met 3 of 4 criteria; 8 of 9 patients with DDN fulfilled 3 or 4 of the 4 criteria for Dupuytren's diathesis.

The 4 patients with only DDN also correlated with the previously described criteria for Dupuytren's diathesis. One of the 4 met the criteria. If the only female in the group is excluded, one of 3 patients exhibited diathesis. If we exclude family history as a criterion, 2 of 3 male patients with DDN unaccompanied by DCP exhibited diathesis.

Statistical analysis

The proportion of patients with DCP did not differ ($p = .803$) between DD patients (22%) and normal controls (18%). This estimated between-group difference in DCP prevalence (0.04; 95% confidence interval, −0.12 to 0.20) has a 0.16 margin of error. By comparison, assuming the validity of its observed prevalence of DCP among normal patients (around 0.2), a study of this size (2 groups of 50 patients each) has 80% power to detect a between-group difference in prevalence of 0.26.

The prevalence of DCP among controls did not differ by gender ($p = .481$), hand dominance ($p = .180$), occupation ($p = .253$), or hobbies ($p = .724$).

DISCUSSION

In 1878, John Cleland[15] described the function of cutaneous ligaments that retain the position of the skin over the interphalangeal joints during flexion and extension. Milford[16] examined the anatomy of these peritendinous fibers and found them to be

small fibers arranged in poorly defined bundles. He described their attachments in the extensor mechanism and into the dorsal skin folds over the PIP and DIP joints. Law and McGrouther[17] in their detailed anatomical study described 3 types of peritendinous cutaneous fibers: lateral, intermediate, and paramedian. The lateral peritendinous cutaneous fibers were attached to the lateral digital sheet on the palmar aspect and to the dorsal skin of the PIP joint. These authors observed continuity of ligamentous pathways between the natatory ligament and lateral part of the skin wrinkle, and concluded that the intermediate and paramedian fibers are definite and independent structures that attach to the dorsal skin and determine the PIP dorsal wrinkle pattern. The knuckle pads are probably the pathologic counterparts of the normal dorsal skin creases over the PIP joint, the pathology of which has not been elucidated thoroughly in the literature. It is unclear what role the dorsal peritendinous fibers have in the development of knuckle pads and whether the fibers undergo pathologic changes. It is obvious, however, that change takes place in the skin, with thickening, sclerosis, and loss of skin elasticity and creases. McGrouther suggested that knuckle pads develop in response to proximal tethering that leads to contracture of the lateral peritendinous cutaneous fibers and loss of dorsal PIP joint skin wrinkles.[18]

Sehgal et al.[19] attempted to discern between the different types of knuckle pads and described primary and secondary knuckle pads. Patients with primary knuckle pads were asymptomatic and had well-defined hyperkeratotic, skin-colored nodules, without systemic abnormalities, history of trauma, or progressive nature of the lesions. Secondary knuckle pads are associated with DD and ichthyosis and may be a reaction to occupation or trauma. The authors' description of knuckle pads is not clear and does not mention subcutaneous nodules. It is possible, however, that they were referring to DDN in describing secondary knuckle pads. Hueston and Wilson[20] wrote about uncertainty in the literature as to whether knuckle pads constitute a clinical sign or disease entity. These authors referred to knuckle pads as a "visible and palpable thickening in the integument over the dorsum of any digital joint, but most frequently the PIP joint" and as "conditions causing lumps over the knuckles." They considered knuckle pad etiology to result from DD, occupation, reactive hyperplasia of the paratenon after injury, or dermatologic diseases.

According to Webster's *New World Dictionary*, the word "pad" is defined as "anything soft used to protect from friction and blows; cushion" and "the cushion like sole of an animal's paw." Also, the word "nodule" is defined as a "small knot or rounded lump." Therefore, it is appropriate to use these terms according to what they portray.

We propose precise definitions for both of these lesions. We found that knuckle pads (DCP) and DDN are different lesions, with the latter being pathognomonic of DD; we did not encounter them in control patients without DD. The DCP are skin lesions, whereas the DDN are pathologic nodules with histologic characteristics similar to those of palmar Dupuytren nodules. These 2 lesions are not related and DDN do not seem to evolve from pre-existing DCP. The DCP were present in 18% of our control group and in 22% of the DD patient group ($p = .803$, Fisher's exact test). Dupuytren's disease patients and controls with DCP were similar in mean age: 60 and 63 years, respectively. Eight of 9 patients in the control group and all 6 patients in the DD group were right-hand dominant. The most common location for DCP in both groups was the PIP joint (8 of 9 of the control group and 4 of 6 in the study group). The most common finger with DCP in both groups was the long finger, and most control patients (6 of 9) and all 6 patients in the DD group had unilateral DCP.

Lagier and Meinecke[21] examined "knuckle pads" histologically at the PIP joint in 4 patients and described true knuckle pads as "identical to that of the thickening of the palmar aponeurosis in Dupuytren's contracture or of plantar aponeurosis in Ledderhose disease," with noninflammatory fibroblastic proliferation along with a dense fibrosis. They also described false knuckle pads as scar tissue, acanthosis, and hyperkeratosis. The authors' description of true knuckle pads is grossly and histopathologically compatible with DDN.

Caroli et al.[22] further examined "knuckle pads" with optical and electron microscopy and demonstrated fibroblasts, myofibroblasts, and collagen fibers identical to palmar Dupuytren's nodules. The authors also clearly referred to dorsal nodules. Irwin et al.[23] found that strips of "knuckle pad" tissue from patients with DD have a dense, fibrous matrix and fibroblasts that demonstrated contractile properties *in vitro* after placement in an antihistamine mepyramine bath, indicating the presence of myofibroblasts that are encountered in palmar nodules of DD. Those authors also referred to DDN.

Lopez-Ben et al.[24] observed differences in "knuckle pad" appearance on ultrasound. One

group showed a diffuse, hypoechoic skin thickening overlying the dorsum of the affected PIP joint, with a linear hypoechoic band paralleling the epidermis layer; another demonstrated a more focal, subcutaneous, noncompressible hypoechoic mass with ill-defined margins overlying the affected PIP joints. It is unclear but possible that the authors were encountering both DCP and DDN.

Skoog[7] reported 50 DD patients, 22 of whom had nodules that were firm soft tissue masses, fairly well defined, of variable size, round or irregular in shape, and rarely symmetrical. On cursory examination they could be mistaken for bony projections. These subcutaneous nodules were movable over the finger joints but closely adherent to the covering skin over the PIP joint of one or more fingers. Caroli et al.[22] identified knuckle pads in 15% of their study group. The index finger was involved in 57% of patients and the right hand was involved in 61% of patients without mentioning hand dominance. Hueston[25] reported that 42% of patients who ultimately required surgery for DD had knuckle pads. In a case report of dorsal DD, Hueston[26] stated that knuckle pads occur commonly in patients with a strong Dupuytren's diathesis.

We found comparable prevalence of DCP in normal patients and among DD patients. DD patients and normal controls with DCP were also comparable regarding mean age (60 and 58 y, respectively), gender (largely male), hand dominance (dominant), laterality (unilateral), and location (PIP joint). Dissimilarities between DD patients and controls with DCP included occupation; normal controls with DCP were likely to have physically demanding occupations, whereas DD patients were likely to have less physical occupations. Normal controls had more DCP involvement in the radial digits, whereas DD patients had more long and small finger involvement. Normal controls with DCP were generally affected at multiple sites, whereas DD patients had DCP at solitary sites.

Among DD patients, DCP and DDN were encountered, especially in white men of Northern European ancestry. Patients with DDN did not have physical occupations that could cause lesions over the dorsal aspect of the PIP joints. Skoog[7] reported patients with dorsal PIP joint lesions that were often located on the ulnar digits. DDN in DD patients were mostly located on the radial digits. None of our patients in either group demonstrated DCP or DDN of the thumb. Of 9 of our DD patients with DDN, 7 met at least 4 of 5 diathesis criteria. Reilly et al.[27] evaluated the progression of Dupuytren's nodules in 59 patients with DD and found that 30 patients with previously diagnosed isolated nodules developed a cord. They reported that only 5% of their patients had dorsal nodules and concluded that the progression of the nodular form of DD to cordlike disease is common but not inevitable. We speculate that DDN are nonprogressive, unlike those in the palm.

Dorsal cutaneous pads are not pathognomonic of DD and their prevalence is similar in the normal population and DD patients. DDN are encountered only in DD patients, especially among those with strong diathesis. Future studies on DD should make a clear distinction between these 2 clinical entities.

REFERENCES

1. Garrod AE. Concerning pads upon the finger joints and their clinical relationships. BMJ 1904;2:8–9.
2. Arnold HL, Odom RB, James WD. Andrews' diseases of the skin clinical dermatology. 8th ed. Philadelphia: WB Saunders, 1990:710–711.
3. Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SI. Fitzpatrick's dermatology in general medicine. 6th ed. New York: McGraw-Hill, 2003:990–991.
4. Hall JC. Sauer's manual of skin diseases. 9th ed. Philadelphia: Lippincott Williams and Wilkins, 2006:487–488.
5. Mulvaney MS, Salasche SJ, Hayes TJ. Differential diagnosis of multiple dermal acral nodules. J Assoc Military Dermatol 1985;11:24–27.
6. Hasham S, Burke FD. Diagnosis and treatment of swellings in the hand. Postgrad Med J 2007;83:296–300.
7. Skoog T. Dupuytren's contraction in relation to some similar changes in connective tissue. Acta Chir Scand 1948;96(Suppl 139):86–93.
8. Morginson WJ. Discrete keratodermas over the knuckle and finger articulations. Arch Dermatol 1955;71:349–353.
9. Mikkelsen OA. Knuckle pads in Dupuytren's disease. Hand 1977;9:301–305.
10. Rayan GM. Dupuytren's disease: anatomy, pathology, presentation, and treatment. J Bone Joint Surg 2007;89A:190–198.
11. Rayan GM, Moore J. Non-Dupuytren's disease of the palmar fascia. J Hand Surg 2005;30B:551–556.
12. Elliot D, Ragoowansi R. Dupuytren's disease secondary to acute injury, infection or operation distal to the elbow in the ipsilateral upper limb: a historical review. J Hand Surg 2005;30B:148–156.
13. Hindocha S, Stanley JK, Watson S, Bayat A. Dupuytren's diathesis revisited: evaluation of prognostic indicators for risk of disease recurrence. J Hand Surg 2006;31A:1626–1634.
14. McFarlane RM, McGrouther DA, Flint MH, eds. Dupuytren's disease biology and treatment. 1st ed. Edinburgh: Churchill Livingstone, 1990:250–252.
15. Cleland J. On the cutaneous ligaments of the phalanges. J Anat Physiol 1878;12:526–527.
16. Milford LW. Retaining ligaments of the digits of the hand. Philadelphia: WB Saunders, 1968:17–19.
17. Law P, McGrouther DA. The dorsal wrinkle ligaments of the proximal interphalangeal joint. J Hand Surg 1984;9B:271–275.
18. McGrouther DA. The extensor mechanism and knuckle changes. In: McFarlane RM, McGrouther DA, Flint MH, eds. Dupuytren's disease biology and treatment. 1st ed. Edinburgh: Churchill Livingstone, 1990:168–171.
19. Sehgal VN, Singh M, Saxena HMK, Nayar M. Primary knuckle pads. Clin Exp Dermatol 1979;4:337–339.
20. Hueston JT, Wilson WF. Knuckle pads. Aust N Z J Surg 1973;42:274–277.

21. Lagier R, Meinecke R. Pathology of "knuckle pads." Virchows Arch A Pathol Anat Histol 1975;365:185–191.
22. Caroli A, Zanasi S, Marcuzzi A, Guerra D, Cristiani G, Pasquali Ronchetti I. Epidemiological and structural findings supporting the fibromatous origin of dorsal knuckle pads. J Hand Surg 1991;16B: 258–262.
23. Irwin LR, Naylor IL, Holms W. The contractility of knuckle pads: an in vitro study. J Hand Surg 1997;22B:110–112.
24. Lopez-Ben R, Dehghanpisheh K, Chatham WW, Lee DH, Oakes J, Alarcon GS. Ultrasound appearance of knuckle pads. Skeletal Radiol 2006;35:823–827.
25. Hueston JT. The management of ectopic lesions in Dupuytren's contracture. In: Hueston JT, Tubiana R, eds. Dupuytren's disease. Edinburgh: Churchill Livingstone, 1974:145–147.
26. Hueston JT. Dorsal Dupuytren's disease. J Hand Surg 1982;7:384–387.
27. Reilly RM, Stern PJ, Goldfarb CA. A retrospective review of the management of Dupuytren's nodules. J Hand Surg 2005;30A:1014–1018.