A Retrospective Review of the Management of Dupuytren's Nodules

Rachel M. Reilly, BS, Peter J. Stern, MD, *Cincinnati, OH*
Charles A. Goldfarb, MD, *St. Louis, MO*

Purpose: To evaluate the progression of Depuytren's nodules with more than 6 years of follow-up study.

Methods: Fifty-nine patients who presented initially with Dupuytren's nodules returned for physical examination at an average follow-up period of 8.7 years (range, 6–15 y). Patients were questioned regarding family history of Dupuytren's disease, family ethnicity, alcohol consumption, smoking, liver disease, seizures, diabetes, and signs of systemic disease such as knuckle pads and plantar nodules. Physical examination evaluated disease state, loss of extension of the finger joints, and disease location.

Results: Thirty of the 59 patients with previously diagnosed isolated nodules developed a cord. Twenty-two percent of patients presented with bilateral disease and another 26% developed bilateral disease. Of those patients whose disease progressed 43% had European heritage, 37% had disease onset before the age of 50 years, 30% had bilateral disease, 23% had a family history of Dupuytren's disease, and 13% had plantar nodules. Five patients lost extension averaging 60° at the metacarpophalangeal joint and 40° at the proximal interphalangeal joint. Three of these 5 had surgical excision because they had a flexion contracture of the metacarpophalangeal or proximal interphalangeal joints averaging 60° and 43°, respectively. Another 7 patients did not meet standard criteria but had surgery for persistent pain associated with grasping objects (without contracture). All surgically treated patients had at least 1 risk factor and 7 patients had more than 1 risk factor. In 7 patients the Dupuytren's nodule had resolved at the time of follow-up evaluation.

Conclusions: The progression of the nodular form of Dupuytren's disease to cord-like disease is common but not inevitable. This evaluation of Dupuytren's nodules has shown that at an average of 8.7 years after diagnosis 5 patients met standard surgical criteria of metacarpophalangeal contracture of greater than 30° or any proximal interphalangeal contracture. Age of onset (before 50 years) is correlated most closely with disease progression, and the disease regressed in 7 patients (12%). (J Hand Surg 2005;30A:1014–1018. Copyright © 2005 by the American Society for Surgery of the Hand.)

Key words: Dupuytren's disease, Dupuytren's nodules, nodules.

Dupuytren's disease results from a random proliferation of fibroblasts in the palmar fascia, which then align and finally leave an acellular, tendon-like mass.[1] These 3 phases were classified by Luck[2] as the proliferative, involutional, and residual phases, respectively. Microscopically these stages correlate with the predominance of fibroblasts and myofibroblasts in the proliferative phase, fibroblasts during the involutional phase, and collagen in the residual phase.[1] Grossly the disease is characterized by the formation of a palmar nodule (proliferative), followed by the development of a cord (involutional) and eventual joint contracture (residual). Nodules generally form in the distal palmar crease, with cords extending longitudinally both into the palm and digit aligned with the digital ray.[1] The ring finger is the most common site of nodule and cord formation.[3]

The period of time in which Dupuytren's disease progresses through these 3 phases, however, has not been elucidated.[1,4,5] A study[6] performed in Iceland reported that 34.6% of patients with palmar nodules or cords developed contractures or had surgery over an 18-year follow-up period.

The purpose of this study was to determine the fate and/or progression of Dupuytren's nodules through follow-up evaluation, a minimum of 6 years after the initial evaluation. By focusing on the progression of nodules we were able to follow-up the disease from its earliest clinical presentation. Re-evaluation of patients allowed us to observe any change in disease state that occurred.

Materials and Methods

In this retrospective study a chart review was performed to identify patients diagnosed with Dupuytren's disease between January 1, 1987 and December 31, 1996. A total of 644 patients were identified. Inclusion criteria were patients with nodular disease without evidence of longitudinal cords or digital flexion contractures. Ninety-six patients met the inclusion criteria and 6 of these patients were deceased. Fourteen patients (including 1 deceased) had bilateral nodular disease.

Of the 90 remaining patients 59 returned for re-examination by one of the authors not involved in the patient's initial management. Thirteen patients presented with bilateral nodules. Thirty-one patients either were unable to be located or were unwilling to participate in the study. At follow-up evaluation patients were questioned about common associations including family history of Dupuytren's disease, ethnicity, alcohol consumption, smoking, liver disease,

seizures, diabetes, and signs of systemic disease such as knuckle pads and plantar nodules. A history of trauma preceding the development of nodules and symptoms related to the nodules also were noted. Symptoms at the time of diagnosis including pain were determined from chart review. At follow-up examination patients were questioned about disease progression or improvement and about limitations in activities compared with the contralateral hand. Physical examination included determining the presence of a nodule, cord, or contracture and its location. Any loss of active extension also was determined at the time of follow-up evaluation with a goniometer applied to the dorsum of the hand and fingers.

The study group included 32 men and 27 women. The average age at the time of diagnosis was 55.4 years (range, 18–78 y) and the average age at time of onset was 54 years (range, 18–78 y). The average age at the time of follow-up evaluation was 64 years (range, 31–85 y). The average time between the initial diagnosis and follow-up evaluation was 8.7 years (range, 6–15 y).

Descriptive statistics were obtained to characterize the study population. These included distributions of gender, age at diagnosis, and possible risk factors. Frequencies of each outcome (cord, contracture, progression to bilateral disease, surgery, regression) also were obtained. Spearman correlations for all independent and outcome variables were calculated to select variables for regression analysis. Univariate regressions were performed relating each outcome to each independent variable. Multivariate logistic regressions then were performed on combinations of independent variables, which were determined by reviewing correlations and univariate regressions.

Results

Of the 59 returning patients who had been diagnosed with a Dupuytren's nodule, 30 (51%) had developed a cord by the time of follow-up examination (Fig. 1). Those whose disease had progressed were divided almost equally between genders (16 men, 14 women). Thirteen patients presented with bilateral disease and in 12 patients (26%) unilateral disease had progressed to bilateral disease with either a new nodule or cord developing in the previously disease-free hand. Disease was located exclusively in the palm, with most disease present in line with the ring finger (n = 45), followed by the middle and small fingers (n = 19 each), index finger (n = 4), and thumb (n = 1).
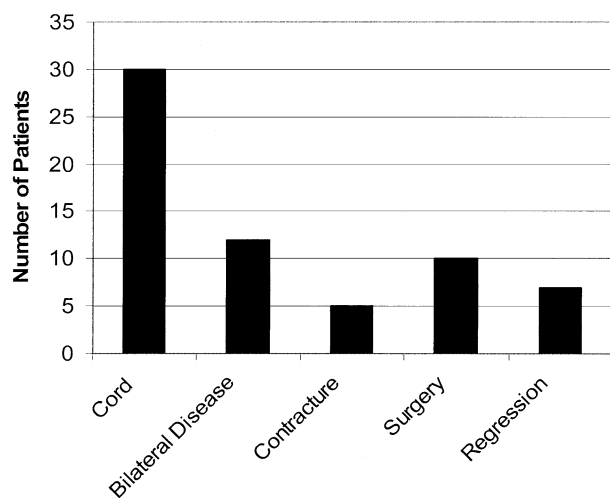
Figure 1. Findings in 59 patients after an average follow-up period of 8.7 years. Regression was defined as disappearance of the Dupuytren's nodule.

Risk factors were a common finding among the 59 patients in our study population (Fig. 2). Thirty-two patients (54%) were of European ethnicity. The remaining patients described themselves as a variety of ethnicities including African American, Native American, and Asian. Twenty-three percent had a family history of Dupuytren's disease, 22% presented initially with bilateral disease, 22% had disease onset at younger than 50 years of age, 11% drank alcohol (>1 drink/d), 9% were diabetic, 8% had plantar nodules, and 5% had knuckle pads. All knuckle pads were located on the ipsilateral hand. None of the patients had a history of liver disease or seizures. The average age of onset among pa-
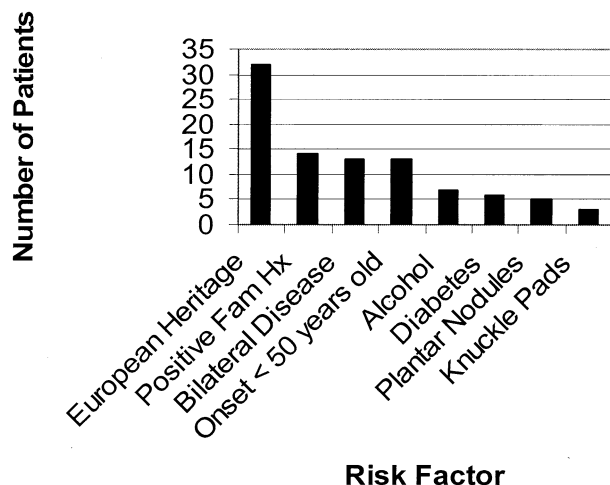
Figure 2. The most prevalent risk factors reported by study participants. Alcohol use was defined as more than 1 drink per day.
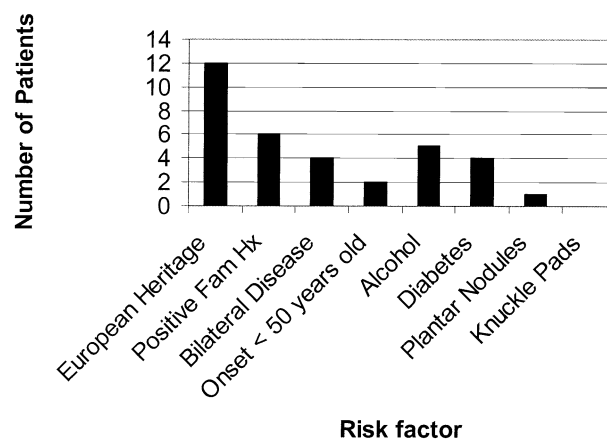
Figure 3. Risk factors reported by patients who showed no disease progression at follow-up evaluation. There were 29 patients in this population.

tients was 54 years (range, 18–78 y). Although the disease progressed in 30 patients only 5 patients (8%) met standard surgical criteria of metacarpophalangeal (MCP) joint contracture of greater than 30° or any proximal interphalangeal (PIP) joint contracture. These 5 patients had an average MCP flexion contracture of 60° and an average PIP contracture of 43°.

In those patients whose disease progressed to either cords or contracture early age at onset was associated closely: 37% of these patients developed Dupuytren's disease before the age of 50 years (p = .001). European ethnicity also was associated with disease progression (43%, p = .023). However, none of the other risk factors assessed was associated significantly with progression. Thirty percent had bilateral disease (p = .101), 27% had a positive family history (p = .744), and 13% had plantar nodules (p = .078). Alcohol consumption, diabetes, and knuckle pads each were found in 7% of patients with progression. None of these risk factors was significant.

The disease did not progress in 29 patients. Among these patients European ethnicity also was the most common risk factor (12 of 29, 41%), followed by family history (21%), regular alcohol consumption (17%), bilateral disease (14%), diabetes (14%), age of onset younger than 50 years (7%), and plantar disease (3%) (Fig. 3). All patients with knuckle pads had disease progression.

Ten patients (17%) had surgical intervention for a variety of indications (Table 1). Three patients had a flexion contracture of the MCP or PIP joints averaging 60° and 43°, respectively. The other 7 patients had surgery for persistent pain related to a

Table 1. Surgical Intervention Outcomes and Risk Factors			
Patient	Reason for Surgery	Findings at Follow-Up Evaluation	Risk Factors
1	Elective: nodule in both hands	Recurrence, 2 cords present	Family history, European heritage, onset <50 years old
2	Elective: nodule in both hands	No recurrence	Family history, European heritage
3	Elective: nodule painful with normal activities/work	Recurrence, cord present	European heritage, alcohol use
4	Strong family history, nodule did not respond to beta-methasone and lidocaine injections.	No recurrence	Family history, European heritage
5	Nodule, previous history of cord development in other hand	No recurrence	Family history
6	Contracture	Recurrence of contracture, surgery repeated, currently 2 cords with contracture (PIP 40°, 55°)	European heritage, alcohol use, onset <50 years old, knuckle pads
7	Contracture	Recurrence, cord with contracture (PIP 40°)	European heritage, alcohol use, onset <50 years old, knuckle pads
8	Elective: nodule present	Recurrence within 9 years, surgery repeated, currently nodule present	European heritage, diabetes, plantar nodules
9	Contracture	Recurrence of contracture within 6 years, surgery repeated, currently cord present with contracture (PIP 35°, MCP 60°)	European heritage, family history, alcohol use
10	Surgery in hand for trigger finger so had nodule excised	No recurrence but development of nodule in disease-free hand	European heritage, family history, alcohol use

nodule or cord (without contracture) that had been present for an average of 2.3 years. Patients described pain related to pressure on the nodule or cord when grasping objects. All patients who had surgery for the indication of pain experienced discomfort such that daily activities or work tasks were disrupted. Of the 10 patients who had surgical excision 6 had disease recurrence, with 3 having repeated surgery. One patient whose disease did not recur after excision developed a nodule in the other, previously disease-free hand at the time of follow-up evaluation. All surgically treated patients had a least 1 risk factor and 9 patients had more than 1 risk factor. The risk factors that were associated significantly with surgery were age less than 50 years at onset (p = .017), bilateral disease (p = .038), and family history of Dupuytren's disease (p = .012).

None of the patients had a history of trauma. In 7 patients (12%) the Dupuytren's nodule or any sign of disease was not detected at the time of latest follow-up evaluation.

Discussion

This study shows in a moderately sized population (n = 59) that although the progression of the nodular form of Dupuytren's disease to cord-like disease is common, it is not inevitable after a minimum follow-up period of 6 years (average, 8.7 y). Disease location was distributed unequally within the palm but in a predictable pattern, with most disease in line with the ring finger.[3] Disease distribution and progression were almost equal between genders. It has been described previously that Dupuytren's disease predominantly affects men.[1,3] Our variance could be explained by a selection bias in our inclusion criteria. It is possible that more men are in fact affected by the disease but did not seek evaluation until cord or contracture formation. Another possibility is that a greater percentage of women were willing to participate in our study.

Even with the disease progression shown a minority of patients had severe enough contracture to warrant surgical intervention. This rate was much lower

than previously reported.[6,7] Our evaluation of the management of Dupuytren's nodules has shown that at an average of 8.7 years after diagnosis with Dupuytren's nodules, only 5 of 59 patients (8%) met standard surgical criteria and only 3 of these 5 patients had surgery. These percentages are much lower than those found by Gudmundsson et al,[6] who found that 34.6% of patients who had palmar nodules or cords developed contractures or had surgery within the 18-year follow-up period. They did not separate those who had only nodules from those with cords, which may explain the higher rate of progression to contracture and surgical intervention. We conducted a smaller study, with less time to follow-up examination than Gudmundsson et al.[6] Another confounding factor is that because the Gundmundsson et al[6] study was conducted in Iceland their study population likely included more patients with Dupuytren's diathesis, thereby increasing the risk for progression compared with our study.

Another notable finding was that 26% of our patients progressed from unilateral disease to bilateral disease. This is an important consequence of which patients should be made aware.

Risk factors may play an important role in how quickly Dupuytren's disease progresses. Some of the risk factors identified for developing the disease include Northern European ethnicity and a positive family history of Dupuytren's disease.[7–9] Diabetes, phenobarbital use, smoking, and alcohol consumption also have been implicated as possible risk factors but none were significant in this study.[10] Developing the disease at an early age (before 50 years) also seems to increase the chances of rapid progression to contracture and was a significant risk factor for both disease progression and surgical intervention in our study.[6]

Although over half of the patients in this study reported being of European ethnicity this may be less significant because many people in the area studied share this characteristic. Almost one fourth of patients had a family history of Dupuytren's disease, however, and although history was not found to be significant in disease progression it was significant in the group that had surgical intervention. Disease progression was associated most closely with nodule formation before 50 years of age. Almost all patients (11 of 13) who presented before age 50 had disease progression. Young age at onset and strong family

history have been described previously as contributing to a Dupuytren's diathesis and these results support the presence of such a diathesis.[11] Having more than 1 risk factor also was common (9 of 10) among those who had surgical intervention.

An unexpected finding was that the nodules regressed in 7 patients (12%). Gudmundsson et al[6] also found that 11% of their patients had nodule regression. It is yet unknown what causes disease regression but because regression has been known to occur without any intervention, one must be cautioned not to proceed too quickly with surgical intervention. It also has been reported that if the disease recurs after surgical excision the rate of progression may be faster.[1,6] In this series 3 of 7 patients who had elective nodule excision experienced recurrence. Because excision has not been shown to be a reliable cure for the disease it should not be considered unless there has been contracture that is bothersome to the patient.

References

1. McGrouther DA. Dupuytren's contracture. In: Green DP, Hotchkiss RN, Pederson WC, eds. Operative hand surgery. 4th ed. New York: Churchill Livingstone, 1999:563–591.
2. Luck JV. Dupuytren's contracture: a new concept of the pathogenesis correlated with surgical management. J Bone Joint Surg 1959;41A:635–664.
3. Rayan GM. Clinical presentation and types of Dupuytren's disease. Hand Clin 1999;15:87–96.
4. Moyer KE, Banducci DR, Graham WP 3rd, Ehrlick HP. Dupuytren's disease: physiologic changes in nodule and cord fibroblasts through aging in vitro. Plast Reconstr Surg 2002;110:187–193.
5. Benson LS, Williams CS, Kahle M. Dupuytren's contracture. J Am Acad Orthop Surg 1998;6:24–35.
6. Gudmundsson KG, Arngrimsson R, Jonsson T. Eighteen years follow-up study of the clinical manifestations and progression of Dupuytren's disease. Scand J Rheumatol 2001;30:31–34.
7. McFarlane RM. On the origin and spread of Dupuytren's disease. J Hand Surg 2002;27A:385–390.
8. Pagnotta A, Specchia N, Greco F. Androgen receptors in Dupuytren's contracture. J Orthop Res 2002;20:163–168.
9. Wilbrand S, Ekbom A, Gerdin B. The sex ratio and rate of reoperation for Dupuytren's contracture in men and women. J Hand Surg 1999;24B:456–459.
10. Burge P, Hoy G, Regan P, Milne R. Smoking, alcohol and the risk of Dupuytren's contracture. J Bone Joint Surg 1997; 79B:206–210.
11. Hueston JT. The Dupuytren's diathesis. In: Hueston JT, ed. Dupuytren's contracture. Edinburgh: E & S Livingstone, 1963:51–63.