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RESEARCH ARTICLE

Diminished distal dorsal finger crease is associated with handgrip weakness in inclusion body myositis

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ABSTRACT

Background: Sporadic inclusion body myositis is a common cause of myopathy in populations over age 45 which classically causes distal finger flexor weakness. Loss of distal dorsal finger creases has been previously noticed in this disease.

Aims: Investigate the association between distal finger creases and grip strength in patients with inclusion body myositis.

Methods: We studied the crease pattern of the dorsal distal interphalangeal joints as well as handgrip strength in 81 affected and 74 control patients.

Results: A subset of patients with inclusion body myositis who had loss of crease of the dorsal fingers had weaker handgrip strength.

Conclusions: The loss of creases of the dorsal fingers is an additional complementary physical exam finding to identify inclusion body myositis and is associated with grip weakness.

Introduction

Sporadic inclusion body myositis (IBM) is the most common acquired myopathy in populations over age 45.[1,2] This disorder causes slowly progressive asymmetric weakness with a predilection for weakness in knee extensors and in finger flexion, particularly in flexor digitorum profundi and flexor pollicis longus in the upper extremities.[3-5] Though this clinical phenotype of IBM is relatively unique, the diagnosis can be missed without a high index of suspicion, or mistaken for amyotrophic lateral sclerosis (ALS), which can also be an asymmetric progressive motor weakness.[6] Diagnosis of IBM remains challenging with average delay in diagnosis of 5.6 years after symptom onset.[7] Weakness in finger flexion has previously been observed to have reduction in dorsal finger creases, which can be a helpful clue to the presence of finger flexor weakness and the diagnosis.[8,9] Expanding on a previous case series[9], we evaluated a larger population in a cross-sectional cohort study, whose hand strength and function we have previously reported.[10] We propose that a simple visual inspection of the dorsal distal interphalangeal joint crease can aid in identification of IBM and will be associated with reduced grip strength.

Methods

We performed a cross-sectional study of 81 patients with IBM and 74 control patients at a myositis patient conference. Hand grip strength and dominant dorsal hand photographs were obtained in all patients. Patients were classified as control or IBM based on the patient report. Grip strength of the dominant hand was measured twice by Jamar hydraulic hand dynamometer. Grip strength measurements were averaged and normalized by age and sex according to the NIH Toolbox project.[11] The loss of dorsal distal interphalangeal creases in photographs of the dominant hand were rated blindly by a board-certified neuromuscular specialist (L.W.) in the sequence that they were acquired. The study was approved by the University of Washington and Washington University institutional review boards.

Results

Our patients with IBM had a male predominance (1.6 male:1 female) that was reversed in the control patient population. The IBM cohort was slightly older with a median age of 68, about four years older than the control cohort. The distal dorsal finger creases were considered abnormal when they were observed to be markedly reduced as shown in the examples in Figure 1. Within the IBM group, a subset had loss of finger creases (40%, n=32), with examples shown in the left column, and are compared to age- and sex-matched controls without loss of dorsal distal finger creases in the right column. In the control group, a smaller subset showed reduced finger creases (15%, n=11). There was no significant difference in age or disease duration between the two IBM sub-groups.

However, the IBM sub-groups did show a difference in grip strength. The median grip strength was lower in the IBM group with loss of dorsal finger creases at the 20th percentile [interquartile range, IQR 12-27] of expected values, compared to the IBM group without reduced finger creases at the 31st percentile [IQR 24-42] (n=49). This difference was statistically significant ($p = 0.008$; Figure 2). A few of the control patients (n=11) had diminished finger creases, however, there was no significant change in grip strength compared to those without loss of creases. In both control sub-groups, the median grip strength was in the 110-111th percentiles (IQR [100-125] for patients with loss of finger crease and [99-121] for those without).

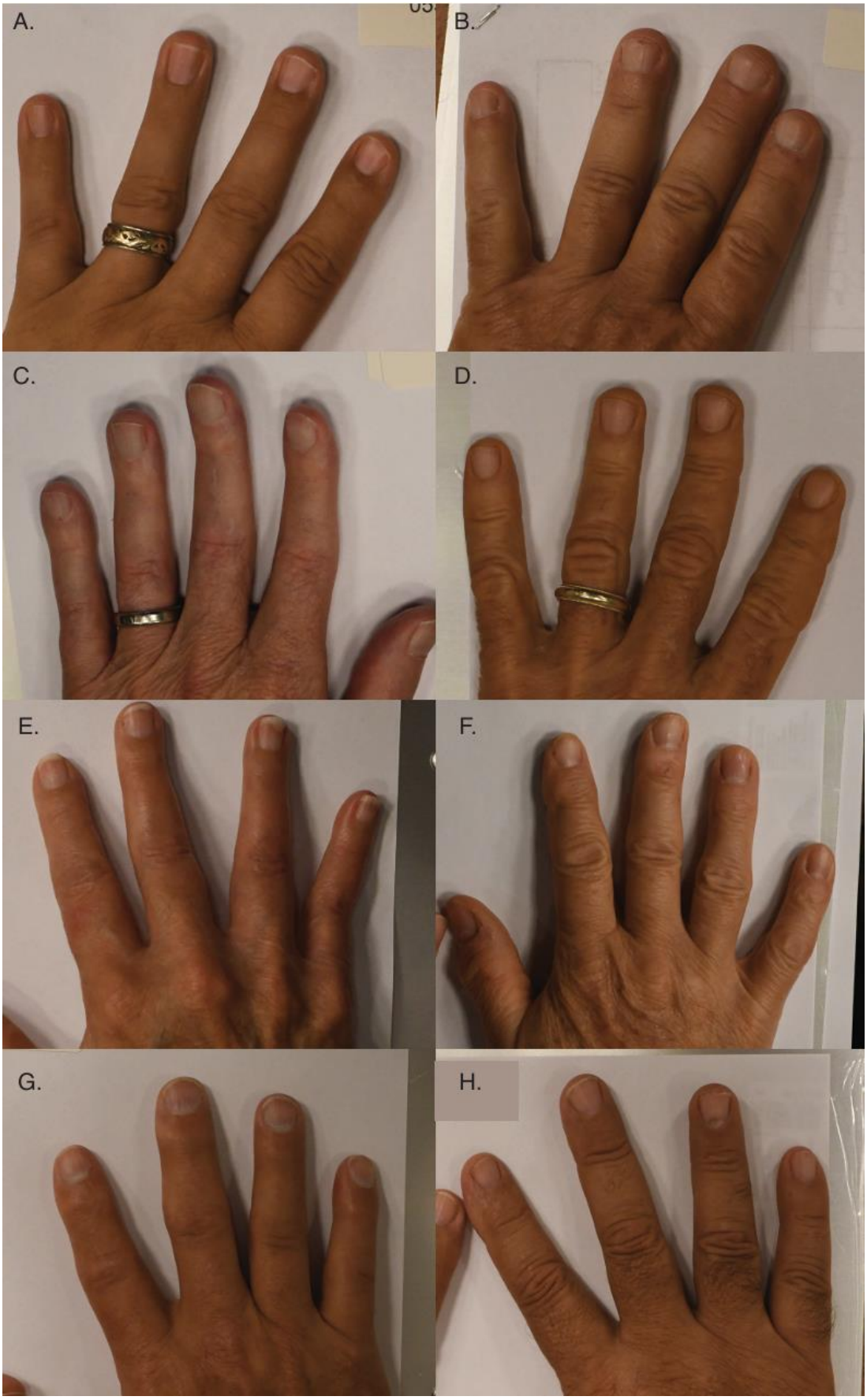

Figure 1. Examples of loss of finger creases in patients with IBM: Subjects A, C, E, and G identified as IBM and have reduction in dorsal distal interphalangeal creases. B, D, F, and H are sex- and age-matched controls with normal finger creases.

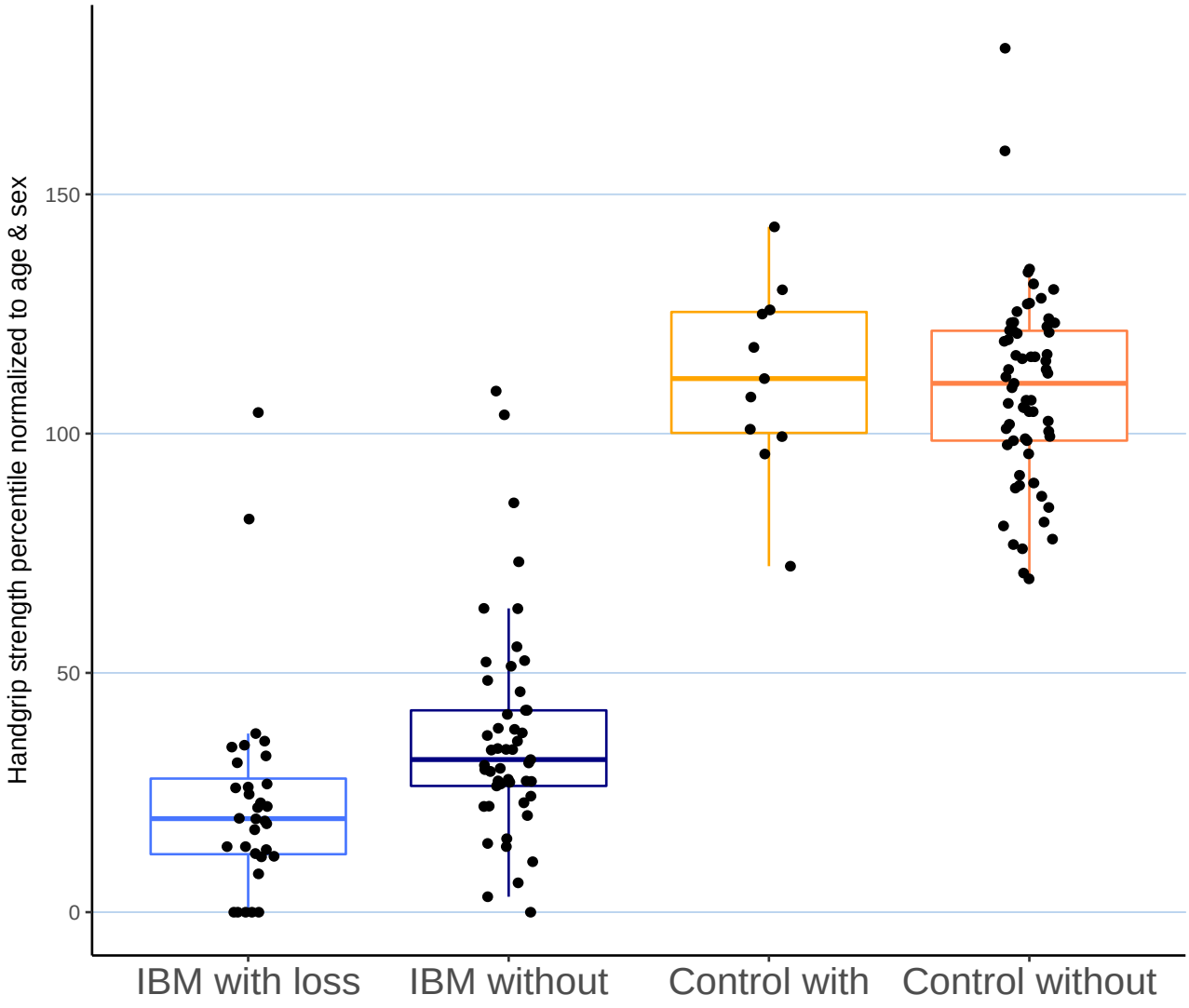

Figure 2: Loss of finger creases and dominant grip strength: Grip strength in patients with IBM showed mean 20th percentile [IQR 12-27] with loss of finger creases (n=32) versus 31st percentile [IQR 24-42] without loss of finger creases (n=49, p value = 0.008). Control patients with or without loss of distal finger creases both showed normal grip in 110-111th percentile. IQR: interquartile range; IBM: inclusion body myositis

Discussion

Our findings show that loss of dorsal distal interphalangeal finger creases is present in more patients with IBM (40%) than control patients (15%). Additionally, we show that the loss of finger creases within the IBM cohort is associated with reduction of grip strength (20th percentile vs 31st percentile; p = 0.008). We also confirm that grip strength testing is a clinically useful and easy measurement in this population in addition to qualitative testing of distal finger flexor strength. Prior studies have demonstrated that grip strength correlates with finger flexor function, supporting this as a helpful component of the exam.[12, 13] It should be noted that testing of the deep finger flexors, while remaining essential in an evaluation for the possibility of IBM, requires proper technique including testing all fingers flexed simultaneously due to the quadriga phenomenon of interconnectedness between deep digit flexors, whereas grip testing is more straightforward for clinicians.[13]

In our IBM cohort, we hypothesize that the worsened grip strength and the loss of dorsal distal finger creases are caused by the same mechanism, which is weakness in the flexor digitorum profundi muscles, and reduced motion at the distal interphalangeal joint. Loss of finger creases has been suspected to be seen a consequence of weakness at the affected joint, primarily reported in development of flexion

creases and especially in congenital weakness.[14] However, little data is available for loss of finger creases in an acquired/degenerative muscle disease, and especially in the dorsal finger creases. Notably, disorders such as ALS which frequently cause distal hand weakness but not finger flexion weakness,[15] do not have this finding in our observations in clinical practice. We expect several factors may be involved in this difference, including the relative sparing of deep finger flexors and the rapidity of symptoms in ALS compared to the slowly progressive weakness often seen in patients with IBM at time of their presentation. The presence of finger creases in 60% of our IBM cohort is suspected to be related to the relative preservation of function in these patients as indicated by the increased grip strength.

The source of absent finger creases in the control cohort is likely different from those with IBM, given the absence of grip weakness. Normal aging expects an increase in distal dorsal finger wrinkles over time.[16] However, reduced mobility even in setting of normal muscle function may occur. Presence of arthritis, primary skin diseases such as scleroderma, or other hereditary sources such as nail-patella syndrome, as well as diabetes (with its association with limited joint mobility) is also associated with reduced wrinkling.[17-19] These healthy controls should not be easily mistaken for IBM due to lack of motor weakness on exam or by history.

This study has several limitations: Firstly, subjects are self-identified with IBM which raises our possibility of false positives in the IBM group. Secondly, we have only a single observer rating finger creases which raises a question on interobserver validity. The presence of dorsal finger creases in some patients with IBM shows that this test is not highly sensitive. Though finger flexor weakness can help differentiate between those abnormal findings in the control group, they may not be as helpful in setting of other myopathies with finger flexor weakness such as myotonic dystrophies.[20]

Given the simplicity of examining for this diminishment in dorsal distal finger creases, it can be a helpful complement to a full evaluation for IBM. The presence of reduced distal finger creases is helpful in consideration of potential mimics of IBM such as ALS which more often spares the deep finger flexors and progresses much more quickly so would not be expected to cause this finding.[15, 21] Additionally, this finding can be a helpful clue to further examine a patient's grip and finger flexor strength when upper extremity weakness is not apparent on a routine physical exam that may not include finger flexors.

Conclusion

This study provides further confirmation that loss of distal finger creases is associated with IBM and associated with reduced grip strength. This is a helpful feature to identify patients who may have IBM and is best interpreted in combination with an appropriate history and will guide an expanded examination for other clinical features associated with IBM.

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