

# Palmaris longus, slopers and Dupuytren's disease

## an anatomical survey of climbers

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### INTRODUCTION

Dupuytren's disease (DD) is an idiopathic, progressive fibroproliferative disorder that leads to permanent flexion contracture of the fingers.<sup>[1]</sup> Risk factors for this condition, which affects around 4% of the UK population, include older age, male sex, family history of DD, excessive alcohol consumption and diabetes mellitus.<sup>[1,2]</sup> Repetitive minor trauma to the palmar fascia, including during rock climbing is also becoming well-established as a risk factor.<sup>[2,3]</sup>

Although DD is sometimes perceived as a 'climbing injury', prevalence data among climbers is limited.<sup>[3,4]</sup> In fact, a search of Medline using 'climbing' (keyword) or 'mountaineering' (MeSH) and 'dupuytren's contracture' results in only five hits, one of which was a survey of climber's club members. This 2005 survey did not examine for the presence of palmaris longus (PL).

PL is a slender muscle in the human forearm that appears to be undergoing an evolutionary recession.<sup>[5]</sup> Experimental studies have shown that the absence of PL does is not associated with weakness in either pinch or power grip, although no account was taken of subjects' lean body mass.<sup>[6-7]</sup> PL presence is, however, associated with significantly greater thumb abduction force, presumably through its insertion into the thenar eminence.<sup>[8]</sup> Although considered a weak flexor of the wrist, the contribution of PL to wrist flexion strength remains unknown.<sup>[9]</sup>

Around 15% of the global population are born without PL in one or both wrists; others have the muscle removed for use as a graft during surgical procedures, including tendon pulley reconstructions.<sup>[8]</sup> It is not clear whether this has any effect upon wrist flexion strength or climbing ability. Not all climbers regain their previous form after surgeries that remove PL, though it is likely that perioperative factors and the original injury account for much of this difference.<sup>[10]</sup>

Interestingly, the presence of PL is higher among athletes who perform sustained-grip sports than those in other sports, raising the question of whether this muscle provides an advantage in certain sporting scenarios.<sup>[7]</sup> The presence of PL among climbers has not yet been established.

Through its anatomical insertion, PL tenses the palmar aponeurosis.<sup>[9]</sup> It is not known whether the additional strain caused by PL is an aetiological factor in the development of DD, but research suggests higher rates of PL in DD patients.<sup>[11]</sup> No studies have investigated PL in relation to climbing on sloping holds.

Sloping holds ('slopers') are a frequent finding on climbing routes and boulders. In addition to flexion at the interphalangeal and metacarpophalangeal joints, many slopers require isometric wrist flexion and thumb abduction (Fig. 1). As PL contributes to these actions, it might be the case that the presence of PL provides a modest advantage when climbing on slopers.

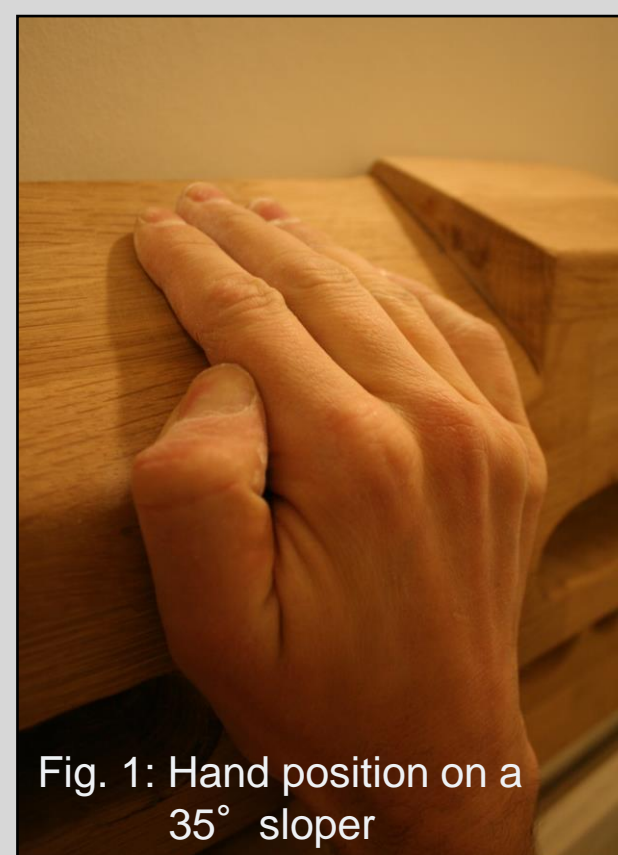


Fig. 1: Hand position on a 35° sloper

### AIMS

To establish:

1. Whether the presence of PL is associated with an increased prevalence of DD in climbers.
2. Whether the presence of PL is associated with a preference for sloping holds over crimps.
3. Whether there is an association between climbing harder grades and developing DD.

### METHODS

#### Subjects

This survey used social media to reach potential subjects and collect data. 198 climbers responded to the online survey, 193 of whom included sufficient data to be included in the results. Four social media hubs were utilised: YouTube, UK Climbing, UK Bouldering and the British Mountaineering Council Facebook page.

#### Testing procedure

An instructional video was posted to YouTube (<https://goo.gl/QQvJrU>). This demonstrated how to check the hands for DD and the wrists for PL. Common locations for DD nodules and cords were demonstrated and subjects were then encouraged to examine their hands. Schaeffer's test for PL was instructed. Subjects were advised to self-administer this simple test, which involves opposition of the thumb and fifth digit (Fig. 2&3: arrows denote position of PL).

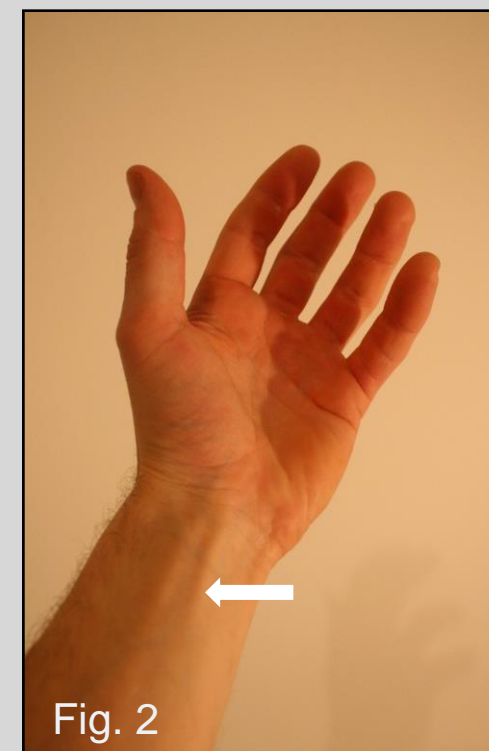


Fig. 2

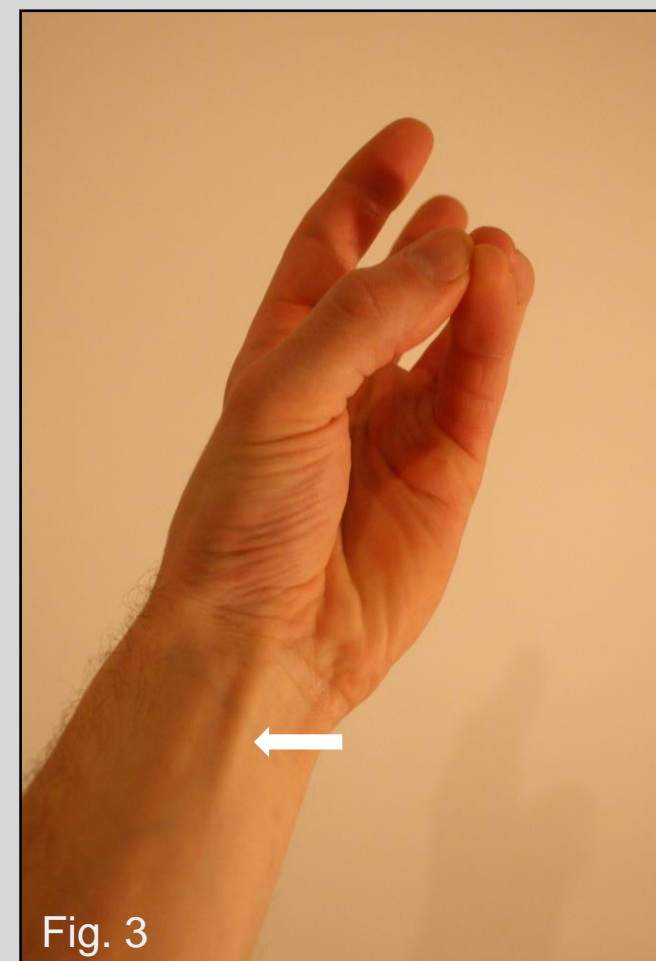


Fig. 3

#### Data Collection

All climbers were encouraged to take part in the survey. An anonymised Google form was set up and subjects were also given the option to contact the author directly. Respondents were asked the following questions:

- What is your age?
- Are you male or female?
- Are you right or left handed?
- Do you have diabetes?
- Any family history of DD?
- Do you have DD (and in which hands)?

- Does anyone in your family have DD?
- How many times do you climb per week, on average?
- Do you have PL? (check both wrists)
- What are your best worked climbing/bouldering grades?
- Do you think you are stronger on slopers or crimps?

#### Data analysis

Responses added via the Google form automatically populated a Google spreadsheet. Responses sent separately were entered manually. To compare between climbers of different disciplines, conversion was performed using the Rockfax comparison charts (<http://www.rockfax.com/publications/grades/>).

### RESULTS

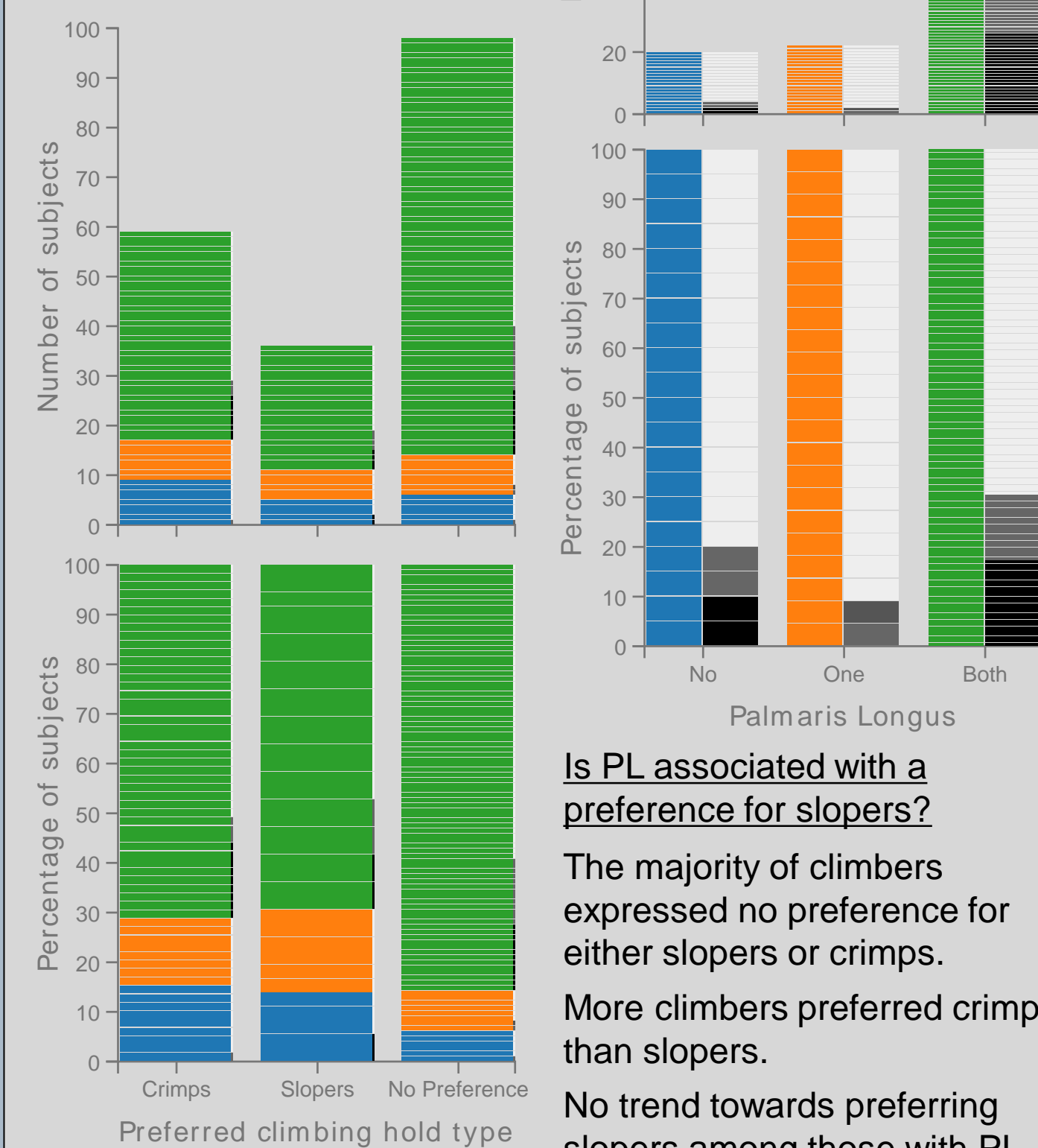
#### Is PL associated with DD in climbers?

17% reported DD on self-examination.

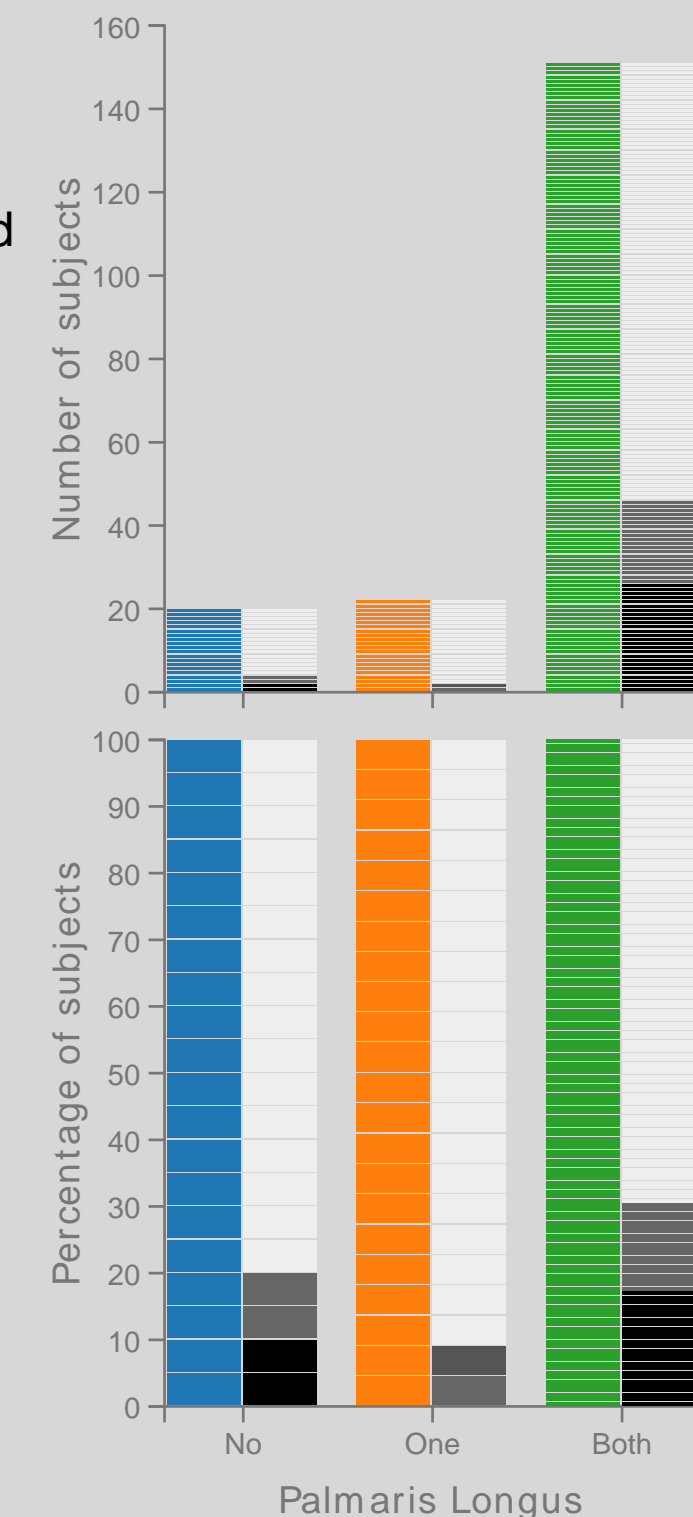
10% were missing PL bilaterally. 13% only had PL in one wrist.

28% with PL bilaterally also had DD in at least one hand.

20% without PL had DD (this group comprised only 4 respondents).



Legend:  
 No Dupuytren's Contracture  
 Dupuytren's Contracture in one hand  
 Dupuytren's Contracture in both hands  
 No Palmaris Longus  
 Palmaris Longus in one arm  
 Palmaris Longus in both arms



#### Is PL associated with a preference for slopers?

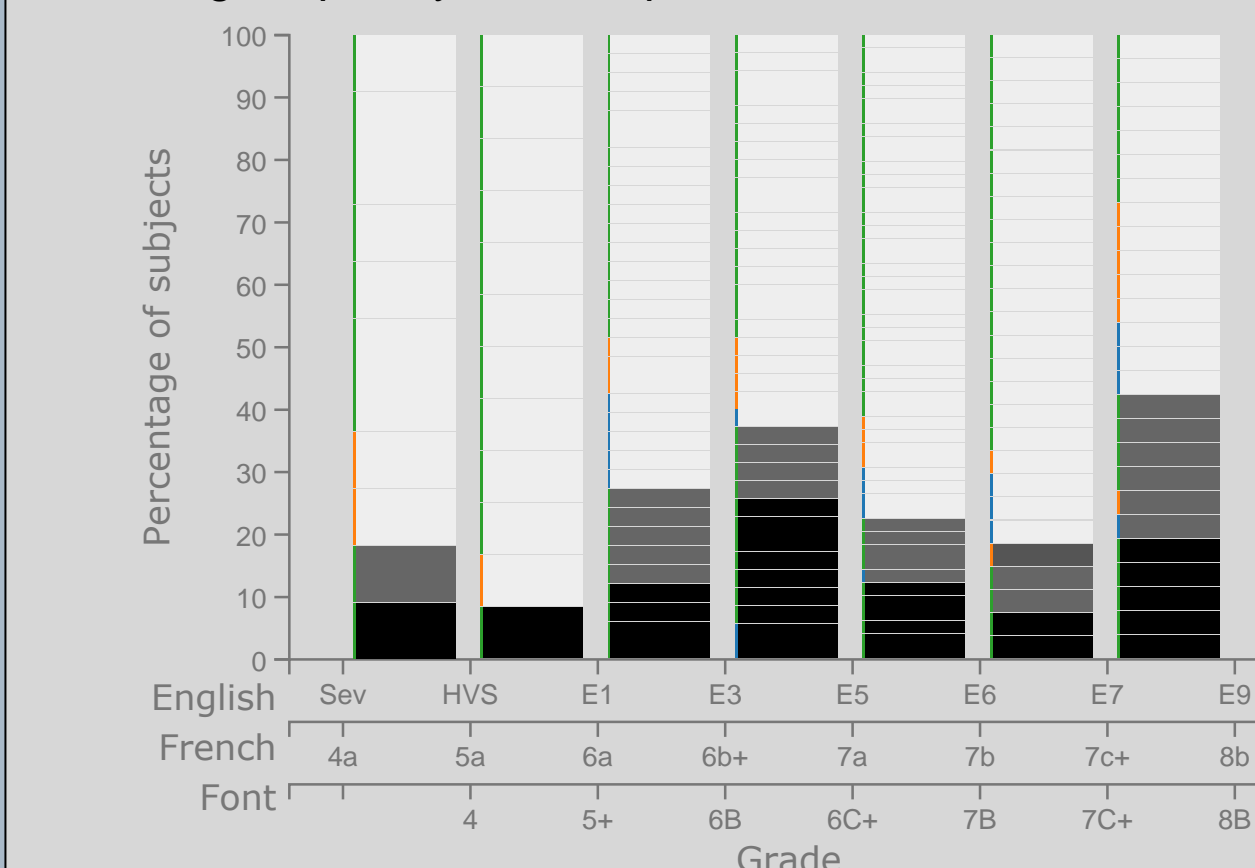
The majority of climbers expressed no preference for either slopers or crimps.

More climbers preferred crimps than slopers.

No trend towards preferring slopers among those with PL, nor were there greater rates of DD in those preferring crimps.

#### Is there a greater risk of DD if climbing harder grades?

There was no association between either harder grades or climbing frequency and DD prevalence.



### DISCUSSION

No significant association between PL presence and developing DD was found. It may be that no association exists. Alternatively, it may be that our study is underpowered – of the 193 respondents, 42 had DD, only four of whom lacked PL. A larger sample size is recommended to validate this finding.

Previous research has suggested that individuals who climb harder grades more commonly develop DD, but we did not observe this trend in our study;<sup>[3]</sup> our data shows similar rates of DD prevalence across the grade range. Additionally, frequency of climbing sessions was not associated with prevalence of DD. Higher DD rates in climbers may therefore relate to strain on genetically predisposed tissues, rather than cumulative trauma.

One strength of this study was its use of social media. This allowed rapid, anonymous data collection from an international sample of climbers. As with any self-response based research, our sample was a self-selecting one. There was also no method of preventing multiple responses per subject, although this is not expected to have been an issue. Response bias is hard to exclude, but it is reassuring that our results are consistent with those of previous work. For example, 10% of climbers were missing PL bilaterally; similar to the results of previous studies.

In our sample, 17% of climbers reported DD on self-examination. Logan et al found a slightly higher rate of 20% among UK climbers.<sup>[3]</sup> However, the mean respondent age in their survey was 58 years old, compared to 38 in this study. Additionally, they only analysed males, in whom DD is well documented to be more common. Our results do agree that DD occurs more commonly in climbers than the general UK population; adding weight to the view that climbing is a risk factor for developing DD.

### FURTHER WORK

Scientific literature on DD in climbers is sparse, providing ample opportunities for future study.

Experimental research is recommended to quantify the contribution of PL to climbing-specific grips. Methodology might involve measuring sloper and crimp performance in each hand of a group of climbers with single, unilateral PL.

There is a lack of longitudinal data on the progression of DD in climbers. Anecdotally, the nodules of early DD do not always lead to contractures. Observational research should follow the disease course of DD in climbers, helping clarify the natural history of this common condition.

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