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Original article

## URAM scale for functional assessment in Dupuytren's disease: A comparative study of its properties

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### ABSTRACT

**Objective:** To test the convergent validity and ease of use of the Unité Rhumatologique des Affections de la Main (URAM) scale for patients with Dupuytren's disease.

**Methods:** Patients were prospectively included. We compared the convergent validity of the URAM scale, the Cochin Hand Function Scale (CHFS) and the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, in terms of their correlation with the Tubiana score and self-assessed disability on a visual analog scale (VAS). Pearson's correlation was used for the convergent validity study. The response time for questionnaire completion was the outcome for ease of implementation.

**Results:** We included 53 patients with Dupuytren's disease in the convergent validity study and 30 other patients with the disease in the time-response assessment. The URAM scale showed strong convergence with the Tubiana scale ( $r=0.64$ ) and self-assessed disability on a VAS ( $r=0.69$ ). Convergence with the Tubiana and self-assessed disability was higher for the URAM scale than the CHFS or DASH questionnaire. The mean [SD] response time was shorter for the URAM scale than the CHFS or DASH questionnaire (42 [20] vs 71 [35] and 103 [59] s, respectively,  $P<0.0001$ ).

**Conclusions:** The results reinforce the psychometric merits of the URAM scale. Furthermore, the response time for assessing disability was shorter with the URAM scale than the CHFS or DASH questionnaire. This evidence supports the high recommendation for the use of the URAM scale in clinical practice and clinical studies to assess disability in Dupuytren's disease.

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## 1. Introduction

Dupuytren's disease is a common fibrosing disorder involving the palmar fascia with resulting flexion contracture of the metacarpophalangeal and proximal interphalangeal joints [1–4]. We recently developed and validated the first patient-reported outcome measure specific to Dupuytren's disease-associated disability [5]. The questionnaire is called the Unité Rhumatologique des Affections de la Main (URAM) scale and is now available in UK English (Fig. 1A), French (Fig. 1B) and 7 other languages: English (US), English (Australia), Spanish (Spain), Danish (Denmark), Swedish, Hungarian and German. The URAM scale shows suitable content validity, reliability, criterion validity and responsiveness. It also demonstrates higher responsiveness than the Cochin Hand

Function Scale (CHFS) and the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, both having previously been developed for and validated in musculoskeletal conditions other than Dupuytren's disease [6–10]. As compared to the CHFS and DASH questionnaire, the URAM scale provided the largest effect size after treatment of Dupuytren's disease with needle aponeurotomy [5].

To further assess the properties of the URAM scale, we tested its relative convergent validity and relative ease of use. We therefore conducted a correlational study with the Tubiana score and self-assessed disability on a 0–100 visual analog scale (VAS) as well as survey-completion response time as outcome criteria, using the CHFS and DASH questionnaire for comparison.

## 2. Methods

### 2.1. Patients

A total of 83 French patients attending our unit for Dupuytren's disease were prospectively included: 53 patients in the comparative convergent validity study and 30 in the response time

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## A

Can you ...	Without difficulty (0)	With very little difficulty (1)	With some difficulty (2)	With much difficulty (3)	Almost impossible (4)	Impossible (5)
1. Wash yourself with a flannel, keeping your hand flat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Wash your face?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Hold a bottle in one hand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Shake someone's hand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Stroke something or caress someone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Clap your hands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Spread out your fingers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Lean on your hand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Pick up small objects with your thumb and index finger?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## B

Pouvez-vous ...	Sans difficulté (0)	Avec très peu de difficultés (1)	Avec quelques difficultés (2)	Avec beaucoup de difficultés (3)	Presque impossible (4)	Impossible (5)
1. Vous laver avec un gant de toilette ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Vous laver le visage ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Prendre une bouteille d'une main ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Serrer la main de quelqu'un ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Caresser quelque chose ou quelqu'un ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Applaudir ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Ecarter les doigts ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Prendre appui sur la main ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Saisir de petits objets entre pouce et index ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fig. 1. The URAM scale<sup>®</sup>. A. English UK version. B. French version.

assessment. Inclusion criteria were ascertained diagnosis of Dupuytren's disease and French comprehension and ability to answer to the questionnaires. The 2 populations were independent.

## 2.2. Outcomes

Assessments were performed before any procedure related to the disease. The Tubiana scale, based on goniometry, was used to grade the morphological severity of Dupuytren's disease [11]. Self-assessed disability on the VAS, URAM scale, CHFS and DASH questionnaire were used for functional assessment. The disability question for the VAS was "Can you indicate how much Dupuytren's disease prevented you from doing daily activities with the hand if 0 means no difficulty and 100 means impossibility?". The URAM scale comprises 9-items, with total scores ranging from 0 to 45 [5]. The CHFS has 18 items and the DASH questionnaire 30 items, with total scores ranging from 0 to 90 and 0 to 100, respectively [6,7]. For the 3 scales, the highest values correspond to the greatest disability. For the response time assessment, each patient was randomly assigned to one of 6 possible orders of questionnaire presentation.

The time needed to complete each questionnaire was recorded in seconds for each patient by an independent timer.

## 2.3. Statistical analysis

Linear Pearson's correlation was used for the convergent validity study [12,13]. Moderate, strong and very strong convergence with the Tubiana scale and self-assessed disability were considered  $r$  from 0.39 to 0.59,  $r$  from 0.60 to 0.79 and  $r > 0.79$ , respectively [12]. For the response time assessment, results are expressed as mean  $\pm$  SD and as absolute number for the categorical variable that corresponded to the questionnaire position in the order of questionnaire presentation (position 1, 2 or 3). Comparisons between scales involved ANOVA and Fisher's partial least-squares difference test for the continuous variable, namely response time, and the  $\chi^2$  test for the categorical variable, the order of questionnaire presentation. Statistical significance was set at  $P < 0.05$ . All analyses involved use of Statview v4.5 (Abacus Concepts, Berkeley, CA).

### 3. Results

For the convergent validity study, the 53 patients included 44 men. The mean (SD) age was 63 (9). The Tubiana score was 4.8 (2.8). The URAM score was 13 (10). The CHFS and the DASH scores were 13 (14, range 0–54) and 13 (13, range 0–54), respectively.

The URAM scale showed strong convergence with the Tubiana scale ( $r=0.64$ ) and self-assessed disability on a VAS ( $r=0.69$ ) (Table 1). For the CHFS, the convergence was moderate with the Tubiana scale ( $r=0.40$ ) and self-assessed disability ( $r=0.58$ ). For the DASH questionnaire, the convergence was also moderate with the Tubiana scale ( $r=0.56$ ) and self-assessed disability ( $r=0.45$ ). Therefore, convergence with the Tubiana and self-assessed disability was higher for the URAM scale than the CHFS or DASH questionnaire.

For the response time assessment, the 30 patients included 23 men. The mean (SD) age was 63 (9). The URAM score was 11 (13, range 0–62). The CHFS and DASH scores were 11 (13, range 0–49) and 18 (19, range 0–68), respectively. The order of presentation did not differ between the scales (Table 2). The response time was shorter for the URAM scale than the CHFS and DASH questionnaire (42 [20] vs 71 [35] and 103 [59] s, respectively,  $P<0.0001$ ).

### 4. Discussion

The URAM scale showed higher convergence – indicated by higher correlation – with the Tubiana scale and self-assessed disability than the CHFS and DASH questionnaire for patients with Dupuytren’s disease. Therefore, the URAM scale has the highest convergent validity among the 3 scales, meaning best ability to specifically assess disability due to flexion contracture in Dupuytren’s disease. Furthermore, the response time for assessing disability was shorter with the URAM scale than the CHFS and DASH questionnaire. Completing the URAM scale takes only 42 s, on average, which is about half the time needed for the CHFS and DASH questionnaire. As well as we hypothesized, in addition to its psychometric properties, the URAM scale is brief and convenient enough for easy use in daily practice and clinical trials for patients with Dupuytren’s disease.

The URAM scale appeared to be more specific to functional restriction in Dupuytren’s disease than the other 2 scales. This finding should be related to the content validity of the URAM scale being developed by an item-generation process involving experts and patients who were asked about daily activities disturbed because of Dupuytren’s disease [5]. The CHFS and DASH questionnaire are

well-known patient-reported functional-outcome measures commonly used for miscellaneous hand conditions [14–16].

However, clinical experience supports that in contrast to most rheumatic hand diseases, in Dupuytren’s disease, pain is neither fairly common nor markedly linked with the disability. As well, the DASH questionnaire contains items related to pain, so it is probably unsuitable and difficult to understand for patients self-assessing Dupuytren’s disease-associated disability [7].

Furthermore, the loss of finger extension and not finger flexion is specific to Dupuytren’s disease. This feature is not found in digit arthropathies and may be of concern for the same reason when using the CHFS to assess Dupuytren’s disease-associated disability. However, the CHFS is particularly well adapted to rheumatoid arthritis and osteoarthritis [6,8].

For the response time assessment, the randomized order of the questionnaire presentation aimed to prevent any bias related to the training or learning curve in completing the questionnaires. The distribution of questionnaire positions in the order of survey presentation demonstrates that the randomization was effective and reinforces our observations, namely, the short response time with the URAM scale relative to the CHFS or DASH questionnaire. The content validity of each tool used for Dupuytren’s disease may be a key explanation for the differing response times. The short response time with the URAM may also be related to and explained by the number of items in the tool. The CHFS has 18 items and the DASH questionnaire, 30, as compared with 9 for the URAM scale [5–7]. Moreover, the length of the questions may explain the difference in completion time between the URAM scale and the DASH questionnaire. This situation may not be the case for the CHFS because contrary to the DASH questionnaire, the CHFS is close to the URAM scale in literal presentation.

Our study provides information of key importance for clinical practice with Dupuytren’s disease. However, our study contains some limitations. The study involved French patients attending our unit for needle aponeurotomy [17,18] and who used the French version of the URAM scale [4]. Feasibility of the English version of the URAM scale has not directly been tested. However, owing the translation and transcultural adaptation processes that we followed, feasibility results would likely be the same for the English version of the URAM scale. For the translation and transcultural adaptation processes, we used native English linguists and native English patients with Dupuytren’s disease. Another consideration is that most of the patients in our study required treatment with needle aponeurotomy and may not be representative of affected populations from epidemiological surveys. Because of a large spectrum of clinical features and natural histories, all patients with Dupuytren’s disease do not necessarily need treatment because of lack of contracture or functional limitation. However, even in miscellaneous constituted populations of patients with Dupuytren’s disease, the 9-item URAM scale may be an interesting feature for easy use in epidemiological studies.

We conclude that because of its favorable psychometric properties and ease of use, the URAM scale is among the most suitable tools, if not the most suitable, for assessing Dupuytren’s disease-associated disability in clinical practice and clinical studies. Thus, the URAM scale can be recommended for this indication.

### Disclosure of interest

Robert Gerber and Joseph Cappelleri are employees of Pfizer Inc. Thomas Bardin declares speaking fees from Pfizer and a previous scientific collaboration with the same organisation<sup>1</sup>. Philippe

**Table 1**  
Construct validity study of the URAM scale, CHFS and DASH questionnaire (linear Pearson’s correlation coefficients with the Tubiana scale and self-assessed disability on a 0–100 VAS).

	Tubiana	Disability VAS
URAM	0.64	0.69
CHFS	0.40	0.58
DASH	0.56	0.45

VAS: visual analog scale; CHFS: Cochin Hand Function Scale; DASH: Disabilities of the Arm, Shoulder and Hand.

**Table 2**  
Order of presentation of the URAM scale, CHFS and DASH questionnaire.

	Position 1	Position 2	Position 3
URAM	11	10	9
CHFS	8	12	10
DASH	11	8	11

CHFS: Cochin Hand Function Scale; DASH: Disabilities of the Arm, Shoulder and Hand. Chi-square test,  $P=0.81$ .

<sup>1</sup> Beaudreuil et al. Arthritis Care Res 2011;63:1448–55.

Orcel declares a previous collaboration with Pfizer<sup>1</sup>. Johann Beaudreuil declares speaking fees from Pfizer and a previous scientific collaboration with the same organisation<sup>1</sup>.

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