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Psychological factors are related to pain intensity in back-healthy people who develop clinically relevant pain during prolonged standing: A preliminary study

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Abstract

Background—An induced-pain paradigm has been used to examine risk factors for LBP development during prolonged standing in back-healthy people (standing paradigm). Prior studies using induced-pain methods suggest that pain intensity may be related to psychological factors. It is not currently known, however, if pain intensity reported during the standing paradigm is related to psychological factors.

Objective—Examine the relationship between low back pain (LBP) symptom intensity and psychological factors (fear of pain and pain catastrophizing) in back-healthy people who develop LBP during prolonged standing. We hypothesized that symptom intensity during standing would be positively related to initial levels of fear of pain and pain catastrophizing in people who developed LBP during standing.

Design—Cross-sectional.

Setting—Musculoskeletal analysis laboratory at an academic medical center.

Participants—Fifty seven back-healthy participants.

Methods—Participants completed the Fear of Pain Questionnaire (FPQ-III) and Pain Catastrophizing Scale (PCS) prior to a 2 hour standing protocol. Participants rated LBP intensity on a 100 mm visual analogue scale (VAS) throughout standing and were classified as pain developers (PDs) or non-pain developers (NPDs). Relationships between LBP intensity and

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psychological measures were examined in PDs that did and did not have a 20 mm maximum VAS score.

Main Outcome Measurements—FPQ-III and PCS total scores. Maximum and average VAS scores during standing.

Results—There were 24 (42%) PDs. Five PDs reported a maximum VAS score 20 mm. For PDs with a maximum VAS score <20 mm, correlations between average VAS scores and each psychological measure were small and non-significant (FPQ-III: $r=0.16$, $p=.50$; PCS: $r=0.27$, $p=.26$). For PDs with a maximum VAS score 20 mm, correlation between average VAS scores and FPQ-III was large and significant ($r=0.91$, $p=.03$), and large for PCS but non-significant ($r=0.87$, $p=.06$).

Conclusion—These preliminary data suggest that if pain exceeds a clinically meaningful threshold (20 mm) during standing, pain intensity is related to psychological factors. Understanding factors that modulate acute pain response can inform early intervention strategies.

INTRODUCTION

Epidemiologic studies have shown that jobs requiring prolonged standing are associated with an increased risk for LBP development.^{1–5} In previous studies, investigators have used an induced-pain paradigm in back-healthy people to understand risk factors for developing LBP during prolonged standing (standing paradigm).^{6–17} The standing paradigm consists of back-healthy participants standing for two hours while rating their LBP symptom intensity on a 100 mm visual analogue scale (VAS). Measures of symptoms are obtained at baseline and every 15 minutes throughout the exposure. Based on VAS scores, participants are classified as a pain developer (PD) or a non pain developer (NPD). The standing paradigm has been shown to be a valid and reliable method for inducing LBP symptoms.^{11, 16, 18} Across the prior studies, 28–70% of back-healthy participants have been classified as PDs.^{6–18}

The fact that some participants develop pain during the standing paradigm and others do not has allowed for examination of variables that may be associated with the development of LBP symptoms during standing prior to the development of pain. Examination of variables that may predispose a back-healthy person to development of initial LBP symptoms is not possible in clinical populations because people already have LBP. Understanding variables that predispose a person to initial LBP symptom development is important because the information can inform preventative and early intervention strategies. Such information is particularly valuable in the area of LBP because of the high prevalence of the condition and the potential for people with acute LBP responses to transition to clinical LBP cases.^{16, 19} The standing paradigm also is interesting from a clinical perspective because it is examining symptom development during a functionally relevant activity, i.e., prolonged postural loading. Pain associated with prolonged postures is rarely studied within the context of induced pain paradigms.

Psychological factors have been assessed as a risk factor for LBP development in studies using induced pain paradigms.^{20, 21} Two constructs often examined are pain-related fear and pain catastrophizing. In a study of people with chronic LBP, investigators used a thermal

stimulus applied to the forearm to induce pain.²¹ Fear of pain was related to the intensity of the pain induced in the forearm after a single pulse of the thermal stimulus. The authors hypothesized that fearful thoughts may result in a primed state that heightens the person's sensitivity to pain. Pain catastrophizing, on the other hand, was related to temporal summation of pain when multiple pulses of thermal stimuli were given. The authors hypothesized that because catastrophic thoughts take time to develop, they might have a stronger association with pain stimuli that build over time. In two studies of back-healthy people, LBP was induced by having participants perform repetitive lumbar extension exercises.^{20, 22} The repetitive exercise results in delayed onset muscle soreness in the lumbar paraspinal muscles. One of the psychological measures included was fear of pain. The authors did not measure pain catastrophizing. In both studies, fear of pain was predictive of peak pain intensity 24 hours after the exercise bout. In a study that used the standing paradigm participants completed a questionnaire that assessed attitudes towards pain, injury, and disability.¹³ The authors reported no differences in scores between the PDs and NPDs. The relationship between attitudes and LBP symptom intensity in PDs was not examined. Psychological factors, however, could be related to symptom intensity even though PDs and NPDs have similar scores on psychological measures. For example, rather than being associated with the initial development of LBP symptoms, a person's psychological status may modulate LBP symptom intensity once symptoms are present. In the situation described, a person would have to be vulnerable to a mechanical stimulus such as spinal loading during standing due to compromised structural integrity of the spinal tissue and not because of psychological status. Once symptoms are present and reach a certain minimum threshold, the person's report of symptom intensity may be modulated by fear or catastrophic thoughts related to pain. Thus, once the minimum criterion intensity level is reached, symptom intensity may be related to scores on psychological measures. The absolute scores on psychological measures could be the same for PDs and NPDs, but the psychological measures' influence on self-report of pain could be dependent on meeting a minimum threshold of LBP intensity. The purpose of the current study was to examine the relationship between LBP symptom intensity reported during the standing paradigm and (1) pain-related fear, and (2) pain catastrophizing. These psychological factors were to be examined first in all PDs. We then separated the PDs into two subgroups, (1) PDs with a maximum VAS score greater than or equal to 20 mm, and (2) PDs with a maximum VAS score below 20 mm. The examination of subgroups of people based on levels of symptom intensity was motivated by reports that identify 20 mm on a VAS or 2 points on a numeric pain rating scale as a clinically relevant level of pain.^{19, 23, 24} Thus, we decided to examine the relevance of this cutoff in people who developed transient acute LBP during the standing paradigm. We hypothesized that the maximum and average VAS scores during standing would be positively related to initial levels of fear of pain and pain catastrophizing in the PDs. We also hypothesized that the relationship would be largest in PDs with a maximum VAS score $\geq$ 20 mm compared to all PDs and PDs with a maximum VAS score $<$ 20 mm.

MATERIALS AND METHODS

Participants

Fifty-seven back-healthy people between the ages of 18 and 30 years old were recruited. Participants were recruited by posting flyers on campuses of local universities and across the St. Louis metropolitan area. Participants also were recruited through two community-based, university operated, recruitment organizations. Inclusion criteria included no lifetime history of an episode of LBP that resulted in (1) seeking some type of health intervention (e.g., physician, physical therapist, chiropractor), (2) 3 or more consecutive days of missed work or school, or (3) 3 or more days of altered activities of daily living. Exclusion criteria included employment in a job that involved standing in one place for more than 1 hour per day during the last 12 months, not able to stand for > 4 hours, a body mass index > 30, or reported LBP symptoms at the beginning of the standing task. All participants read and signed an informed consent form that was approved by the Institutional Review Board of the Human Research Protection Office at Washington University School of Medicine.

Measures

The Fear of Pain questionnaire (FPQ-III) is a 30 item questionnaire that measures fear of pain associated with specific events.²⁵ The total range of scores is from 30–150. Higher scores on the FPQ-III indicate higher fear of pain. The FPQ-III has been shown to be reliable and valid in clinical²⁵ and healthy populations.²⁶ The Pain Catastrophizing Scale (PCS) is a 13 item questionnaire. The PCS measures the extent of catastrophic thoughts a person reports in response to pain.²⁷ The scores range from 0–52. Higher scores on the PCS indicate a higher degree of catastrophizing. The PCS has been shown to be reliable and valid in clinical and healthy populations.²⁷ Symptom intensity was measured using a VAS. The VAS is a 100 mm horizontal line with the anchors of “no pain” and “worst pain imaginable.” Participants placed an ‘X’ through the line at the point that best represented their perception of their current LBP symptom intensity. Intensity was quantified by measuring the distance of the ‘X’ from the left end of the scale with a ruler. Greater distances indicated higher symptom intensities.

Procedures

After signing the informed consent document, participants completed the FPQ-III and PCS. The participants also completed the Baecke Questionnaire of Habitual Physical Activity²⁸ and an injury history questionnaire. The Baecke questionnaire was completed to ensure that there were no group mean differences in activity level between NPDs, PDs with maximum VAS score < 20 mm, and PDs with a maximum VAS score ≥ 20 mm. The injury history questionnaire was completed to ensure that there were no group mean differences in the number of body regions with a history of injury between NPDs, PDs with maximum VAS score ≥ 20 mm, and PDs with a maximum VAS score < 20 mm.

Following completion of the questionnaires, participants were positioned in front of a work table in a 2 foot by 4 foot confined workspace. The table was adjusted to 5 cm below the participant’s wrist while his or her elbows were flexed to 90°. ²⁹ Participants then stood for two hours performing simulated light work tasks. Participants were allowed to shift their

weight as often as desired but were told to keep both feet on the ground the majority of the time, and were not allowed to rest their feet on the legs of the table or arms on the surface of the table. Participants rated the intensity of their LBP symptoms on the VAS every 15 minutes.

The tasks used included shuffling cards, sorting poker chips, and a simple assembly task. There also was a quiet standing condition. The work tasks and quiet standing were completed in 15 minute blocks of time. The order of tasks was randomized prior to the start of standing. Randomization of the tasks was performed using random.org/lists. Each task and the period of quiet standing were completed twice during the two hours, with the added constraint that the same task could not be performed consecutively. Following randomization, if any of the 3 work tasks or quiet standing was to be performed consecutively, randomization was repeated.

For each participant, the maximum VAS (max VAS) score that was reported during the two hours of standing was identified. The average VAS score was calculated by summing the VAS scores at baseline and throughout standing and dividing by 9.

Data Analyses

Back-healthy participants were separated into PDs and NPDs. NPDs were people that reported 0 on the VAS throughout the standing test. PDs were participants that reported any symptoms after baseline and maintained the symptoms throughout the standing test. PDs then were separated into subgroups of PDs that reported a max VAS score < 20 mm (max VAS < 20 mm) and PDs that reported a max VAS score ≥ 20 mm (max VAS ≥ 20 mm). *NPDs vs. PDs.* A Chi-square analysis was conducted to test for differences in the distribution of sex among the 3 groups. One-way ANOVA tests were conducted to test for differences in height, weight, BMI, activity level, FPQ-III total score, PCS total score, max VAS score, and average VAS score among the three groups. *All PDs.* In PDs, a Pearson correlation coefficient was calculated for (1) maximum VAS scores and the total scores on the FPQ-III and the PCS, and (2) average VAS scores and the total score on the FPQ-III and the PCS. *Subgroups of PDs.* Pearson correlation coefficients were calculated for the same pairs of variables noted above for the max VAS < 20 mm subgroup and for the max VAS ≥ 20 mm subgroup. Statistical analyses were performed in SPSS version 21.0 (IBM, Armonk, NY). Statistical significance was set at $P = .05$.

RESULTS

Group characteristics

Participant characteristics for NPDs and the subgroups of PDs are provided in TABLE 1. There were 33 (58%) NPDs and 24 (42%) PDs. There were 19 PDs with a maximum VAS score < 20 mm (79%) and 5 PDs with a maximum VAS score ≥ 20 mm (21%). There were no differences among the NPDs, max VAS < 20 mm, and max VAS ≥ 20 mm at baseline in gender, age, height weight, mass, BMI, activity level, and body regions with a history of injury ($P = .15$ to $.99$). There also were no differences among the groups for FPQ-III total scores ($P = .39$) and PCS total scores ($P = .26$). There was a significant difference between

NPDs, max VAS < 20 mm subgroup, and max VAS ≥ 20 mm subgroup in maximum VAS scores ($P < .01$) and average VAS scores ($P < .01$).

Relationships between Psychological Measures and Symptom Intensity

Correlation coefficients and P -values for the two psychological measures and (1) max VAS scores are shown in TABLE 2, and (2) average VAS scores are shown in TABLE 3. For the max VAS ≥ 20 mm subgroup, there was a large³⁰ and significant relationship between the FPQ-III total score and average VAS score. There also were large relationships between FPQ-III and max VAS scores, and PCS and max VAS scores, and PCS and average VAS scores for the max VAS ≥ 20 mm subgroup. These 3 relationships, however, were not significant. In the max VAS score < 20 mm subgroup and for all PDs relationships between the two psychological measures and (1) maximum VAS scores, and (2) average VAS scores were small or moderate and none were significant.

DISCUSSION

Our purpose was to examine the relationship between psychological factors and LBP symptom intensity in back-healthy people who developed LBP during two hours of standing. We examined fear of pain and pain catastrophizing in all PDs, and then in two subgroups of PDs, people with a maximum VAS score < 20 mm and people with a maximum VAS score ≥ 20 mm. We initially tested for differences in scores on the psychological measures among the NPDs and the two subgroups of PDs (max VAS < 20 mm and max VAS ≥ 20 mm). Scores on the psychological measures were not significantly different among any of the groups. Thus, no group displayed more extreme scores on the psychological measures than any other group before the two hours of standing. The only group of PDs in which there were large relationships between LBP symptom intensity and the two psychological measures was the max VAS ≥ 20 mm subgroup. In addition, the relationship between FPQ-III total scores and average VAS scores was significant. These preliminary data are important because they suggest that in back-healthy people baseline psychological status does not differentiate who will and who will not develop LBP symptoms during standing. Instead our data indicate that fear of pain and pain catastrophizing may play a role in modulating the pain response in the subgroup of PDs with a max VAS score ≥ 20 mm. Thus, in back-healthy people experiencing pain, the pain intensity may have to reach a clinically relevant threshold before psychological factors influence the person's report of LBP symptoms. These data also suggest that psychological factors appear to play a role as prognostic factors rather than risk factors for first onset LBP.

The correlation coefficients between the two psychological measures and the two pain measures (maximum VAS and average VAS) were large³⁰ for the max VAS ≥ 20 mm subgroup. The coefficient values ranged from 0.53 to 0.91. Only one of these correlations, however, was statistically significant; the correlation between fear of pain and average pain ($r=0.91$, $P=.03$). The relationship between pain catastrophizing and average pain approached significance ($r=0.87$, $P=.06$). One factor that likely contributed to the lack of significance of some of the correlations for the max VAS ≥ 20 mm subgroup was the sample size ($n=5$). For example, if the size of the correlation remained the same, a post-hoc power analysis

indicated that only one additional person would have been needed for the relationship between pain catastrophizing and average pain to be significant. The current study, however, is the first to use a functionally relevant stimulus (prolonged postural loading) to identify relationships between pain and psychological measures and to examine these relationships in back-healthy people rather than a group of people with clinical LBP. Given the size of the obtained correlations and that the lack of significance may be due to the small sample size of the max VAS 20 mm subgroup, we consider that these data suggest a need for future work in a larger sample. Future work is being planned to investigate the relationships of biomechanical, sensory processing, and psychological measures to LBP symptom intensity in prolonged standing using a larger sample.

Relationships between LBP symptom intensity and fear of pain were identified in a prior study of induced LBP in back-healthy people. Bishop et al.²⁰ reported a significant relationship between fear of pain and current LBP symptom intensity 24 hours after back-healthy people performed repetitive lumbar extension exercises. Fear of pain, however, explained only 7% of the variance in pain intensity. In the current study the amount of explained variance in symptom intensity for all PDs was similar (4%) to that reported in the Bishop study.²⁰ Interestingly, when we examined the subgroup of PDs with a maximum VAS score 20 mm, 81% of the variance in average pain intensity was explained by fear of pain. The larger amount of explained variance in symptom intensity in the max VAS 20 mm subgroup provides some support for the proposal that pain may need to reach a clinically relevant threshold before psychological factors influence a person's perception of initial LBP symptoms.

The interest in investigating the relationships of interest in subgroups of PDs was motivated by reports that have suggested that 20 mm on a VAS or a 2 point change on a numeric pain rating scale may have some clinical relevance. In one study, a panel of experts agreed that 20 mm on a 100 mm VAS was the minimum threshold needed to indicate the presence of a LBP recurrence.²⁴ Other investigators identified a 2 point change on an 11 point numeric pain rating scale as clinically important because in people with LBP the 2 point value exceeded the bounds of measurement error.²³ Finally, using the 11 point numeric pain rating scale, investigators reported that a 2 point increase in a person's median LBP indicated the presence of an acute LBP flare-up.¹⁹

In the current study, we examined the relationship of psychological factors to both maximum pain intensity and average pain intensity during standing. Maximum pain intensity was the largest VAS score reported at any 15 minute interval throughout the two hours standing and provides a measure of pain behavior at a single point in time. The average pain intensity was the sum of the VAS scores reported at baseline and each 15 minute interval throughout standing divided by the total number (9) of VAS reports. We calculated average pain for an index of pain behavior over time. The FPQ-III and PCS both had large relationships with maximum and average pain intensity during standing. The relationships to average pain, however, were larger than the relationships to maximum pain. The stronger relationships of fear of pain and pain catastrophizing to average pain suggests that for back-healthy people, psychological factors may have a stronger influence on pain report over time rather than the maximum pain intensity a person reports at a single point in time.

In one earlier study using the standing paradigm differences in psychological measures were examined between PDs and NPDs.¹³ The investigators developed a questionnaire that included select items from 3 questionnaires frequently used in people with clinical LBP. The 3 questionnaires included the Cognitive Risk Profile for Pain,³¹ Survey of Pain Attitudes-b,³² and the Fear Avoidance Beliefs Questionnaire.³³ The authors reported no differences between PDs and NPDs. Using measures validated for use in healthy participants we also found no difference between PDs and NPDs in psychological status. The lack of a difference between PDs and NPDs suggests that a person's absolute level on psychological measures does not distinguish between back-healthy people who will develop pain in standing and back-healthy people who will not develop pain in standing. Rather, the current data suggest that once pain reaches a clinically relevant threshold,^{19, 23, 24} psychological factors appear to modulate pain perception.

Our study has some limitations. First, the age range of the participants was 18 to 30 years. Our results, therefore, may not be generalizable to adults above 30. Age also may have impacted the number of participants that reached the 20 mm threshold on the VAS. A sample of participants over the age of 30 may have been more likely to have morphological changes in the spine. The changes in the spine may not yet be symptomatic until exposed to the prolonged loading stimulus. Future studies should include participants of all working ages. Given the typical age for an initial LBP episode, however, the likelihood of finding a sample of people over the age of 30 without a history of LBP could be low.³⁴ Second, the participants stood for only two hours which may not be representative of all jobs that involve prolonged standing. For example, it has been reported that bank tellers spend over 80% of their work day standing.³⁵ In addition, it has been reported that the length of time a person stands in a work setting is related to the level of LBP reported.³⁶ A longer standing duration, therefore, may result in more people reaching and exceeding the 20 mm threshold value. We recruited participants from the university and surrounding areas. The education level of our sample therefore may not reflect the distribution of educational level in the general population. Recruitment for future studies should place a larger emphasis on recruiting people that reflect the educational level of the general population. In all induced pain paradigms there is a potential for over reporting of symptoms when asking participants for a self-report measure of symptom intensity. Finally, the symptoms that were developed were acute and transient in nature. Even under these circumstances, however, we found interesting relationships between psychological measures and pain intensity.

Conclusion

In PDs that reached the minimum criterion of pain intensity to qualify for a recurrence of an episode of LBP (max VAS = 20 mm), fear of pain and pain catastrophizing were related to different aspects of pain intensity. The relationships were present even though there were no initial differences between measures of fear of pain and pain catastrophizing among the three groups of interest. These data suggest that baseline psychological status may not provide insight into who will be at risk for initial LBP development during standing and that the pain response to standing is not simply psychological in nature. If a person is susceptible to LBP with prolonged loading during standing and develops a clinically relevant level of pain, however, psychological status may potentially modulate the report of initial pain

intensity. Therefore, in people who develop clinically meaningful LBP symptoms initially during jobs that require prolonged standing psychological measures could be addressed in addition to mechanical factors leading to pain. Given that many people who experience a first episode of LBP go on to develop a chronic or recurrent condition, it is important to understand the factors that modulate initial LBP symptom intensity in people that develop clinically relevant symptoms.

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Figure 1.

Scatter plot of average VAS score and FPQ-III Total Score in NPDs, PDs with a maximum VAS <20 mm ($r=0.16$, $p=.50$), and PDs with a maximum VAS >20 mm ($r=0.91$, $p=.03$). NPDs are included to show the distribution of FPQ-III scores across all participants.

Figure 2.

Scatter plot of average visual analog scale (VAS) scores and Pain Catastrophizing Scale (PCS) Total Score in non-pain developers (NPDs), pain developers with a maximum VAS below 20 mm (PDs < 20 mm) ($r=0.27$, $p=.26$), and PDs with a maximum VAS above 20 mm (PDs ≥ 20 mm) ($r=0.87$, $p=.06$). NPDs are included to show the distribution of PCS scores across all participants.

Table 1

Participant Characteristics.

Characteristic	Group				P-value
	NPDs (n = 33)	PDs <20 mm (n = 19)	PDs 20 mm (n = 5)	Statistical Value	
Sex (female, male)	13, 20	11, 8	4, 1	$\chi^2 = 3.7$	.15
Age (years)	23.9 ± 3.5	24.4 ± 3.2	26 ± 3.9	F = 0.9	.43
Height (cm)	171.4 ± 8.7	171.7 ± 7.7	172.2 ± 4.5	F = 0.03	.97
Mass (kg)	67.1 ± 9.1	69.7 ± 13.8	67.4 ± 8.6	F = 0.3	.72
BMI (kg/m ²)	22.8 ± 2.3	23.4 ± 3.0	22.7 ± 2.3	F = 0.4	.69
Baecke Questionnaire of Habitual Physical Activity (3–15) ⁺	8.2 ± 1.2	8.1 ± 1.3	8.1 ± 1.7	F = 0.007	.99
Number of body regions with a history of injury	1.3 ± 1.8	1.7 ± 2.1	0.6 ± 1.3	F = 0.7	.49
Fear of Pain Questionnaire (FPQ-III; 30–150) ⁺	69.3 ± 20.6	76.5 ± 18.2	66.6 ± 21.5	F = 1.0	.39
Pain Catastrophizing Scale (PCS; 0–52) ⁺	6.5 ± 8.6	10.5 ± 8.1	7.4 ± 7.2	F = 1.4	.26
Maximum VAS score (0–100 mm)	0.0 ± 0.0	10.1 ± 5.6	27.7 ± 5.6 [*]	F = 152.3	<.001
Average VAS score (0–100 mm)	0.0 ± 0.0	4.2 ± 2.8	11.5 ± 7.6 [*]	F = 47.9	<.001

Abbreviations: NPDs, Non-pain developers; PDs, Pain Developers; VAS, visual analogue scale; BMI, body mass index.

⁺Total scores used for the Baecke Questionnaire of Habitual Physical Activity, FPQ-III and PCS.^{*}Significantly different from both NPDs and PDs < 20 mm based on post hoc analyses (*P*-values .05).

Table 2

Pearson correlation coefficients (*r*) and *P*-values for the two psychological measures and maximum VAS scores in all pain developers, pain developers with a VAS score < 20 mm, and pain developers with a VAS score ≥ 20 mm.

Psychological Measure	Max VAS Score		
	PDs (n = 24)	PDs <20 mm (n = 19)	PDs ≥ 20 mm (n = 5)
Fear of Pain Questionnaire (FPQ-III; 30–150) [†]	0.04 (.87)	0.31 (.21)	.60 (.30)
Pain Catastrophizing Scale (PCS; 0–52) [†]	0.09 (.67)	0.35 (.14)	.53 (.36)

Abbreviations: PDs, Pain Developers; VAS, visual analogue scale.

[†]Total scores used for both the FPQ-III and PCS.

Values indicate correlation coefficient, *r* (*P*-value).

TABLE 3

Pearson correlation coefficients and *P*-values for each psychological measures and average VAS scores in pain developers, pain developers with a VAS score < 20 mm, and pain developers with a VAS score ≥ 20 mm.

Psychological Measure	Average VAS Scores		
	PDs (n = 24)	PDs <20 mm (n = 19)	PDs ≥ 20 mm (n = 5)
Fear of Pain Questionnaire (FPQ-III; 30–150) ⁺	0.21 (.33)	0.16 (.5)	.91 (.03)
Pain Catastrophizing Scale (PCS; 0–52) ⁺	0.24 (.27)	0.27 (.26)	.87 (.06)

Abbreviations: PDs, Pain Developers; VAS, visual analogue scale.

⁺Total scores used for both the FPQ-III and PCS.

Values indicate correlation coefficient, *r* (*P*-value).

* Boldface indicates a significant relationship.