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The effect of written information on pain experience during periodontal probing

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Abstract

Objectives: To study the effect of providing written information prior to periodontal treatment on the pain experience during periodontal probing.

Materials and Methods: Patients were randomly assigned to the experimental or control condition and had to read the accompanying information. Information was manipulated to enhance perceptions of control. Anticipated pain (Numerical Rating Scale, NRS), dental anxiety (short version of the Dental Anxiety Inventory, S-DAI), and the Dental Control List were filled out before treatment; the McGill Pain Questionnaire (MPQ) and experienced pain (NRS) were filled out after treatment.

Results: No significant differences were found in anticipated or experienced pain. However, the experimental condition evaluated treatment as less negative (MPQ-evaluative scale, $F(1,55) = 11.56$, $p < 0.001$), and scored lower on most measures. Subjects experiencing a discrepancy between desire for control and felt control showed the highest anticipatory distress (S-DAI, $F(3,53) = 6.32$, $p < 0.001$; anticipated pain, $F(3,53) = 3.28$, $p < 0.03$).

Conclusion: Providing patients with written information prior to periodontal probing can alter the pain experience. Future research will be aimed at strengthening the impact of information.

Key words: information; interventions; pain/prevention and control; periodontal diseases

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Periodontal disease is not necessarily painful and may consequently have negative effects on oral health due to late recognition. Conversely, periodontal treatment is experienced as painful by substantial numbers of patients (Karadottir et al. 2002). In particular, assessing periodontal status by means of probing pocket depth is potentially painful. The amount of pain during probing is, among others, associated with the extent of periodontal inflammation (Heft et al. 1991) and the location of the teeth in the mouth (Heins et al. 1998).

Eli (1992) discusses four important cognitive aspects of pain, which are control, beliefs, expectations, and attention. In general, providing patients with perceived control over pain does seem to reduce pain or increase tolerance (Weisenberg 1998). Providing patients with information can reduce anticipatory stress and enhance feelings of perceived control, thereby positively influencing the pain experience (Martelli et al. 1987, Litt et al. 1993, 1995, Croog et al. 1994, Touyz & Marchand 1998).

Giving patients instructions to focus on sensory (versus emotional) stimuli during a root canal procedure significantly reduced self-reported pain, but only among patients who were classified as having a strong desire for control and a low felt level of control in dental situations (Baron et al. 1993). It has been suggested that the discrepancy between a high desire for control and a low-perceived control plays a causal role in the elevated distress and pain initially reported by patients with such control perceptions (Law et al. 1994).

The present study is aimed at studying the effect of pre-treatment information on pain experience during periodontal probing. Our null hypothesis was that providing information would yield no differences in pain experience. In addition, the concept of desired and felt control was also taken into account. It was hypothesized that stronger feelings of control would reduce pain and distress. In addition, patients showing a discrepancy between desired control and felt control are expected to show elevated levels of pain and distress.

Material and Methods

Subjects

Participants were dental patients applying for periodontal treatment at the

Academic Center for Dentistry in Amsterdam (ACTA). In general, dental practitioners refer patients to the ACTA, concerning those cases of periodontitis too severe to be treated by an ''ordinary'' dentist. As such, subjects can be described as having moderate chronic periodontitis with pocket depths of 5 mm or more. Patients suffering from gingivitis, for instance, are not referred to the ACTA. A total of 61 subjects participated, 31 males (mean age = 39 years, SD = 8.9) and 30 females (mean age = 43 years, SD = 9.1). All subjects gave written approval to participate in the study, with the possibility to withdraw at any moment. The design of the study was approved of by the Netherlands Institute for Dental Sciences (IOT). Patients were instructed not to take any medication on the day of probing, which is a common ACTA-strategy for incoming patients. One highly experienced periodontist from the ACTA performed the procedure of probing pocket depth.

Information

In the control condition, subjects received a brochure explaining the causes and consequences of periodontal disease. This is a standard brochure provided to all patients applying for periodontal treatment. In the experimental condition, the brochure contained three additional paragraphs that each described information intended to enhance feelings of control (Thompson 1981). The first paragraph explained the possibility to have the dentist stop during treatment (perceived control). In the second paragraph, a cognitive coping strategy was presented that could be applied by the patient (positive imagery). The third paragraph provided the patient with the possibility to use a behavioral coping technique (relaxation through a breathing exercise).

Pain

Quantitatively, a Numerical Rating Scale (NRS) (1–10) was used before and after treatment, to assess the pain anticipated, and the pain experienced during treatment. Qualitatively, the sensory, affective and evaluative dimensions of pain were assessed using the McGill Pain Questionnaire (MPQ) (Melzack 1975). The Dutch language version (MPQ-DLV) was used in the present study (Vanderiet et al. 1987, Verkes et al. 1989, Kloot & Vertommen 1989).

Desired and felt control

Desired control reflects the level of threat, and felt control reflects the patient's belief in his own ability to cope. A discrepancy between the two is expected to result in higher dental anxiety due to the level of threat felt and the inability to cope with this threat. The Dental Control List (Logan et al. 1991) consists of four items. Two items represent the desired control, and two items represent the felt control during treatment. Based on median scores, four groups were created. That is, a low/low (group 1), a low/high (group 2), a high/low (group 3, the group of interest), and a high/high (group 4) group on desired and felt control.

Dental anxiety

The S-DAI stands for short version of the Dental Anxiety Inventory (Stouthard 1989). It contains nine of the original items and has been shown to be reliable and valid (Aartman 1998), and strongly correlated (Stouthard et al. 1995) to the more widely known Dental Anxiety Scale (Corah 1969).

Procedure

Subjects were randomly assigned to conditions and had to read the experimental or control version of ''Information regarding first treatment''. Before starting treatment the NRS (anticipated pain), S-DAI, and Dental Control List were filled out. Next, treatment took place in which periodontal status was determined by probing pocket depth. After treatment, the MPQ and NRS (experienced pain) were completed. Measuring pocket depth took place by means of probing gently the entire surrounding of each tooth, using a periodontal probe with a probe tip diameter of 0.40 mm, and lasted approximately between 30 and 60 min.

Statistics

Group differences on the dimensions of pain were analyzed simultaneously using a MANOVA, univariate analyses were performed using a one- and two-way analysis of variance followed by independent samples *t*-tests when appropriate. A χ^2-test was used to analyze the distributions of categorical variables. Pearson's correlation was used as a measure of linear association.

Results

Quantitatively, no differences between conditions were found on anticipated and experienced pain. Interestingly, in both conditions pain was overestimated. That is, on average both groups indicate lower experienced pain than was anticipated. Pearson's correlations between anticipated and experienced pain were 0.60 (total), 0.65 (experimental), and 0.55 (control) all significant at $p < 0.003$. Female patients scored significantly higher on all pain measures, with experienced pain (NRS) as the only exception. However, gender was distributed equally over the conditions $\chi^2 = 1.32$, $p < 0.25$. Qualitatively, the MPQ subscale-scores were subjected to a MANOVA. A multivariate effect for condition was found, $F(3,53) = 4.20$, $p < 0.01$. Although the experimental conditions' mean score was lower on all measures, subsequent univariate analysis shows that the only significant difference can be found on the MPQ evaluative subscale, $F(1,55) = 11.56$, $p < 0.001$. The above results are presented in Table 1.

Male and female patients were distributed equally, $\chi^2(3) = 2.12$, $p < 0.55$, over the four typologies of control as described in the methods section. An ANOVA was performed on these typologies to detect differences on the dependent variables. Results from this analysis show an effect for anticipated pain, $F(3,53) = 3.28$, $p < 0.03$, resulting from a higher score of group 3 (a high desire for, but low felt control) relative to the mean scores of all the other groups. An effect on dental anxiety was also found, $F(3,53) = 6.32$, $p < 0.001$, this time resulting from a higher score of group 3 relative to the mean scores of group 1 and 2. These results are summarized in Table 2. None of the other variables showed significant differences. No significant interaction was found between condition and desired and felt control on pain experience. Finally, patients with different control typologies were distributed equally in the two conditions $\chi^2(3) = 4.35$, $p < 0.23$.

Discussion

In the present study, the pain experience of patients undergoing periodontal

Table 1. Mean score and standard deviation on all measures in both conditions

Measure	Condition	
	Experimental ($n = 31$)	Control ($n = 30$)
anticipated pain	5.21 (2.40)	5.97 (2.34)
experienced pain	4.68 (2.47)	4.71 (2.23)
MPQ-t	7.93 (6.40)	12.36 (10.59)
MPQ-s	4.28 (3.73)	5.86 (6.13)
MPQ-a	0.97 (1.70)	1.82 (2.95)
MPQ-e*	2.69 (1.85)	4.62 (2.41)

MPQ-t, -s, -a, -e = MPQ-total, -sensory, -affective, and -evaluative scale,
*Significantly different at $p < 0.01$.

Table 2. The effect of a discrepancy between desired and felt control on anticipated pain and dental anxiety

Group	Expected pain				Dental anxiety			
	M	SD	*N*	(m, f)	*M*	SD	*N*	(m, f)
1	5.27	1.93	26	12, 14	18.31	8.32	26	12, 14
2	4.82	2.36	11	4, 7	16.00	5.83	10	4, 7
3	7.14*	2.28	14	9, 5	29.38†	12.14	16	10, 6
4	4.50	3.27	6	3, 3	22.29	6.97	7	4, 3

*Differs from all other groups,
†Differs from group 1 and 2, (m, f) = (number of male and female subjects), group 3 = high desire for control and low felt control.

treatment was manipulated by providing written information. The information was a standard brochure explaining the causes and consequences of periodontal disease, and an experimental text that contained additional messages to enhance feelings of perceived control. The results showed a small effect of the additional information on pain experience, as was apparent from a lower MPQ-evaluative score for the experimental condition. In addition, people experiencing a discrepancy between the level of desired and felt control anticipated more pain (and anxiety) but did not experience more pain. In both conditions, subjects generally anticipate more pain than they actually experience, in line with other research (for instance, Watkins et al. 2002).

A number of reasons can be given to explain the small effect of information found in the present study. The first is related to providing patients with a brochure to read. Even taking into account that the brochure was relevant for their dental problem, and of course that patients were highly motivated to be optimally treated, it cannot be excluded that (some) patients may not have read the entire brochure, or experienced difficulties comprehending (parts of) it. Another point concerns the information itself. Although comforting information was provided (perceived control), the two coping techniques (cognitive and behavioral) presented may need extensive practice in order to have an effect on the pain experience. The information was provided just before treatment. For future research we recommend a more complex approach. The impact of the information can be strengthened, for instance, by providing it more than once (as in Croog et al. 1994), or more in advance. For instance, when making the appointment, as well as immediately before treatment. Furthermore, coping techniques may have no effect at all if they do not adhere to the patients' coping style (Litt 1996). This possibility was anticipated by offering more than one strategy in the information. For future research videotaped information (as in Heye et al. 2002) shown in the waiting room may also facilitate the impact of the information. In addition, video allows for other possibilities such as modeling.

To conclude, the present study shows that a single presentation of written information can influence pain experience during periodontal treatment. Although patients in the experimental condition did not experience significantly less pain, the painful experience itself was evaluated as less negative.

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