Relationships Among Psychological Functioning, Dental Anxiety, Pain Perception, and Coping in Children and Adolescents

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ABSTRACT

This study's purpose was to examine relationships among dental anxiety, psychological functioning, coping, and pain perception in child and adolescent dental patients and their parents. Participants were recruited from private dental offices and included 129 9- to 15-year-old patients and 84 parents. The children completed self-report measures of dental anxiety, dental coping, and pain perception, while parents completed self-report measures of dental anxiety, dental coping, and child's psychological functioning. The intraclass correlation coefficient method was used to examine each hypothesis. For child-ren, correlational analyses indicated positive relationships between dental anxiety and total psychological symptoms, and dental anxiety and pain perception. Both child and parent coping measures were examined using principal axis factor analysis. Clear 2-factor structures (ie, approach and avoidant-based coping factors) emerged. The children's approach-based coping was negatively related to both dental anxiety and pain perception; their use of avoidant-based coping was also negatively related to dental anxiety. Psychological functioning emerged as a mediating variable between dental anxiety and pain perception. The findings suggest that dental professionals and clinicians should consider dental anxiety and general psychological functioning to reduce pain perception in the office. Additionally, the child's coping type and approach should be considered in treatment planning. **(J Dent Child 2008;75:243-51)**

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Medical procedures have been shown to cause stress, anxiety, and pain in children.[1] In particular, dental procedures can be stressful experiences. Research indicates that 5% to 33% of children experience at least 1 toothache during childhood.[2,3] The prevalence rate of toothaches is higher for older children and for children of lower socioeconomic status, though rates vary widely across countries.[3] Dental pain affects children's school attendance and ability to eat, sleep, and play.[3,4] In addition to the strong likelihood of experiencing dental pain, research has shown that 20% of children have dental fears and 21% engage in negative behaviors in the dental office.[5] Increased anxiety has been shown to increase perceived pain in children[1] and can be considered an important barrier to patients' receiving the recommended dental care.[6] Specifically, dental anxiety in children is positively related to missed dental appointments.[7]

The dental field now recognizes that the success of dental treatment is influenced by children's psychological processes.[2] The acquisition of dental fears has been explored by several researchers and is thought to involve a number of variables including poor dental health, direct conditioning, modeling, dispositional factors, personality traits, gender, and socioeconomic status.[8-10] Many variables that may play a role in dental anxiety and dental pain perception in children and adolescents, however, remain unexplored. Although research has indicated that children can use specific coping skills to reduce their distress when facing a medical stressor,[11]

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the role of coping as it relates to the experience of dental anxiety and dental pain perception remains unclear.

Coping can be divided into 2 main classifications: approach-based coping and avoidant-based coping.[12] Approach-based coping is defined as actions that strive to change the stressful event so that it becomes less distressing to the individual. More specifically, the individual recognizes the stressor and uses a skill to reduce his or her negative reactions to the stressor. When engaging in avoidant-based coping, the individual's responses "are characterized by an absence of attempts to alter the situation."[12] Thus, he or she fails to take an active role in managing the stressor. Instead, avoidant-based coping shifts the focus of distress away from the original stressor. In general, coping type has been related to a child's pain experience.[13] Versloot et al identified a relationship between coping and pain specifically in child dental patients.[14] The nature of this relationship, however, is not well-understood.

In addition to factors within the child, because of the role parents play in children's development, parental coping should be considered when assessing a child's coping and dental anxiety. Results of existing research on the relationship between the child's and the parent's dental anxiety are inconsistent. Some studies find a positive relationship,[8,15] while others find no relationship.[5] While research suggests a possible relationship between the child's and parent's coping, the nature of the relationship is unclear.[16-8]

This study's purpose aimed to clarify the relationships between a child's psychological functioning, dental anxiety, coping type, and pain perception. In addition, the study sought to explore the psychometric properties of an existing measure, COPE,[19] and a newly developed questionnaire, the measure of dental coping style (MDCS). Based on previous research, 6 hypotheses were developed:

1. Youths' perception of their dental anxiety would be positively related to their parents' perception of their psychological symptoms.
2. There would be a positive relationship between youths' dental anxiety and pain perception.
3. Coping type would be related to dental anxiety. It was predicted that approach-based coping would be negatively related to dental anxiety while avoidant-based coping would be positively related to dental anxiety.
4. Coping type would be related to pain perception. In particular, it was expected that approach-based coping would be negatively related to pain perception while avoidant-based coping would be positively related to pain perception.
5. Youth and parents' dental coping would be related.
6. Parent and child dental anxiety would be positively related.

By better understanding the relationships among these variables, clinicians can decide which variables to target to make dental procedures less traumatic for youth and more likely to receive consistent dental care.

METHODS

PARTICIPANTS

Participants were recruited from 5 private general dentistry offices over a 7-month period. Of the eligible youth (N=133), only 4 declined to participate, yielding a 97% response rate. Thus, participants included a total of 129 (72 male) dental patients and 84 parents. The youth were divided into 2 groups, children and adolescents. The sample included 69 children (ages 9- to 11-years old; 38 males) and 60 adolescents (12- to 15-year-old; 34 males). The youths' age ranges were selected because this collective age group has the capacity to self-reflect but is still young enough that interventions in the future could help to develop positive coping styles. Overall, participants had similar backgrounds. Parents reported that 93% of the youth were performing at either an average or above average level in school, with only 4% reporting that their child was below average in school performance. Most participants were European American (90%). Most participating children lived in a 2-parent home (85%), while 10% lived in a single-parent home. Parents reported a variety of education levels, ranging from eighth grade to graduate degree; most reported attending at least some college.

PROCEDURES

Participants were recruited from private dental offices. Receptionists screened patients, requested participation from qualified individuals, and obtained informed consent from parents and youth. Patients with a known history of cognitive delays or deficits were excluded from the study. Youth completed the dental subscale of the children's fear survey schedule (DC-CFSS)[20] and the measure of dental coping styles (**MDCS**) before the appointment and a visual analogue scale (**VAS**) rating pain immediately following the appointment. Parents completed a demographics questionnaire, strengths and difficulties questionnaire(**SDQ**),[21] Corah's dental anxiety scale (**DAS**),[22] and COPE[19] during or after the youths' dental appointment. Youth were offered 1 pack of sugarless gum or a pen as a token of appreciation for participation. In addition, youth and parents had the option of being entered in a drawing to win a $20 gift certificate to a major retail store as a token of appreciation for their participation. The research study was approved by the Institutional Review Board of the University of Toledo, Toledo, Ohio.

MEASURES

DC-CFSS.

The DS-CFSS is a 15-item self-report questionnaire designed to assess dental anxiety in children using a 5-point Likert scale (1=not afraid at all; 5=very afraid). Scores on the scale range from 15 to 75.[20] Previous studies have found that scores between 32 and 39 are indicative of borderline levels of dental anxiety, and scores 39 and above represent clinical levels of dental fear in Dutch children.[8] The internal reliability coefficients range from 0.85 to 0.90 across studies. Test-retest reliability has ranged from 0.72 to 0.97. Validity

has been established across a number of studies in which the instrument was able to distinguish between anxious and nonanxious children. Additionally, low to moderate correlations have been found with the VPT (r=.35), the children's fear survey schedule short form (r=.48), and higher correlations with the children's dental fear picture test (r=.87).[23] In the current study, children and adolescents completed the DS-CFSS before the appointment; completion typically took less than 10 minutes.

MDCS.
The MDCS was created for this study by synthesizing and modifying the Kidcope[24] and the dental coping questionnaire.[14] The MDCS is a self-report measure designed to assess coping in a dental situation in 9- to 16-year-old youth. The questionnaire's first version contained 21 items, and the Flesch-Kincaid reading level of the scale was 3.6. Similar to the Kidcope questionnaire and DCQ, the child was asked whether or not he or she used the coping strategy (yes/no) when coping with a dental stressor. Following data collection, factor analysis was conducted to examine the scale's structure. Based on the factor analysis, the scale's final version contained 13 items and was divided into 2 subscales: (1) approach-based coping (7 items) and (2) avoidant-based coping (6 items). Detailed analyses are presented in the results section (see Table 1 for items used in the analyses).

VAS for Pain.
Visual Analogue Scales are considered valid for assessing pain in children who are at least 5 years old.[25] Additionally, children who are at least 8 years old are cognitively capable of using a 5-point Likert scale.[26] Thus, children and adolescents were asked by the dental assistant or dental hygienist to rate the pain that they experienced during the visit on a pain thermometer ranging from 1 to 5 (no pain to worst imaginable pain) immediately following the dental appointment.

SDQ.
The SDQ is a 25-item parent-report questionnaire which measures psychological functioning in children. The SDQ has 5 subscales, 4 of which are combined to produce a score of total difficulties. Total difficulties had good internal consistency (r>.80) and test-retest reliability over 4 to 6 months (r=.72).[21] In assessing validity, these researchers determined that the presence or absence of psychological disorders was associated with SDQ scores. The high association between the diagnosis of disorders and SDQ scores established validity for the measure. For the current study, parents completed the measure during the child's appointment.

DAS.
This questionnaire is a 4-item self-report measure to be rated on a 5-point Likert scale. Internal consistency was established using the Kuder-Richardson formula 20 (K-R formula coefficient=.86). A score of 15 or higher classifies the patient as "highly anxious."[22] Test-retest reliability was measured over 3 months, and the measure is considered highly reliable (r=.82). Validity was assessed by comparing patients' ratings to dentists' ratings (r=.41). Thus, the measure is considered to have acceptable reliability and validity. [22] In the present study, parents completed the measure during the child's appointment.

COPE.
The COPE is a 60-item measure that is rated on a 5-point Likert scale (1=I usually don't do this at all to 5=I usually do this a lot). The measure was initially conceptualized based on 3 coping styles: (1) problem-focused coping; (2) emotion-focused coping; and (3) negative coping. The COPE is further divided into 14 subscales: active coping, planning, suppression of competing activities, restraint, and instrumental social support (problem-focused); emotional social support, positive reinterpretation, acceptance, denial, and religious coping (emotion-focused); and focus on and venting emotions, use of alcohol, mental disengagement, and behavioral disengagement (negative coping). Internal

Table 1. Measure of Dental Coping Style (MDCS) Items Used in Analyses

MDCS subscales
Avoidant-based coping
I am blaming someone else for needing to come to the dentist.
I think going to the dentist is good for my teeth.
I am angry at mom and dad.
I will get angry at the dentist.
I am wishing that I didn't have to come to the dentist.
I am wishing that I could make things different.
Approach-based coping
I am just trying to forget about it.
I will try to calm myself down.
I am trying to see the good side of things.
I will try to think about something else.
I am thinking of other things.
I will ask the dentist what the dentist is doing.
I am asking my mom or dad questions about my dental visit.

Table 2. Items Removed from COPE

I use alcohol or drugs to make myself feel better.
I daydream about things other than this.
I accept that this has happened and that it can't be changed.
I try to lose myself for a while by drinking alcohol or taking drugs.
I drink alcohol or take drugs, in order to think about it less.
I use alcohol or drugs to help me get through it.

Table 3. Means, Standard Deviations, and Factor Loadings of the COPE Scale

Items	Means±(SD)	FACTORS	
		Approach-based	Avoidant-based
I learn something from the experience.	2.78±1.02	.81	.01
I look for something good in what is happening.	2.74±0.92	.80	.04
I think about how I might best handle the problem.	2.88±1.06	.78	-.12
I try to come up with a strategy about what to do.	2.51±1.04	.76	-.01
I think hard about what steps to take.	2.48±1.00	.75	.11
I talk to someone to find out more about the situation.	2.54±1.07	.74	.15
I ask people who have had similar experiences what they did.	2.62±1.03	.73	.15
I focus on dealing with this problem, and if necessary let other things slide a little.	1.36±0.67	.72	.21
I talk to someone who could do something concrete about the problem.	2.50±1.15	.72	.21
I try to get emotional support from friends or relatives.	2.17±1.04	.71	.23
I try to see it in a different light and make it seem more positive.	2.74±0.92	.69	.07
I make a plan of action.	2.51±1.06	.69	.23
I talk to someone about how I feel.	2.18±1.00	.69	.21
I let my feelings out.	2.27±1.00	.69	.32
I accept the reality of the fact that it happened.	2.87±1.04	.67	-.11
I take additional action to try to get rid of the problem.	2.36±1.00	.66	.05
I try hard to prevent other things from interfering with my efforts to deal with this.	2.30±0.93	.66	.27
I try to find comfort in my religion.	2.49±1.22	.63	.21
I discuss my feelings with someone.	2.21±1.04	.63	.10
I put aside other activities to concentrate on this.	1.87±0.83	.62	.21
I get sympathy and understanding from someone.	1.95±0.94	.62	.14
I do what has to be done, one step at a time.	2.96±0.91	.61	-.19
I seek God's help.	2.52±1.20	.59	.18
I concentrate my efforts on doing something about it.	2.58±1.02	.59	.13
I take direct action to get around the problem.	2.26±1.05	.57	.23
I put my trust in God.	3.02±1.15	.56	.11
I laugh about the situation.	2.43±1.00	.55	.32
I pray more than usual.	2.27±1.24	.55	.36
I make jokes about it.	2.21±0.96	.55	.21
I kid around about it.	2.13±0.93	.55	.21
I force myself to wait for the right time to do something.	2.18±0.89	.54	.34
I try not to make matters worse by acting too soon.	2.22±0.96	.54	.13
I turn to work or other substitute activities to take my mind off things.	2.49±1.12	.54	.17
I learn to live with it.	2.37±0.91	.53	.21
I keep myself from getting distracted by other thoughts or activities.	2.21±0.91	.52	.10
I get used to the idea that it happened.	2.38±1.02	.50	-.06
I accept that this has happened and that it can't be changed.	2.60±1.00	.50	.08
I try to grow as a person as a result of the experience.	2.53±1.12	.49	.23
I try to get advice from someone about what to do.	2.20±1.07	.46	.24
I make fun of the situation.	2.10±1.01	.45	.36
I hold off doing anything about it until the situation permits.	2.30±0.91	.45	.22

Table 3. Continuation

Items	Means±(SD)	FACTORS Approach-based	Avoidant-based
I restrain myself from doing anything too quickly.	2.18±0.89	.35	.14
I pretend that it hasn't really happened.	1.29±0.57	.11	.70
I go to movies or watch TV to think about it less.	1.83±0.90	.24	.60
I sleep more than usual.	1.36±0.67	.03	.58
I admit to myself that I can't deal with it and quit trying.	2.18±0.83	-.07	.57
I give up trying to reach my goal.	1.30±0.64	-.04	.57
I act as though it hasn't even happened.	1.31±0.58	.13	.57
I refuse to believe that it has happened.	1.29±0.55	-.03	.56
I feel a lot of emotional distress and find myself expressing those feelings a lot.	1.74±0.83	.36	.54
I reduce the amount of effort I'm putting into solving the problem.	1.61±0.76	.22	.49
I get upset and am aware of it.	1.65±0.86	.36	.44
I get upset and let my emotions out.	1.81±0.96	.42	.44
I say to myself "this isn't real."	1.24±0.51	.07	.43
I give up attempting to get what I want.	1.45±0.70	.34	.40

consistencies for the subscales range from α=.45 to .92. The original researchers found that test-retest reliability over 4 to 6 weeks was acceptable (*r*=.48-.89). Discriminant and concurrent validity was assessed by comparing COPE scores to personality variables and social desirability. Results showed that correlations between the COPE and personality variables as well as the COPE and social desirability were small, indicating that the COPE is measuring a unique construct. Correlations with functional personality traits were related to functional coping strategies, providing concurrent validity.[19] In the present study, a factor analysis was conducted that supported a 2-factor structure: (1) avoidant-based coping; and (2) approach-based coping. Six items were removed from the measure because they failed to load on either factor. The approach subscale had 41 items and the avoidant subscale had 13 items. Detailed analyses are presented in the results section (see Table 2 for items removed from the measure).

RESULTS

SCALE STRUCTURE AND DESCRIPTIVE ANALYSES

Both child and parent coping measures were examined using principal axis factor analysis with Varimax rotations and clear 2-factor structures (ie, approach-based and avoidant-based coping factors) emerged. For the COPE, both the approach-based (α=.97) and avoidant-based (α=.85) coping factors were conceptually sound and had high internal consistencies. On the MCDS, both factors were also conceptually strong and had acceptable internal consistencies (approach-based coping factors: =.65; avoidant-based coping factors: α=.63). Means, standard deviations, and factor loadings are displayed for COPE in Table 3 and for MDCS in Table 4.

HYPOTHESIS TESTING

No significant differences emerged for gender or age for any of the dependent variables. Additionally, there were no significant differences among the 5 participant groups from dental offices on any of the dependent variables. To examine relationships among dental anxiety, psychological functioning, coping, and pain perception, the intraclass coefficient random effects method was utilized. As predicted (hypothesis 1), youths' perception of their dental anxiety was positively related to their parents' perception of their psychological symptoms (Cronbach's alpha=.40; *P*=.002.) Additionally, results supported the prediction in hypothesis 2 that the relationship between youths' dental anxiety and pain perception was positive (Cronbach's alpha=-.33; *P*=.01). Also, as expected (hypotheses 3 and 4), approach-based coping was negatively related to dental anxiety (Cronbach's alpha= -.36; *P*=.006) and pain perception (Cronbach's alpha=-.26; *P*=.045). Unexpectedly, avoidant-based coping was negatively related to dental anxiety (Cronbach's alpha=-.34; *P*=.01), and there was not a significant relationship with pain perception. In evaluating hypothesis 5, a small, negative relationship emerged between parent avoidant-based coping, as measured by the COPE, and child approach-based coping, as measured by the MDCS (Cronbach's alpha=-.29; *P*=.04). No other significant relationships were found, however, for parent and child coping. Contrary to the prediction of hypothesis 6, a significant relationship between parent and child dental anxiety was not found.

Table 4. Means, Standard Deviations, and Factor Loadings of the Measure of Dental Coping Scale (MDCS)

Items	Means±(SD)	FACTORS Approach-based	Avoidant-based
I blame someone else for needing to come to the dentist.	1.95±0.21	.64	-.16
I think going to the dentist is good for my teeth.	1.97±0.18	-.61	.14
I am angry at mom and dad.	1.94±0.24	.58	-.12
I will get angry at the dentist.	1.96±0.19	.56	-.01
I wish that I didn't have to come to the dentist.	1.63±0.48	.47	.18
I wish that I could make things different.	1.70±0.46	.41	.24
I will try to forget about it.	1.72±0.45	.31	.57
I will try to calm myself down.	1.32±0.46	.10	.53
I will to see the good side of things.	1.33±0.47	.09	.51
I will try to think about something else.	1.48±0.49	.15	.48
I will think of other things.	1.44±0.50	-.10	.39
I will ask the dentist what he or she is doing.	1.72±0.44	.01	.33
I will ask my mom or dad questions about my dental health.	1.77±0.42	.01	.31

Table 5. Summary of Hierarchical Regression Analysis for Dental Anxiety and Psychological Functioning to Predict Pain Perception

Variable	B ±(SE B)	ß
Step 1		
Psychological functioning	0.03±0.01	.26*
Step 2		
Psychological functioning	0.02±0.01	.22*
Dental anxiety	0.01±0.01	.15

** P=.02*

Based on this study's results, regression analyses were conducted to evaluate possible predictors of pain perception and possible mediating relationships. Regression analyses results identified dental anxiety as a significant predictor for pain perception; more specifically, dental anxiety account-ed for 4% of the variance in pain ($F[1, 126]=5.55$; $P=.02$). When psychological functioning was evaluated as a mediator between dental anxiety and pain perception, however, the predictive value of dental anxiety became non-significant. Results indicated that youths' psychological symptoms were mediating (ie, full mediation) the relationship between dental anxiety and pain perception (see Table 5 for B, SE B, and β values; see Figure 1 for the correlations between dental anxiety, psychological symptoms, and pain perception, the Sobel z-value, and the standardized coefficient of dental anxiety on pain perception).

DISCUSSION

DENTAL ANXIETY AND COPING STYLE

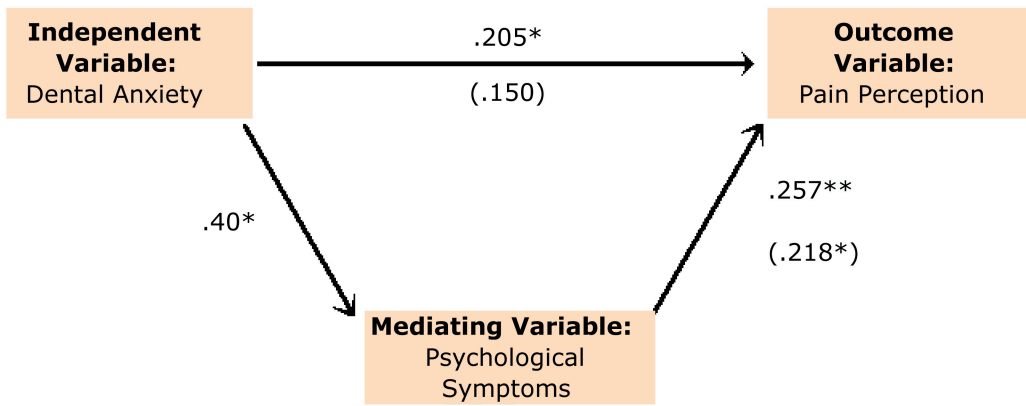
Previous research has indicated that medical procedures are distressing for youth[1] and that children can use specific coping skills to reduce distress when facing a medical stressor.[11] In the current study, the hypothesis that youth coping style would be related to his or her dental anxiety was partially supported. While it was expected that avoidant-based coping would be positively related to dental anxiety, avoidant-based coping was actually negatively related. As Power explained, previous research is mixed regarding the efficacy of avoidant-based coping.[18] It is possible that if a child is not thinking about his or her dental appointment before the appointment begins, his or her anticipatory dental anxiety will be lower.

The current study's results did not examine the relationship of avoidant-based coping to anxiety or pain perception during the dental appointment. It is possible that avoidant-based coping might be effective before the appointment, but not during the appointment. Even though avoidant-based coping might be considered effective before the appointment, research in other medical populations indicates that avoidant-based coping has negative outcomes. For example, researchers have found that avoidant-based coping is related to worse psychological functioning, lower child quality of life, and lower parent quality of life in children diagnosed with asthma.[27] Thus, since avoidant-based coping may only be effective before the stressor (ie, dental procedure) and is associated with other poor outcomes, it is recommended that professionals teach other coping techniques to reduce distress related to medical procedures.

As predicted, approach-based coping was negatively related to dental anxiety. This finding agrees with Weinstein et al's study results, which indicated that teaching an approach-based coping technique (ie, talking about dental fears and notifying the dentist if the child felt pain) decreased dental anxiety.[28] Weinstein et al, however, did not measure approach-based coping directly. Rather, these researchers examined the children's perceived control of the dental situation. Thus, the current study's results provide support for their conclusions by providing an additional explanation as to why their intervention was successful

Figure 1. Psychological symptoms as a mediator between dental anxiety and pain perception.

Type of Mediation	Full
Sobel z -value	2.437453 significance .014791
Standardized coefficient of Dental Anxiety on Pain Perception	
Direct:	.150
Indirect:	.055



* <.05; † <.01

while teaching children to have more perceived control, children also learned how to utilize approach-based coping. More specifically, children learned how to directly address the dental stressor by talking about their dental fears and letting the dentist know if they began to have anxiety during the procedure. This study's results suggest that approach-based coping should be considered as a possible influential variable when implementing interventions to decrease dental anxiety.

COPING STYLE AND PAIN PERCEPTION

Also, as predicted, each youth's coping style was related to his or her pain perception; however, only approach-based coping, not avoidant-based coping, was related to pain perception. Current findings agree with previous research that has indicated that coping type is related to a child's experience of pain.[13] More specifically, the current study's results add to Blount et al's results that approach-based coping was related to lower pain perception before the procedure, while avoidant-based coping was not significantly related to lowered pain.[1] Additionally, current results support findings by Piira et al, which found that children who engaged in more attempts to distract themselves from the stressor (ie, a type of approach-based coping) had a higher pain tolerance.[29] Thus, children who were able to utilize a coping strategy to directly target their distress were more successful at reducing pain perception (ie, evidenced by increased pain tolerance) than children who did not utilize such strategies. Overall, results from the current study and previous studies suggest that using approach-based coping can be utilized as an effective technique in reducing perception of pain in youth. By reducing pain perception, youth will likely have more pleasant experiences and be less distressed in the dental office. Youth who have better experiences in the dental office are likely to engage in better dental hygiene practices by attending more appointments and sharing concerns about their teeth with dental professionals, thus improving oral health.

ROLE OF OVERALL PSYCHOLOGICAL FUNCTIONING

Based on the initial findings, dental anxiety was examined and determined to be a significant predictor for pain perception in children and adolescents. Additionally, the level of psychological symptoms was identified as a significant mediator in this relationship (Figure 1). Consistent with Berge et al's findings,[30] the current study's results suggested that evaluating anticipatory dental anxiety alone may not be the best way to predict dental appointment outcomes. While Berge et al found that dental anxiety alone did not account for anxious or externalizing behaviors during the dental appointment,[30] the current study's results agree with their findings in that dental anxiety alone is not the best predictor

for pain perception. Rather, psychological functioning serves as a conductor of the relationship between dental anxiety and pain perception.

Thus, considering both dental anxiety and psychological symptoms better explains the predictive relationship between dental anxiety and pain perception. The significance of psychological symptoms as a mediator suggests that targeting dental anxiety independently would not produce the best results for decreasing pain perception during dental procedures. Instead, dental anxiety as well as psychological symptoms should be considered when attempting to reduce pain at the dental office. Future research can help to determine which specific symptoms should be targeted (eg, anxiety, depression, oppositional, etc).

CLINICAL IMPLICATIONS

The current study's results suggest that coping is an important variable in relation to dental anxiety and pain; thus, dentists and clinicians should consider coping when working with a dentally fearful child or adolescent. It is possible that youth dental anxiety and perception of pain during dental procedures would decrease if professionals worked with them to develop positive coping techniques. Additionally, dental professionals and clinicians should consider the mediating relationship of psychological functioning between dental anxiety and pain perception when utilizing interventions to decrease distress in the dental office.

LIMITATIONS

Two main limitations need to be addressed in interpreting this study's results. First, the nature of the sample is important. Participants were predominantly European American, middle-class youth and parents, so caution should be taken in generalizing results to dissimilar populations. Additionally, this study did not examine specific dental histories of youth or their parents. Thus, it is possible that patients' past experiences could influence their experience of dental procedures, dental anxiety, or utilization of dental coping techniques. As targeted interventions are developed, it may be helpful to obtain a detailed dental history and to determine how these experiences are affecting youth. Second, while the psychometric properties of both coping measures were examined, the results involving each coping measure should be interpreted with caution until additional research can be conducted using the new factor structures.

Future research should assess the efficacy of programs targeted to enhance effective coping (ie, particularly aimed at increasing approach-based coping) to reduce anxiety and pain perception.

CONCLUSIONS

Based on this study's results, the following conclusions can be made:

1. Positive relationships exist between dental anxiety, psychological functioning, and pain perception. Thus, both dental anxiety and general psychological symptoms should be considered in treat-ment planning with the goal of reduced pain perception.
2. While approach-based coping is associated with lower anticipatory dental anxiety and lower pain perception, avoidant-based coping is related only to lower anticipatory anxiety but not pain perception. Hence, clinicians should focus on teaching children approach-based coping, since it is more effective during the dental appointment.
3. Results indicated that the new dental coping measure, measure of dental coping style (MDCS), has promising psychometric properties, though more research is needed. Overall, future research should continue to examine the effectiveness of specific coping styles in dental situations and should develop and evaluate programs targeted to increase approach-based coping to manage distress in the dental office.

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