

Comparing the Effectiveness of Emotional Self-Regulation Strategies and Systematic Desensitization on Pain of Adults Referring to Dentistry

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Abstract

Introduction: This study aimed to compare the effectiveness of emotional self-regulation strategies and regular desensitization on the pain level of adults referring to dentistry.

Method: The population included 60 adults referring to a dentistry- who were selected using the purposeful sampling method and were classified into three groups including group 1, emotional self-regulation strategy (n=20), group 2, regulation desensitization (n=20), and group 3, control group (n=20). Data were collected using a pain questionnaire (FPQ-III). Experimental groups received eight sessions, each with 90 min emotional self-regulation strategies and regular desensitization instruction. The control group received no intervention. The data were analyzed using SPSS 23, a multivariate covariance test.

Results: Results showed that emotional self-regulation and regular desensitization have an impact on pain levels of adults referring to dentistry. However, there was no significant difference between the impact of emotional self-regulation and regular desensitization on the pain level of adults who had visited the studied dentistry.

Conclusion: Emotional self-regulation strategies and regular desensitization affected the pain level of adults who had referred to the studied dentistry.

Keywords: Pain, Emotional Self-regulation strategies, Regular Desensitization, Dentistry

Introduction

Mouth and dental health are among the public health indices and the related injuries are considered as important issues. They are grouped into objective pains and should be treated as soon as possible [1]. Pain as the most common mental pressure is imposed on individuals in dentistry affairs. Most of the clinical experts could not explain the pain and its symptoms in patients using physical basics, however, they attempt to explain it using psychology concepts [2]. This is while, physiological factors could not justify the severity of the perceived pain [3]. The patients with severe dental and dentistry anxiety not only avoid restorative treatments but also delay the preventive treatments. Such individuals have tolerance for body pain, loss of confidence, and beauty bugs better than the pain and mental problems caused by the dentistry itself [2].

There are different techniques to control toothache feeling such as soothing and hypnotic drugs, cognitive-behavioral methods, and a combination of both methods. Cognitive-behavioral methods are almost new approaches in psychology. They emphasize expanding

retraining practices and changing the behavior using cognitive processes. Emotional regulation ability is one of the methods playing a significant role in the reduction of pain in psychological status and the advancement of dental treatments. Self-regulation strategy is one of the best emotional regulation strategies. It is a fundamental principle in starting, evaluating, keeping, and organizing compromised behavior, as a result of its importance in emotional self-regulation and related strategies in mental health. Further, it is considered as a preventive factor against negative emotions and uncompromised behaviors. The other psychological strategy is the regular desensitization strategy which could be considered effective in the reduction of pain. Generally, since most dental treatments could lead to individuals' confusion, therefore, experts tend to make use of coping strategies [4]. Thus, the present study attempted to consider and compare the impact of emotional self-regulation strategies and regular desensitization on dental pain.

In many studies, toothache has been associated with dental treatments. When you are not able to cope with severe pain status using simple methods such as psychotherapy, you should make use of some methods and techniques to control and avoid the pain. The relaxation technique is one of these methods, in which, each group of muscles are contracted and then relaxed. In each phase, the mind concentrates on contract sense and then on relaxation. Using practice, it is learned that which muscle is under pressure and you can simply convert tension to relaxation. Therefore, tension will be sensed and then muscles will be automatically relaxed. Then, stiffness and pain in the neck, shoulders, and back are reduced automatically. When muscles are in a relaxing mode, the mind is calm and the reduction of sympathetic nerve activity will lead to the reduction in heart rate and hypertension. This method is not recommended to individuals with high hypertension and an appropriate, warm, and quiet place is needed for the users of this method to do such exercises [5].

Gross [6] provided an emotional regulation process based on the emotion production model (Figure 1). His model has five phases including starting, situation, attention, evaluation, and response. According to Gross [6], each phase of the emotion production model has a potential regulating goal and emotional regulating skills

can be applied in different points of this model [7]. In starting an emotion while selecting a situation, there are factors putting a person in an emotional arousal position or taking her/him away from that position (avoidance). In the second phase (situation), one could change the emotion production process through situation correction. In the third phase (attention), one of the ways to make the change and regulate emotion is to change direction or expand attention. There are three methods to expand attention including distraction, concentration, and rumination [7]. Through these methods, distraction is considered as a metacognitive technique of emotional regulation. Concentrated individuals intensify their attention on a special situation. Moreover, the rumination method includes concentrating on feelings and their outcomes. In the fourth phase of the emotion production model (evaluation), the task of regulating is to create cognitive changes, for which cognitive evaluation is one of the strategies [7]. The final phase of the emotion production model is the response phase including the response adjusting as the final part of the emotion regulation process. These five phases are considered as the sets of processes that form five families of emotion regulation processes. The first four families are known as antecedent-based emotion regulation because they occur before the evaluations leading to arousing and culminating of desire to respond. In contrast, there is a response-based emotion regulation which is related to the final phase of emotion regulation. These strategies occur after the production of responses [8]. Overall, the emotion regulation model of Gross [6] includes five phases, each with some compatible and incompatible strategies. Particularly, individuals with emotional problems make use more of incompatible strategies such as rumination, concern, and avoidance. To treat such emotional problems or remove incompatible strategies, instructions of compatible strategies should be used such as counterconditioning where a conditioning response will be replaced by another inconsistent response. This avoids the conditioning response in the presence of a conditioning stimulus. The objective of counterconditioning-based methods is to reduce or avoid unpleasant behavior through conditioning the behavior inconsistent with unpleasant behavior [4].

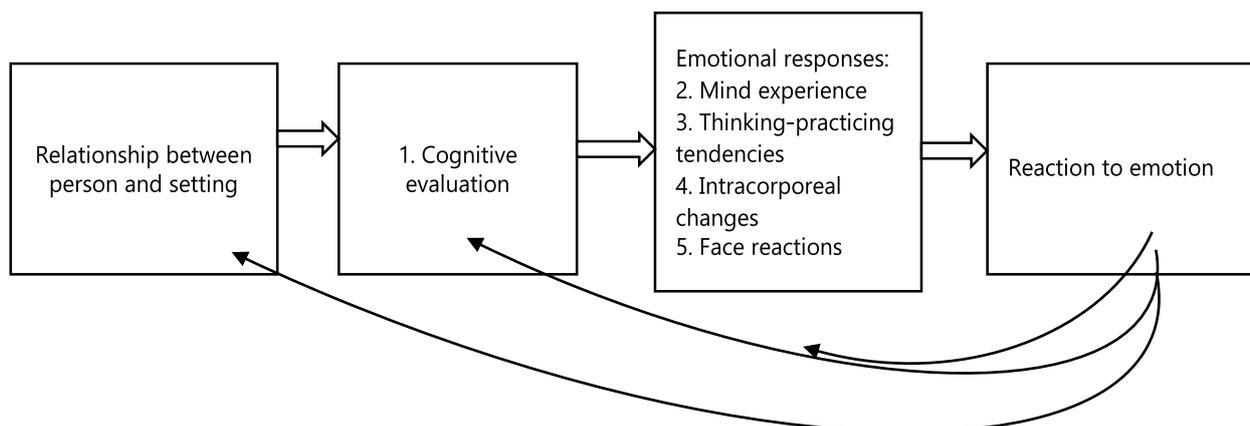


Figure 1. The schematic of six-dimensional emotion processes [9].

The most important behavior-therapy method resulting from counterconditioning is the desensitization method in which regular desensitization, real desensitization, and self-desensitization are mostly common [10]. Regular desensitization is used to treat patients with severe fear or anxiety from some events, individuals, or things or with generalized fears. For example, this method is so effective that is used to treat the fear from animals or speak in public and social anxiety [11].

The regular desensitization method comprising three phases is often used to treat individuals with phobia. In the first phase, a hierarchy of anxiety is created. To this end, a sequence of anxiety-making events is considered and then arranged from mild to severe. In the second phase, the therapist instructs individuals to relax and experience a situation without anxiety. In the third phase, the individuals deeply relax at the first experience, then they are asked to visualize the next event. This continues until the individual could visualize all outlined events. Wolpe [12] believed that when one of the outlined events is experienced by an individual with relaxation (without anxiety), some of the anxiety responses are turned off dependent on the final outlined anxiety events. This method brings the individuals closer to the situation very frightening for them. One of the problems of individuals with fear is that they avoid approaching anxiety situations. For example, an individual with a fear of airplanes avoids all related experiences; or an individual with dentistry fear avoids visiting a dentistry and all dependent experiences. To eliminate the fear, a fearful event should be experienced by the person without anxiety. This is the goal of Wolpe's regular desensitization [10].

Fallahpour et al. [13] studied 45 children with Dentistry problems in the Ardebil dentistry Clinic. The children were grouped into three groups of desensitization group (n=15), distraction group (n=15), and control group (n=15). Then, each group responded to the dental fear and pain numerical scales as a pre-test. Next, the experimental groups received regular desensitization and distraction instructions. The results showed that they could use psychological interventions such as regular desensitization and distraction to reduce pain. They concluded that regular desensitization had more impact on pain reduction. Aitken et al [14] considered the effect of emotional self-regulation on pain and fear reduction when applying dental restorations. They found that distraction was not an appropriate tool to reduce pain, however, it impacted mental pressure reduction. Schmid-Leuz et al. [15] compared the effectiveness of distraction and concentration of individuals exposed to dental pains and fears. They concluded that the concentration group showed more fear and pain reduction. Nilsson and Renning [16] showed that behavior-cognitive therapy significantly impacted the confusions caused by dental therapies. The present study contributed to the literature from the applied aspect, because it could help to provide strategies to reduce the pain level of adults visited in dentistry. Therefore, it is necessary to attend psychological variables related to the mental health of adults referring to such clinics to provide appropriate and

effective interventions.

Method

The present study aimed to compare the effectiveness of two approaches including emotional self-regulation and regular desensitization on dental pains. This semi-experimental study was based on a pre-posttest plan with a control group. The population consisted of all adults with dentistry problems who referred to the Parivar Dentistry in 2019 and were the patients of Dr. Jahanshahi (N=500, approximately). Among them, 60 patients with dental pain were selected as the sample size using a purposeful sampling method. To select samples, they were asked to fill the dental pain scale. Sixty patients with a score higher than the mean were selected as the sample. Then, the sample size was classified into three groups including group 1 (emotional self-regulation, n=20), group 2 (regular desensitization, n=20), and control group (n=20). The ages higher than 20 years old and problems related to dental were among the inclusion criteria to this research. Individuals with psychological disorders including Alzheimer's, dementia, and depression were excluded from the research.

To measure the dental pain of participants, we used a dentistry pain questionnaire (FPQ-III), which was designed by McNile and Rinvaer (1998). It has 30 items to evaluate dental pain. It is scored based on a five-points Likert scale within the range of 1 to 5 (1-at all, 5=infinite). This scale comprises three sub-scales including severe pain, mild pain, and medical pain. Its reliability was calculated by Cronbach Alpha (0.93) [17]. Vala et al. [18] reported its reliability 0.91, 0.86, 0.84, and 0.84 for severe, mild, medical pains, and dental pain scales, respectively. In our study, the reliability of this scale was calculated using Cronbach Alpha (0.78) and the content validity was confirmed by psychological experts.

At the first step, the total visited individuals in Parivar's Dentistry Clinic in 2019 were considered by the researcher (N=500). Then, 120 visited individuals were randomly selected as the samples, for which the satisfaction was considered and the scale dental pain was distributed. In the next step, the individuals were classified into three groups including group 1 (n=20), group 2 (n=20), and control group (n=20). An introduction session was held for both groups 1 and 2. The program goals, methods, and how to work were introduced to the participants. In each method including desensitization and emotional self-regulation, the sessions were held and the participants could do their tasks in a social setting. Moreover, they could take feedback from groups' members through this method. The two groups received eight sessions of 90 min, once a week for two months.

The program sessions for the emotional self-regulation group is presented in Table 1.

The program sessions for the desensitization group is presented in Table 2.

The SPSS version 26 and the multi-variate co-variance test were used to analyze the data.

Table 1. The Instruction Phases of Emotional Self-Regulation based on the Gross Theory

Phase	Objective	Emotion Regulation Techniques
Situation Selection (1)	Increasing awareness through emotional education	a. Understanding the emotion and motivating situations b. Self-evaluation to understand his/her emotional experiences c. Self-evaluation to understand his/her emotional vulnerability d. Self-evaluation to understand his/her emotion regulating strategies
Situation Modification (2)	Changing the emotion motivating situations	a. Avoiding social isolation b. Instructing the problem-solving c. Instructing interpersonal skills (Dialogue, expression, and conflict resolution)
Expanding Attention (3)	Changing attention	a. Stopping rumination b. Instructing distraction
Cognitive Changes (4)	Changing the cognitive evaluations	a. Identifying incorrect evaluations and their effect on emotional status b. Instructing re-evaluation strategy
Response Adjustment (5)	Changing the behavioral and physiological outcomes of emotions	a. Identifying level and how to use of inhibition strategy and considering its emotional outcomes b. Facing with emotion motive c. Instructing emotion expression d. Modifying the behavior through changing the setting enhancers e. Emotional discharge instructing, relaxation, reverse action

Table 2. The Sessions and Phases of Regular Desensitization

Session	Phase	Subject
1	1	Initial communication. Describing, introducing the group members to each other, explaining therapy and its phases for visitors
	2	Providing suitable and well set for relaxation
2	3	Instructing muscles relaxation, muscles instructing in 14 groups of muscles
	1-3	Hand and wrist, front arms, head, mouth, lip, nose, neck, abdominal, hip, thigh, foot wrist, and fingers
3	2-3	Muscles instructing in six groups of muscles (Dominant arm of the hand, non-dominant arm of hand, faces, neck, abdominal and foot)
	3-3	Muscles instruction in three groups of muscles (each arm of hand, body center, and both of feet)
4	3-4	Remembering and repeating three groups of muscles
	4	Providing hierarchy of anxiety from dentistry
5	1-4	Providing five motives of the hierarchy of anxiety from dentistry
6	2-4	Providing 10 motives of the hierarchy of anxiety from dentistry
7	3-4	Providing 15 motives of the hierarchy of anxiety from dentistry
8	3-5	Providing 18 motives of the hierarchy of anxiety from dentistry and implementing regular desensitization

Results

Based on the descriptive results, 51.7% (n=31) were women and 48.3% (n=29) were men. The median for gender was 1.51, the mean was 2.0 and the variance was 0.254. Furthermore, 60% (n=36) were grouped in the 30-39 years old group and 3.3% (n=2) were classified into the 12-19 years old group. Pain means in the pre-test was 97.00 which was reduced using emotional self-regulation and regular desensitization instructions to 83.00 and 82.50, respectively. Pain means in the control group was 97.00.

The results of the variance homogeneity test showed that the F value (2.92) with the P level (0.06) higher than 0.05 suggests the normal variable-dependent distribution in groups and not rejecting the equality of the population variance. Furthermore, the results of regression models homogeneity test showed that squares sum (278.60), average square (139.30), F (3.016) with the P level of 0.059, and Eta value of 0.118 represent no significant differences between each dependent variable among independent groups.

Given the results of premise tests, we tested our hypotheses using multivariate covariance analysis. At first,

we examined the impact of instructing emotional self-regulation on the pain level of individuals who had visited the dentistry, for which the results are provided in Tables 3 and 4. To test this hypothesis, we unutilized the multivariate covariance test. In Table 3, the mean of research variables is compared before and after instructing the emotional self-regulation strategies. The results suggested that the mean pain in the pretest was 97.00 which was decreased to 83.00 in the post-test. The results of covariance analysis are presented to investigate the effect of the group on dental pain.

According to Table 4, there is a significant difference between the two groups. Considering the significant reduction in the scores of group 1 on the pain scale, it is indicated that emotional self-regulation affected the pain reduction (Eta=0.52, P < 0.05, F=47.02). Eta shows the severity of such effectiveness indicating that the emotional self-regulation strategies had an effect of 47% on pain reduction of individuals who had visited the dentistry.

Afterward, we tested the impact of instructing regulation desensitization on the dental pain of individuals referring to the dentistry, for which the results are provided in

Tables 5 and 6.

To test this hypothesis, we used multi-variate covariance tests.

In Table 5, the means of research variables are compared before and after instructing regulation desensitization. The results indicated that the pain means in the pretest was 97.00 which was decreased to 82.50 in the post-test. The results of covariance analysis are presented to investigate the effect of the group on dental pain.

According to Table 6, there is a significant difference between the two groups. Considering a significant reduction in the scores of group 1 on the pain scale, it is revealed that the regular desensitization affected the pain reduction (Eta=0.630, sig < 0.05, F=63.04). Eta shows the severity of such effectiveness representing that the regular desensitization had an effect of 63% on the pain reduction of individuals visiting the dentistry.

Furthermore, we compared the effectiveness of the two instructing methods including emotional self-regulation strategies and regulation desensitization on the dental

pain level of individuals who had visited the dentistry. Comparing the mean and SD of the two methods showed that the pain means of group 1 (emotional self-regulation strategy) was 82.7000 which was higher than the pain means of group 2 by 2.85 (regulation desensitization). The results of t independent test comparing the effectiveness of the two groups on dental pain are provided in Table 7.

The results of t independent test comparing the effectiveness of the two instructing methods including emotional self-regulation strategies and regulation desensitization dental pain of individuals who visited the dentistry are presented in Table 7. This table indicates that the significance level to compare the effectiveness of the two methods on dental pain is 0.186 (p>0.05). It means that there is no significant difference between the effectiveness of the two instructing methods of emotional self-regulation strategies and regulation desensitization of dental pain of individuals who had visited the dentistry.

Table 3. Comparing Variables Pre-and Post-test of Instructing the Emotional Self-regulation Strategies

Pre-test	N	Mean	SD	Emotional self-regulation strategies instructing	N	Mean	SD
Pain 1	60	97.00	24.031	Pain 2	20	83.00	18.39

Table 4. The Results of Covariance Analysis on the Effect of Grouping on Dental Pain

Variable	Squares Sum	DF	Squares Mean	F	P	Squares
Corrected Model	24195.3	2	12097.67	189.37	0.0001	0.91
Intercept	101.59	1	101.59	1.59	0.215	0.04
Pain (pretest)	23841.31	1	23841.31	373.20	0.0001	0.91
Pain Group	3004.11	1	3004.11	47.02	0.0001	0.56
Error	2363.64	37	63.88			
Total	404667.00	40				
Corrected Total	26558.98	39				

a.R Squared=0.921 (Adjusted R Squared=0.917)

Table 5. The Results of Regular Desensitization Instruction on Research Variables in Pre-posttest

Pre-test	N	Mean	SD	Regular Desensitization	N	Mean	SD
Pain 1	60	97.00	24.03	Pain 2	20	82.50	11.40

Table 6. The results of Covariance Analysis on the Effect of Grouping (regular desensitization) on Dental Pain

Variable	Squares Sum	DF	Squares Mean	F	P	Squares
Corrected Model	18510.8	2	9255.39	162.36	0.0001	0.89
Intercept	81.11	1	81.11	1.42	0.241	0.03
Pain (pretest)	16437.18	1	16437.18	288.35	0.0001	0.88
Pain Group	3593.96	1	3593.96	63.04	0.0001	0.63
Error	2109.12	37	57.00			
Total	323728.0	40				
Corrected Total	20619.90	39				

a.R Squared=0.921 (Adjusted R Squared=0.917)

Table 7. The Results of t Independent Test

	Leven Test					T-test			
	F	P	t	DF	P	Mean difference	Standard error difference	95% confidence Level	
								Minimum	Maximum
Pain	1.81	0.186	0.58	38	0.559	2.85	4.83	-6.96	12.64

Discussion

The objective of this study was to compare the effectiveness of the emotional self-regulation strategies and regular desensitization on dental pain of individuals who had visited the dentistry. To this end, three hypotheses were provided and tested. The results of the

first hypothesis showed that the emotional self-regulation strategy reduces the dental pain of individuals. To explain our results, we could suggest that the emotional cognitive strategies help individuals to regular arousals and negative emotions such as anxiety which is directly related to the regular pain [19] . Furthermore, emotional self-

regulation needs high flexibility as well as higher acceptance to cope with the pain. It reveals that the individuals have a conscious choice and thoughtful awareness. Consequently, individuals visiting a dentistry learn to grow the emotional self-regulation steps. Therefore, they accept information and related experiences with high consciousness and evaluate and change them if required. Then, the individuals could control themselves and reduce their dental pain through this technique [6, 20]. According to Goleman et al. [21], emotion regulation helps individuals to obtain more self-awareness, control themselves more appropriately and thus have less pain. Our results are consistent with previous research [22-24].

The results of the second hypothesis showed that regular desensitization affects the dental pain reduction of individuals visiting in dentistry. To explain our results, it was indicated that in the regular desensitization method, individuals learn to relax through creating tension and relaxation in different muscle groups, and then they are faced with anxiety hierarchy from low to high regularly affecting their dental pain. Our results are consistent with other studies [25, 26].

The third hypothesis revealed that there was no significant differences between the impact of the emotional self-regulation strategies and regular desensitization methods on dental pain of individuals visiting dentistry. To explain our results, we proved that both emotion self-regulation strategies and regulation desensitization methods reduced the dental pain of individuals. The mean in the emotional self-regulation strategies is higher than the regulation desensitization, which represents the higher effectiveness of regulation desensitization than emotional self-regulation strategies. However, t-test results showed that there was no significant difference in the effectiveness of both methods on dental pain. The patients in emotional self-regulation settings have higher awareness than regulation desensitization and can simply identify the distressful situations. Thus, such a method could accelerate treatment in less time. If patients have more control over the situation, they could perceive its effectiveness on the decreased pain in a short time.

Conclusion

This study aimed to compare the effectiveness of emotional self-regulation strategies and regular desensitization on the pain level of adults who had visited dentistry. The main limitation of our study was the sample size which was selected using a purposeful method. Therefore, the results should be generalizing cautiously. According to the literature and our results, the painful situations of a dentistry are surgery, neurosurgery, tooth extraction, and observation of injection syringes. Therefore, dentists should spend more time to calm down patients and gain their trust through dentist awareness of the painful situations. It is recommended to repeat our

study on a different population to achieve a better view in real-time.

Conflict of Interest

The authors declare that they have no conflicts of interest and no financial benefits from this study.

Ethical Approval

The participants willingly filled out the questionnaires and signed written informed consent. The study was approved by the Ethics Committee of the Islamic Azad University, Tabriz Branch.

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