

Effects of providing prior face-to-face information on the anxiety of patients undergoing dental extraction.

Efeito da informação prévia face-a-face sobre a ansiedade de pacientes submetidos à exodontia.

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ABSTRACT

This article test the effect of providing face-to-face information on anxiety and physiological measures of patients undergoing third molars extraction. The study included 123 patients divided into: experimental group (EG) and control group (CG). The instruments used were: the Dental Anxiety Scale (DAS) and the State-Trait Anxiety Inventory (STAI). Assessment of anxiety occurred in the stages: Pre-Surgical, Immediate Post-Surgical, Mediate Post-Surgical and Suture Removal. Physiological assessment occurred in the stages: Pre-Surgical, Immediate Post-Surgical and Suture Removal. Face-to-face information was only offered to the EG immediately after the first stage. We used the Chi-square test, mixed models for repeated measures (*Proc Mixed* of the SAS program)

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and Tukey ($\alpha=5\%$). There were no statistically significant differences between groups on anxiety and physiological measures. However, patients' systolic and diastolic blood pressures and their anxiety scores were lower in the EG than the CG, which suggests an effect of the preparatory procedure.

Keywords: anxiety, preparatory procedure, extraction of third molars.

RESUMO

Este artigo avalia o efeito da informação prévia face-a-face sobre a ansiedade e as medidas fisiológicas de pacientes submetidos à exodontia de terceiros molares. Participaram 123 pacientes, distribuídos nos grupos: Controle e Experimental. Utilizou-se para avaliação da ansiedade: Escala de Ansiedade Odontológica de Corah e Inventário de Ansiedade Traço-Estado. A avaliação da ansiedade ocorreu nos momentos: Pré-Cirúrgico, Pós-Cirúrgico Imediato, Pós-Cirúrgico Mediato e Remoção de Sutura. A avaliação fisiológica ocorreu nos momentos: Pré-Cirúrgico, Pós-Cirúrgico Imediato e Remoção de Sutura. A informação face-a-face foi oferecida ao Grupo Experimental após o primeiro momento. Utilizou-se os testes Qui-Quadrado, Análise de Variância com Modelo Misto e Tukey ($\alpha=0,05$). O resultado sugeriu não haver diferença estatisticamente significativa entre os grupos quanto à ansiedade e as medidas fisiológicas. Entretanto, a pressão arterial sistólica e diastólica e os escores de ansiedade foram menores entre os pacientes do grupo experimental, sugerindo possível efeito do procedimento preparatório.

Palavras-chave: ansiedade; procedimento preparatório; exodontia de terceiros molares.

INTRODUCTION

Extraction of third molars is a surgical procedure involving minimal risk to patients when compared to other dental surgeries (Kim, Kim and Myoung, 2010). Although it is routine and relatively simple, the extraction is an invasive dental procedure and is often associated with anxiety responses in patients.

A number of studies indicate that this procedure is commonly performed on young people who generally have not had any previous experience with surgery (Van Wijk & Lindeboom, 2008). Ignorance about the procedure may create a higher probability for emission of anxiety responses (Muglali & Kome-

rik, 2008). These emotional responses are elicited by the dental context (i.e., anesthesia, needles, motors, tweezers, and probes) and may be assessed by patients as potentially threatening, unknown or strange (Eli *et al.*, 1997).

The anxiety behaviors are learned responses that can be caused by: (a) direct exposure to the dental treatment situation, when the patient is subjected to stressful and/or painful events, or (b) indirect exposure, such as when a person relates to another person's experience of pain during dental treatment, or (c) when a person observes another person being exposed to a treatment and showing signs of pain, which is called vicarious learning (Rachman, 1997). Both situations

can be generalized to other stressful situations that are not necessarily related to dental treatment, such as medical treatment contexts.

Thus, patients' exposure to invasive procedures requires special care with regard to the potential for adverse emotional reactions, especially those reactions that indicate anxiety. A number of environmental management procedures have been investigated that prepare patients for the invasive process by providing them with information, including the following: oral or face-to-face resources (Ng, Chau and Leung, 2004; Wong, Chan and Chair, 2010), audio-visual features (Jlala *et al.*, 2010), listening to music (Kim, Kim and Myoung, 2011), informative leaflets or booklets (Sjöling, 2003; Van Wijk *et al.*, 2010) Internet educational programs (O'Conner-von, 2008), hypnotherapy (Schnur *et al.*, 2008) and relaxation programs (Cheung, Molassiotis and Chang, 2003).

Providing face-to-face information has been the subject of a number of studies, and analysis of the effects of this preparatory procedure suggest that it may lead to a reduction in anxiety levels (Wong, Chan and Chair, 2010). Ng *et al.* (2004) analyzed the effectiveness of providing preoperative information through verbal and illustrative reports on the postoperative anxiety levels of patients who have undergone dental surgery. The authors suggest that providing face-to-face information regarding sensory and the postoperative variables is effective for reducing the anxiety levels of patients.

Van Wijk *et al.* (2010) evaluated the satisfaction and well-being of patients undergoing third molars extractions considering the amount of information offered regarding the extraction. The patients were divided into two groups: one that received minimal

information (routine information) and one that received a greater amount of information (routine information and instructions regarding the use of analgesics, descriptions of the symptoms that are likely to occur and measures to improve healing). The results showed that patients who received greater amounts of information showed improved levels of satisfaction and perceived well-being.

Bytzer and Lindeberg (2007) evaluated the impact of providing information in the form of a video on anxiety of patients undergoing a colonoscopy. The video contained technical information about the invasive procedure. The results indicated no significant effects of the preparatory procedure on patients' anxiety levels, although the group that watched the video showed lower anxiety scores than the group that did not watch the video (group with video = 45.0; group without video = 45.9).

A study by Ruffinengo *et al.* (2009) examined the effect of a preparatory procedure on the anxiety of patients undergoing invasive procedures. The objective of this study was to evaluate the effectiveness of an informational video about the anxiety of patients undergoing a coronary angiography. The results showed a statistically significant difference between the group that watched the video and a control group, which indicates that watching the informational video was effective in reducing the anxiety scores of patients undergoing this procedure.

Given the previous work, it is evident that there is no consensus regarding the results of using preparatory procedures prior to invasive procedures. Some studies indicate that preparatory procedures cause a significant decrease in anxiety, and other studies do not. The current study aims to evaluate the effective-

ness of using a preparatory procedure in the form of providing prior face-to-face information on anxiety and the physiological measures for adolescents undergoing extraction of third molars.

METHOD

This study was submitted to an Ethics Committee in Research and was approved under protocol n° 052/2009. Data collection occurred from February to December 2010 in the surgical center of a dental school within a public university in São Paulo State. This study design includes a longitudinal follow-up that was conducted with 123 individuals (81 females) between the ages of 14 and 24 years. The individuals required extraction of at least one third molar during a dental session.

We included healthy and literate patients, who were selected due to their having a third molar extraction and suture removal at the same location. We excluded patients ($n = 9$) that, for whatever reason, did not show up for some of the stages of data collection or who did not complete all of the assessment instruments.

Participants were randomly assigned into the following two groups: (a) a control group (CG) that did not receive prior face-to-face information and (b) an experimental group (EG) that received prior face-to-face information. A simple randomization was conducted with a sequence of random tables that were generated by a program assignment, which was available on the internet site <<http://www.randomizer.org>>.

Data collection was performed by two researchers: one who performed the procedure at the first sta-

ge, which was the Pre-Surgical (PS) stage before surgery (with the introduction of prior face-to-face information to patients in the EG), and the other who, without knowledge regarding the data for the pre-surgical patients, followed the other three stages, which were Immediate Post-Surgical (IPS), Mediate Post-Surgical (MPS), and Suture Removal (SR). Two researchers performing data collection could avoid any possible biases in the research, such as the second researcher having prior knowledge regarding the preoperative results of each participant.

The researchers were trained to follow the first four stages and apply the tools of data collection. If the researchers observed any emotional manifestations, they did not question patients about these responses or make any behavioral intervention support or social support available. After he offered prior face-to-face information, patients were ushered into the waiting room of the surgical center.

During the first stage, which was Pre-Surgical (PS), all of the patients responded to questions regarding their health habits (e.g., their consumption of coffee and their tobacco use) and their history of oral surgical treatment. They also completed anxiety instruments and had their physiological measures assessed. The EG patients then experienced a preparatory procedure (i.e., the provision of prior face-to-face information), following which they were taken to the operating room.

The second stage, which is Immediate Post-Surgical (IPS), occurred immediately after surgery with all of the patients, as they were sitting in the dental chair of the surgery center, completing the anxiety and physiological measures of the PS.

During the Mediate Post-Surgical (MPS) stage, which occurred three days after the surgery, patients completed the instrument for measuring anxiety (STAI). The physiological measurements were not conducted at this time.

During the last stage, Suture Removal (SR), which occurred seven days after surgery, patients completed an assessment of anxiety and physiological measures before their suture removal.

The prior face-to-face information was presented to EG participants immediately after the first stage (Pre-Surgical). This preparatory procedure was developed and evaluated by researchers in the field of psychology applied to dentistry. This procedure consists of oral presentations explaining the technical procedures of the surgery and the possible physical and emotional sensations associated with the clinical routine.

The presentation followed a pre-defined script containing information about the surgical third molar extraction and was performed with the aid of a notebook. The objective of the script was to guide the researcher in the task to provide information to the EG patients regarding the surgical procedure and possible physical and emotional sensations that may occur during the postoperative period. In addition to nine questions about the extraction, a quiz assessing patients' knowledge included the following items: the formation and location of the tooth, the surgical center, methods for communicating with the dentist, preparation for the surgery, an asepsis, the surgical procedure, sensory information and post-surgical indications. The researcher asked patients each question orally to assess their prior knowledge (prior to the provision of information). After patients' respon-

ded verbally, the researcher presented a video with the answer to the question with the notebook. The video had a news program format and contained the image of a person's face and upper torso. These video responses ensured the standardization of information in terms of content and format.

To assess anxiety at each of the four stages, we used the State-Trait Anxiety Inventory (STAI) and the Dental Anxiety Scale (DAS).

The STAI consists of the following two scales: one that assesses anxiety as a state (A-state) and one that assesses anxiety as a trait (A-trait). The A-state is composed of 20 descriptors of anxiety and asks patients to report how they are currently feeling with regard to each descriptor according to a 4-point scale, as follows: 1) absolutely not, 2) slightly, 3) fairly, and 4) greatly. The A-trait is also composed of 20 descriptors of anxiety, and patients answer to the question, "How do you usually feel?" with regard to each descriptor of anxiety according to a 4 point scale: 1) seldom, 2) sometimes, 3) frequently, and 4) often (Spielberger, Gorsuch and Lushene, 1970).

The DAS scale is composed of four multiple choice questions, each with five alternative responses that are related to patients' reactions. These questions evaluate the day prior to the visit to the dentist, the waiting time before treatment, the stages of service prior to the use of a tooth motor, and tooth brushing. Each response receives a score ranging from 1 to 5 points. The result for this measure is the sum of the scores for the four questions. The final score can range from 4 to 20 points (Corah, 1968).

The evaluation of physiological measures (i.e., systolic blood pressure, diastolic blood pressure and

heart rate) occurred at three time points during the procedure, which were PS, IPS, and SR. Physiological measurements were taken at intervals of two minutes over a 10-minute period, with a total of five measurements taken at each time point. This evaluation was performed by an Automatic Blood Pressure Wrist Monitor OMRON, model HEM-631INT with a digital display.

The results were analyzed using nonparametric Chi-square tests to determine whether there were statistically significant differences between the groups for the categorical variables. To compare the continuous variables (i.e., anxiety and physiological measures) between the groups across the four stages of data collection, we used mixed models for repeated measures (Proc Mixed of SAS program) following an exploratory analysis and a selection of the best covariance structure. When the difference was significant, multiple comparison tests and Tukey's test were used to identify differences between the averages (*p-value* ≤ 0.05).

RESULTS

The results are presented in Table 1, which shows the frequency and percentage of participants that responded for each of the categorical variables, as well as in Figures 1 and 2, which show the averages and standard deviation scores related to patients' ratings of anxiety and physiological measures.

Table 1 presents the frequency and percentage of patients according to gender, history of oral surgical treatment, and smoking and coffee consumption separated by group (CG and EG) and by total sample. Men and women were distributed similarly in both groups (CG: 65.6% women and 34.4% men, EG: 66.1% women and 33.9% men). Sample characteristics for both groups showed homogeneity with respect to the categorical variables (e.g., gender, dental and surgical experience, and smoking and coffee consumption).

Regarding the anxiety assessment, there are three graphs in Figure 1 showing the averages and stan-

Table 1. Frequency and percentage of patients across the control group, experimental group and total sample according to gender, history of oral surgical treatment and consumption of tobacco and coffee.

Variable		Control Group		Experimental Group		Total Sample		p*
		n	%	n	%	n	%	
Gender	Female	40	65.6	41	66.1	81	65.9	0.9482
	Male	21	34.4	21	33.9	42	34.2	
History of oral surgical treatment	No	31	50.8	37	59.7	68	55.3	0.3232
	Yes	30	49.2	25	40.3	55	44.7	
Tobacco	No	59	96.7	58	93.5	117	95.1	0.4141
	Yes	2	3.3	4	6.5	6	4.9	
Coffee	No	56	91.8	55	88.7	111	90.2	0.5632
	Yes	5	8.2	7	11.3	12	9.8	

*Chi-square $\alpha=5\%$

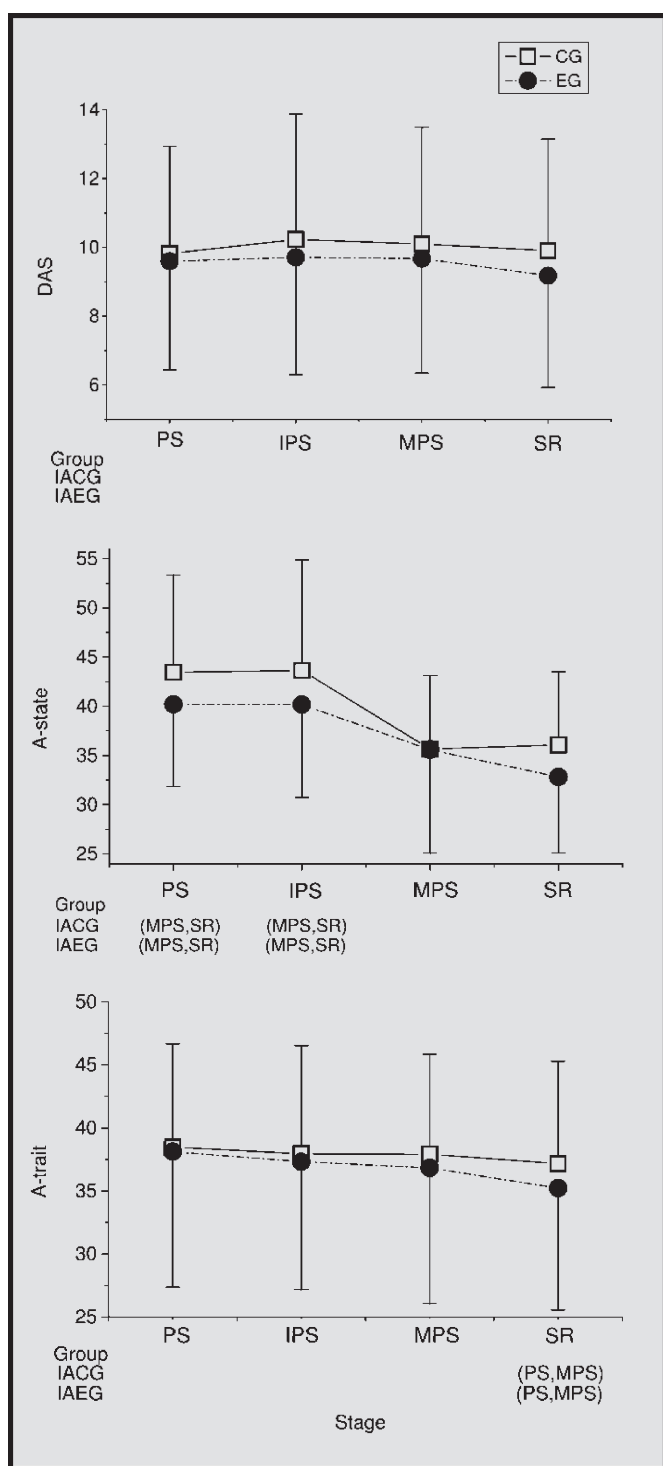


Fig. 1- Averages and standard deviations for the anxiety scores as assessed by the DAS and STAI (A-state and A-trait, respectively) for the control group (CG) and experimental group (EG) across the four stages of data collection (PS, IPS, MPS and SR).

Legend Fig. 1: CG: control group; EG: experimental group; PS: Pre-Surgical; IPS: Immediate Post-Surgical; MPS: Mediate Post-Surgical; SR: Suture Removal. For the 'Group', the asterisk indicates a statistically significant difference for the assessed stage (Tukey's test). IACG: Intra-group assessment of the control group. IAEG: Intra-group assessment of the experimental group. In the intra-group assessment, the codes in parentheses indicate the stage(s) that differs from the current stage. Test: mixed models for repeated measures (Proc Mixed of SAS program). The significance value adopted was $p \leq 0.05$.

dard deviations for the DAS (top), A-state (center) and A-trait (bottom), which were obtained across the four stages of data collection. In all of the graphs, the solid lines with hollow points refer to averages for the CG, and the dashed lines with filled points refer to averages for the EG. The horizontal axis shows the four stages of the anxiety evaluation, whereas the vertical axis shows the average values.

At the top of Figure 1, the average scores for the DAS in the control group are higher than those for the experimental group across all of the time points (CG-PS = 9.82 and EG-PS = 9.59; CG-IPS = 10.23 and EG-IPS = 9.71; CG-MPS = 10.09 and EG-MPS = 9.67; CG-SR = 9.90 and EG-SR = 9.17). There were no statistically significant differences between the groups (analysis between groups) and no statistically significant differences for the intra-group (the group compared with itself within the stages) across the four stages of data collection.

At the center of Figure 1, which shows the observed A-state inventory averages, the averages of the control group are higher compared to the experimental group (CG-PS=43.45 and EG-PS=40.19; CG-IPS=43.63 and EG-IPS=40.17; CG-MPS=35.65 and EG-MPS=35.58; CG-SR=36.08 and EG-SR=32.82). For the analysis between groups, patients at the Pre-Surgical stage in the control group were already showing average anxiety scores that were higher than those in the experimental group, and this difference remains consistent through the next stage (Immediate Pre-Surgical), yet no statistically significant difference was found between the groups for any time point during data collection. For the intra-group measures, the groups differ in similar ways across the stages of data collection as follows: the PS has higher scores than the MPS and SR stages for both groups, and this

difference is significant. This difference remains for the IPS stage, which has higher average scores than the MPS and RS stages.

The bottom of Figure 1 shows that the average A-trait anxiety levels for the EG are lower than average levels for the CG across the four stages (CG-PS=38.47 and EG-PS=38.12; CG-IPS=37.95 and EG-IPS=37.32; CG-MPS=37.91 and EG-MPS=36.83; CG-SR=37.16 and EG-SR=35.22). There were no significant differences between the groups (analysis between groups) at any stage in data collection. For the intra-group analysis, there was a drop in anxiety scores during the SR stage, with a statistically significant difference in the anxiety average scores of the PS and MPS stages. This decline occurred equally in both groups.

Figure 2 presents three graphs, as follows: systolic blood pressure (top), diastolic blood pressure (center) and heart rate (bottom). These physiological measures were obtained during three stages (PS, IPS, and SR). The dashed lines with filled points refer to the averages for the experimental group (EG), and the lines filled with hollow points refer to the control group (CG). The vertical axis shows the average values, and the horizontal axis shows the stages of data collection.

The average systolic blood pressure is presented at the top of Figure 2. Both groups show an increase in systolic blood pressure at the Immediate Pre-Surgical stage compared to the other stages (CG-PS=115.20 and EG-PS=115.40; CG-IPS=122.62 and EG-IPS=119.48; CG-SR=114.49 and EG-SR=114.01). There are no significant differences between the groups (analysis between groups). The groups present the same trend (i.e., an increase in systolic blood pressure in IPS), and there are no significant differ-

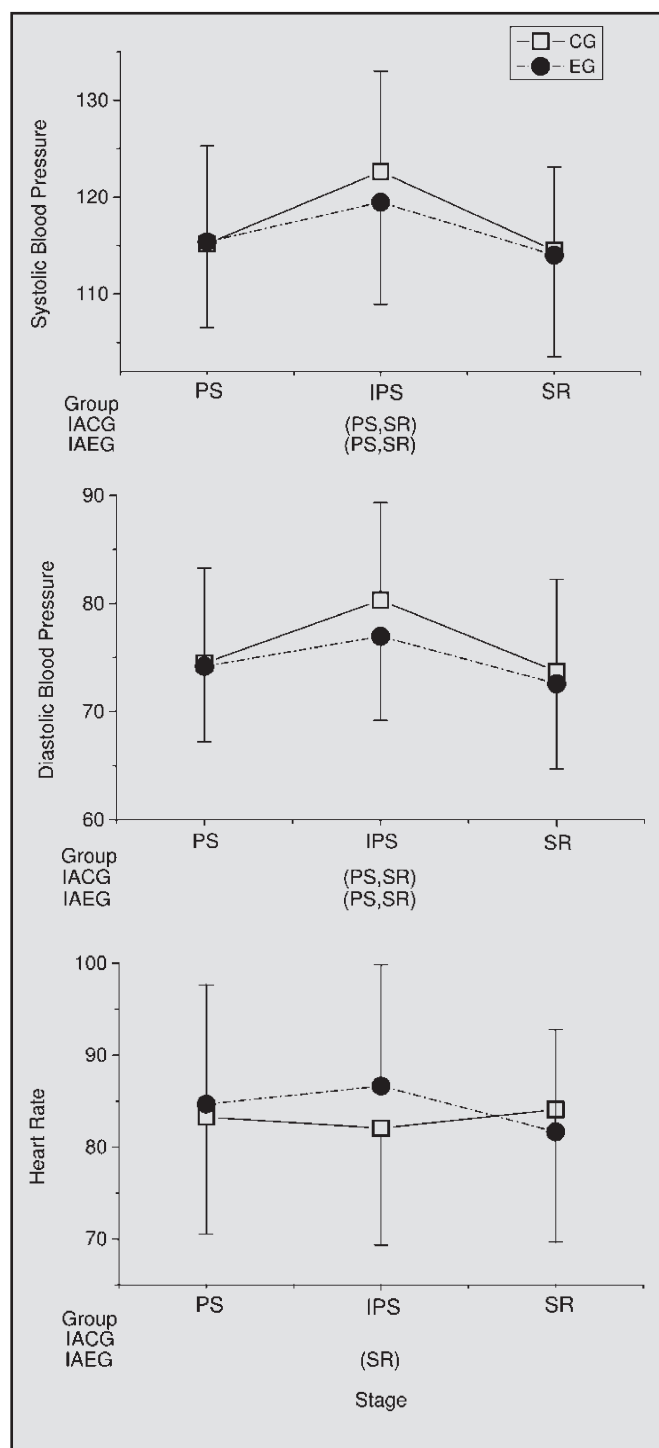


Fig. 2 - Averages and standard deviations for the systolic blood pressure, diastolic blood pressure and heart rate measures for the control group (CG) and experimental group (EG) across the three stages of data collection (PS, IPS and SR).

Legend Fig. 2: CG: control group; EG: experimental group; PS: Pre-Surgical; IPS: Immediate Post-Surgical; SR: Suture Removal. For the 'Group', the asterisk indicates a statistically significant difference for the assessed stage (Tukey's test). IACG: Intra-group assessment of the control group. IAEG: Intra-group assessment of the experimental group. In the intra-group assessment, the codes in parentheses indicate the stage(s) that differs from the current stage. Test: mixed models for repeated measures (Proc Mixed of SAS program). The significance value adopted was $p \leq 0.05$.

ces between them, despite the finding that the control group has higher averages in the IPS and SR stages compared to the averages for the experimental group. This finding may indicate a possible effect of the preparatory procedure on systolic blood pressure. For the intra-group evaluation, the difference in IPS is statistically significant from the other stages of data collection for both groups.

The center of Figure 2 shows that both groups present the same trend for diastolic blood pressure as they did for systolic blood pressure, which is increased scores during the IPS stage compared to other stages (CG-PS=74.48 and EG-PS=74.19; CG-IPS=80.31 and EG-IPS=76.97; CG-SR=73.71 and EG-SR=72.58). For the intra-group evaluation, the difference in IPS scores is statistically significant compared to the other two time points, and this difference is significant for both groups. Furthermore, the average increase during IPS is greater than during CG, which may be an indication of the effect of the preparation procedure on diastolic blood pressure, although this difference was not statistically significant between the groups.

The bottom of Figure 2 shows that the average heart rate for the EG was higher than that for the CG during the PS and IPS stages (CG-PS=83.25 and EG-PS=84.67; CG-IPS=82.05 and EG-IPS=86.64). However, in the SR stage, there is a decrease in heart rate in patients in the experimental group (EG-SR = 81.66), whereas there is an increase heart rate in patients in the control group (CG-SR = 84.07). There were no statistically significant differences between the groups. This result suggests that there was no effect of the preparatory procedure for the EG as expressed in measures of heart rate. For the intra-group analysis, only the EG showed a significant difference in one of the stages of data collection, which was

the Immediate Post-Surgical stage had higher scores than the Suture Removal stage.

DISCUSSION

The results of the current study examining the effects of prior face-to-face information on indicators of anxiety in patients who underwent extraction of third molars do not allow us to state that the preparatory procedure was effective in reducing anxiety scores and physiological measures in the experimental group. However, the evaluation of the patient's characteristics, the anxiety measurements and the physiological measures of blood pressure (i.e., systolic and diastolic) show that the control group had higher average scores than the experimental group, especially immediately after extraction (Immediate Post-Surgical). This finding suggests a possible effect of prior face-to-face information in the EG patients.

A study by Kim *et al.* (2011) evaluated the influence of a music intervention on anxiety levels and physiological changes during third molar extractions. The assessment of anxiety, as obtained by the DAS scale, and the physiological measures (i.e., systolic blood pressure, diastolic blood pressure, heart rate and respiratory rate) occurred before and during the surgery. There was not a statistically significant difference between the group that listened to music during the extraction and the control group. However, anxiety levels decreased for the group that listened to music during surgery, whereas anxiety levels for the control group increased compared with preoperative anxiety. In the present study, despite a difference in the type of preparatory procedure used, we observe the same trend as Kim *et al.* in that the experimental group (received prior face-to-face information) showed a de-

creasing trend in their scores for anxiety and showed a smaller dispersion (Figure 1).

Wong *et al.* (2010) investigated the effectiveness of an educational intervention on anxiety levels in patients who underwent orthopedic surgery. The authors used the STAI to assess measures of anxiety, which was collected six times throughout the pre- and post-surgery time period. The educational intervention lasted 30 minutes and was held one day prior to surgery. It aimed to increase the self-efficacy of the patient by providing information about pain and analgesics, as well as through providing breathing and relaxation exercise training. The results showed that the anxiety of the educational intervention group was lower than the control group and that this difference was statistically significant (control group: T0=55,27, T1=52,44, T2=47,38, T3=44,87, T4=40,89, T5=35,71; experimental group: T0=50,82, T1=43,97, T2=38,10, T3=37,65, T4=37,89, T5=36,14). Wong *et al.*'s use of a combination of intervention techniques, consisting of information and breathing and relaxation exercises, could have enhanced the anxiety-reducing effects of the procedure. Moreover, it is not possible to isolate which variable was most effective for reducing anxiety scores, as it could be the imparting of information or the training in breathing and relaxation.

Jlala *et al.* (2010) found a significant difference in the anxiety levels of patients who had undergone a surgery of the upper or lower limbs when they experienced a preparatory procedure. Anxiety was assessed using the STAI. The experimental group watched a video that contained information about the surgical procedure, anesthesia, and risks involved, as well as a real situation of a patient during a preoperative consultation with the anesthesiologist and a simulation of the procedure from the moment the patient entered

into the operating room until the transfer to the recovery room. Levels of pre- and post-operative anxiety for the group that watched the video were lower than that for a control group.

In the Jlala *et al.* study, although the average anxiety levels for the experimental group were smaller than those for the control group, they were not significantly different from each other. The results of Wong *et al.* (2010) and Jlala *et al.* (2010) are divergent, which may be due to methodological differences between the studies. Despite both studies using the same instrument to assess anxiety (STAI), the preparatory procedures included differing content addressed in different preparatory procedures in that Wong *et al.* provided information and performed breathing and relaxation training with patients whereas Jlala *et al.* offered information and presented a video of a patient in a real surgical situation.

O'Conner-von (2008) evaluated the effectiveness of two methods of preoperative preparation on adolescents' (10-16 years) anxiety regarding having surgery to remove their tonsils. One group of adolescents was exposed to a preparation program available on the internet, and the other group was exposed to a standard preparation program offered by the hospital. Both programs offered sensory and procedural information about the surgery to remove the tonsils. The results, as evaluated by the STAIC (State-Trait Anxiety Inventory for Children), showed no significant differences between the groups. However, the internet group reported having higher levels of satisfaction with their method of preparation than the group with the standard preparation.

The information available and the results found in the O'Conner-von (2008) preparatory procedure are similar to those observed in the current study. Howe-

ver, the current study failed to investigate EG patients' satisfaction with regard to providing information pertaining to the third molar extraction, which may be a limitation of this study.

Given the results of the current study and from previous studies, the preparatory procedure, as performed with prior face-to-face information, may cause a reduction in physiological measures (i.e., blood pressure) and in anxiety indicators among adolescents ages 14-24 years who are undergoing extraction of third molars, yet this reduction was not statistically significant.

Therefore, the study of preparatory procedures using prior face-to-face information in situations like extraction of third molars shows the importance of adopting a biopsychosocial approach of intervention and attention with regard to health research, as this preparatory procedure facilitates and enhances professional contact in that it humanizes the patient and health care. Additionally, this procedure may be used to effectively reduce anxiety responses in patients undergoing invasive situations.

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