

# Determinants of painful experience during dental treatment\*

## *Fatores determinantes de experiência dolorosa durante atendimento odontológico*

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### SUMMARY

**BACKGROUND AND OBJECTIVES:** Pain is usually associated to dental care and several factors may influence its perception because it is a complex process. So, our study aimed at identifying factors established by the scientific literature as determinants of this painful experience.

**CONTENTS:** Pain during dental treatment is more associated to invasive procedures, tooth extractions and surgeries, but it may also be associated to noninvasive procedures. Local anesthesia is referred to as a painful procedure generating anxiety. Although some patient-related factors may influence pain perception, few studies have analyzed such factors, with the exception to anxiety. There are controversies with regard to the role of patient's sociodemographic variables. With regard to children, studies have shown that dentists do not believe in pain referred by children and tend not to use available methods to control pain.

**CONCLUSION:** Anxiety is determinant for pain during dental care and pain is related to local anesthetic procedures. There are evidences that dentists' attitudes are determinants for pain.

**Keywords:** Anxiety to dental treatment, Dental care, Fear of dental treatment, Odontalgia, Toothache.

### RESUMO

**JUSTIFICATIVA E OBJETIVOS:** A dor frequentemente está associada com o cuidado com os dentes e

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vários fatores podem influenciar a sua percepção, sendo esse um processo complexo. Sendo assim, o objetivo do presente estudo foi identificar os fatores que a literatura científica tem condições de estabelecer como determinantes dessa experiência dolorosa.

**CONTEÚDO:** A dor durante o tratamento odontológico está mais associada a procedimentos invasivos como exodontias e cirurgias, mas também a procedimentos não invasivos. A anestesia local é referida como procedimento doloroso e gerador de ansiedade. Apesar de vários fatores relacionados ao paciente influenciarem na percepção da dor, poucos estudos analisaram esses fatores, a exceção da ansiedade. Há controvérsias com relação ao papel das variáveis sociodemográficas do paciente. Em relação ao atendimento de crianças, os estudos mostram que os dentistas não acreditam na dor referida pela criança e tendem a não usar métodos disponíveis de controle da dor.

**CONCLUSÃO:** A ansiedade é determinante para dor durante atendimento odontológico e está relacionada ao procedimento da anestesia local. Existem evidências que a atitude do dentista seja fator determinante para a dor.

**Descritores:** Ansiedade ao tratamento odontológico, Assistência odontológica, Dor de dente, Medo ao tratamento odontológico, Odontalgia.

### INTRODUCTION

In Dentistry, pain may be associated to oral cavity diseases or to dental procedures. With regard to procedures, if pain is adequately controlled by local anesthesia, the procedure will mildly interfere with painful sensitivity<sup>1</sup>. However pain is often associated to dental care, so that more than 60% of dental patients report some pain during their dental visits<sup>2</sup>.

Psychological aspects may also influence the vision they have about dental treatment, so that patients' level of anxiety, state of attention and emotions may lead them to overestimate the pain they felt<sup>3</sup>.

Several factors may influence pain awareness, being

this a complex process. Details about the participation of each factor are spread throughout the literature so the scientific evidence of their participation is not very clear. This study aimed at carrying out a broad and thorough review of studies about pain awareness during dental treatment to identify factors established by the literature as determining such painful experience.

For such, LILACS, Medline, Scielo, BBO and Pubmed databases were queried between 1991 and 2011, limiting the query to English and Portuguese languages, using the following keywords: dental pain, dental fear and dental anxiety (and their translation into Portuguese), and the keyword pain associated to the words dentist, treatment and/or management. We have selected 36 articles pointing to some clinical or not clinical factor associated to pain during dental treatment. Four were not mentioned in the review because they did not add information beyond those already available.

## **PAINFUL DENTAL PROCEDURES**

A significant number of adults report pain when visiting the dentist<sup>4</sup>. A population study has shown that 73.4% of patients report pain during dental treatment<sup>5</sup>; a different population study with 1086 individuals has shown that 42.5% of them have reported pain during dental treatment<sup>6</sup>.

Pain intensity was reported as mild, uncomfortable, moderate, severe or very severe by 20%, 35.1%, 33.3%, 8.2% and 3.4% of patients, respectively<sup>6</sup>. In some cases, severe pain was reported by 25% of patients<sup>7</sup>. As to dental experience involving severe pain, 60% of a representative sample of general population aged 15 years or more have reported pain at least once<sup>2</sup>.

Invasive dental treatments, such as restorations, extractions, crowns/bridges, endodontic treatment and periodontal/surgical treatment were associated to higher possibility of intraoperative pain<sup>6</sup>. This does not mean that pain is not present in noninvasive procedures, because 25% of a sample of young adults submitted to procedures such as probing, prophylaxy and removal of supragingival calculus have reported severe pain at some moment<sup>8</sup>.

The risk of feeling pain during endodontic treatment is higher for irreversible pulpitis or acute apical periodontitis as compared to chronic lesions, as well as for posterior teeth treatment with longer sessions<sup>9</sup>.

To minimize or prevent pain during dental procedures, local or regional anesthesia is induced. However, fear of anesthesia and pain are factors encouraging patients to avoid the dentist<sup>10</sup>. During outpatient tooth extrac-

tions, 15% of patients have reported pain during anesthesia<sup>7</sup> and patients submitted to local anesthesia for scraping and periodontal surgery have referred that local anesthetic pain was higher than periodontal therapy pain<sup>1</sup>. Blocking the inferior alveolar nerve (IAN) in preschool children is the most stressing method to control pain for some dentists<sup>11</sup>.

A study has shown that IAN block is the most painful anesthetic technique, followed by periodontal ligament injection. Chin blockade and local infiltrative anesthesia were similar<sup>12</sup>.

In addition to local anesthesia pain, there is also the possibility of anesthetic failure not controlling pain<sup>13</sup>.

## **INFLUENCE OF SOCIODEMOGRAPHIC CHARACTERISTICS OF PATIENTS ON PAIN AWARENESS AND DENTAL TREATMENT**

Pain is not exclusively dependent on the degree of organic injury. It is believed that cognitive, behavioral, sociocultural, genetic and demographic aspects, oral health status and previous experiences may influence pain awareness<sup>7,14</sup>.

A study has shown that a higher number of male patients feel pain during dental treatment as compared to females<sup>6</sup>. However, a different study has not shown significant differences between genders, although females had a higher incidence of pain<sup>9</sup>.

It seems that the higher is the level of education of patients, the higher is pain intensity report, but marital status is not associated to pain awareness<sup>6</sup>.

With regard to age, a study has found that young and adult patients feel more pain than older adults<sup>6</sup>, and another has shown that the probability of feeling pain was lower for individuals above 35 years of age, as compared to those with 35 years of age or less<sup>9</sup>. However, a third study has not shown differences between individuals aged from 15 to 19 years and those above 20 years of age<sup>2</sup>.

## **DENTAL PATIENTS PSYCHOLOGICAL ASPECTS AND THEIR PAIN AWARENESS DURING TREATMENT**

The stimulation level needed to perceive pain differs among individuals being this awareness also linked to their psychological status during the procedure. Distraction may also decrease pain awareness, as well as positive emotions; negative emotions, on the other hand, may increase pain awareness<sup>3</sup>. Among psychological aspects, anxiety has been widely studied<sup>1,4,5,7,14</sup>.

Dental treatment anxiety or fear are inferred as dental anxiety, varying in intensity from one patient to the other, or even for the same patient as a function of the type of procedure<sup>14,15</sup>.

Dental treatment anxiety is related to its multifactorial etiology, especially influenced by internal individual aspects, the environment where one lives and also the dental treatment itself<sup>16-18</sup>. Previous negative dental experiences seem to determine anxiety<sup>4,5</sup>.

A critical aspect is the fact that anxiety may directly interfere with perceived or referred pain with regard to dental treatment<sup>6,19-23</sup>.

Patients submitted to tooth extraction and endodontic treatment with high or low dental anxiety levels were compared as to their pain expectations and awareness with regard to the treatment. Results have shown that patients with high dental anxiety scores reported more pain, both expected and perceived<sup>19</sup>. Similar results were found with regard to dentistry restoration procedures<sup>23</sup> and also among patients coming for emergency tooth extraction<sup>22</sup>. In a study evaluating local anesthesia, highly anxious patients have reported higher intensity and longer duration of pain when receiving anesthetic injection, as compared to less anxious patients<sup>21</sup>.

When dentistry students were asked to read a tooth extraction case scenario imagining themselves as patients, and to refer the anxiety they would have in different moments of the situation, it was shown that referred pain was more severe when anxiety was high in the therapeutic environment, regardless of the anxious personality of the individual<sup>20</sup>.

### **Relationship of dental anxiety to some dental procedures and patients' sociodemographic characteristics**

Procedures reported by the literature as major inducers of anxiety and/or fear are anesthetic injections and minor oral surgeries such as tooth extraction<sup>14,16,18</sup>, followed by cavity preparation and drills inside the mouth<sup>22</sup>. Other situations also mentioned by the literature as inducing anxiety are endodontic treatment, caries<sup>21</sup> and periodontal scaling<sup>14</sup>.

As to sociodemographic aspects, studies have shown that females are more anxious than males during dental treatment<sup>7,17,24</sup>. However, other studies have not found difference between genders in the level of anxiety<sup>20,25</sup>.

There are studies showing that individuals older than 24 years of age have higher levels of anxiety<sup>26</sup>. However, other studies could not establish relationship between age and anxiety<sup>17,27</sup>. Patients' level of education and family income could not be associated to anxiety<sup>25</sup>.

### **ROLE OF THE DENTIST ON PATIENTS' PAIN AWARENESS DURING DENTAL TREATMENT**

There are many procedures promising to prevent dental treatment pain, such as nitrous oxide, anxiolytic and pre-anesthetic drugs, in addition to new and different local anesthetic techniques<sup>28,29</sup>. On the other hand, it seems that health professionals do not systematically ask about the presence of pain; they believe that patients will take the initiative of telling them; they do not want to waste time and attribute pain complaint to emotional aspects without reviewing, most of the times, the analgesic regimen being used<sup>30</sup>.

A survey with generalist dentists and pedodontists has shown that 10% of dentists deny pain in children and many do not believe that pain reports are valid<sup>10</sup>, findings also confirmed by other studies<sup>11,31,32</sup>. In a study with Swiss generalist dentists, almost half of them reported that children have difficulties in separating pain and discomfort<sup>32</sup>. American and Finish dentists did not ask children about pain; encourage them beforehand to report their more frequent pain; these same dentists do not consider dental procedures as being particularly painful or uncomfortable<sup>31</sup>.

Studies with children have shown a poor relation between dentists' procedures to control pain and their awareness of pain felt by patients<sup>31</sup>. In addition, more than 80% of Danish dentists have mentioned that they would never be committed to a pain-free treatment<sup>11</sup>; Swiss dentists tend to underuse local anesthesia, analgesics and sedatives to control pain during dental treatment<sup>32</sup>; and American and Finish dentists do not usually prescribe sedation with nitrous oxide or preanesthetic medication<sup>31</sup>.

Some aspects, directly or indirectly linked to dentists due to their working condition, seem to influence their attitude toward children. Demographic factors, such as gender, structural factors such as always working alone and daily seeing children between 3 and 5 years of age, and behavioral factors due to stress during anesthetic block in preschool children and the acceptance of dentists of performing potentially painful procedures without anesthesia, were associated to dentists' procedures to control dental pain<sup>11</sup>. Dentists working in private offices used local anesthetics more frequently than those working in clinics<sup>10</sup>, and American dentists used it more than Finish dentists during restorative treatments<sup>31</sup>.

### **DISCUSSION**

Pain has been perceived by a significant number of individuals during dental treatment and, most of the

times, pain is not mild<sup>2,4-6</sup>. Pain is not only a consequence of invasive procedures, although being more associated to such procedures<sup>6,8</sup> and anesthesia itself seems to be among most painful procedures<sup>1,10-12</sup>. However, literature data are not enough to exactly establish which are the most painful invasive procedures and to what extent anesthesia contributes to pain associated to such procedures.

The positive relationship between anxiety and dental treatment pain shown by several studies<sup>6,19-23</sup>, added to the fact that procedures reported by the literature as major generators of anxiety are anesthetic injections and minor oral surgeries such as tooth extraction<sup>3,18</sup>, reinforces the possibility of anesthesia being among the most painful procedures, as well as allows to suppose that minor oral surgeries, such as tooth extraction, are among the most painful invasive procedures.

Associating anesthesia, which is in theory the procedure to prevent pain, to pain during dental treatment is something deserving concern. Studies have been carried out to improve this procedure and to minimize pain, such as low-pressure injection<sup>33</sup> or the use of computerized anesthesia which decreases pain during injection<sup>34</sup>. However, a lot is still to be done, especially to benefit a larger number of people with the new techniques.

Some authors state that several patient-related factors, in addition to procedure itself, may influence pain awareness, but few studies have directly analyzed such factors<sup>6</sup>, with the exception of anxiety, which has been reasonably studied so that there are enough scientific evidences to indicate it as determining pain awareness during dental treatment<sup>6,18,20-23</sup>. Still with regard to patient-related factors, specifically sociodemographic factors, it does not seem valid, at the light of current literature, to point them as determining dental patients' pain, considering the scarcity of studies analyzing this aspect added to the negative association found among some of those factors and patients' pain and the disagreement among the few studies, at least in some aspect<sup>2,6</sup>.

Patients' sociodemographic factors also do not seem to determine dental anxiety, since most studies have not found relationship between anxiety and studied variables, such as age<sup>26,30</sup>, income and level of education<sup>17,20,28</sup>. While some studies have found significant association between gender and level of dental anxiety, being females more anxious than males<sup>10,20,27</sup>, others have not found this association<sup>23,28</sup>. Based on the association between anxiety and pain, the non association of sociodemographic factors and anxiety reinforces the hypothesis that such factors might not be determinants of dental treatment pain.

Dentists' ability and care to control patients' pain and anxiety with regard to treatment will directly impact patients' pain awareness during future visits. This because past dental painful experience is not only source of dental anxiety<sup>8</sup>, but also impacts current treatment pain, so that the major predictor of pain intensity perceived by patients during local anesthesia may be the pain they felt in previous anesthetics<sup>24</sup>. Also considering that the earlier people have painful experiences during treatment, the more fearful they become with regard to dental treatment as compared to those who had late pain experiences<sup>35</sup>, it is possible to imagine the responsibility of professionals treating children and of those working with basic attention.

However, in spite of several techniques available to dentists indicating what they could have done to prevent dental treatment pain, there is little in the literature about what they are actually doing in their daily practice and which factors may be interfering with their *modus operandi* to cause this high incidence of pain during dental treatment.

With regard to pediatric patients, literature states that dentists are indifferent to children's pain history or profile, deny pain referred by children and do not believe that their information is valid, so they tend not to use available methods to control pain<sup>10,12,31,32</sup>.

Dentists are not alike and it is well defined in the literature that treatment decisions vary according to demographics, professional qualification and working structure<sup>36,37</sup>. But in spite of gender<sup>14</sup>, working structure<sup>13,14</sup> and country<sup>34,35</sup> being associated to their attitudes and their procedures to control dental pain, these studies are scarce and just related to pediatric treatment. So, there is the need for studies directly evaluating which and how dentist-related factors interfere with pain felt by patients, moreover because the literature favors the hypothesis that dentist-related factors are determinants of pain.

## CONCLUSION

Dental anxiety is the best defined variable to determine pain awareness during treatment and painful sensation is related to local anesthetic procedures. There are evidences that patient-related sociodemographic factors do not determine pain, but that dentists' attitudes are an important factor for the presence of pain.

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