

Preoperative Pain and Medications Used in Emergency Patients with Irreversible Acute Pulpitis or Acute Apical Periodontitis: A Prospective Comparative Study

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***Aims:** To determine the pain characteristics of and medications used for patients seeking emergency care for irreversible acute pulpitis (IAP) or acute apical periodontitis (AAP). **Methods:** General (age, sex, weight, general health) and specific (pain intensity, localization, tooth mobility, lymphadenopathy, use of medications) information was noted in 209 patients who appeared for emergency care in 2 dental centers of Dakar with either IAP or AAP. Statistical analysis was performed with the Mann-Whitney and chi-square tests. **Results:** The sample comprised 97 IAP patients (46.4%) and 112 AAP patients (53.6%); there were no significant differences between the 2 groups with respect to age, sex, or weight. Of the involved teeth, 62% were mandibular and 38% were maxillary. IAP patients waited 6.6 ± 5.3 days before seeking an emergency consultation versus 5.0 ± 3.8 days for AAP patients ($P < .05$). Severe pain was reported in 75% of the IAP and 76% of AAP patients (not significant). Percussion and apical palpation were painful only in AAP, in 98% and 40% of patients, respectively. Mobility and adenopathies were noted only in AAP, in 87% and 46% of patients, respectively ($P < .001$). Seventy-five percent of IAP patients and 80% of AAP patients used medications, mainly non-narcotic analgesics, which offered relief in 62% of IAP patients and 46% of AAP patients. **Conclusions:** Patients with IAP waited longer than those with AAP before seeking treatment. Self-medication offered better relief in cases of IAP than in cases of AAP. Pain to percussion and palpation, lymphadenopathies, and dental mobility were strong indicators for AAP. J OROFAC PAIN 2007;21:303–308*

Key words: apical periodontitis, emergencies, medication, pain, pulpitis

Pain is the principal motive for emergency consultations at the dental office or in emergency services, and most such emergencies are endodontic in origin. Segal¹ reported that 2 of 3 patients who presented for dental consultation complained of pain and, among those, 89% had experienced pain for 1 week. In addition, the majority of patients in emergency consultations report pain of moderate or severe intensity.²

There have been few studies related to the natural history of pulpitis and apical periodontitis with or without periapical lesions.^{2,3} However, information related to the intensity, time course, and characteristics of the pain (ie, spontaneous or provoked), including the use of over-the-counter medication and the delay before treatment seeking, provide key data for establishing a diagnosis. The subjective signs, clinical examination with pulp

vitality tests, and radiologic examination are the principal diagnostic tools currently available. Previous studies have been carried out to evaluate the pain characteristics pre- and postoperatively. The use of medications for treating various pathologies has been based on data gathered from dental patients in the United States and Europe but not in Africa.²⁻⁷ The only studies on this subject conducted in Africa have been primarily oriented toward postoperative pain in relation to the number of visits during endodontic treatments.⁸⁻¹⁰ Analysis of the literature also shows that no study conducted in Africa has correlated the preoperative pain characteristics with endodontic pathology, particularly the delay in seeking consultation and the medications used.

The aim of this prospective study was therefore to determine the pain characteristics of and medications used for patients seeking emergency care for irreversible acute pulpitis (IAP) or acute apical periodontitis (AAP).

Materials and Methods

Sample

The sample consisted of 209 patients who appeared for emergency consultation at the Operative Dental Clinic of the Dental Department of the Faculty of Medicine, Pharmacy, and Dentistry of Dakar and the Health Center of Ouakam, Senegal. All patients who presented at the clinic with IAP or AAP during the time-course of the study were included. The scientific committee of the faculty approved the study, and patient anonymity was strictly respected.

The inclusion criteria were

- At least 15 years of age
- Presentation for an emergency consultation for moderate or severe preoperative pain of endodontic origin
- Good health status as attested to by a written health history and oral questions
- Willingness to sign a consent form

The criteria for noninclusion were

- Age less than 15 years
- A systemic illness, recent hospitalization, or being under general treatment for a medical condition
- Being under dental treatment
- Refusal to give written consent

Examination

Examination of each patient was conducted through a standardized questionnaire. The first part of the patient examination consisted of an interview that covered general parameters (age, sex, weight, and general health status) and administration of a questionnaire to obtain information concerning the pain characteristics, the type of tooth in question, and the type of medications used (eg, non-narcotic analgesics, narcotic analgesics, antibiotics).

The intensity of the dental pain was evaluated using a simple verbal scale with 4 levels: 0 = absence of pain; 1 = slight pain; 2 = moderate pain; 3 = severe pain. The delay before the consultation was estimated in number of days.

Following the interview and administration of the questionnaire, all the patients were examined with emphasis on the tooth in question. All examinations, tests, and radiographic analyses necessary for diagnosis were performed. Pulpal vitality tests were performed using the cold spray tetrafluoroethane (Pharmaethyl, Septodont France). After the tooth was isolated and dried, the cold test consisted of soaking a cotton pellet in tetrafluoroethane and immediately placing it on the cervical third of the buccal surface of the tooth. The pulp was considered vital when the test elicited a painful response. Clinical examination included evaluation of tooth mobility and the presence of an adenopathy. Dental mobility was evaluated using the Muhlemann¹¹ mobility index, which classifies mobility as follows: 0 = no mobility; 1 = perceptible but nonvisible mobility; 2 = transversal mobility of less than 1 mm; 3 = transversal mobility of more than 1 mm; 4 = axial mobility.

The presence of lymphadenopathy was evaluated by finger palpation of the submaxillary, submental, and subdiaphragmatic nodes and the cervical nodes.

All of these examinations were performed by 1 operator, an instructor in endodontics. Diagnosis of the tooth was established based on the following characteristics¹²:

- IAP
 - Presence of an endodontic pathway for bacterial contamination
 - A positive pulpal vitality test
 - Spontaneous pain
- AAP
 - Presence of an endodontic pathway for bacterial contamination
 - A negative pulpal vitality test
 - Spontaneous pain exacerbated by percussion

Statistical Analysis

Collection and analysis of the data were carried out with SPSS software version 11.0. The Mann-Whitney test was used to compare patients with IAP with those with AAP with reference to the following variables: age, sex, weight, delay before consultation, pain intensity, percussion, palpation, mobility, and lymphadenopathy. Differences between groups in sex and the effectiveness of medications in relieving pain were analyzed with the chi-square test. The significance level was fixed at 5% ($P < .05$).

Results

Distribution of the Sample Depending on Age, Sex, and Weight

The sample consisted of 209 patients, of whom 97 (46.4%) consulted for an IAP and 112 (53.6%) for an AAP (Table 1). Statistical analysis revealed no differences between the 2 groups with regard to age, sex, and weight.

Distribution of Teeth According to Diagnosis

For the 209 teeth of the sample, 130 were mandibular (62%) and 79 maxillary (38%). The molars were the teeth most subject to pulpal and periapical diseases, followed by the premolars; very few anterior teeth were involved (Table 2).

Delay Before Consultation

The number of days that the patients suffered pain before seeking consultation was significantly higher for the IAP group than for the AAP group (6.6 ± 5.3 days versus 5.0 ± 3.8 days; $P < .05$). Figure 1 compares the 2 groups with respect to pain severity, painful percussion and apical palpation, dental mobility, and lymphadenopathy.

Pain Intensity

In the majority of cases in both groups (75% for the IAP group and 76% for the AAP group), the patients presented with severe pain. The rest of the patients reported moderate pain. Statistical analysis indicated no difference between the groups with respect to this symptom.

Table 1 Distribution of the Sample with Regard to Age, Sex, and Weight

	IAP (n = 97)	AAP (n = 112)	P
Age (y)	27.90 ± 9.74	29.55 ± 12.87	> .05
Sex (n [%])			
Male	38 (39.2%)	59 (52.7%)	> .05
Female	59 (60.8%)	53 (47.3%)	
Weight (kg)	62.02 ± 10.84	62.02 ± 11.29	> .05

Mean age and weight ± SD presented.

* maximum interincisal distance < 40 excluded.

Table 2 Distribution of Teeth According to Diagnosis

	Diagnosis			
	IAP (n = 97)		AAP (n = 112)	
	n	%	n	%
Maxillary (n = 79)				
First molar	13	16.45	12	15.20
Second or third molars	12	15.20	7	8.90
First premolar	4	5.10	7	8.90
Second premolar	12	15.20	7	8.90
Anterior	1	1.30	4	5.10
Mandibular (n = 130)				
First molar	11	8.70	30	23.10
Second or third molars	41	31.52	40	31.50
First premolar	1	0.07	1	0.07
Second premolar	2	1.50	2	1.50
Anterior	0	0	2	1.50

Percussion

Percussion was not painful in the patients suffering from IAP; however, it was painful in 98% of the patients who consulted for an AAP ($P < .001$).

Apical Palpation

Apical palpation was not painful in the patients who had IAP. It was painful in 40% of the patients with AAP ($P < .001$).

Dental Mobility

Dental mobility was noted in 87% of the patients with AAP. It varied from type 2 to 4. No dental mobility was seen in the patients with IAP ($P < .001$).

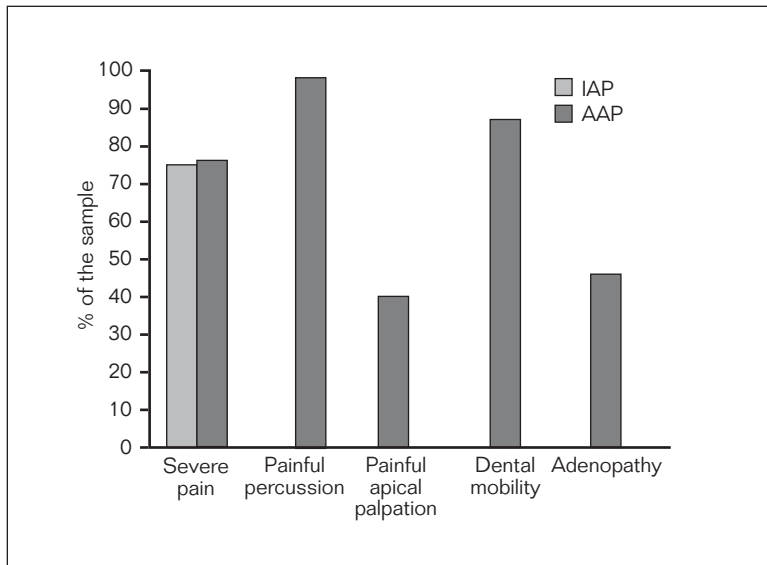


Fig 1 Distribution of the sample for clinical signs associated with the painful condition in patients suffering from IAP or AAP.

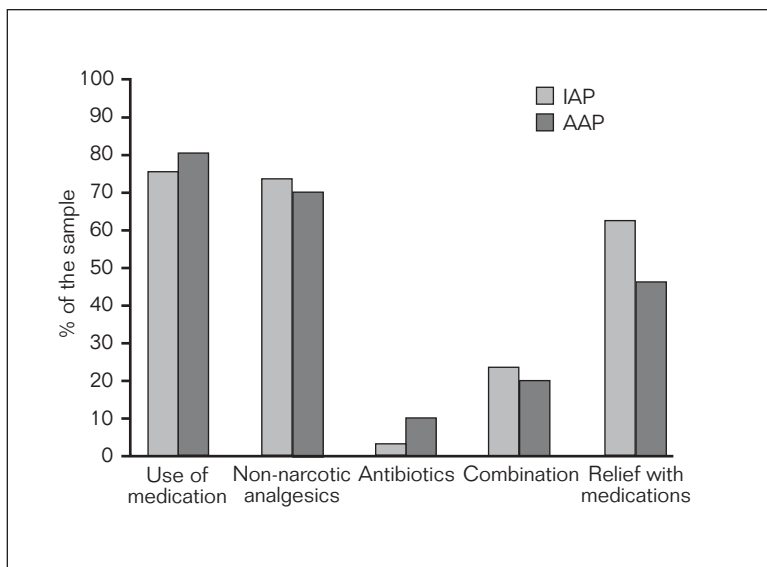


Fig 2 Distribution of the sample for the use of medication in patients suffering from IAP or AAP.

Lymphadenopathy

The presence of lymphadenopathy was recorded only in 46% of the patients suffering from AAP. No presence of lymphadenopathy was revealed in the patients consulting for IAP ($P < .001$; Fig 1).

Medications Used and Their Effects

The use of medication was noted in 75% of the patients with IAP, and 80% of those with AAP (Fig 2). Seventy percent of the medications used by the patients with AAP were non-narcotic analgesics, as were 73% of those used by IAP patients. Ten percent of the medications used by the AAP group

were antibiotics, versus 3% for the IAP group. Combinations of the 2 or 3 medications were used by 20% of the AAP patients and 24% of the IAP patients. No narcotic analgesics were used. The medications provided relief in 46% of the patients who suffered from AAP who used medication and 62% of the patients who complained of IAP medication. Non-narcotic analgesics (71%), antibiotics (7%), and combinations of these 2 types of medications (22%) were used. These medications were obtained from pharmacies or through family members or friends; old prescriptions were used in some cases. There was no significant difference in the amount of medication used with respect to sex (81% of women, 70% of men).

Discussion

The sample examined in this study was composed of 209 patients presenting for endodontic pain (97 IAP and 112 AAP) examined with criteria similar to those used in prior studies.^{4,13,14} No difference was noted concerning the intensity of pain between the groups, with 75% of the patients presenting for consultation for IAP and 76% of those presenting for AAP complaining of severe pain. For all other patients, moderate pain was reported. These findings are similar to data reported in the literature. Dummer et al³ found that 87% of patients who suffered from acute pulpitis reported severe pain, and that all patients who presented with AAP complained of severe pain. Nusstein and Beck⁴ noted that 50% of the patients suffering from pulpitis reported severe pain, and 50% reported moderate pain. In patients with AAP, 45% suffered moderate pain and 55% severe pain.

There was no difference between groups related to general findings such as age, sex, and weight. Analysis of the age distribution showed that most subjects were between 15 and 40 years. This may be explained by the fact that the population of Senegal is relatively young; furthermore, young people may present for consultation more readily. Nusstein and Beck⁴ observed the same tendencies and reported an average age of 31 and 33 years. Ethnic variability was not studied because of the ethnic cross-breeding in Senegal. Previous studies have shown that race and ethnicity have no effect on the characteristics of endodontic pain.⁴

In the present study, patients presenting with IAP waited longer before presenting for consultation, an average of almost 7 days, versus 5 days for AAP. The difference was statistically significant ($P < .05$). Nusstein and Beck⁴ found the same tendency to delay consultation much longer with patients suffering from IAP than patients with AAP (9 versus 4 days). Segal, who did not distinguish between the 2 conditions, found that 89% of patients waited at least 7 days before presenting for consultation.¹ However, Dummer et al³ reported shorter delays of consultation: 54% of patients with acute pulpitis waited a minimum of 3 days before seeking consultation, and only 41% of patients with AAP waited more than 3 days. Baranska-Gachowska and Waszkiewick-Golos¹⁵ noted that patients with IAP could wait 3 to 14 days before consulting. The differences between studies might be due to the criteria for patient selection in some studies and the mixing of patients with mild and moderate pain in others. In the present study, only moderate to severe pain

was taken into account. Given that there was no difference in the intensity of pain, the difference in delay before consultation between the 2 groups may be related to previous experiences of dental pain and subsequent treatment and the nature of the pain (intermittent or continuous). IAP pain is generally intermittent, spontaneous, and provoked by stimuli such as cold, heat, and contact. AAP pain has a continuous spontaneous character and is exacerbated by pressure. Thus, it is possible that patients suffering from pulpitis have a tendency to wait until the pain starts to be unbearable before seeking consultation. Another explanation is that the medications used were more efficient in the treatment of IAP than AAP. The patients may have delayed treatment until the point that their medications no longer controlled their pain.

Pain on percussion and palpation, lymphadenopathies, and dental mobility were found only in the group of patients with AAP. None of these signs were noted in the IAP group. All of these signs are therefore indicators of periapical inflammation associated with necrosis and pulpal infection. The absence of percussion-evoked pain in the IAP group is surprising, since other authors have found much higher rates.^{4,15} This difference might be attributed to the force of the percussion, which can differ between studies and is not quantified. Furthermore, some authors have reported ethnic differences in experimental pain thresholds; this may explain variation between studies to some degree.^{16,17}

Regarding the use of medications for pain control, no difference was noted between the 2 groups. Medications to ease the pain were used in 75% of the IAP cases and in 80% of the AAP cases. Nusstein and Beck⁴ found an average of 81% for 2 similar groups of patients. Walton and Fouad¹⁸ found that only 18% of patients used medications before presenting for consultation. The difference is probably related to variations in the populations studied, since these authors included in their sample patients who did not have pain.

A significant difference, however, was noted concerning the effect of the medications, with IAP patients reporting a much greater degree of relief (62%) than AAP patients (46%). The greater degree of relief with pulpitis may be related to the type of pain felt in the 2 pathologies. Dummer et al³ noted the same tendencies, though to a lesser degree (50% of IAP patients experienced relief with medications versus 47% of AAP patients). In a similar study, Nusstein and Beck⁴ found an average relief of 62% for both conditions. The difference between their study and the present study

may be attributed to the use of narcotic analgesics (68% to 71%) in the former.

Previous studies^{14,19} have shown that antibiotics have no effect on pain control in IAP and that analgesics alone do not totally control pulpal pain. Indeed, the same observations were found in this study. Pulpotomy or complete elimination of the inflamed pulpal tissue remains the most useful treatment against pain in IAP.

A variety of medications were used in the present study, including non-narcotic analgesics, antibiotics, and combinations of these 2 types of medications. There was no significant difference in the amount of medication used with respect to sex. These results are similar to data reported by Nusstein and Beck⁴ and Eggen.²⁰

Conclusions

The results showed that patients with IAP waited longer than those with AAP (6.6 ± 5.3 days versus 5.0 ± 3.8 days) before seeking emergency treatment. The use of medication was noted in 75% of patients with IAP and 80% of those with AAP. The medications offered relief in 46% of the patients who suffered from AAP and 62% of the patients who complained of IAP.

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