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## Razina anksioznosti i percepcija bola endodontskih pacijenata

### *The Level of Anxiety and Pain Perception of Endodontic Patients*

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**Sažetak**

**Svrha rada:** Željela se usporediti razina anksioznosti pacijenata s tjeskobom, strahom koji su procijenili doktori dentalne medicine. Također se htjelo usporediti pacijentovu očekivanu bol s onom doživljenom tijekom zahvata te liječnikova procjena očekivane i stvarne boli. **Metode:** Šezdeset i šest pacijenata i njihovi liječnici dentalne medicine ispunili su dva upitnika prije i poslije zahvata. Prvi dio pitanja postavljenih pacijentima odnosio se na demografske podatke, učestalost odlazaka stomatologu, razinu anksioznosti i očekivanu bol. Prije zahvata liječnici su procijenili razinu straha pojedinog pacijenta i očekivani intenzitet boli. Nakon zahvata pacijenti su procijenili razinu očekivane boli te liječnikovu empatiju, a liječnici su ponovno procijenili jakost pacijentove boli. Za statističku analizu zavisnih uzoraka upotrijebljen je bio t-test, a Spearmanovim rho koeficijentom korelacije određena je razina statističke značajnosti od 0,05. **Rezultati:** Pacijentovo očekivane intenziteta boli bilo je veće, negoli se to dogodilo tijekom zahvata (t-test = 3,540, p = 0,001). Nije pronađena razlika između razine boli koju su očekivali terapeuti i njihove percepcije boli tijekom zahvata. Utvrđena je statistički značajna korelacija između pacijentove razine anksioznosti i doktorova prepoznavanja njegove ustrašenosti (Spearmanov rho = 0,460, p<0,001). Viša razina anksioznosti povećala je očekivani intenzitet boli (Spearmanov rho = 0,401, p=0,001). Stvarni intenzitet boli nije bio značajno povezan s dentalnom anksioznošću. (Spearmanov rho = 0,080, p = 0,524). **Zaključak:** S obzirom na to da je razina dentalne anksioznosti povezana s povećanim intenzitetom očekivane boli, začarani krug boli i straha mogao bi biti prekinut pozitivnim informacijama koje bi dobio pacijent prije endodontskog zahvata i tijekom tretmana.

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**Ključne riječi**

strah od stomatologa; bol; endodoncija

**Uvod**

Pacijenta prije endodontskoga zahvata često zabrinjavaju dvije stvari: trajanje tretmana i bol (1). Endodontski zahvat često se povezuje s negativnim konotacijama, što može biti posljedica neutemeljenog poimanja. Mnogi pacijenti koji nikad nisu iskusili endodontski zahvat radije bi odabrali ekstrakciju zuba, no samo 17 posto onih koji su bili podvrgnuti endodontskom zahvatu opisuje ga kao ekstremno bolno iskustvo, a 96,3 posto ponovno bi pristalo na takav tretman (2,3). Ponašanje oblikovano bolnim iskustvom može biti uvjetovano i neuvjetovano. Akutna bol primjer je neuvjetovanoga ponašanja jer bol uzrokuje pojava *okidača* (eng. *trigger*) te reakcija pacijenta nije pod utjecajem okoline. Kronična bol, zato što je dugotrajna, povećava razinu anksioznosti čime se ostvaruje uvjetovano ponašanje (1).

Anksioznost (tjeskoba) stanje je ustrašenosti i straha sve do panike, uz psihomotornu napetost i unutarnji nemir (4,5). Etiološke teorije objašnjavaju nastanak fobičnih anksioznih poremećaja kao proces utiskivanja emocionalnih re-

**Introduction**

Patients who need endodontic treatment are often burdened by two main concerns, the length of the procedure and pain (1). Endodontic treatment is often accompanied by negative connotations caused by the patient's unfounded perceptions. Many patients who have not experienced endodontic treatment would rather undergo a tooth extraction, however, of the patients who actually underwent endodontic treatment, only 17 % described it as an extremely painful experience, and 96.3 % agreed to the re-intervention (2,3). The behaviour that is shaped by painful experience can be conditioned and unconditioned. Acute pain is an example of unconditioned behaviour, where the appearance of triggers causes a pain response, and the patient's reaction is not under the influence of environment. Chronic pain, because of its duration, increases the level of anxiety resulting in a conditioned behaviour (1).

Anxiety is a condition that manifests itself in excess difficulty and a sense of fear advancing to panic, accompanied by the psychomotor agitation and inner discomfort (4,5). Etiolo-

akcija u kritičnom razdoblju sazrijevanja zbog čega se oni poslije teško mijenjaju (6). Dentalna anksioznost uži je pojam, a uzrokuje je specifična stresna situacija u stomatološkoj ordinaciji. Strah najčešće nastaje zbog traumatskih iskustava u djetinjstvu ili usvajanja fobičnog ponašanja od roditelja (6,7). Anksioznost može biti prouzročena očekivanjem neke opasne situacije u čijoj percepciji sudjeluju kognitivni procesi. Jedan od parametara koji ima velik utjecaj na te kognitivne procese jest strah od dentalne boli te znanje, osjećaji i stajališta (3).

Dentalni strah reakcija je na poznatu opasnost jer se pojavljuje kod osoba koje već imaju određena negativna stomatološka iskustva i očekuju da će se to nužno ponoviti. Najintenzivniji oblik straha od stomatologa jest dentalna fobija (4,8).

Anksiozni pacijenti skloni su zatražiti tretman samo u slučaju trenutačne boli uzrokovane vjerojatno težim stadijem bolesti. Samim time potencira se anksiozno stanje u ordinaciji (9).

Psihološke karakteristike osobe i potencijalno negativno iskustvo jači su od objektivnog stanja vezanog za sam postupak (10). Tako se stvara začarani krug anksioznosti i boli, sa stalnom tendencijom povećavanja (2,3).

Bol pri dentalnim zahvatima povezana je, između ostaloga, i s emocionalnim stanjem. Drugi čimbenici koji utječu na doživljaj boli jesu dob, spol, oralno zdravlje, učestalost posjeta stomatologu, socijalno-ekonomski status i način ophođenja s pacijentom (11).

Unatoč napretku u obavljanju stomatoloških zahvata i metodama kontrole boli, većina pacijenata opisuje posjet dentalnom liječniku kao bolno i neugodno iskustvo (12,13,14).

Nakon utvrđivanja uzroka boli i anksioznosti, zadaća je stomatologa pronaći optimalnu kontrolu boli. To se postiže psihološkim i farmakološkim pristupom ili njihovom kombinacijom (14).

Kontrola boli ovisi o prepoznavanju psiholoških potreba, znanju i vještinama potrebnima za pravilno obavljanje dentalnoga zahvata i postoperativnoj brizi o pacijentu (1).

Svrha ovoga istraživanja bila je usporediti razinu anksioznosti pacijenata s procjenom liječnika. Također se željela usporediti pacijentova očekivana bol i ona doživljena tijekom zahvata te procjena doktora dentalne medicine o očekivanoj i stvarnoj boli. Tako se pokušalo utvrditi neke čimbenike povezane s doživljajem boli kod pacijenata podvrgnutih endodontskom zahvatu.

## Ispitanici i postupci

Istraživanje je provedeno u Zavodu za endodonciju i restaurativnu stomatologiju Stomatološkoga fakulteta Sveučilišta u Zagrebu, u Domu Zdravlja Zagreb – Centar (Runjaninova 4, 10000 Zagreb, Hrvatska).

Ispitanici su bili detaljno informirani o prirodi i tijeku istraživanja te su potpisali informirani pristanak. Istraživanje

logical theories explain the emergence of phobic anxiety disorders with the process of imprinting emotional reactions in the critical period of maturation which is why there are difficulties to change them later (6). Dental anxiety is caused by a specific stressful situation in a dental office. Fear usually begins after traumatic experiences in childhood or by adopting phobic behaviour learned from parents (6,7). Anxiety can be caused by the expectation of a threatening situation, perception of which involves the cognitive processes. One of the parameters that have a major impact on the cognitive processes is fear of dental pain, and also knowledge, feelings, and beliefs (3).

Dental fear is a reaction to a known danger because it occurs in people who have already had a number of negative dental experiences and who expect the bad experience to be repeated. The most intense form of the fear of dentist is dental phobia (4,8).

Anxious patients are prone to seek treatment only in case of existing pain probably caused by the severe stage of the disease. Therefore, the anxious state of the patient in dental practice is intensified (9).

Psychological characteristics of people and the potentially negative experience overpower the objective state of the patient regarding the procedure (10). This creates a vicious circle of anxiety and pain, with a tendency of the two to increase (2,3).

Pain which is present during dental procedures is, among other things, related to the emotional state of the patient. Other factors that influence the experience of pain are age, gender, oral health, frequency of dental visits, socio-economic status and the dentists' way of dealing with the patient (11).

Despite the progress in the way of conducting dental procedures and methods of pain control, most patients describe a visit to the dentist as a painful and unpleasant experience (12-14).

After determining the cause of pain and anxiety, it is up to the dentist to find the optimal way to control pain. This is achieved by a physiological and pharmacological approach and a combination of both (14).

Pain control is dependent on the identification of psychological needs, knowledge and skills for the proper conduction of dental surgery and postoperative care of the patient (1).

The purpose of this study was to compare the level of anxiety reported by patients and assessed by dentists. Also, the expected and actual pain during the treatment perceived by the patient and dentist were assessed. This could reveal some factors associated with exaggerated perception of pain in patients undergoing endodontic therapy.

## Subjects and methods

The study was conducted in the Department of Endodontics and Restorative Dentistry, School of Dental Medicine, University of Zagreb, at Community Health Centre Zagreb-Centre (Runjaninova 4, 10000 Zagreb, Croatia).

Respondents, endodontic patients and therapists were informed in detail of the nature and course of the study,

je 23. svibnja 2013. odobrilo Etičko povjerenstvo Stomatološkoga fakulteta Sveučilišta u Zagrebu..

#### Protokol ispitivanja

Ispitanicima se prilazilo u čekaonici gdje su popunili prvi dio upitnika. Od ukupno njih 86 s kojima se kontaktiralo, troje su odbili sudjelovati. Zbog nepotpunih podataka moralo se isključiti 17 upitnika, pa ih je u statističku analizu bilo uključeno 66.

#### Upitnik

Upitnik je bio pripremljen prema uzoru na Corah's Dental Anxiety Scale (CDAS) objavljenu 1969. godine koju se smatra vrijednim i pouzdanim pokazateljem u kliničkim istraživanjima (5,15). Bio je podijeljen trideset trojici studenata Stomatološkoga fakulteta radi validacije. Upitnik se sastojao od dva dijela i popunjavao se prije i poslije endodontskoga zahvata. Jedan dio bio je namijenjen liječnicima dentalne medicine, a drugi pacijentima.

Upitnik za pacijenta prije endodontskoga zahvata sadržavao je pitanja o demografskim podacima (spol, dob), učestalosti odlazaka stomatologu, razinu anksioznosti te očekivanja o razini boli. Upitnikom nakon endodontskoga zahvata vrednovala se razina boli koju je pacijent doživio te njegova procjena empatije stomatologa.

Upitnik za stomatologa prije endodontskoga zahvata sadržavao je podatke o spolu, godinama rada u praksi, vrsti ordinacije (dom zdravlja, privatna ordinacija ili stomatološki fakultet) i stupnju školovanja (doktor dentalne medicine, specijalizant, stažist, student). Stomatolog je procijenio stupanj anksioznosti pacijenta te očekivani intenzitet boli. Za svakoga pacijenta upisana je dijagnoza (akutni pulpitis, kronični pulpitis, akutni periapikalni parodontitis, kronični periapikalni parodontitis, nekroza pulpe, zdrava pulpa i ostalo). Nakon endodontskoga zahvata stomatolog je ponovno procijenio jakost boli koju je pacijent osjećao tijekom zahvata. Zabilježena je i vrsta anestezije (intraglaventarna, plexus, mandibularna).

#### Statistička obrada podataka

Razina statističke značajnosti bila je određena na  $p < 0,05$  i svi intervali pouzdanosti dani su na razini od 95 posto. U svim slučajevima upotrebljavali su se dvostruki (engl. two-tail) testovi statističke značajnosti. Korišteni su egzakti i Monte Carlo testovi statističke značajnosti. Normalnost raspodjele provjeravala se Shapiro-Wilkskim testom u slučaju uzorka manjega od 30, ili Kolmogorov-Smirnovljevim testom ako je uzorak bio veći od 30. Kao mjere centralne tendencije prikazani su medijan i interkvartilni raspon u slučaju odstupanja raspodjele od normalne, ili aritmetička sredina i standardna devijacija zbog veće preciznosti i osjetljivosti ljestvice od 0 do 10. Za testiranje razlika između dviju nezavisnih skupina na kontinuiranoj numeričkoj varijabli, primjerice razlika u intenzitetu boli s obzirom na spol, bio je primijenjen Mann-Whitneyjev U-test. Za testiranje razlika između više od dviju skupina na kontinuiranoj varijabli, primjerice razlika u jakosti boli s obzirom na dijagnozu, koristili smo se Kruskal-

and they signed informed consent forms. The study was approved by the Ethics Committee of the School of Dental Medicine in Zagreb on 23<sup>rd</sup> of May 2013.

#### Testing protocol

Subjects were approached in the waiting room where they completed the first part of the questionnaire. Of the total of 86 patients who were contacted, three of them refused to participate, and 17 questionnaires had to be excluded due to the incomplete information. The statistical analysis included 66 questionnaires.

#### Questionnaire

The questionnaire was modelled on Corah's Dental Anxiety Scale (CDAS), published in 1969, which proved to be a valuable and reliable indicator in clinical trials (5, 15). It was distributed to 30 students of the School of Dental Medicine for validation. The questionnaire consisted of two parts and was filled out before and after endodontic procedures. One part was intended for dentists and the other for patients.

The questionnaire for the patients before endodontic procedures contained questions on demographics (gender, age), the frequency of dental visits, the level of anxiety and expectations about the level of pain. The questionnaire for the patient after endodontic procedures evaluated the level of pain experienced by the patient and the patient's assessment of empathy of the dentist during the treatment.

The questionnaire for the dentist before endodontic procedures contained information on gender, years of work in the dental practice, type of practice (health centre, private clinic or public dental office), education level (dentist, resident, resident or student). Dentists estimated the level of anxiety and the expected severity and the intensity of pain. The diagnosis was recorded for each patient (acute pulpitis, chronic pulpitis, acute apical periodontitis, chronic apical periodontitis, pulp necrosis, healthy pulp, etc.). After the endodontic treatment, the dentists reassessed the intensity and severity of the pain felt by the patient during surgery. The type of anaesthesia was recorded as well (intraglavement, plexus, mandibular).

#### Statistical analysis of data

The level of significance was set at  $p < 0.05$ , and all confidence intervals were given at the level of 95%. In all cases, two-tail tests of statistical significance were used. Exact Test and Monte Carlo Test of statistical significance were used. Normality of distribution was checked with the Shapiro-Wilks Test in the case of a sample of less than 30 or Kolmogorov-Smirnov test in the case of sample size larger than 30. As a measure of central tendency, the median and interquartile range in case of deviation from the normal distribution were used, or the mean and standard deviation for greater precision and sensitivity scale of 0-10. To test the difference between two independent groups for continuous numeric variables, such as differences in the intensity of pain in relation to gender, the Mann-Whitney U Test was used. To test the difference between more than two groups for continuous variables, such as differences in the intensity of pain with regard to diagnosis, the Kruskal-Wallis Test was used.

Wallisovim testom. Tijekom analize razlika između dviju zavisnih grupa na kontinuiranoj varijabli, primjerice razlika u očekivanom intenzitetu boli i stvarne boli, rabio se t-test za zavisne uzorke. Povezanost dviju numeričkih varijabli analizirana je Spearmanovim rho koeficijentom korelacije. Sve statističke obrade obavljene su u programu SPSS 17.0 (SPSS Inc., Chicago, IL, SAD).

## Rezultati

### Opis uzorka bolesnika

Raspodjela uzorka prema spolu, dobi i učestalosti posjeta stomatologu nalazi se u tablici 1.

**Tablica 1.** Pacijenti prema spolu, dobi i učestalosti posjeta stomatologu  
**Table 1** Patients by gender, age and frequency of dental visits

|   | n  | (%)     |
|---|----|---------|
| Spol pacijenta • Gender   |    |         |
| Muški • Male  | 28 | (42.4)  |
| Ženski • Female   | 38 | (57.6)  |
| Ukupno • Total  | 66 | (100.0) |
| Dob pacijenta (medijan, IQR) • Patient's age (median, IQR)  |    |         |
|   | 34 | (23-45) |
| Učestalost posjeta stomatologu • The frequency of dental visits                                   |    |         |
| - Jednom u nekoliko godina • Once in several years  | 12 | (18.2)  |
| - Jedanput na godinu • Once a year  | 16 | (24.2)  |
| - Dva puta na godinu • Twice a year   | 11 | (16.7)  |
| - Nekoliko puta na godinu • Several times a year  | 27 | (40.9)  |
| Ukupno • Total  | 66 | (100.0) |
| Posljednji posjet stomatologu radi kontrolnoga pregleda • Last visit to the dentist for check-ups |    |         |
| - U posljednjih mjesec dana • In the last 30 days   | 40 | (60.6)  |
| - U posljednjih 6 mjeseci • In the last 6 months  | 11 | (16.7)  |
| - U posljednjih godinu dana • In a last year  | 8  | (12.1)  |
| - U posljednjih 5 godina • In the last 5 years  | 3  | (4.5)   |
| - Prije više od 5 godina  | 3  | (4.5)   |
| - Nikad   | 1  | (1.5)   |
| Ukupno • Total  | 66 | (100.0) |

### Pacijenti prema dijagnozi i vrsti anestezije

S obzirom na postavljenu dijagnozu trinaestero (19,7 %) pacijenata imalo je akutni pulpitis, osmero (12,1 %) kronični pulpitis, dvoje (3,0 %) akutni periapikalni parodontitis, petnaestero (22,7 %) kronični periapikalni parodontitis, sedamnaestero (25,8) nekrozu pulpe i jedanaestero (16,7 %) pacijenata imalo je druge dijagnoze.

Prema vrsti anestezije, osamnaestero (27,3 %) pacijenata primilo je pleksusnu anesteziju, dvoje (3,0 %) intraligamentarnu i dvoje (3,0 %) provodnu. Najvećem broju pacijenata, njima četrdeset četvero (66,7 %), zahvat se obavljao bez anestezije.

Broj stomatologa prema spolu, godinama prakse, vrsti ordinacije u kojoj je obavljen zahvat i stupnju akademskoga obrazovanja

S obzirom na spol, dvadeset jedan (32,3 %) stomatolog bio je muškarac, a četrdeset četiri (67,7 %) žene. Prosječna duljina trajanja prakse bila je tri godine, što je povezano s činjenicom da su zahvate u najvećem postotku obavljali stu-

When analysing the difference between the two dependent groups on continuous variables, such as differences in the expected intensity of pain and actual experienced pain, the t-test for paired samples was used. Correlation between two numerical variables was analysed using Spearman's Rho correlation coefficient. All statistical analyses were performed in SPSS 17.0 (SPSS Inc., Chicago, IL, USA).

## Results

### Description of the sample of patients

Distribution of the sample by gender, age and frequency of dental visits is shown in Table 1.

### Classifying patients according to diagnosis and type of anaesthesia

According to the diagnosis, 13 (19.7%) patients had acute pulpitis, 8 (12.1%) chronic pulpitis, 2 (3.0%), acute apical periodontitis, 15 (22.7%), chronic apical periodontitis, 17 (25.8) pulp necrosis, and 11 (16.7%) patients had other diagnoses.

According to the type of anaesthesia given, 18 (27.3%) of patients received plexus anaesthesia, 2 of them (3.0%) intraligamentary and 2 (3.0%) block anaesthesia. In the majority of patients, 44 (66.7%), the procedure was performed without anaesthesia.

Number of dentists by gender, length of practice, type of practice in which the procedure was performed and the level of academic education

With regard to gender, 21 (32.3%) dentists were male, and 44 (67.7%) female. The average length of practice was 3 years, which is connected with the fact that the procedures were performed by students in the highest percentage

denti [52 (78,8 %)]. Ostalo su bili doktori dentalne medicine – njih devet (13,6 %), specijalizanti – troje (4,5 %), te po jedan stažist i profesor.

#### Ljestvica dentalne anksioznosti

Izvorni rezultati ovoga istraživanja, prema ljestvici dentalne anksioznosti, prikazani su u tablici 2.

- 52 (78.8%). Others were performed by general dentists - 9 (13.6%), residents - 3 (4.5%), one by an intern and one by a professor.

#### Dental Anxiety Scale

Original results of this study, according to dental anxiety scale are shown in Table 2.

**Tablica 2.** Rezultati ljestvice dentalne anksioznosti  
**Table 2** Results of Dental Anxiety Scale

|   | Opušteno • Relaxed |      | Malo nelagodno • A little uncomfortable |      | Napeto • Tight |      | Vrlo napeto i anksiozno • Very tense and anxious |     | Izrazito napeto i anksiozno • Extremely tense and anxious |     | Ukupno • Total |     |
|---|--------------------|------|---|------|----------------|------|--|-----|---|-----|----------------|-----|
|   | n                  | %    | n                                       | %    | n              | %    | n  | %   | n   | %   | n              | %   |
| Kako ste se osjećali jučer znajući da danas trebate ići stomatologu? • How did you feel yesterday, when you knew you have to go to the dentist the next day?  | 39                 | 57.6 | 16                                      | 14.2 | 8              | 12.1 | 2  | 3.0 | 2   | 3.0 | 66             | 100 |
| Kako se osjećate sada kada čekate svoj red u stomatološkoj čekaonici? • How do you feel now when you are waiting for your turn in the waiting room at the dentist?  | 39                 | 59.1 | 19                                      | 28.8 | 4              | 6.1  | 1  | 1.5 | 3   | 4.5 | 66             | 100 |
| Što mislite, kako ćete se osjećati dok budete sjedili u stomatološkom stolcu čekajući da stomatolog pripremi instrumente za rad? • What do you think you will feel while sitting in the dental chair and waiting for the dentist to prepare the instruments for work? | 31                 | 47.0 | 22                                      | 33.3 | 9              | 13.6 | 3  | 4.5 | 1   | 1.5 | 66             | 100 |

Razlika u intenzitetu boli tijekom zahvata s obzirom na spol pacijenta i stomatologa, dijagnozu, vrstu anestezije, bol, prethodnu bol i učestalost posjeta stomatologu

Nije utvrđena statistički značajna razlika u intenzitetu osjećaja boli tijekom zahvata s obzirom na spol pacijenta, dijagnozu, anesteziju, prethodnu bol, učestalost posjeta stomatologu te spol stomatologa. Također nije pronađena statistički značajna povezanost jakosti osjećaja boli s dobi pacijenta (Spearmanov rho = -0,172; P = 0,172), ni s duljinom radnog iskustva stomatologa (Spearmanov rho = 0,123; P = 0,324).

#### Povezanost boli pacijenta s ponašanjem stomatologa

Nije utvrđena statistički značajna razlika u intenzitetu boli s obzirom na ophođenje stomatologa prema pacijentu.

Utvrđena je statistički značajna korelacija između pacijentove procjene nježnosti stomatologa i procjene intenziteta boli tijekom zahvata (Spearmanov rho = -0,500; P < 0,001). Korelacija je negativna, što upućuje na to da, što je veća pacijentova procjena nježnosti stomatologa, to je manja procjena intenziteta boli.

#### Očekivana i stvarna bol

Utvrđena je statistički značajna razlika u očekivanom intenzitetu boli pacijenata i one stvarne tijekom zahvata (t-test = 3,540; P = 0,001). Pacijentova očekivanja jakosti boli bila su veća negoli je bila stvarna bol koju su osjećali tijekom zahvata.

The difference in the intensity of pain during the procedure with regard to gender of patient and dentist, diagnosis, type of anaesthesia given, previous pain, frequency of dental visits

There was no statistically significant difference in the intensity of pain during the procedure with regard to gender, diagnosis, anaesthesia, pain experienced earlier, the frequency of dental visits and gender of dentists. Also, there was no statistically significant correlation between the intensity of pain with patient's age (Spearman Rho = -0.172, P = 0.172), as well as the length of dentist's practice (Spearman Rho = 0.123, P = 0.324).

#### Correlation of patient's pain with dentist's behaviour

There was no statistically significant difference in the intensity of pain with regard to behaviour of dentists towards patients.

There was a statistically significant correlation between patients' assessments of dentist's tenderness and estimated intensity of pain during the procedure (Spearman Rho = -0.500, P < 0.001). The correlation is negative, which indicates that when the patient's assessment of dentist's tenderness is higher, the estimated intensity of pain is lower.

#### Expected and actual pain

There were significant differences in the intensity of expected pain and the actual pain during the procedure (t-test = 3.540, P = 0.001). Patients' expectations of pain intensity were higher than the intensity of actual pain they felt during the procedure.



Daljnjom analizom provjereno je postoji li razlika u očekivanom intenzitetu boli i stvarnom intenzitetu boli s obzirom na spol i dob pacijenta, učestalost posjeta stomatologu, bol posljednjih tjedan dana, spol stomatologa i duljinu njegove prakse. Nije pronađena ni jedna statistički značajna interakcija razlike očekivane i stvarne boli s navedenim parametrima.

Nije utvrđena statistički značajna razlika u boli koju je očekivao stomatolog prije zahvata i u percepciji boli tijekom zahvata.

#### Povezanost dentalne anksioznosti s očekivanom i stvarnom boli

Utvrđena je statistički značajna povezanost ukupne razine anksioznosti i očekivanoga intenziteta boli (Spearmanov  $\rho = 0,401$ ;  $P = 0,001$ ). Korelacija je pozitivna, što upućuje na to da s porastom anksioznosti raste i očekivana jakost boli. Ukupna dentalna anksioznost nije se pokazala statistički značajno povezana sa stvarnim intenzitetom boli (Spearmanov  $\rho = 0,080$ ;  $P = 0,524$ ).

#### Razlika u boli pacijenta i u percepciji boli stomatologa

Nije utvrđena statistički značajna razlika između pacijentove očekivane boli i boli koju je tijekom zahvata očekivao stomatolog. Nije utvrđena ni statistički značajna razlika u stvarnoj boli pacijenta i percepciji koju je o boli imao stomatolog, što upućuje na to koliko stomatolozi dobro procjenjuju intenzitet pacijentove boli. Iako je srednja vrijednost očekivane boli pacijentata nešto viša nego što je srednja vrijednost boli koju je očekivao stomatolog, razlika nije bila dovoljno velika da bi se pokazala statistički značajnom (slika 1).

#### Povezanost pacijentove razine anksioznosti i stomatologove procjene razine ustrašenosti pacijenta

Utvrđena je statistički značajna povezanost pacijentove razine anksioznosti i stomatologove procjene razine ustrašenosti, straha pacijenta s obzirom na ukupnu anksioznost (Spearmanov  $\rho = 0,460$ ;  $P < 0,001$ ) te na sve tri čestice ljestvice dentalne anksioznosti. Najveća povezanost stomatologove procjene o anksioznosti utvrđena je u rečenici: *Što procjenjujete, kako ćete se osjećati dok budete sjedili u stomatološkom stolcu čekajući da liječnik pripremi instrumente za rad?* (Spearman  $\rho = 0,480$ ;  $P < 0,001$ ).

There was no statistically significant difference in the expected intensity of the pain and the actual intensity with regard to patient's gender, patient's age, the frequency of dental visits, the pain in the past week, gender of dentist and length of dental practice.

There was no statistically significant difference in the pain that the dentist expected before the treatment and the perception of pain during the procedure.

#### Relationship between dental anxiety with the expected and actual pain

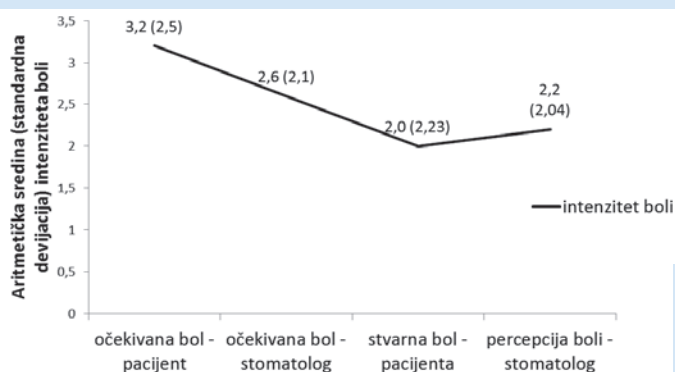
There was a statistically significant correlation between the overall level of anxiety and expected pain intensity (Spearman  $Rho = 0.401$ ,  $P = 0.001$ ). The correlation was positive, which indicates that the increase in anxiety increases the expected intensity of the pain. Dental anxiety in total was not statistically significantly associated with the actual intensity of pain (Spearman  $Rho = 0.080$ ,  $P = 0.524$ ).

#### The difference in the patients' pain and pain perception of dentists

There was no statistically significant difference between the patient's expected pain and the dentist's assessment of the patient's expected pain. Also, there was no statistically significant difference in the actual patient's pain and dentist's perception of the actual pain, which indicates how well dentists assess the intensity of patient's pain. Although the mean value of the expected patient's pain is higher than the mean value of the dentist's expected pain, the difference was not great enough to be statistically significant (Figure 1).

#### Correlation between the patient's level of anxiety and the dentist's assessment of the level of anxiety

There was a statistically significant correlation between the patient's level of anxiety and dentist's assessment of the level of anxiety, considering both the overall anxiety (Spearman  $Rho = 0.460$ ,  $P < 0.001$ ), and with respect to all three particles of the dental anxiety scale. Maximum correlation between dentist's assessment of patient's anxiety and patient's own assessment was assessed by the following particle "What do you think you will feel while sitting in the dental chair and waiting for the dentist to prepare the instruments for work?" (Spearman  $Rho = 0.480$ ,  $P < 0.001$ ).



**Slika 1.** Razlike u očekivanom intenzitetu boli pacijenta i stomatologa; stvarna bol pacijenta i stomatologova percepcija boli

**Figure 1** Differences in the intensity of pain that the patient and dentist expected, actual patient's pain and dentist's perception of pain

## Rasprava

Protetkih desetljeća u dentalnoj medicini ostvaren je velik napredak u razvoju tehnologije, materijala i nadzoru nad infekcijom, što je rezultiralo porastom svijesti o oralnom zdravlju. No dentalna anksioznost ostala je problem mnogih pacijenata (6). Uspješno obavljanje endodontskoga zahvata pacijentima s visokom razinom anksioznosti i straha velik je problem u svakodnevnoj stomatološkoj praksi (16,17). U ranijim istraživanjima dokazana je uska povezanost između razine boli i dentalne anksioznosti (13,18), što je potvrđeno i u ovom radu. Radi lakšeg prepoznavanja takvoga stanja, a time i boljega odnosa te uspješnijeg obavljanja terapije, opisani su modeli ponašanja i karakteristike anksioznoga pacijenta (7, 15). To se ponajprije odnosi na otežanu komunikaciju, produženu terapiju zbog izbjegavanja dogovorenih termina i čestu postoperativnu bol (19). Kod takvih pacijenata ustanovljen je i loš oralni status te nezadovoljstvo estetskim izgledom zuba (što rezultira manjkom samopouzdanja, a time i većom anksioznošću), obrambeno stajalište prema doktoru dentalne medicine, nezadovoljstvo i kritika zahvata, plač, agresivno ponašanje, poremećaji sna i prehrane te uzimanje raznih lijekova (16). Dokazano je također da demografski pokazatelji imaju određenu ulogu u nastanku dentalne anksioznosti. Prosječno jedna od šest odraslih osoba pati od različitih oblika straha i anksioznosti (16). Općenito se može reći da razina ustrašenosti opada s dobi. Najveća je kod adolescenata, što je uglavnom rezultat pogrešne predodžbe o dentalnoj medicini, a nastaje zbog vlastitih loših iskustava u djetinjstvu te pod utjecajem negativnoga stajališta roditelja, prijatelja i medija (14). Mlađi pacijenti također su rjeđe zadovoljni obavljenim zahvatom (20). Istraživanja su pokazala da je prosječna dob, i za žene i za muškarce, u kojoj počinje redukcija straha 40 godina (21). To se može objasniti povećanom tolerancijom zbog sve češćega i duljega izlaganja stresnim situacijama te životnim iskustvom koje oblikuje bihevioralne karakteristike pojedinca (15). Pronađene su razlike i s obzirom na spol koje pokazuju da je najveća prevalencija anksioznosti među ženama između 26 i 35 godina, iako su u toj populaciji uočeni češći posjeti doktoru dentalne medicine (5, 16, 20). U ovom istraživanju uočen je također povećani bruto *skor* ukupne anksioznosti kod žena, iako nije pronađena statistički značajna razlika. Istraživanje koje se bavilo upravo dentalnim strahom kod žena pokazalo je povećanje srčane frekvencije čak 24 sata prije dogovorenoga termina. Ova skupina imala je prividno manji broj ispuna (zbog manjega broja zuba) i veću učestalost karijesa u odnosu na žene bez dentalnoga straha (12). Učestalost odlaska stomatologu bitno je manja kod anksioznih pacijenata. Osim toga, skloni su izgovorima radi izbjegavanja dogovorenog termina (5,12).

To je dokazano i u ovom istraživanju u kojemu su veću anksioznost pokazali pacijenti koji odlaze liječniku dentalne medicine jedanput u nekoliko godina u odnosu na one koji ga posjećuju jedanput na godinu. Vrijeme provedeno u čekaonici proporcionalno povećava razinu ustrašenosti, straha pa se stresni odgovor pojedinca očituje u znatnom porastu krvnoga tlaka i koncentraciji kortizola. Prije zahvata kod

## Discussion

over the past decade, dentistry has made great progress in the development of technology, materials and infection control, which led to an increase in awareness of oral health. However, dental anxiety remained a problem for many patients (6). Successful implementation of endodontic treatment in patients with high levels of anxiety and fear is a significant problem in everyday dental practice (16,17). Earlier studies have demonstrated a close correlation between the level of pain and dental anxiety (13,18) which was confirmed in this study. In order to facilitate recognition of such state, and thus establish better relations and more efficient methods of therapy, behaviour patterns and characteristics of anxious patients were described (7,15). This primarily refers to the difficulty in communication, prolonged therapy to avoid appointments and occurrence of postoperative pain (19). Poor oral health status and dissatisfaction with the aesthetic appearance of teeth (which leads to a lack of confidence, and thus more anxiety), defensive attitude towards the dentist, discontent and criticism of the intervention provided, crying, aggressive behaviour, sleep and eating disorders, and taking various drugs were also established in those patients (16). It has been shown that the demographic indicators have a role in the development of dental anxiety. On average, one out of six adults suffers from various forms of fear and anxiety (16). Generally, it can be said that the level of anxiety decreases with age. It is greatest in adolescents, in most cases it is the result of distorted views of dentistry due to their own bad experiences in childhood and influences of the negative attitude of parents, friends and the media (14). Also, younger patients show the least satisfaction with the provided procedure (20). Studies have shown that the average age at which reduction of fear begins is 40 years for both men and women (21). This may be explained by the increased tolerance of frequent exposure to stressful situations over a prolonged period, and life experience that shapes the behavioural characteristics of the individual (15). There were differences with regard to gender which suggest that the highest prevalence of anxiety is among women between 26 and 35 years of age, although in this population frequent dental visits were observed (5,16,20). This study also observed an increased total score of anxiety in women, although there was no statistically significant difference. Research that specifically deals with dental fear in women showed an increase in heart rate up to 24 hours in advance. Also, this group showed a seemingly small number of fillings (because of the smaller number of teeth) and a higher incidence of caries compared to women without dental fear (12). The frequency of dental visits is significantly reduced in anxious patients. In addition, they tend to use subterfuges to avoid the scheduled date (5, 12). This has also been proven in our study, in which it was shown that patients who visit the dentist once every few years were more anxious compared to those who visit it annually. Time spent in the waiting room is a factor which proportionally increases the level of anxiety and stress response of individuals who manifested

anksioznih pacijenata uočeno je povećanje krvnoga tlaka, a srčana frekvencija bila im je povećana za prosječno četiri otkucaja po minuti (16, 22, 23, 24). Nakon što sjedne na stomatološki stolac, pacijent je izvrgnut novim *okidačima* straha. Oni se mogu sustavno prikazati u engleskome kao *pravilo 4 S*, a svrha mu je skretanje pozornosti stomatologa pri radu (16). To su:

- *sights* - vizualni doživljaj (igle, brusna sredstva)
- *sounds* – zvukovi (mikromotor, turbina)
- *sensations* – osjeti (vibracije)
- *smells* – mirisi (različiti stomatološki materijali)

Ovo istraživanje dokazalo je statistički značajnu povezanost između pacijentove razine anksioznosti i kako je prepoznaje stomatolog. Najveća povezanost stomatologove procjene anksioznosti utvrđena je pitanjem: *Što procjenjujete, kako ćete se osjećati dok budete sjedili u stomatološkom stolcu čekajući da liječnik pripremi instrumente za rad?*

No, ne treba zanemariti ni razinu stomatologova stresa. U jednom istraživanju ustanovljena je povišena srčana frekvencija i krvni tlak kod stomatologa koji je obavljao zahvat anksioznim pacijentima (5). Negativna povratna informacija uzrokuje napetost kako pacijentu, tako i stomatologu.

Učinkovitost obavljanja bilo kojega složenoga zahvata u stresnim je okolnostima smanjena. Zbog složenosti endodontskoga zahvata vrlo je vjerojatno da će razina stresa koju odašilje pacijent utjecati na kvalitetu rada stomatologa (3). Ključni čimbenici koji potiču ugodno okruženje jesu prevencija boli, pozitivna interakcija, riječi ohrabrenja i osjećaj kontrole nad situacijom (25).

Što se tiče preferencija pacijenata s obzirom na spol stomatologa, istraživanja su pokazala da nema razlike u izvještajima o boli, unatoč stereotipnom mišljenju da su žene nježnije i suosjećajnije. To potvrđuje i ovo istraživanje. Osobnost i vještina liječnika pokazala se važnijim čimbenikom od spola (9, 20). Zanimljivo je da su pacijenti izvijestili o manjem doživljaju boli kad su zahvate obavljali studenti stomatologije. U istraživanju u kojem se uspoređivalo zadovoljstvo pacijenata tretmanom s obzirom na vrstu ordinacije, privatne su prakse bile bolje ocijenjene od javne službe (20). Posljednje dvije teze nisu se mogle usporediti u ovom istraživanju jer su zahvate većinom obavljali studenti – njih 52 (78,8 %) na Stomatološkom fakultetu Sveučilišta u Zagrebu.

Unatoč razmjerno čestoj pojavi dentalne anksioznosti, iznenađuje da doktori dentalne medicine nemaju dovoljno ni razumijevanja ni znanja o psihološkom pristupu koji bi smanjio strah (5). Ne tako davno stomatolozi su si mogli priuštiti ignoriranje toga problema i takvi su im pacijenti bili samo otežavajuća okolnost u radu. Danas, zbog zakonske regulative te opasnosti od tužbi, moraju posvetiti posebnu pozornost anksioznim pacijentima i razviti tehnike komunikacije (26).

Mnoge studije o boli u endodontiji pokušale su povezati postoperativnu bol s čimbenicima kao što su jednoposjetna endodoncija, različiti materijali za punjenje korijenskoga kanala, različiti načini obavljanja zahvata, upotreba analgetika, anestezika, antibiotika te predoperativna bol. No relativno se malo istraživanja izravno usredotočilo na iskustvo pacijenata (2).

a significant increase in blood pressure and cortisol. Before the procedure anxious patients show an increase in blood pressure, heart rate being increased by an average of 4 beats per minute (16,22-24). Once he/she sits in the dental chair, the patient is exposed to new triggers of fear. They can be systematically displayed as “4S rule”, and have to draw attention of the dentist during the operation (16). These are:

- *Sights* - visual experience (needles)
- *Sounds* - Sounds (micromotor, turbine)
- *Sensations* - feel (vibration)
- *Smells* - smells (different dental materials)

This study showed a statistically significant correlation between the patient's level of anxiety and the dentist's recognition of the same. The largest correlation of dentist's assessment of anxiety was estimated by the question “What do you think you will feel while sitting in the dental chair and waiting for the dentist to prepare the instruments for work?”

However, one should not ignore the stress level of the dentist. One study found a higher heart rate and blood pressure of the dentist who conducted the procedure on anxious patients (5). Negative feedback causes tense situations for both the patient and the dentist.

The success in performance of any complex procedure is reduced under stress. Due to the complexity of endodontic treatment, it is likely that the level of stress that the patient transmits reflects on the quality of the dentist's performance (3). Key factors that lead to a pleasant environment are pain prevention, positive interaction, words of encouragement and a sense of control over the situation (25).

As for the preference of patients with respect to the gender of the dentist, studies have shown no difference in reports of pain, despite the stereotypes about women who are gentle and compassionate. This has been confirmed by our study. Personality and skills of the dentist proved to be more important factors than gender (9,20). Interestingly, the patients reported experiencing less pain when procedures were performed by dental students. In a study in which the patients' satisfaction with the treatment was compared with regard to the type of clinics they were treated in private practices overcame public services (20). The last two hypotheses could not be compared in this study because the majority of procedures were performed by students, 52 (78.8%) at the School of Dental Medicine, University of Zagreb.

Despite the relatively common occurrence of dental anxiety, it is surprising that dentists show a lack of understanding and lack of knowledge about the psychological approach that would lead to a reduction of fear (5). Not so long ago, dentists could afford to ignore this problem and these patients represented only an aggravating circumstance of the work. Today, due to legal regulation and the threat of lawsuits, dentists must pay particular attention to anxious patients and develop communication techniques with patients (26).

Many earlier studies on pain in endodontics have tried to correlate with postoperative pain factors such as one-visit endodontic treatment, various materials for filling the root canal, different ways of performing the procedure, the use of analgesics, anaesthetics, antibiotics, and preoperative pain.



Svijest doktora dentalne medicine o anksioznim pacijentima nužna je radi uspostave dobre komunikacije i pravilnoga psihološkog pristupa. Osim mnogih upitnika i ljestvica za procjenu boli, stomatolog može prepoznati takvoga pacijenta prema navedenim karakteristikama ili jednostavnim pitanjem kako se osjeća. Ako nema anksioznosti, ovo pitanje neće je potaknuti (7,27). Viša razina kontrole boli zahtijeva psihološki pristup, a najuspješnije su bihevioralna terapija i hipnoterapija nakon kojih su pacijenti pokazali statistički značajnu redukciju straha mjerenu ljestvicom Dental Anxiety Scale (DAS). No te metode zahtijevaju sustavnu posvećenost i brigu o pacijentu, a to je upitno u svakodnevnom radu (28). Buduća istraživanja trebala bi se usmjeriti na metode optimalnog pristupa anksioznom pacijentu i individualnim načinima u redukciji boli. To u prvom redu obuhvaća edukaciju stomatologa i širenje profesije izvan znanosti i kliničkoga rada.

### Zaključak

Kako bi se ublažio strah i dobili što točniji podatci o glavnim teškoćama te održala suradnja s pacijentom tijekom liječenja, kliničar bi trebao uspostaviti i održavati nadzor nad situacijom, postići povjerenje pacijenta, privući njegovu pozornost i simpatiju te se prema njemu odnositi s punim poštovanjem. Budući da je razina dentalne anksioznosti povezana s povećanim intenzitetom očekivane boli, začarani krug boli i straha može biti prekinut davanjem pozitivnih informacija pacijentu prije endodontskoga zahvata i tijekom tretmana. Pacijent će tako svoja predviđanja temeljiti na stvarnim činjenicama i postat će svjestan učinkovitih metoda kontrole boli te da bol u endodonciji nije neizbježna. Upravljanje tim komponentama značajno smanjuje percepciju boli i podiže prag reakcije te tako olakšava postupak.

### Sukob interesa

Ne postoji.

However, few researches have been directly focused on the experience of patients (2).

Dentists' awareness about anxious patients is essential for establishing good communication and proper psychological approach. Apart from various questionnaires and scales to assess pain, the dentist can identify such patients by already mentioned characteristics or simple question of how the patient feels. If there is no anxiety, this issue will not cause it (7,27). Psychological approaches such as behavioural therapy and hypnotherapy represent a higher level of pain control, after which the patients showed a statistically significant reduction of fear, measured with Dental Anxiety Scale (DAS). However, these methods require care and a systematic commitment to the patient, factors the implementation of which is questionable in dentists' daily work (28). Future research should be focused on finding the optimal method of accessing patient anxiety and individual ways of reducing pain. This primarily involves educating dentists and expanding profession beyond science and clinical work.

### Conclusion

In order to reduce fear and get the most accurate information about main difficulties and maintain cooperation with the patient during treatment, the clinician should establish and maintain control of the situation, gain the confidence of the patient, get his attention and sympathy, and treat the patient with respect. Since the level of dental anxiety is associated with increased intensity of expected pain, a vicious cycle of pain and anxiety may be terminated by giving positive information to the patient before and during endodontic procedures. The patients will base their predictions on actual facts and will become aware that there are effective methods of pain control and that pain in endodontics is not inevitable. Managing these components can significantly reduce the perception of pain and raise the threshold of reactions, thus facilitating the process.

### Conflict of interest

None declared.

**Abstract**

**Objectives:** to compare the level of anxiety reported by patients and assessed by dentists. Also, the expected and actual pain during the treatment perceived by the patient and dentist were assessed. **Methods:** sixty six endodontic patients filled in two questionnaires, prior to and after the treatment, so did their therapists. The first set of questions for patients was regarding demographics, the frequency of dental visits, the level of anxiety and expectations about the level of pain. Before the treatment, dentists estimated the level of patients' anxiety and the expected intensity of pain. After the treatment, the patients evaluated the level of experienced pain and dentists' empathy during the treatment, while dentists reassessed the intensity of patients' pain. The data were statistically analysed by t-test for paired samples and by Spearman's Rho correlation coefficient at level of significance set at 0.05. **Results:** Patients' expectation of pain intensity was higher than the actual pain during the treatment ( $t\text{-test}=3.540$ ,  $p=0.001$ ). There was no difference in the level of pain which dentists expected and their perception of pain during the procedure. There was a statistically significant correlation between the patients' level of anxiety and recognition of it by dentists (Spearman  $Rho=0.460$ ,  $p<0.001$ ). A higher level of anxiety increased the expected intensity of pain (Spearman  $Rho=0.401$ ,  $p=0.001$ ). Actual intensity of pain was not significantly associated with dental anxiety (Spearman  $Rho=0.080$ ,  $p=0.524$ ). **Conclusion:** Since the level of dental anxiety was associated with the increased intensity of expected pain, a vicious cycle of pain and anxiety may be terminated by giving positive information to the patient before and during endodontic procedures.

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**Key words**

Dental Anxiety; Pain; Endodontics

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