

**REASONS, PREVENTION AND TREATMENT
POSSIBILITIES OF DENTAL FEAR WITH SPECIAL REGARDS TO
THE ORTHODONTIC AND PEDODONTIC PRACTICE**

DOCTORAL THESIS

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INTRODUCTION

Fear can be seen as an alarm reaction with concrete reason in general. Accordingly, *dental fear* is an alarm reaction induced by dental treatment in the patient. The level of dental fear varies in a wide range. There is low intensity dental fear without any significant changes of dentistry related behavior called *simple dental fear*. There are also more severe fear reactions with consequent changes of dental behavior. Those cases in which behavioral changes are roughly limited to the treatment (i.e. "ask for brake", "defense") and the patient at least rarely visits dentist can be classified as *high dental fear*. In those cases in which the behavioral changes leads to avoidance of dental care because of extreme high level of dental fear we can speak about *dental phobia*. In more severe cases such phobic reaction may result in *phobic attack* or *panic attack* as well. (However these attacks are differing from *panic disorder*, which is a disease of *spontaneous* and *recurrent* panic attacks of unknown concrete reasons.) The most frequent types of dental fear in the clinical practice are simple dental fear and high dental fear. The recognition of latter types of fear is based on the patient's report, and the discrimination from other forms of fear.

There are numerous aspects of the background of dental fear. The phenomenon may develop on the basis of anxiety, although it should be noted that dental fear is rather independent from anxiety. The possible role of gender differences was also considered, however data in the literature are contradictory: woman scores higher in numerous studies, but other ones did not find significant differences related to gender. Data of age related differences are also not clear in case of adults; however there is a decreasing tendency with age in children. There is also some influence of marital and social status on dental fear. Dental fear level of the mother is also an important factor of the children's dental fear. It is not clear yet whether there is an influence of children's general behavior and school achievement on dental fear scores or not. Further, *highly important factors* are compromised dental status, previous painful dental experience, mistakes of dentist's behavior, unnecessary and/or defective dental treatment, time pressure of dental treatment, and negative expectations of the surrounding people (relatives, friends).

High dental fear is a rather frequent phenomenon. Data in the literature indicate an incidence of ca. 5-15% in the Western-European and North-American communities, although in some studies there were even higher proportions found. Considering that dental fear is rather unpleasant, the importance of the dental fear problem is clear. Especially because in spite of

impressive technical-methodological progress in dentistry, dental fear scores show an increasing tendency worldwide.

High dental fear resulted in significantly worse dental status. In a Swedish study of 1423 participants the number of removed and decayed teeth was significantly higher and the periodontal status was significantly worse in case of patients with high dental fear as compared to other patients. There is a high number of teeth decayed to the level of marginal gingiva and also untreated periapical lesions (three and four respectively). Oral hygiene was also reported much worse (with thick plaque accumulation on *all* of the teeth in half of the cases). There is also significantly higher level of periodontal attachment-loss with an *average* value of at least 1/3 of the length of the roots. Long lasting avoidance of dental care is also rather pronounced (70% \geq 10 yrs; 30% \geq 20 yrs). It should also be considered that, fearful dental treatments also frequently destroy patient-dentist relationship in a long run.

Because of above, prevention of dental fear is a highly important matter for the dentists. Careful management of the patients, pain free treatment, and skilled communication are the most important possibilities of *primary prevention*. Although prevention targets primarily children, but adult populations should also be targeted to change the dentistry related attitude of the children's surrounding adults. Although patient management is the basis of the prevention, more specific methods including relaxation, relaxing hypnosis, biofeedback, and pharmacological interventions (etc.) may also be used for preventive purposes. Early diagnosis of sensitive children and the isolated treatment of them as well as of those with high dental fear is also an important aspect for *secondary prevention*. The reconstruction of the oral hygiene and the health-oriented behavior of high dental fear patients are also highly important in *tertiary prevention*.

In case of therapy reaching of exact diagnosis is the first step. In the differential diagnosis non-dental phobia, panic disorder, somatic indispositions (i.e. collapse, hypoglycemia, seizure disorder etc.), and allergy against local anesthetics (or other material) should be excluded. The level of dental fear can be evaluated by fear surveys. The recognition of concrete reasons of the dental fear based on the anamnesis is also crucial, to avoid repetition of traumatizing stimuli. Methods of psychotherapy including *client centered* attitude of the dentist, and several methods of *behavior- and cognitive therapy* should also be used. Other methods like relaxation, hypnotherapy, biofeedback and pharmacological therapy (including the combination of them) may also be used in more severe cases.

AIMS

Present doctoral thesis is based on a series of studies of the last 10 years with certain aim of each study carried through in team work. Some of the studies were aimed to collect dental fear epidemiological data of the Hungarian population. Others were aimed to recognize the reasons behind high dental fear of the Hungarian Population. There were also studies with the aim to recognize possible deeper psychological background of dental fear. Further, there was also a study to evaluate the efficiency of hypnotherapy in the immediate treatment of dental phobic patient. The short summaries of the aims of each study are as follows:

Introduction of the Hungarian version of Dental Anxiety Scale

The aim of this study was to translate into Hungarian and to introduce the Dental Anxiety Scale (DAS), and to collect the first epidemiological data related to dental fear in Hungarian population.

Introduction of the Hungarian version of Dental Fear Survey

The aim of this study was similar to previous one: to translate into Hungarian and to introduce the Dental Fear Survey (DFS), and to collect the first epidemiological data related to dental fear in Hungarian population.

Dental fear epidemiology of adults and grammar school children

The aim of this study was to analyze the influence of gender, age, marital status, and level of anxiety on dental fear with mathematical statistical analysis of the previously collected data.

Detailed analysis of the Dental Fear Survey scores

This study was based on the previous one, but this was aimed to analyze the Dental Fear Survey scores more detailed. In this case not only mean scores, but all of each item scores were analyzed to see whether the structure of dental fear of Hungarians shows phobic-like pattern in a "society level" or not.

Dental fear epidemiology of primary school children

The aim of this study was to collect data from the Hungarian primary school children population (aged 8-15 yrs.).

Article in English not related to thesis

1. Gábris K., Fábián G., jr. Kaán M., Rózsa N., Tarján I.: Prevalence of hypodontia and hyperdontia in paedodontic and orthodontic patients in Budapest. *Community Dental Health* 2006; 23: 80-82.

Articles in Hungarian not related to thesis

1. Juhász G., Nagy I., Fábián G.: Teleröntgenértékelés Ricketts és Hasund szerint. *Fogorvosi Szemle* 1990; 83: 363-365.
2. Fábián G., Dénes Zs., Gábris K.: A tejmolárisok korai elvesztésének következményei és a helyfenntartók alkalmazásának lehetőségei. *Fogorvosi Szemle* 1996; 89: 253-263.
3. Dénes Zs., Fábián G., ifj. Kaán M.: Az első maradó moláris elvesztésének következményei. *Fogorvosi Szemle* 1996; 89: 325-331.
4. Razouk G., Fábián G.: Szekeletális anomália kezelése orthodontiai módszerrel. *Magyar Fogorvos* 1999; 9: 278-279.
5. Gábris K., Tarján I., Fábián G., Kaán M., Szakály T., Orosz M.: A maradó számfeletti fogak előfordulási gyakorisága és kezelésük lehetőségei. *Fogorvosi Szemle* 2001; 94: 53-57.
6. Rózsa N., Fábián G., Szádeczky B., ifj. Kaán M., Gábris K., Tarján I.: Retineált felső maradó szemfogak előfordulási gyakorisága és a kezelés lehetőségei 11-18 éves orthodontiai betegeken. *Fogorvosi Szemle* 2003; 96: 65-69.

6. Kaán B., Gáspár J., Fábián G., Fejérdy L., Tóth Zs., Fábián T.K.: A "Fogászati félelem kérdőív" ("Dental Fear Survey") statisztikai elemzése különböző mintacsoporthoz. *Fogorvosi Szemle* 2003; 96: 81-85.
7. Fábián G., Fejérdy L., Fábián Cs., Kaán B., Gáspár J., Fábián T.K.: Fogászati kezeléstől való félelem epidemiológiai vizsgálata általános iskolás (8-15 éves) korcsoportban. *Fogorvosi Szemle* 2003; 96: 129-133.
8. Fejérdy L., Fábián Cs., Kaán B., Fábián G., Gáspár J., Fábián T.K.: Epidemiológiai adatok néhány hazai szubpopuláció fogászati kezeléssel kapcsolatos félelmeiről. *Fogorvosi Szemle* 2003; 96: 277-281.
9. Fábián G., Fejérdy L., Kaán B., Fábián Cs., Tóth Zs., Fábián T.K.: Adatok általános iskolás(8-15 éves) gyermekek fogászati kezeléssel kapcsolatos félelmeinek háttéréről. *Fogorvosi Szemle* 2004; 97: 128-132.
10. Fejérdy L., Kaán B., Fábián G., Tóth Zs., Fábián T.K.: Adatok budapesti középiskolások fogászati kezeléssel kapcsolatos félelmeinek háttéréről. *Fogorvosi Szemle* 2005; 98: 9-13.
11. Fábián G., Bálint M., Fábián T.K.: Pszichológia és pszichoszomatika a fogszabályozásban. Irodalmi összefoglaló. *Fogorvosi Szemle* 2005; 98: 113-119.
12. Markovics E., Markovics P., Fábián G., Vértes G., Fábián T.K., Fejérdy P.: Adatok a határon túli magyarság fogászati félelem értékeiről 12-19 éves korcsoportban. *Fogorvosi Szemle* 2005; 98: 165-169.
13. Kaán B., Fejérdy L., Tóth Zs., Fábián G., Korchmáros R., Fábián T.K.: Fogakkal kapcsolatos történetek szótani alap-paramétereinek vizsgálata általános iskolás (8-15 éves) korcsoportban. *Fogorvosi Szemle* 2005; 98: 239-244.

Thesis related abstracts

1. Fábián T.K., Kovács Sz., Müller O., Fábián G., Marten A., Fejérdy P.: Some aspects of existential psychotherapy in dentistry. *Fogorvosi Szemle* 2006; 99: 246
2. Fábián G., Müller O., Nguyen M.T., Fábián T.K., Fejérdy P.: Lexicological parameters of free association (coupling) about teeth of Hungarian middle school children. (absztrakt) *Fogorvosi Szemle* in press



Chapter in Hungarian not related to thesis

1. Dénes J., Fábián G.: A fogszabályozó kezelés alapelvei. Biológiai és mechanikai adottságok. In: Dénes J., Gábris K., Hidas Gy., Tarján I. (szerk.): *Gyermekfogászat, fogszabályozás*. Egyetemi tankönyv, 3. átdolgozott kiadás. Semmelweis Kiadó, Budapest, 2004; 221-227.

Dental fear epidemiology of outside border Hungarian minority

The aim of this study was to collect data from a larger children population for evaluation of the influence of gender, age and level of anxiety on dental fear of children. Another aim was to see the fear structure of outside border Hungarians show phobic-like pattern or not. Another goal of this study was to compare the results of outside border Hungarian children to those of inside border Hungarian children. Further, another aim was to collect data about patient-dentist relationship from children with the use of Dental Beliefs Survey (DBS) which were previously used on adult population only.

Background of dental fear of primary school children

The aim of this study was to collect data about possible reasons of the high dental fear scores of the Hungarian primary school children (aged 8-15 yrs.). For this purpose the analysis of written free associations of the subjects about teeth was used.

Background of dental fear of grammar school children

The aim of this study was similar to previous one: to collect data about possible reasons of the high dental fear scores of the Hungarian grammar school children. For this purpose the analysis of written free associations of the subjects about teeth was used, similarly to the previous study.

Study with the Expectation Scale

The aim of this study was to construct a scale to detect the expectation of subjects related to the fear level of their surrounding people (mother, father, brother, sister, friends). Further goal of this study was to collect data about such expectations with this scale in both primary and grammar school children.

Lexicological parameters of primary school children's free associations

This study was aimed to recognize possible effects of dental fear on the lexicological parameters of written free associations about teeth in primary school children.

Lexicological parameters of grammar school children's free associations

The aim of this study is similar to the previous one: it was aimed to recognize possible effects of dental fear on the lexicological parameters of written free associations about teeth in grammar school children.

LIST OF PUBLICATIONS

Interrelation between attitude toward death and dental fear

Our previous studies indicated that, there is also a deeper psychological background of dental fear (i.e. aggression or death related psychological events in symbols' level, oral phase of psychological development etc.). The aim of this study was to recognize possible interrelation between attitude toward death and dental fear.

Efficiency of hypnotherapy in treatment of dental needle phobia

The aim of this study was to evaluate the efficiency of hypnotherapy in the immediate treatment of dental phobic patient.

METHODS

Subjects

There were 1279 subjects participating in these studies, from which 462 adults 139 primary school children and 139 grammar school children were from Budapest; 549 primary and grammar school children were from the Hungarian minority of Partium in Rumania. The 549 subjects of the Hungarian minority and a proportion (217 subjects of the first DAS study and 12 phobic patients of hypnosis study) of the adults from Budapest were participated in one study only. Other subjects (223 adults, 139 primary school and 139 grammar school children from Budapest) were analyzed in several studies from different aspects.

General circumstances of the studies

All of the subjects and patients participated *voluntarily*, after the *appropriate information about the study had been given*. Agreement of the students' parents was also obtained. Subjects filled the surveys in a certain order as follows: sociological-demographical data, DAS, DFS, Expectation Scale, DBS, STAI-S, STAI-T, written free association, drawing projection, Lester's scale, questions related to the possible interrelation between dental fear and fear of death.

Dental fear and anxiety surveys

Dental Anxiety Scale (DAS): was published in 1969, measures dental fear level. The Hungarian translation of the scale was done by our group. *Dental Fear Survey (DFS)*: was published in the original (27 items) form in 1973. The scale was later reduced, and the final (20 item) form was used in most research papers. The Hungarian translation of the scale was done by our group.

Thesis related chapters in English

1. *Fábián T.K., Fábián G.*: Dental stress. In: Fink G. (ed in chef); Cox T, de Kloet ER, McEwen BS, Rose NR, Rothwell NJ, Rubin RT, Steptoe A, Swanson LW (assoc eds).: *Encyclopedia of Stress*. San Diego, Academic Press, 2000, Pp. 657-659.
2. *Fábián T.K., Fábián G., Fejérdy P.*: Dental Stress. In: Fink G (ed in chef); Chrousos G, Craig I, deKloet ER, Feuerstein G, McEwen BS, Rose NR, Rubin RT, Steptoe A (assoc eds).: *Encyclopedia of Stress. 2-nd enlarged edition, Vol. 1*. Oxford, Academic Press, Printed and Online version. 733-736.

Thesis related chapter in Hungarian

1. *Fábián G.*: Az orthodontia pszichoszomatikus vonatkozásai. In: Vértés G., Fábián T.K. (szerk.): *Fogorvosi pszichoszomatika*. Medicina, Budapest, 2007; 137-146.

Thesis related articles in English

1. *Fábián T.K., Fábián G.*: Stress of Life, Stress of Death: Anxiety in Dentistry from the Viewpoint of Hypnotherapy. *Annals of the New York Academy of Sciences* 1998; 851: 495-500. **(IF.:0.959)**
2. *Fábián G., Müller O., Kovács Sz., Nguyen M.T., Fábián T.K., Csermely P., Fejérdy P.*: Attitude toward death. Does it influence dental fear? *Annals of the New York Academy of Sciences*; 2007; 1113: 339-350 **(IF.:1.93 /2006/)**.

Thesis related articles in Hungarian

1. *Dénes Zs., Fábián G., ifj. Kaán M., Fejérdy P.*: A felnőttkori preprotetikai-orthodontiai kezelések klinikai szempontjai. *Fogorvosi Szemle* 1998; 91: 117-125.
2. *Fábián T.K., Kelemen P., Fábián G.*: A Dental Anxiety Scale ("Fogászati szorongás skála") hazai bevezetése. Magyar populáción végzett szorongás-epidemiológiai vizsgálatok. *Fogorvosi Szemle* 1998; 91: 43-52.
3. *Fábián T.K., Handa T., Szabó M., Kelemen P., Kaán B., Fábián G.*: A dental Fear Survey (a "Fogászati félelem kérdőív") magyar fordítása, hazai populáción végzett mérések eredményei. *Fogorvosi Szemle* 1999; 92: 307-315.
4. *Fábián T.K., Fábián G.*: A fény-hang készülék fogászati alkalmazási lehetőségei. (Módszerismertetés) *Fogorvosi Szemle* 2000; 93:195-201.
5. *Fábián G., Gáspár J., Fábián T.K.*: Adalékok a felnőttkori orthodontiai-protetikai kezelések témaköréhez egy esettanulmány kapcsán. *Fogorvosi Szemle* 2000; 93: 233-238.

also be an effective tool for preventive purposes especially in case of sensitive (risk) patients as indicated by our results with phobic patients.

Treatment of dental fear

The majority of our treatment related data are connected with the use of several dental fear related scales in the diagnosis of dental fear. Two of the most important dental fear related scales such as DAS and DFS were translated into Hungarian, and introduced to the practice. A high number of epidemiological data were also collected with these scales for comparison and better understanding of the data. Therefore, exact measurement of dental fear level, and the most important individual traumatizing factors of Hungarian speaking patients became possible. The use of these scales and also DBS scale (previously used for adults) were also tried out in small children (from the age of 8) and was shown to be a good tool also in this age. Thus, DAS and DFS and DFS became a good diagnostic tool in the hand of Hungarian dentists based on these results. A new scale measuring the expectations of the subjects about the dental fear scores of their surrounding peoples was also developed. This scale may help to decide whether there is a need to involve patients more actively into the prevention or the treatment of fearful children. Beside translation and introduction of several diagnostic tools, a pilot study was also carried through with dental needle phobic patients. This pilot study confirmed previous data about that: hypnotherapy is a possible effective tool in the treatment of dental fear. Level of dental fear and frequency of indispositions can be reduced effectively with such methods. Finally there were also some treatment related aspects of the deeper psychological background of dental fear recognized. These data indicate that, there can be deeper psychological problems behind high dental fear in some cases although it is also true that, high dental fear is mainly a result of several social-learning processes, however. Therefore high quality education of dentists in behavioral sciences is also needed to treat high dental fear patients in a safe manner. In certain cases participation of other professionals (i.e. psychologist, psychotherapist, and psychiatrist) in the treatment may also be needed.

Spielberger's State-Trait Anxiety Inventory (STAI): measures anxiety in two versions. Version "S" ("State") measures state anxiety, whereas version "T" ("Trait") measures trait anxiety.

Other surveys and scales

Dental Beliefs Survey (DBS): was published in 1985 measures the subjects' expectations about the dentists' behavior and the milieu of the dental treatment in general. *Expectation Scale:* was constructed by our research group based on the last four items of the early (non-reduced) version of the DFS scale. This scale measures the expectation of subjects related to the fear level of their surrounding people (mother, father, brother, sister, friends). *Lester's Attitude Toward Death Scale:* was published in 1991, measures attitude toward death, but may also be used for evaluation of fear of death level. *Sociological and demographical data:* like gender, age, marital status and profession were collected anonymously. These data were written on the cover page of the surveys. *Written free associations about teeth:* were collected on a separate sheet of paper, and the participant was asked to write any thoughts that came into his or her mind about teeth. *Tooth drawings:* were collected in a 15 x 15 cm square on a separate sheet of a paper and the participant was asked to draw a tooth (or teeth) in it. *Questions related to the interrelation between dental fear and fear of death:* participants were asked to indicate if they believed any of the following two statements to be true: 1.: "Dental treatment may induce dental fear"; 2.: "Dental treatment never induces dental fear".

General evaluation of the content of written free associations

Written free associations were evaluated by three investigators related to the general content. Following evaluations subgroups were formed based on typical contents, and all of the written associations were assigned to one of the established categories.

Detection of death related content of written free associations

For these purpose the content criteria of Gottschalk-Gleser were used, but content related directly to a description of an actual dental treatment was not regarded as positive. The free associations were evaluated by three investigators, and only those were regarded as positive, in which minimum one death related content was found by at least two of the investigators.

Lexicological analysis of written free associations

There were three categories established such as: 1.: verbs and infinitives; 2.: nouns; 3.: adjectives and participles; 4.: other words. Words of written

associations were assigned to one of the established categories. Number of the words in the categories and distributions were analyzed.

Detection of death related content of tooth-drawings

For these purpose the content criteria of Gottschalk-Gleser were used, but content related directly to a description of an actual dental treatment was not regarded as positive. The free associations were evaluated by three investigators, and only those were regarded as positive, in which minimum one stress related content was found by at least two of the investigators.

Technique and evaluation of hypnotic treatment

Hypnosis combined with local anesthesia by a dental hypnotist during conservative dental treatments (making of fillings) in a single chair dental office. Calming- amnesia inducing- and time distortion inducing hypnotic suggestions were used in all hypnotic treatments. Suggestions related to hypnotic anesthesia were used in the case of patients with high hypnotic susceptibility. DAS values were measured before treatments. Decrease of injection related fear was evaluated based on the report of patients, before and following treatments. Before treatment patients compared fear level to that of previous treatment. Following treatment patient compared fear level to that of the beginning of the same treatment. For comparison patients used three categories such as "decreased", "unchanged" or "increased". The dentist also registered any signs of indispositions (if any) during the treatments. Patients were also interviewed accurately following treatments.

Statistical analysis

In these studies measurement of Chronbach-alpha and Pearson's correlation, χ^2 probe, Fisher's exact test, Student's t-probe, and analysis of variance (one-way ANOVA) were used. The level of significance was $p \leq 0.05$ in all cases. Data were analyzed with the use of *Statistical Package for the Social Sciences (SPSS) 8.00 and 10.0 for Windows*.

RESULTS

Results shown below are produced by a research group with the participation and cooperation of several researchers. The author of this thesis played essential role (as first and last author) in numerous studies and participated as an active coauthor in others. (See also references at the end of the thesis.)

acceptance of and positive emotions toward the child and the contact with the parents especially with the mother. The quality of the dental treatment (i.e. painlessness and avoidance of rough, unnecessary or defective treatment), the skilled communication and high quality patient management are also highly important factors. Beside these, deeper psychological aspects of dental fear may also be important. Although there was no significant interrelation between dental fear and fear of death in case of the majority, but there was a proportion of the subjects with high dental fear and anxiety scores in which these interrelation is detectable in both conscious and unconscious level. It may also be considered that, such deeper aspects shows increased importance in adolescents, because the regressive phenomena may be more frequent in this age group (at least related to topics connected with teeth and dentistry). In case of outside border Hungarian minorities the dental fear scores seem to be even higher than inside Hungary. The structure of dental fear does not show structural changes toward phobic patterns, although the mean DBS values are near to that of phobic in West-Europe. The most important reasons of such increased scores outside border are time pressure and weaknesses of the dentists' communication and patient management skills.

Prevention of dental fear

Our data indicate that not only children and adolescents, but also adult shows rather high dental fear scores, therefore preventive activities should target not only children but also adolescents and adults. Adults are also important because the surrounding people around children (including adult parents) significantly influence the development of dental fear as indicated also in the Expectation Scale study. Consequently, prevention in case of adults is highly important also from the viewpoint of children. However our data also indicated that, the basic attitude toward dentistry (including dental fear) develops until the age of 16, which indicates that, major preventive efforts should be made in small children. The esthetic function of teeth seems to be especially important in primary school children, therefore it may be utilized effectively in this age group to motivate children to oral hygiene activity. Another important point of prevention is the early diagnosis of sensitive children, and the isolated treatment of them as well as of those with high dental fear (to prevent appearance or chronification of high dental fear respectively). For recognition of risk patients the Hungarian versions of several dental fear scales introduced by our research group serve as proper tools in the clinical practice. Further important factors of prevention is the quality of the dental treatment including painlessness, skilled communication with high quality patient management and avoidance of rough, unnecessary or defective treatment as mentioned above. In some cases dental hypnosis may

may be confirmed also with the finding that, the number of regressive contents was duplicated in this age group comparing to the previous study, and the preference of nouns is more pronounced in those written associations which contain such regressive contents. The evaluation of the most frequently used words confirmed previous findings related to the importance of parents (especially the mother); however the coupling of pain and fear seems to be less strong comparing to the previous study.

Interrelation between attitude toward death and dental fear

There was no significant correlation between fear of death and dental fear scores or anxiety scores. However, a small proportion of the subjects (7.22 %) with high dental fear and anxiety scores reported that, the interrelationship between dental fear and fear of death can be recognized. Accordingly, another proportion of the subjects (17.69 %) did not exclude that, such interrelation may exist. Taking together these data, it may be concluded that, there is no recognizable interrelation between fear of death and dental fear in the majority of the subjects, however there is a small high dental fear proportion in which the interrelation can be recognized.

Efficiency of hypnotherapy in treatment of dental needle phobia

This study confirmed previous data in the literature that hypnotherapy is an affective tool to decrease fear and indispositions induced by dental needle phobia. There were only few recognizable indispositions during treatments of patients having injection induced indispositions in their anamnesis. Patients having indispositions under hypnosis did not recognize these conditions in the conscious level advantageously. These data indicate the great possibilities of hypnotic methods in the prevention and treatment of dental fear as well.

CONCLUSIONS

Increased dental fear scores and their likely reasons

Results indicated much higher dental fear scores of both Hungarian adults and children comparing to West-European and North-American studies. Hungarian adult also shows phobic-like character of dental fear structure, however this was not found in case of Hungarian children. The significant influence of gender, age, anxiety level and marital status on dental fear was also confirmed in the Hungarian population including both children and adults (marital status in case of adults only). The importance of the family in development (or prevention) of dental fear was also confirmed. From this point of view not only dental fear level of the family members are important, but also the

Introduction of the Hungarian version of Dental Anxiety Scale

Results indicated increased dental fear scores of the Hungarian population comparing to West-European and North-American values. The study also indicated that, the Hungarian version of the DAS is a good tool to measure dental fear. This study also indicated the possible influence of gender, age and marital status on dental fear scores. The data also indicated that, dental fear is rather independent from anxiety level.

Introduction of the Hungarian version of Dental Fear Survey

This study indicated that, the Hungarian version of DFS is also a good tool for detailed analysis of dental fear. The data also confirmed previous finding that; dental fear scores of the Hungarian population are higher comparing to West-European and North-American values. Similar tendencies were found related to the possible influence of gender, age and marital status as previously, but significant differences were not verified. Surprising new finding was that, inside structure of dental fear seems to be similar to that of odontophobics in a population level in Hungary. Rather high dental fear scores of kindergarten teachers indicated the influence of social factors and profession on dental fear as well.

Dental fear epidemiology of adults and grammar school children

Data confirmed previous findings related to high dental fear scores of the Hungarians. The significant influence of gender, age and marital status on dental fear scores of Hungarian adults was also verified (t-probe; one-way ANOVA). The "weak link" between dental fear and anxiety scores was also confirmed with correlation measurement.

Detailed analysis of the Dental Fear Survey scores

Results confirmed previous indication that, Hungarian adults show phobic-like inside structure of dental fear in "population level". These data clearly indicated that dental fear of the Hungarian adults is not only increased, but also changed in structure comparing to West-European and North-American populations.

Dental fear epidemiology of primary school children

There were high Chronbach-alpha values in this study indicating that, DAS and DFS scales (previously used mainly in adult population) can be used properly also in case of children. Dental fear scores were somewhat less than those of Hungarian adults, but still much higher than those of West-European and North-American populations. However the structure of the fear does not show that kind of phobic-like pattern, which was detected in case of Hungarian

adults. Gender did not influence dental fear scores significantly; however there was a tendency of girls to score higher. Age did not have any recognizable influence on dental fear in this study. The "weak link" between dental fear and anxiety scores was confirmed with correlation measurement also in this study.

Dental fear epidemiology of outside border Hungarian minority

Dental fear scores (DAS and DFS) of the Hungarian minority in Rumania were even higher than values of the inside border Hungarians (including adult with the highest scores). However, similarly to inside border Hungarian children and adolescents, this population also did not show any phobic-like structural changes of dental fear. DBS mean scores were also rather high, comparable to that of phobic populations of West-European communities. Evaluating most frequently nominated items of DBS time pressure of dental treatments, not skilled communication of the dentists, compromised management of patients, and consequent loss of trust in dentist seems to be the most important reasons behind the high dental fear scores. Age and gender showed significant influence on dental fear as well in this study (t-probe; one-way ANOVA). Other interesting finding was that, dental fear scores (DAS, DFS) increased with age between ages of 12 and 16 years only but not in higher ages. This finding indicates that, dental fear behavior develops roughly until the age of 16.

Background of dental fear of primary school children

Data of this study indicated that, the most important reason of dental fear is traumatizing dental treatment. However, not painfulness but fearfulness of the treatment is the most frequently reported reason. (But it should also be considered that, primary school children may not differentiate properly). This finding is in good accordance with data in the literature that, rough behavior of the dentist is more frequent reason of dental phobia in children (in contrast to adults, which are more frequently traumatized with painful treatments). Data about experiences of loss of deciduous teeth indicated the importance of the manifestations of positive emotions toward children in coping with dental fear. Traumatizing loss of deciduous teeth was reported in those cases in which the tooth was removed by authority (i.e. dentist, father), and the teeth were not taken as a memory in the family. In contrast, teeth were taken as a memory in one-third of cases of non-traumatizing loss of deciduous teeth. Data also indicated the importance of the esthetic function of teeth in this age group, which may be utilized in maintaining oral health behavior of children. Some free associations of the children about magic-, grotesque- or tale-like stories in this study also indicated a possible deeper psychological background of dental fear.

Background of dental fear of grammar school children

Comparing the data of this study to those of the previous one, an important difference is that, age did not have any influence on the content of free associations, which confirms previous finding that, dental fear behavior develops roughly until the age of 16. Subjects of this age group also could differentiate more perfectly in relation with traumatizing experiences. Experiences with the loss of deciduous teeth appeared also in this age group indicating the psychological importance of this life-event. However in this group positive experiences were reported only, indicating a processing and „growing more handsome” of such experiences at this age. Surprising was the significantly increased percentage of magic-, grotesque- or tale-like stories containing regressive elements and motifs comparing to the previous study with younger aged children.

Study with the Expectation Scale

Results indicated that, the dental fear of the family and friends is important in the development (or prevention) of dental fear, although in this study the *expectations* about the family members' and friends' dental fear were measured only. ANOVA analysis indicated the significant influence of these factors on the dental fear scores; however the interrelationship is not linear as indicated by the rather low Pearson's correlation values.

Lexicological parameters of primary school children's free associations

Content of the written free associations influenced the length of the text, and the distribution of etymons (roots of words). Gender also influenced the length of the text significantly. It may also be considered that, dental fear scores may influence the distribution of the etymons at this age. The evaluation of the most frequently used words (especially in case of boys) confirmed previous findings related to the coupling of fear and pain, and to the importance of parents (especially the mother).

Lexicological parameters of grammar school children's free associations

Data of this age group was similar to those of previous study in that: content of the free associations, and gender influenced the length of the text significantly. But, in contrast to the previous study there was no recognizable interrelation between the dental fear scores and any of the measured lexicological parameters at this age group. The word-stock of the subjects was larger comparing to that of younger aged in the previous study, and the percentage of nouns also decreased. However the preference of nouns in the text did not change which may be an indication of regressive phenomena. This hypothesis