Caries prevalence, gingivitis and attitudes towards oral health among 50–60-year-old Germans

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Summary

The objective of the present study is to evaluate the oral health of German adults between 50 and 60 years of age, and to determine to what extent it is associated with personal factors of gender, general health, nutritional attitudes, dental attendance, education, and oral hygiene.
Two dentists examined 298 subjects (40% male, 60% female) in a city in southwest Germany according to the following parameters: Papillary Bleeding Index (PBI), Quigley Hein Plaque-Index (PI), probing pocket depth and DMF/T. Interviews were conducted to gather information relevant to the personal factors.
The mean number of functional teeth per subject was 22.8 (±4.13). The mean DMF/T-index was 18.7 (±4.85). The mean PI was 1.57 (±0.49). The mean PBI was 0.84 (±0.60) and the mean probing pocket depth was 2.8 mm (±0.68).
A significant correlation between DMF/T scores and probing pocket depth, but not between frequency of tooth brushing and probing pocket depth was observed. Frequency of tooth brushing showed no correlation with DMF/T values. A significant correlation was observed between DMF/T scores and gender, nutritional attitudes and dental attendance, and between DT scores and cigarette smoking, while no correlation was shown between the personal factors general health and education, caries prevalence and gingival health.
In conclusion, few subjects between 50 and 60 years of age have problems with caries. However, the skewed distribution of D-teeth points out the need to refocus dental services on more individual, prophylactic therapy.

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Introduction

Despite the fact that their etiology is largely understood, caries and gingivitis remain widespread in the adult populations of industrialized countries (Bader et al. 1993, Clarkson & Worthington 1993, Budtz-Jørgensen et al. 1996, Eriksen et al. 1996). While we know today that caries and many cases of periodontitis are avoidable (Holst et al. 1997), it seems that many adults in Germany still suffer from caries and periodontal problems (Micheelis & Bauch 1996). While this is likely owing to inadequate preventive practices in the past (Hugoson et al. 1995), a second contributing factor may be the *extension for prevention* restorative approach to dental treatment still commonly practiced by dentists (Bader et al. 1993). A better understanding of the biological processes behind caries initiation and progression as well as growing acceptance of the concept of remineralization of dental hard tissue may lead to a more conservational and preventive approach in the future.
Data pertaining to caries prevalence and gingivitis in middle-aged adults in Germany are scarce. In 1997, we began a prospective, longitudinal study of the effect of certain preventive measures on oral health in a group of 50–60-year-old subjects in Germany. We assessed caries prevalence, gingival health and various personal factors. The objective of the study was to detect possible associations between dental and gingival parameters and personal factors of gender, general health, nutritional attitudes, dental attendance, education, and oral hygiene.

Materials and Methods

Study participants were recruited in a city of 200,393 inhabitants in southwestern Germany. According to the study design, only subjects between 50 and 60 years old with a minimum of 10 teeth were eligible.
A market-research institute recruited volunteers by placing an advertisement in a local newspaper for a period of four weeks. Interested persons were encouraged to contact the research institute by phone. After telephone conversations of about

15 minutes in which the details of the study were discussed, 90% of the callers agreed to participate. These (n = 300) were invited to come for the baseline investigation, and all participated after signing an informed-consent form.

The investigation consisted of two parts: an interview and a clinical examination. The clinical and sociological methods and instruments used in the study were originally established for two cross-sectional surveys in 1989 and 1992 (Micheelis & Bauch 1996) and are described in a separate publication (Einwag et al. 1992). The sociological survey section was developed at the Institute of German Dentists using relevant literature from the field of empirical, social and health research in Germany (Scheuch 1973, Siegrist 1988). With the help of the market-research institute, the questionnaire was adapted to meet the requirements of the present study. The diagnostic criteria and the data-recording manual (Einwag et al. 1992) used in the study accord with WHO criteria for the diagnosis of dental caries (Micheelis & Bauch 1996).

Both parts of the investigation took place at the Department of Operative Dentistry of the Dental Clinic at the University of Freiburg. Professional interviewers questioned the subjects in order to ascertain: socio-demographic and socio-economic background; subjective perception of dental health; frequency of dental attendance; previous periodontal treatment; existing preventive health habits; attitudes towards proper nutrition; attitudes towards sugar consumption; and attitudes towards dental treatment. Participants were also questioned about their medical histories and subsequently examined by the two investigating dentists. Depending upon the results, they were then divided into two groups, one containing those with severe problems undermining their general health and another containing those whose histories were uneventful.

The clinical examinations were carried out by two experienced dentists at a rate of 15–20 subjects per day over a period of about three weeks. In order to better ensure the reproducibility of results, the two dentists jointly examined patients prior to the start of the study until assessment correspondence with regard to the study parameters was achieved.

The full mouth recording included the following parameters: restorations (fillings and crowns), gingival health, oral hygiene and caries prevalence. The number of missing teeth was also recorded. Third molars were not included in the examination.

In order to assess gingival health, the Papillary Bleeding Index (PBI, Mühlemann 1978) was used. The probing pocket depth of each tooth was evaluated mesially and distally. The gingival examination was performed with a periodontal probe with a 1 mm scale. Oral hygiene was evaluated using the Turesky modification of the Quigley and Hein Plaque-Index (PI, Turesky et al. 1970). Calculus was not removed prior to the examination.

Caries diagnosis was carried out carefully by visual and tactile examination, using a standard operating light, a plane mouth mirror and a blunt dental probe. In contrast to WHO (1987) criteria, no CPI probe was used. The teeth were dried with an air syringe before inspection. Diagnostic criteria distinguished between primary and secondary caries, as well as between missing teeth and restored and sound teeth and surfaces. In keeping with WHO criteria, active caries was recorded as present when the respective lesion on the crown or root surface showed an unmistakable cavity, undermined enamel, or a detectably softened area. The probe was used to confirm visual evidence of caries. Areas with only visual evidence of demineralization, i.e., only brown or chalky staining, but no soft surface, were deemed sound. A restored crown or root surface with caries at its margin was classified as recurrent decay (Fure & Zickert 1990). This distinction between primary and secondary caries does not conform to WHO criteria. No x-rays were taken.

For purposes of statistical analysis, educational level was divided in three categories: low (elementary school), medium (high-school with or without degree), and high (college or university). Subjects' attitudes towards different parameters were initially judged as very important, important, less important and unimportant, and later, for purposes of analysis, as important and unimportant.

Results were presented as mean values (± standard deviation). The Pearson-correlation coefficient was used to establish correlations among the clinical parameters PI, PBI, probing depth and DMF/T. The t-test was used to determine the relationship between the clinical parameters and the information gathered during the personal interviews. All statistical tests were carried out at 0.05 level of significance.

Additionally, the analysis was performed by alternately modeling DMF/T, DT, MT, FT, PI, PBI and probing pocket depth through multiple regression. Predictor variables included gender, education, attitude towards low-sugar nutrition, fluoride measures, dental attendance and smoking.

Results

The study population consisted of 300 subjects. In two cases, the questionnaires were not filled in correctly. The remaining 298 participants consisted of 179 females (60%) and 119 males (40%) between the ages of 50 and 60. The age distribution within the population was uniform, with an average age of 54.7 (female 54.6, male 54.9).

Table I Caries indices, PI, PBI and probing pocket depth by gender: Median, and mean values, standard deviation (sd), and statistical differences.

	total (n = 298)			male (n = 119)			female (n = 179)			t-test p-value
	median	mean	±sd	median	mean	±sd	median	mean	±sd	
Number of teeth	**25**	**22.82**	4.13	**25**	**23.24**	3.86	**25**	**22.52**	4.30	–
DMF/T	**19**	**18.7**	4.85	**19**	**18.11**	5.08	**19**	**19.10**	4.67	0.090
D	**1**	**1.35**	2.02	**1**	**1.49**	2.20	**1**	**1.26**	1.89	0.350
MT	**3**	**4.31**	4.11	**3**	**4.15**	3.94	**3**	**4.33**	4.22	0.939
FT	**13**	**13.05**	4.44	**13**	**12.47**	4.41	**14**	**13.43**	4.43	0.629
PI	**1.51**	**1.57**	0.49	**1.62**	**1.63**	0.50	**1.50**	**1.51**	0.48	**0.036**
PBI	**0.75**	**0.84**	0.60	**0.77**	**0.85**	0.61	**0.71**	**0.83**	0.59	0.799
Probing depth	**2.80**	**2.80**	0.68	**2.84**	**2.85**	0.73	**2.78**	**2.77**	0.66	0.311

Table II DT, PBI, PI and probing pocket depth by smoking habits:
Mean values, standard deviation (sd), and statistical differences (t-test).

		DT	PBI	PI	Probing depth
Smoking habits	**yes (n=64)**	**1.92**	**0.69**	**1.61**	**3.1**
	± sd	± 2.75	± 0.52	± 0.54	± 0.78
	no (n=234)	**1.19**	**0.88**	**1.53**	**2.7**
	± sd	± 1.74	± 0.61	± 0.48	± 0.65
p-values		**0.047**	**0.018**	**0.282**	**0.001**

Dental Status

A mean of 22.82 (± 4.13) teeth was preserved, with 15% of the subjects having all and 82% having more than 20 teeth in function. The mean DMF/T score was 18.7 (± 4.85). DMF teeth were distributed as follows: 1.35 DT (± 2.02), 4.31 MT (± 4.11) and 13.05 FT (± 4.44). T-test results revealed no difference between male and female DMF/T scores (Table I). Smokers' teeth (1.92 ± 2.75) showed significantly more decay than those of non-smokers (1.19 ± 1.74, p = 0.047, Table II). Eighty-five percent of the participants exhibited no primary caries (mean: 0.21 ± 0.67) and 80% exhibited no secondary caries (mean: 0.32 ± 0.78) in the coronal part of the teeth.
The DMF/T frequency distribution (Table III) across the whole study population was only slightly skewed. Fifty percent of the subjects made up for 59.2% of the DMF teeth. FT results were slightly more skewed, with 50% of the subjects making up for 63% of the F teeth. The mean FT score was 13.05 (± 4.44). With a mean of 7.49 (± 4.44), more than half of all restored teeth had been restored with crowns – more frequently in the case of females (7.85 ± 4.47) than males (6.99 ± 4.74). Only 8% of all subjects had no crowns and only 3% no fillings. Skewed distribution was considerably pronounced with respect to MT and DT. Fifty percent of the subjects made up for 84.4% of the missing teeth and 96.5% of the decayed teeth. Nearly half (45.3%) of the D teeth were found in 10% of the population.

Oral Hygiene and Gingival Health

Analysis of subject responses to questions concerning personal oral hygiene showed that females claimed to brush their teeth more often than males (t-test: p ≤ 0.001). The mean PI (1.57 ± 0.49) showed significantly higher scores for males (1.63 ± 0.50) than for females (1.50 ± 0.48, p < 0.05, Table I). All subjects claimed to brush their teeth at least once a day. While only 13.8% of the population had received professionally-applied topical fluoridation, this had no influence on DMF/T scores.
Seventy percent of the subjects had an average probing pocket depth of ≤ 3 mm, and only 1% an average depth of ≥ 6 mm. PBI (p < 0.05, correlation coefficient R = 0.11914), PI (p < 0.01, correlation coefficient R = –0.17930), and probing pocket depth (p < 0.01, correlation coefficient R = 0.1375) revealed low correlation coefficients with DMF/T. Frequency of tooth brushing showed no significant influence on DMF/T.
Smokers comprised 21% of the study population. Probing pocket depth and PBI were significantly correlated with smoking, while PI revealed no correlation. Smokers showed a mean probing pocket depth of 3.1 mm (± 0.78) and a PBI of 0.69 (± 0.52). Non-smokers showed a lower mean probing pocket depth of 2.7 mm (± 0.65), but a higher mean PBI of 0.88 (± 0.61, Table II).
Fewer males (25%) had received periodontal treatment than females (36%). In general, those participants who had received periodontal treatment had significantly more missing teeth (5.03 ± 4.30) than those who had received no treatment (3.97 ± 3.98, p = 0.044).

Table III Frequency distribution of DMF/T, DT, MT and FT among the participants: Fraction of subjects (%) comprising fraction of DMF/T, DT, MT and FT (%).

	Fraction of subjects	Fraction of D/M/F teeth
DMF/T	50%	59.2%
DT	50%	96.5%
MT	50%	84.4%
FT	50%	63%

Interview

Thirty-five percent of the subjects had reached a low level of education, 42% a medium level and 23% a high level. Level of education was significantly higher for males than for females (p = 0.0004), but as a factor showed no influence on DMF/T scores.
Seventy-eight percent of the subjects had uneventful medical histories (i.e. with at most slight illness). The remaining 22% had more severe illnesses, e.g. epilepsy (1%), diabetes (2%), abnormal blood-clotting (3%) and asthma (7%). General health status did not correlate with the dental health parameters.
When interviewed, 99% of the subjects responded that proper nutrition is important for their health, while only 75% said the same of a low-sugar diet. This group had significantly higher DMF/T scores (t-test: p = 0.047).
Fifty-six percent of the subjects had paid their most recent visit to the dentist for a regular examination, and 23% to have their teeth cleaned. These participants showed significantly less tooth decay (DT 1.08 ± 1.53) than the remaining participants, who visited their dentists only when experiencing dental problems (DT 1.82 ± 2.61; p = 0.008). The same tendency was observed for missing teeth (MT 3.9 ± 3.76 and 4.9 ± 4.62, resp.) and DMF/T (18.3 ± 5.02 and 19.4 ± 4.51, resp.), but the differences were not significant (p = 0.052 and p = 0.057, resp.).
A multiple regression analysis was performed for DMF/T, DT, FT, MT, PI, PBI and probing pocket depth with an eye to determining the influence of the variables included in the model, i.e. gender, educational level, low-sugar diet, fluoride measures, dental attendance and smoking. With respect to DMF/T (Table IV), the results indicated that (1) DMF/T scores were significantly higher (by an average of 1.27 DMF/T) among female adults; (2) prevalence of DMF/T was significantly higher among those subjects who visit their dentists only when experiencing problems than those who visit their dentists regularly for annual check ups and teeth cleaning; (3) DMF/T scores (4.74) were significantly higher for participants of the opinion that regular dental attendance is important; (4) the opinion that low-sugar nutrition is not important for dental health did have a bearing on DMF/T scores; and (5) smoking, education and supplementary fluoride measures had no significant bearing on DMF/T scores.
The results of the regression analysis for the parameters DT and MT were consistent with those for DMF/T in regard to the reason for most recent dental attendance (p = 0.0038, regression coefficient b = 0.70 and p = 0.0357, b = 1.05). Additionally, this analysis revealed significant confounding in the case of smoking (p = 0.0325), indicating higher DT scores (regression coefficient

Table IV Multiple regression analysis for the association of DMF/T with a series of studied variables.

Variables		DMF/T b	p
Gender	male/female	1.2748	0.0296
Education	low/middle/high	0.1587	0.6749
Low-sugar nutrition	important/unimportant	1.3424	0.0412
Fluoride measures	yes/no	1.2076	0.1381
Dental attendance	important/unimportant	–4.7400	0.0068
Reason for last visit	control/problems	1.3381	0.0202
Smoking habit	yes/no	–0.4795	0.4878

b = regression coefficient

b = 0.62) for smokers than for non-smokers. As for the parameter FT, the results showed significantly higher values for females than for males (p = 0.045, regression coefficient b = 1.09). The remaining variables revealed no association with the parameters DT, MT and FT.

With regard to gingival parameters, multiple regression analysis revealed a non-significantly lower PI for female subjects than for male subjects (regression coefficient –0.12, p = 0.055). The analysis revealed significantly higher PBI scores for non-smokers and a significantly greater probing pocket depth for smokers. Probing pocket depth was negatively associated with the opinion that dental attendance is important. There was no significant mutual confounding between PI, PBI and probing pocket depth and the remaining variables.

Discussion

Owing to particular aspects of the sampling method used, the population examined in the present study was not representative. It is likely that the data present an overly favorable picture of dental health (KALSBEEK et al. 1998).

When comparing prevalence data, it should be appreciated that diagnostic criteria may vary substantially. Furthermore, the fact that there are no existing caries-prevalence data from random samples of 50–60-year-old Germans prevents a critical comparison with the data obtained in this study.

Unpublished data cited by CLARKSON & WORTHINGTON (1993) suggest that only 4% of adults over 25 years who visit their dentists regularly have fewer than 12 teeth. Similarly, FELDMANN et al. (1993) encountered no toothless persons below the age of 54. Therefore, the inclusion criterion limiting our study population to subjects having at least 10 teeth should have little bearing on the associations found between the clinical parameters and the remaining data evaluated.

The average number of remaining teeth in this study (22.82) is consistent with results of surveys conducted by KALSBEEK et al. (1998), PAPAS et al. (1992) and FURE (1998) who found, respectively, 22.4 and 21.0 preserved teeth in the same age group and 22.0 in a group of 60-year-olds.

The mean DMF/T score in our results (18.7) is consistent with data taken from other studies showing DMF/T scores between 18.2 and 25.5 (BORUTTA et al. 1991, FELDMANN et al. 1993, DUFOO et al. 1996, PISTORIUS et al. 1997, KALSBEEK et al. 1998).

While the present data show no gender-specific differences with regard to DMF/T when assessed by t-test, they show significantly higher DMF/T scores for women than for men when assessed by multiple regression analysis and controlling for mutual confounding among the variables gender, educational level, low-sugar nutrition, fluoride measures, dental attendance and smoking. While BUDTZ-JØRGENSEN et al. (1996) and FELDMANN et al. (1993) found no relationship between caries prevalence and gender, other studies revealed significantly higher DMF/T scores for females than for males (BJERTNESS & ERIKSEN 1992, ERIKSEN et al. 1996, PISTORIUS et al. 1997). Furthermore, the FT scores are significantly higher for females than for males in the present study, but the DT and MT scores show no significant gender-specific differences. Thus, this does not mean that females have more unrestored caries and missing teeth, but more restorations – particularly, more crowns – than males. This suggests that the overall DMF/T scores are more likely an indicator of attitudes towards restorative care than of caries prevalence.

In contrast to the results of the present study, BJERTNESS & ERIKSEN (1992) and ALVAREZ-ARENAL et al. (1996) found higher values for carious teeth in 50-year-old Norwegians (3.0 DT) and in 45–64-year-old Spaniards (2.4 DT). German epidemiological data from 1989 (BORUTTA et al. 1991) found 1.7 DT in a group of 45-54-year-olds.

The incidence of carious teeth in the study population reveals a skewed distribution vis-a-vis the number of MT and DT. Our data pertaining to M and D scores confirm the results of a study conducted by Vehkalahti (VEHKALAHTI: J Dent Res 77 [Abstract 657] 714, 1998) in 30–65-year-old subjects in Finland.

PISTORIUS et al. (1997) found 5.9 missing teeth in a group of 46–64-year-olds in Germany, while ALVAREZ-ARENAL et al. (1996) reported an MT score of 8.0 for Spain. FELDMANN et al. (1993) found 13.6 missing teeth in a group of 55–64-year-olds in Switzerland. The comparably low MT scores in the present study (4.3) can be attributed, at least in part, to the inclusion criterion requiring that subjects have at least 10 remaining teeth.

The mean FT score of 13.5 is relatively high. While FELDMANN et al. (1993) found a similarly high FT score of 12.1 among 45–64-year-olds in Switzerland, ALVAREZ-ARENAL et al. (1996) reported approximately 2.1 filled teeth among 45–64-year-olds in Spain. In their study, the FT score was extremely low (16.8% of DMF/T) compared to the MT score (64% of DMF/T). They described an urgent need for treatment, especially for pontics (5.6). In contrast, the MT score in our study group is 23.1% of the whole DMFT and the FT score is 69.8%. About half of these had been restored with crowns – a figure consistent with results obtained by FURE & ZICKERT (1990) who found crowns responsible for 47% of all filled surfaces in Sweden. These high filling and crown scores are likely also reflective of the kind of dental services available in Germany.

It is well known that regions whose populations exhibit low rates of restorative dental care received have a correspondingly low number of dentists (DUFOO et al. 1996, ALVAREZ-ARENAL et al. 1996). Inversely, one may find a potential source for the relatively high FT scores in our results in a "dentist treatment effect". DF/T is not a linear measure of caries incidence for the simple reason that some tooth surfaces may have been filled that were not truly carious. Indeed, this factor may substantially influence study results (BADER et al. 1993) This treatment-effect hypothesis gains support from a conspicuous result obtained in the present study: multiple regression analysis revealed 4.74 higher DMF/T in subjects of the opinion that regular dental attendance is important.

On the basis of their responses, female subjects in this study brush their teeth more often than the males, and their PI scores are, correspondingly, significantly lower. PAYNE & LOCKER (1996) found that females, the elderly and those with higher incomes are more likely to maintain better health habits. But there is no

general consensus on the effects of oral hygiene on oral health in the literature. Significant correlations have been demonstrated between number of carious surfaces and oral hygiene index (Budtz-Jørgensen et al. 1996) and between DMF/T and plaque index (Pistorius et al. 1997). Our investigation, however, reveals only a very slight correlation between PI and DMF/T, which should not be overemphasized. Frequency of brushing also shows no significant influence on DMF/T and probing pocket depth. In keeping with our results, most studies have failed to demonstrate a relationship between caries and personal oral hygiene (Bellini et al. 1981, Bjertness & Eriksen 1992, Eriksen et al. 1996). This may, however, highlight the importance of a proper technique for plaque removal, and, at the same time, point out the importance of motivation and instruction of the proper technique.

In our study, PBI and probing pocket depth are slightly correlated with DMF/T. Similar results were found by Pistorius et al. (1997) for gingival index. There may be additional factors apart from oral hygiene (e.g. cigarette smoking) that contribute to caries and periodontal destruction. Indeed, our study indicates that these two dental-health parameters are significantly influenced by smoking. Smoking has been identified as a risk factor for moderate and severe periodontitis (Page & Beck 1997). In our investigation, smokers exhibit greater probing pocket depth and lower PBI, but no difference in plaque index. A possible explanation for the surprisingly low PBI scores for smokers in our investigation could be the local effects of smoking, such as reduction in gingival blood flow due to the vasoconstricting actions of nicotine (Bergstrom & Floderus 1983, Preber & Bergstrom 1985, Goultschin et al. 1990).

In keeping with the observations of Eriksen et al. (1996), the general health of the subjects in our study is not correlated with caries. But it must be taken into account that people with severe health problems tend not to volunteer for such studies.

The subjects whose opinion it is that low-sugar diet is not very important, have significantly higher DMF/T scores than those who place great emphasis on a low-sugar diet. SAKKI et al. (1994) also found an association between dietary habits and caries.

The correlation between cigarette smoking and caries prevalence found in our study corroborates data obtained by Bjertness & Eriksen (1992), Sakki et al. (1994) and Drake et al. (1997).

The existing data concerning dental health and smoking point out the important role dentists could play in making patients aware of smoking's detrimental effects both on dental and periodontal tissue and on health in general.

Nearly 80% of the participants visit their dentists regularly (either for standard check ups or professional cleaning) and exhibit correspondingly less tooth decay. The same correlation was found by Eriksen et al. (1996). However, while the opinion that regular dental attendance is important is significantly correlated with higher DMF/T scores, it is not correlated with DT scores. This is again an argument suggesting that DMF/T scores are not a suitable indicator of caries prevalence, particularly in populations where restorative options are highly available.

Although the prevalence data recorded are not representative, they are consistent with results found in representative studies of other age groups. Therefore, the associations identified in representative studies could be expected to apply to German adults of the age group studied here (Petridou et al. 1996).

The data presented in this investigation testify to a dental community well-equipped for restorative treatment and a population committed to regular dentist-office attendance. These factors are responsible for the following overall outcome: in Germany, few carious lesions are left unrestored.

Several parameters (i.e. gender, nutrition, dental attendance) are associated with DMF/T scores. The significant correlation between the smoking and DT scores and between stated reason for dental attendance and DT scores provide even more specific information about persons with higher caries risk.

These associations, together with skewed distribution of D-teeth, should be seen as a reason to promote individualized preventive measures, for instance, involving proper nutrition, correct oral hygiene, additional fluoridation, and more frequent professional tooth cleaning. In this way, the incidence of new caries lesions can be reduced and the life of existing restorations prolonged.

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Zusammenfassung

Ziel der vorliegenden Studie war es, den oralen Gesundheitszustand bei einer Gruppe 50–60-jähriger Deutscher zu untersuchen. Es sollte zudem der Zusammenhang zwischen Mundgesundheit und Geschlecht der Probanden, allgemeiner Gesundheit, Ernährung, Häufigkeit des Zahnarztbesuches, Bildungsstand und Mundhygienegewohnheiten evaluiert werden. Zwei Zahnärztinnen erfassten bei 298 Personen (40% männlich, 60% weiblich) aus einer Stadt im Südwesten Deutschlands folgende Parameter: Papillenblutungsindex (PBI), Quigley Hein Plaque Index (PI), Sondierungstiefen und DMF/T. Die übrigen Informationen wurden während eines Interviews gesammelt.

Im Durchschnitt waren noch 22,8 Zähne vorhanden. Der DMF/T-Index betrug 18,7 (± 4,85), der PI 1,57 (± 0,49), der PBI 0,84 (± 0,60) und die mittlere Sondierungstiefe 2,8 mm (± 0,68). Es konnte eine signifikante Korrelation zwischen DMF/T und Sondierungstiefe nachgewiesen werden. Zwischen Zahnputzhäufigkeit der Teilnehmer und dem DMF/T und der Sondierungstiefe wurde keine Korrelation festgestellt. Die Kariesprävalenz korrelierte signifikant mit dem Geschlecht, den Rauchgewohnheiten, der Ernährung und der Häufigkeit des Zahnarztbesuches. Der allgemeine Gesundheitszustand und das Bildungsniveau beeinflussten den DMF/T-Wert und die Gesundheit der Gingiva nicht.

Zusammenfassend lässt sich feststellen, dass 50–60-jährige wenig kariöse Läsionen haben. Die deutliche Polarisation bei der Verteilung der kariösen Zähne dieser Population verdeutlicht, dass eine zielgerichtete Individualprophylaxe notwendig ist.

Résumé

Des examens dentaires et buccaux ont été effectués sur 298 personnes (age 50–60 ans) dans notre service. L'indice DMF-T, l'indice d'hygiène (Quigley Hein, PI), l'indice d'inflammation de la gencive (PBI) et les valeurs au sondage (PPD) ont été retenus. Les autres informations ont été obtenues au moyen d'un questionnaire.

La moyenne de l'indice DMF-T était de 18,7 (± 4,85), celle de l'indice PI était de 1,57 (± 0,49), celle de PBI était de 0,84 (± 0,60) et celle du sondage était 2,8 mm (± 0,68).

Une relation directe entre l'indice DMF-T et les valeurs au sondage a pu être démontrée. Mais il n'y avait pas de relation significative entre l'hygiène dentaire et l'indice DMF-T ou les valeurs au sondage. La prévalence de la carie était en corrélation avec le sexe, la consommation de tabac, l'alimentation et la fréquence des consultations du dentiste.

Les personnes faisant partie de ce groupe montraient une polarisation évidente de la distribution de la carie. Ceci démontre que le but des efforts de prophylaxie de la carie n'est pas encore atteint à cet âge. En conséquence, une prophylaxie plus individuelle et efficace est nécessaire non seulement pour les jeunes, mais aussi pour les personnes d'âge moyen.

Literature

Alvarez-Arenal A, Alvarez-Riesgo J A, Pena Lopez J M, Fernandez Vazquez J P, Villa Vigil M A: DMFT and treatment needs in adult population of Oviedo, Spain. Community Dent Oral Epidemiol 24: 17–20 (1996)

Bader J D, Shugars D A, Rozier R G: Relationship between epidemiological coronal caries assessment and practitioners' treatment recommendations in adults. Community Dent Oral Epidemiol 21: 96–101 (1993)

Bellini H T, Arneberg P, von der Fehr F R: Oral hygiene and caries. A review. Acta Odontol Scand 39: 257–265 (1981)

Bergstrøm J, Floderus-Myrhed B: Co-twin study of relationship between smoking and some periodontal disease factors. Community Dent Oral Epidemiol 11: 113–116 (1983)

Bjertness E, Eriksen H M: Design of a socio-ecologic caries model and testing on 50-year-old citizens of Oslo, Norway. Acta Odontol Scand 50: 151–162 (1992)

Borutta A, Künzel W, Micheelis W, Müller P J: Dringliche Mundgesundheitsprobleme der Bevölkerung im vereinten Deutschland. Institut der Deutschen Zahnärzte, Köln (1991)

Budtz-Jørgensen E, Mojon P, Rentsch A, Roehrich N, von der Muehll D, Baehni P: Caries Prevalence and associated risk factors in recently hospitalized elderly persons. Acta Odontol Scand 54: 251–256 (1996)

Clarkson J E, Worthington HV: Association between untreated caries and age, gender and dental attendance in adults. Community Dent Oral Epidemiol 21: 126–128 (1993)

Drake C W, Beck J D, Lawrence H P, Koch G G: Three-year coronal caries incidence and risk factors in North Carolina Elderly. Caries Res 31: 1–7 (1997)

Dufoo S, Maupomé G, Díez-de-Bonilla J, Hernández-Guerrero J C: Caries experience in a selected patient population in Mexico City. Community Dent Oral Epidemiol 24: 298–299 (1996)

Einwag J, Kess K, Reich E: Oral health in Germany: diagnostic criteria and data recording manual. Deutscher Ärzte-Verlag, Cologne (1992)

Eriksen H M, Marques M D, Bjertness E, Moe B: Dental caries determinants in an adult Portuguese population and a comparison with Norwegian adults. Acta Odontol Scand 54: 49–54 (1996)

Feldmann D, Hefti A, De Crousaz P, Marthaler T M, Hotz P, Menghini G D, Vock P: Zahnkaries (DMFT) bei Erwachsenen in der Schweiz (1988). Schweiz Monatssch Zahnmed 103: 835–843 (1993)

Fure, S., Zickert, I: Prevalence of root surface caries in 55-, 65-, and 75-year-old Swedish individuals.Community Dent Oral Epidemiol 18: 100–105 (1990)

Fure S: Five-year incidence of caries, salivary and microbial conditions in 60-, 70- and 80-year-old Swedish individuals. Caries Res 32: 166–174 (1998)

Goultschin J, Cohen H, Donchin M, Brayer L, Soskolne W: Association of smoking with periodontal treatment needs. J Periodontol 61:364–367 (1990)

Holst D, Schuller A, Grytten J: Future treatment needs in children, adults, and the elderly. Community Dent Oral Epidemiol 25: 113–118 (1997)

Hugoson A, Koch G, Bergendal T, Hallonsten A L, Slotte C, Thorstensson B, Thorstensson H: Oral health of individuals aged 3–80 years in Jönköping, Sweden in 1973, 1983, and 1993. Swed Dent J 19: 243–260 (1995)

Kalsbeek H, Truin G J, van Rossum G M J M, van Rijkom H M, Poorterman J H G, Verrips G H: Trends in caries prevalence in Dutch adults between 1983 and 1995. Caries Res 32: 160–165 (1998)

Micheelis W, Bauch J: Oral health of representative samples of Germans examined in 1989 and 1992. Community Dent Oral Epidemiol 24: 62–67 (1996)

Mühlemann H R: Patientenmotivation mit individuellem Intensivprogramm für orale Gesundheit. In: Peters, S (Eds): Prophylaxe. Ein Leitfaden für die tägliche Praxis. Quintessenz, Berlin (1978)

Page R C, Beck J D: Risk assessment for periodontal disease. Int Dent J 47: 61–87 (1997)

Papas A, Joshi A, Giumta J: Prevalence and intraoral distribution of coronal and root caries in middle aged and older adults. Caries Res 26: 459–465 (1992)

Payne B J, Locker D: Relationship between dental and general health behaviors in a Canadian population. J Public Health Dent 56: 198–204 (1996)

Petridou E, Athanassouli T, Panagopoulos H, Revinthi K: Sociodemographic and dietary factors in relation to dental health among Greek adolescents. Community Dent Oral Epidemiol 24: 307–311 (1996)

Pistorius A, Willershausen-Zönnchen B, Zimmermann M: Dental Status of outpatients in a university dental clinic. Acta Med Dent Helv 2: 173–177 (1997)

Preber H, Bergstrom J: Occurrance of gingival bleeding in smoker and non-smoker patients. Acta Odontol Scand 43: 315–320 (1985)

Sakki T K, Knuuttila M L, Vimpari S S, Kivela S L: Lifestyle, dental caries and number of teeth. Community Dent Oral Epidemiol 22: 298–302 (1994)

Scheuch E: Das Interview in der Sozialforschung. In: König R (Eds): Handbuch der empirischen Sozialforschung. Band 2: Grundlegende Methoden und Techniken. Part I. Ferdinand Enke Verlag, Stuttgart, pp 66–190 (1973)

Siegrist J: Medizinische Soziologie. Urban Schwarzenberg, Munich (1988)

Turesky S, Gilmore N D, Glickman I: Reduced plaque formation by the chlormethyl analogue of Vitamine C. J Periodontol 41: 41–3 (1970)

WHO: Oral Health surveys, Basic methods. Third edition, World Health Organisation, Geneva (1987).