

Comparison of Periodontal Health in Two Different Rural Population Types in Croatia

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Summary

The rural population in mountain region has less periodontal disease and attachment loss degree. A comparison of periodontal health and necessary treatment between the littoral and rural populations in mountain region was conducted on a sample of 441 individuals (40% of the population) in the 15+ age group, by applying the Community Periodontal Index (CPI) and the Loss of Attachment Index (LA). The prevalence of periodontal disease in both areas appears to be very high. The occurrence of gingivitis and parodontitis is evident at an early age. Neither in the littoral nor in the mountains region was the prevalence of healthy periodont in the 30+ age group recorded. In the littoral area shallow periodontal pockets are already present with adolescents - 11.76% ($p < 0.05$), and in the mountain region from the age of 20 - 14.26%. More than 50% of the 30+ population of both regions has either deep or shallow pockets, while approximately 40% of the 55+ population in both groups has at least one deep pocket. The mountain village has excluded sextants in all age groups, ranging from 2 to 11 times more than the littoral village ($p < 0.05$). In the 65+ group of both populations more than 4 sextants are excluded. Because of the smaller number of remaining teeth, the mountain village records less periodontal disease.

More than 50% of the 35+ age group has loss of attachment > 6 mm (approximately in one sextant). In the 45+ age group there is almost no sextant with loss of attachment < 3 mm. More than 90% of the examinees in both regions need some kind of periodontal treatment.

Key words: periodontal disease, rural population, Community Periodontal Index, loss of attachment.

Acta Stomatol Croat
2000; 183-187

ORIGINAL SCIENTIFIC
PAPERS
Received: April 14, 2000

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Introduction

Periodontal disease is more frequent in rural than in urban populations, as a result of nutritional habits, poorer general and oral hygiene, lower educational standard, poorer dental health care, inadequate rural dental equipment and no preventive measures (1,2). Some authors claim that the differences between the sexes, races, geographical areas, social and economical factors disappear when the population is classified in groups, according to oral hygiene standard (3).

The World Health Organisation (WHO) standardised methodology for periodontal disease examination. It suggests two indices - The Community Periodontal Index (CPI, 1982, modified 1997) and The Loss of Attachment (LA, 1997). It also established The Global Oral Data Bank with collected data from more than 150 studies of periodontal status of age groups 15-19, 35-44 and 65-74 from all over the world, where we can find similar frequency and distribution of periodontal disease. The percentage of people with deep pockets and the mean number of these sextants per person is low. It minimises the need for complex periodontal treatment. There is no significant difference between the developed industrial and underdeveloped countries with regard to the frequency of developed disease forms. On the other hand, initial forms such as bleeding and calculus are more frequent in underdeveloped countries (4).

Maity et al. found low destructive periodontal disease degree, but a high degree of calculus in a rural population of India (5). The rural population of Greece has a higher prevalence of deep pockets than the urban. Low oral hygiene, plaque and calculus, as well as bleeding when probing, are equally present in both populations (1). In the rural population of Kenya the risk groups for new periodontal disease occurrence were determined - male sex, persons with less teeth as well as with removable dentures, and with loss of attachment 4mm on 6% of tooth sites (6). The isolated Amish rural population in Canada has slightly higher values for periodontal disease than the control non-Amish group. The risk factors are male sex, age, calculus and poor oral hygiene education (7). Dolan et al. found a higher incidence of attachment loss in a rural population, low income and black (2).

The aim of this study was to determine whether there is difference between types of rural populations. Two typologically different villages were chosen - littoral and mountainous. Analysis included the collection and comparison of periodontal status data of these two populations - the prevalence and severity of both periodontal disease and loss of attachment, as well as necessary treatment. By comparison of the collected data with existing epidemiological studies their periodontal status in relation to Croatia and the world could be determined.

Materials and methods

The population of Sveti Juraj (littoral village) and Krasno (mountain village) were examined. Sveti Juraj is 10 km, and Krasno 35 km away from Senj, a larger urban centre. A dentist works once or twice a week in the dental surgery in Krasno, and three or four days a week in the dental surgery in Sveti Juraj. According to a census in 1991 there were 691 inhabitants in Sveti Juraj and 674 in Krasno. The differences between them are climatological, geographical, cultural, ethnological, sociological, economical and nutritional (Table 1). The littoral village is an open society type and should have a higher health standard than the mountain village, which is a closed society type. The littoral area has more accessible dental care and regular, heterogenous nutrition. Fluoride from sea fish not only effects better enamel mineralisation, but also slows down alveolar bone resorptive processes. The mountain area has worse road connections with urban centres, and so closed is to external influence. The poorer population does hard physical work for a living - agriculture, cattle breeding, dairy farming, forestry work. The littoral population because of better road connections has a higher number of middle-aged persons going daily to the city to work. Thus it is more open to external influence, it has a higher level of education. Namely, the average level of education in the littoral area is finished secondary school, and in the mountain area - primarschool. Additional activity in the littoral area is tourism, which is a very profitable activity, which less physical effort. The number of inhabitants in these two villages is almost equal.

The 441 examined subjects (40% population, mountain 178, and littoral 263), were divided into 7 age groups. The edentulous population was excluded from the examination. There were almost equivalent percentages of both sexes. Subjects had diverse professional qualifications, profiles and social standards, because of the representative quality of the sample. The CPI probe, mirror and standard dental unit light were used. The results were written in WHO Oral Health Assessment Forms (WHO, 1997) (8). Probing was conducted by the same dentist (Špalj), as a guarantee of equal criteria, in the period between January 1999 and May 2000. Dentition was divided into six sextants, and the highest values found on referent teeth (17 or 16, 11, 26 or 27, 37 or 36, 31, 46 or 47) were recorded by using the Community Periodontal Index (CPI, WHO, 1997) and Loss of Attachment (LA, WHO, 1997) methodology (8, 9, 10). The criteria of CPI: (0) healthy, (1) bleeding on probing, (2) calculus, (3) shallow pocket 3-5mm, (4) deep pocket 6mm, (X) excluded sextants without at least two teeth present. The criteria of LA: (0) 0-3mm, (1) 4-5mm, (2) 6-8mm, (3) 9-11mm, (4) 12mm, (X) excluded sextants. The results were tested by using the statistical t- test with probability of 95%.

Results

The mountain village excluded sextants in all age groups, ranging from 2 to 11 times more than the littoral village ($p < 0.05$). There were even more excluded sextants in groups 20-29 in the mountain population (1,25) than in the littoral population (0,11) ($p < 0.001$) (Tables 1 & 2, Figures 1 & 2). The littoral area has more healthy sextants in groups 35-44 and 55 - 64, but also initial and advanced stages of periodontal disease ($p < 0.05$) (Table 2).

Neither in the littoral, nor in the mountain region was the prevalence of a healthy periodontium in the 30+ year age group recorded. In the littoral area, shallow periodontal pockets are already present in adolescents - 11.76% ($p < 0.05$), and in the mountains from the age of 20-14.26%. Already, at that age in the mountain region area deep pockets in 3.57% of examinees, were recorded while in the littoral area they appear only after 30 years of age - 13.33%. More than 50% of the 30+ population of both

regions have either a deep or shallow pocket, while approximately 40% of the 55+ population in both groups have at least one deep pocket registered. Periodontal disease is rapidly growing in the 45+ year group with advanced periodontal destruction. Deep pockets occur more often in the mountain area in the 45-54 year group ($p < 0.005$). In the 65+ group of both populations more than 4 sextants are excluded, resulting from extractions due to decay or periodontal disease (Table 2, Figures 1 & 2).

More than 90% of the examinees in both areas need oral hygiene instructions, more than 65% need scaling and polishing, while between 13 and 30% of the residents in the littoral and 4 - 50% residents in the mountain region need complex periodontal treatment. Evidence of some form of periodontal disease was found in more than 90% of examinees in both rural populations.

Loss of attachment of 0 to 3 mm was found (over 5.3 sextants by severity), in almost 80% of adolescents in both populations while more than 50% of the 35+ age group have loss of attachment > 6 mm (approximately in one sextant). In the mountain region 90% of the 45+ individuals have loss of attachment > 9 mm (approximately 0.5 sextant). In the 45+ age group there is almost no sextant with the loss of attachment < 3 mm. The highest prevalence of loss of attachment in the 30+ group was found in the littoral region (40 - 45%) 4 - 5 mm ($p < 0.05$). In the 45+ mountain population this amounted to 9 - 11 mm ($p < 0.005$) (30 - 40%) (Tables 2 & 3, Figures 3 & 4).

Discussion

Baelum et al. obtained very similar results to those in this study, on a rural population of Kenya, with a limited tradition of oral hygiene and dental health care. They calculated that 90% of 40+ year-old persons with the code CPI 2 have LA ≥ 4 mm, and 50% 50+ year-old persons with the same code have LA ≥ 6 mm. CPI 3 code in adolescents have LA ≥ 6 mm, while persons younger than 35 years in 35% of cases have LA ≤ 3 mm. Persons over 35, with CPI 0 code, in 10% cases have LA ≤ 4 mm (11, 12, 13).

Dolan et al. (1997) showed lower results of loss of attachment in a population in Florida in 45+ year-old persons. Their results show LA 4mm in 92% of the population (Špalj 99%) and 35% LA 7mm (Špalj around 62%). They conclude that the rural population had worst parodontal health than the urban population (2).

By comparing the results of the prevalence of periodontal disease in the 15-19 age group with WHO Global Oral Data Bank, our littoral population has similar values to those in France (1985), Germany (1985 & 1986), Italy (1983), Great Britain (1990/1), Yugoslavia (1984/5), New Zealand (1981), Papua New Guinea (1989/90) and Syria (1989). Similarity exists between data from the Croatian mountain population and Estonia (1987), Italy (1984), Latvia (1984), Russia (1983/4), Yugoslavia (1987), Philippines (1982) and Yemen (1990) (4).

In the 35 - 44 age group in the littoral population data on disease prevalence correspond with France (1985), Italy (1983), Papua New Guinea (1989), Cook Islands (1984), Egypt (1990), Estonia (1987), India (1989), Indonesia (1986 & 1987), Kenya (1984), Marocco (1986), Holland (1983), Great Britain (1985), Yugoslavia (1986 & 1987) and Zaire (1987). Similarity exists between data from Croatian mountain population and Philippines (1982), China (1992), Indonesia (1988) Japan (1988), Portugal (1984) and Thailand (1989) (14).

Prevalence in the 65+ year- old littoral rural population differs from any published data in WHO Global Oral Data Bank, while prevalence in the mountain population corresponds only with Slovenia. In Germany (1991) there were more calculus deposits (almost 60%), and only 6% deep pockets. In Japan (1990/1) there was a prevalence of shallow pockets (53%), and only 10% deep pockets. Kyrgyzstan (1987) records even 91% deep pockets, and Turkmenistan (1987) 84%. In Korea 20% of the population aged 65+ have healthy sextants. United States (1991) and Hong Kong (1991) have similar distribution and prevalence of shallow and deep pockets as our rural population. United States have 65% of them, Hong Kong 66%, littoral village 80%, and mountain 75% (18). It is interesting to note that data from France (1985), Italy (1983) and Papua New Guinea (1989) are

almost the same as the prevalence in our littoral population for age groups 15-19 and 35-44 years. The same was determined in the Philippines (1982) in a mountain village in both age groups.

Data on the severity of periodontal disease in adolescents from a littoral and a mountain village are similar to studies from Algeria (1987), Estonia (1987), France (1985 & 1987), Ghana (1991) and Hong Kong (1982). Neither group excluded sextants at this age. Again, as for the prevalence, similar results appeared in France (1985) and Italy (1983) (16).

By comparing data on the severity of periodontal disease in persons aged from 34 and 44 and 65+ year old inhabitants in a littoral and mountain village with other results in the world, difference can be seen in the number of excluded sextants. In the age group 35-44 our littoral population has 2.13 excluded sextants, and the mountain population almost 4 (3,78). In the world they amount to a maximum of 1.5. Brazil (1986) has the worst results in the number of excluded sextants - 1.5, Hungary (1991) - 1,4, Poland (1990) - 1.5, and Yugoslavia (1986 & 1987) - 1.3. In the age group 65+ compared results are even worse. The littoral village has 4.35 excluded sextants, and the mountain village 5.12. Poland (1990) has the worst data for excluded sextants in WHO Global Oral Data Bank - 3.9; Estonia (1987) - 3.0; Finland (1987) - 3.0 and Kyrgyzstan (1987) - 3.2. In that age group only Poland had results similar to ours (17).

The severity of periodontal disease in the littoral rural population aged 35-44, because of the higher number of excluded sextants, is similar only partly to results from Yugoslavia (1987), Uruguay (1987) and Holland (1983 & 1986). For the same reason in the mountain population it is difficult to find similar severity (18.)

Results from studies conducted in Croatia by Aurer - Koželj et al. (1989), Plančak (1992) and Potočki - Tukša (1993) are very similar to ours for younger age groups. In adults our populations have less pockets and more initial forms of disease (19,20,21). Studies conducted in former Yugoslavia (1984/5, 1986 and 1987) mainly correspond to our periodontal disease severity and prevalence (16-21). By comparison with other studies in Croatia and the world, we can conclude that there is a decrease in

pocket prevalence, and growing calculus prevalence. According to more recent studies in Slovenia (1991 and 1996), France (1997) and Romania (1998) it seems that they have better conditions, which will be still improved (26, 27, 28, 29). Differences may appear because of modifications of the CPI criteria accepted in our research. New criteria excludes every sextant without at least two present teeth. Former criteria examined one remaining tooth and included it in the nearer sextant. The biggest results displacements could be in the older population, where we often find one remaining tooth in the sextant.

Conclusions

According to the results of this study, the prevalence and severity of periodontal disease and attachment loss appears to be very high. The mean number of sextants and percentage of persons with healthy sextants, bleeding, calculus and attachment loss ≤ 5 mm diminish with age, and shallow, deep pockets, attachment loss ≥ 6 mm and the need for various treatment is increasing. This observation was the same in both rural populations. The significant differences in periodontal disease and attachment loss, concerning the sextants and subjects are rarer under 35 years of age, and more frequent over. Only significant differences between

the littoral and mountain village were proved in excluded sextants of all age groups. In those few cases of statistically significant differences, the littoral population had more healthy, initial and advanced periodontal disease manifestations. Significance has been determined in only 1/4 or 20% of cases, which is not sufficient for generalisation about the littoral population's inferior periodontal health. Because of the decreased number of remaining teeth, the mountain village records lower periodontal disease degree. Also, in the mountain region extraction was preferred as therapy for caries, resulting in healthy remaining teeth or very little conservative / prosthodontic treated teeth. In this way the number of sites for periodontal disease causing bacteria was reduced. Comparing our results with other results published in Croatia and the world, primarily from WHO Global Oral Data Bank, the improvement is evident. Initial disease forms - gingivitis and calculus are more frequent, and pockets (shallow and deep) rarer. It concerns only the growing number of excluded sextants.

The cause of such problematic conditions of the supportive dental tissue and number of excluded sextants are insufficient preventive treatment, dentists neglecting the periodont in front of conservative therapy, lack of education on oral hygiene and indolence with regard to own oral health.