# PERIODONTAL TREATMENT NEEDS IN ARGENTINE ADULT SUBJECTS

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### ABSTRACT

*The aim of the present study was to assess the periodontal treatment needs of the population that spontaneously sought treatment from general dentists.*

*3694 patients (2000 females and 1494 males, age range between 18 and 84 years) were evaluated using the Community Periodontal Index (CPI).*

*Data were reported according to the percentage of subjects with the highest Score:*

*14.3 % presented pocket depth $\geq$5.5 mm (Score 4), 26,4% pocket depth between 3.5 and 5.5 (Score 3), 38.3% presented pockets $\leq$3.5 mm with calculus or overhanging restorations (Score 2), 17.2% pockets $\leq$3.5 mm with bleeding upon probing without calculus (Score 1) and 3.2% were healthy (Score 0).*

*Analyzing the data according to age it was observed that in the group > 40 years the percentage of patients with Score 4 was higher (25.1%) compared to the other two groups of 18-34 years (6.4%) and 34-45 years (14.3%).*

*Only 16.4% of the patients consulted for periodontal reasons (gingival bleeding or tooth mobility), whereas 88% requested treatment for other reasons (pain, caries, esthetics, replacement of teeth, etc.). However 77% of the patients in this last group needed periodontal treatment.*

*96.8% of the patients attending the general dentistry office needed periodontal treatment: 17.2% oral hygiene instruction, 65.2% oral hygiene instruction and scaling and 14.3% complex treatment.*

***Key words:*** *Community Periodontal Index of Treatment Needs, CPITN, Epidemiology, Argentina, South America.*

# NECESIDADES TERAPÉUTICAS PERIODONTALES DE SUJETOS ADULTOS DE LA REPÚBLICA ARGENTINA

### RESUMEN

*El objetivo de este estudio fue evaluar la necesidad de tratamiento periodontal de pacientes adultos de la República Argentina. Se evaluaron 3694 pacientes (2000 mujeres y 1494 hombres con edad entre 18 y 84 años) que concurrieron espontáneamente al odontólogo general. Se utilizó el Índice Periodontal Comunitario (IPC) examinando todos los dientes presentes.*

*Según la lesión más severa por paciente: un 14,3% presentaban por lo menos un sextante con bolsas de 5,5 mm o más (Valor 4), un 26,4% por lo menos un sextante con bolsas entre 3,5 y 5,5 mm (Valor 3), un 38,3% bolsas menores a 3,5 mm con cálculos (Valor 2), un 17.2% sangrado al sondaje sin cálculos (Valor 1) y un 3,2 % salud (Valor 0).*

*Al analizar los datos según la edad el porcentaje de pacientes con por lo menos un sextante con valor 4 fue mayor en el grupo de más de 45 años (25,1%) comparado con los otros grupos: 34 a 44 años (14,3%), 18-34 años (6,4%).*

*Un 16,4% de los pacientes demandaron atención por problemas periodontales mientras que un 88% por otros motivos, sin embargo un 77% de ellos necesitaba tratamiento periodontal. Estos resultados nos permiten establecer que un 96,8 % de los pacientes que concurrieron al odontólogo necesitaron algún tratamiento periodontal: 17,2% instrucción en higiene bucal, 65,2% instrucción en higiene bucal y raspaje y 14,3% atención de mayor complejidad.*

***Palabras clave:*** *Índice Periodontal Comunitario de Necesidades Terapéuticas (CPITN), epidemiología, Argentina.*

## INTRODUCTION

Epidemiological studies have shown the high prevalence of gingival and periodontal disease. In reference to gingival disease the prevalence is almost 100%, while that of periodontitis varies between 16 and 80%, depending on age, environment, countries studied, disease definition and indexes used for evaluation (1-2).

The main etiological factor is the pathogenic bacterial flora. Individual risk factors (among them some sys-

temic diseases, genetic factors, host response factors, tobacco use, age, stress and certain medication) determine the evolution and speed of periodontal bone loss. As a first resort, therapy tries to eliminate the gingival inflammatory process in order to avoid the onset of bone loss. If it has already begun, the aim is to stop its progress and, if possible, to further restore and regenerate the lost periodontal tissues.

The great variation of periodontal destruction in the different individuals requires different therapeutic strategies. The knowledge of these therapeutic in a specific population is the essential information on which adequate strategies for oral health promotion are based.

The Community Periodontal Index for Treatment Needs (CPITN) was developed by the International Dental Federation and approved by the World Health Organization (3) with the purpose of evaluating the need for periodontal treatment in different populations through a simple, quick and objective method. This Index is at present called Community Periodontal Index: CPI (4).

The CPI evaluates bleeding on probing, pocket depth and presence of dental calculus or plaque retentive factors, with the purpose of determining the level of therapy that is needed by the individuals of the population under study. It was not designed to determine prevalence or severity of periodontitis, since it does not evaluate attachment level, gingival recession, mobility or difference between supra and subgingival calculus (5).

Data obtained by CPI evaluation provide essential information for the development and promotion of preventive or therapeutic programmes and to estimate implementation resources (human, physical and material) (6).

Since its development, CPI has been used in numerous countries. The data obtained from those epidemiological studies may be found in the WHO Global Oral Data Bank (7).

To date, few studies using this index have been carried out in Argentina. In the province of Corrientes, Gasparini and Burri (8) studied 532 persons between 15 and 39 years of age. In Buenos Aires City, Gómez et al. (9) evaluated 320 patients, older than 15 years, who attended the Dental School of Buenos Aires University.

The purpose of this study was to evaluate the need for periodontal treatment in adult patients, throughout all Argentina, using the CPI.

## MATERIAL AND METHODS

The study sample consisted of 3694 patients (2000 women and 1472 men) from 18 to 84 years of age, who spontaneously attended general dental services. The examinations were carried out in private dental offices, hospitals and health centres with dental services, between March 1999 and December 2000. In each of the 23 Argentine provinces and in Buenos Aires City a minimum of 100 patients were examined and the data obtained were analysed by geographic regions: Centro, Cuyo, Noroeste (NOA), Noreste (NEA) and Sur (Fig. 1).

To be examined, patients had to be older than 18 years and have at least two teeth in any sextant.

Patients with risk of bacterial endocarditis, diabetes or immunologic deficiency disease, and patients receiving corticoids or immunosuppressor drugs were excluded.

The sample was obtained at random from volunteer patients that fulfilled the above criteria, and consulted the examining dentist for the first time. The procedure continued until a minimum of 100 or a maximum of 200 patients per province was reached.

Clinical examination was carried out by dentists of the National Commission of Health Care of the Dental Confederation of the Argentine Republic (CORA), dentists of the Departments of Periodontics of the University of Buenos Aires, Maimonides, Salvador-Argentine Dental Association and the Independence Fundation (Córdoba, Argentina).

The examiners were calibrated with two experienced periodontists of the Argentine Society of Periodontics. Inter-examiner reliability was evaluated in terms of the percentage of agreement between duplicated recordings on a group of 5 patients per examiner, and one experienced periodontist. All together, the inter-examiner agreement was 73%.

Each examiner was provided with the probes, mirrors, surgical gauze and gloves necessary for the examination. All the material was sterilized and was individual for each patient.

The examination was carried out with the WHO periodontal controlled pressure probe (WHO PDT), Sensor Probe Type C, which has a 0,5 mm spherical point, and a black band, which runs from 3.5 mm to 5.5 mm.

The Community Periodontal Index (CPI) (3) was recorded as follows:

**0**: Black band visible (probing depth less than 3.5 mm), no bleeding on probing, no calculus or overhanging restoration margins.

**1**: Black band visible (probing depth less than 3.5 mm), gingival bleeding on gentle probing, no calculus or overhanging restoration margins.

**2**: Black band visible (probing depth less than 3.5 mm), supra or subgingival calculus and/or overhanging restoration margins.

**3**: Black band partially visible (probing depth 3.5 - 5.5 mm).

**4**: Black band not visible (probing depth 5.5 mm or greater).

All teeth present, except the third molars, were examined. Six sites per tooth were examined: mesio-buccal, buccal, disto buccal, disto lingual, lingual, mesio lingual.

The highest value in each sextant was recorded as the score for that sextant. To be evaluated, the sextant had to present at least two teeth; otherwise it was considered edentulous.

In order to characterise the sample, each patient answered a questionnaire indicating the reason for consultation, occupation, educational level, smoking habit and oral hygiene habit.

The criteria recommended by Ainamo et al. (3) and Hohlfeld and Bernimoulin (10) to determine the periodontal treatment requirements were used as follows:

Score 0: no treatment needed.

Score 1: requires at least oral hygiene instruction.

Score 2 and 3: requires scaling and removal of plaque retentive factors.

Score 4: requires complex periodontal treatment.

**Data Analysis**

A minimum of 100 individuals per province were examined. This sample size was sufficient to estimate the frequency of individuals in the different categories, with a margin of error not higher than 10% and 95% reliability.

For analysis, the patient was taken as a unit. His/her need for treatment was determined according to the highest score recorded for his/her mouth.

The recorded data were analysed for the complete sample, according to geographic regions, age, reasons for consultation, frequency of tooth brushing and use of dental floss. The percentage of patients in each category was determined.



*Fig. 1: Argentina geographic regions: Centro: Ciudad Autónoma de Buenos Aires, Provincia de Buenos Aires, Córdoba, Entre Ríos, Santa Fe. Cuyo: Mendoza, San Juan, San Luis. NOA: Catamarca, Jujuy, La Rioja, Salta, Santiago de Estero, Tucumán. NEA; Chaco, Corrientes, Formosa, Misiones. Sur: La Pampa, Chubut, Neuquén, Río Negro, Santa Cruz, Tierra de Fuego.*

The data were loaded in an Excel (Microsoft Office program) page and exported for processing with the statistics software program SPSS 10.0 (Statistical package for social-science).

In the appropriate cases, comparisons between specific groups were performed using the Chi-square test. The level of significance was set at p=0.05. The comparison was completed taking into account each of the confidence intervals (95%).

## RESULTS
### Characteristics of the sample

For the global sample, and for each geographic region, the characteristics in reference to age, gender, residence, educational level, occupation and reason of consultation are shown in tables 1 to 6. In each age group, more than 60 individuals were evaluated as required by OMS. The distribution by gender and the percentages for rural and urban populations were even in every area.

The educational levels were similar in all the areas, except for NEA, where the percentage of individuals with a higher education level was smaller.

The most frequent reason for consultation was caries followed by pain.

| TABLE 1. Age groups: Frequency distribution (percentage of individuals in each category evaluated) | | | | | | |
|---|---|---|---|---|---|---|
| | | REGION | | | | |
| Age | GLOBAL n=3694 | CENTRO n=858 | CUYO n=497 | NEA n=439 | NOA n=913 | SUR n=987 |
| 18-34 | 42.1 | 37.8 | 41.9 | 45.8 | 48.3 | 38.5 |
| 35-44 | 27.4 | 26.7 | 27.4 | 24.1 | 26.0 | 30.8 |
| >45 | 30.5 | 35.5 | 30.8 | 30.1 | 25.7 | 30.7 |

| TABLE 2. Frequency distribution (percentage of individuals in each category evaluated) | | | | | | |
|---|---|---|---|---|---|---|
| | | REGION | | | | |
| Gender | GLOBAL n=3694 | CENTRO n=858 | CUYO n=497 | NEA n=439 | NOA n=913 | SUR n=987 |
| Female | 60.2 | 63.1 | 61.8 | 59.0 | 59.3 | 58.2 |
| Male | 39.8 | 36.9 | 38.2 | 41.0 | 40.7 | 41.8 |

| TABLE 3. Place of residence: Frequency distribution (percentage of individuals in each category evaluated) | | | | | | |
|---|---|---|---|---|---|---|
| | | REGION | | | | |
| Place of residence | GLOBAL n=3694 | CENTRO n=858 | CUYO n=497 | NEA n=439 | NOA n=913 | SUR n=987 |
| Urban | 78.0 | 83.5 | 74.4 | 58.5 | 79.6 | 82.4 |
| Rural | 15.8 | 15.0 | 21.2 | 13.7 | 16.2 | 14.2 |
| No answer | 6.2 | 1.6 | 4.0 | 27.8 | 4.2 | 3.4 |

| TABLE 4. Educational level: Frequency distribution (percentage of individuals in each category evaluated) | | | | | | |
|---|---|---|---|---|---|---|
| | | REGION | | | | |
| Educational level | GLOBAL n=3694 | CENTRO n=858 | CUYO n=497 | NEA n=439 | NOA n=913 | SUR n=987 |
| Primary | 23.8 | 25.1 | 24.7 | 30.3 | 22.2 | 20.9 |
| High school | 36.5 | 34.4 | 33.4 | 44.4 | 35.8 | 37.2 |
| College | 15.7 | 16.3 | 13.9 | 9.6 | 15.9 | 18.5 |
| University | 18.0 | 20.6 | 23.5 | 10.5 | 21.1 | 13.5 |
| No answer | 5.9 | 3.6 | 4.4 | 5.2 | 4.9 | 9.9 |

| TABLE 5. Occupation: Frequency distribution (percentage of individuals in each category evaluated) | | | | | | |
|---|---|---|---|---|---|---|
| | | REGION | | | | |
| Occupation | GLOBAL n=3694 | CENTRO n=858 | CUYO n=497 | NEA n=439 | NOA n=913 | SUR n=987 |
| Student | 10.6 | 12.4 | 8.2 | 8.4 | 13.0 | 9.0 |
| House keeper | 21.3 | 20.0 | 26.6 | 25.5 | 19.8 | 19.1 |
| People on sales | 7.0 | 6.4 | 5.2 | 8.4 | 8.5 | 6.4 |
| Professional | 15.6 | 16.6 | 18.1 | 9.1 | 15.7 | 16.5 |
| Labourer | 33.5 | 33.3 | 26.8 | 34.2 | 29.7 | 40.1 |
| Unemployed | 6.3 | 6.4 | 5.0 | 7.1 | 9.2 | 3.7 |
| No answer | 5.7 | 4.9 | 10.1 | 7.3 | 4.1 | 5.1 |

| TABLE 6. Reason for consultation: Frequency distribution (percentage of individuals in each category evaluated) | | | | | | |
|---|---|---|---|---|---|---|
| | | REGION | | | | |
| Reason for consultation | GLOBAL n=3694 | CENTRO n=858 | CUYO n=497 | NEA n=439 | NOA n=913 | SUR n=987 |
| Caries | 37.2 | 31.4 | 23.7 | 38.7 | 39.1 | 46.2 |
| Pain | 16.6 | 19.2 | 16.5 | 18.7 | 17.2 | 12.8 |
| Gingival bleeding | 12.3 | 14.8 | 15.9 | 14.6 | 12.3 | 7.2 |
| Aestethic | 10.1 | 9.1 | 7.0 | 9.3 | 13.5 | 9.7 |
| Infection | 4.6 | 4.8 | 6.8 | 4.3 | 4.5 | 3.5 |
| Tooth mobility | 4.1 | 4.7 | 6.2 | 2.7 | 4.2 | 3.2 |
| Other | 15.2 | 16.1 | 23.7 | 11.6 | 9.2 | 17.3 |

Tables 7 to 9 show the risk factors evaluated: frequency of brushing, use of dental floss and smoking habit.

## CPI distribution

The results are reported considering the most severe condition found in each patient (Table 10, Fig. 2). 3.2% of the patients presented Score 0 in all the sextants (gingival health), 17.2% presented Score 1 as the most severe condition (pockets under 3.5 mm, with bleeding on probing, no calculus nor overhanging restorations), 38.8% presented Score 2 as the most severe (pockets under 3.5 mm with calculus and/or overhanging restoration), 26.4% presented Score 3 as the maximum finding (pockets between 3.5 and 5.5 mm) and 14.3% presented one or more sextants with Score 4 (pockets over 5.5 mm).

The most prevalent condition was the presence of pockets under 3.5 mm with calculus or overhanging restoration (Score 2).

Table 11 shows that 44.7% of the patients with Score 4 exhibited only one sextant with that value, and only 4.7% had Score 4 in all sextants.

Analysing data according to treatment needs (Fig. 3), 17.2% of patients needed instruction in oral hygiene
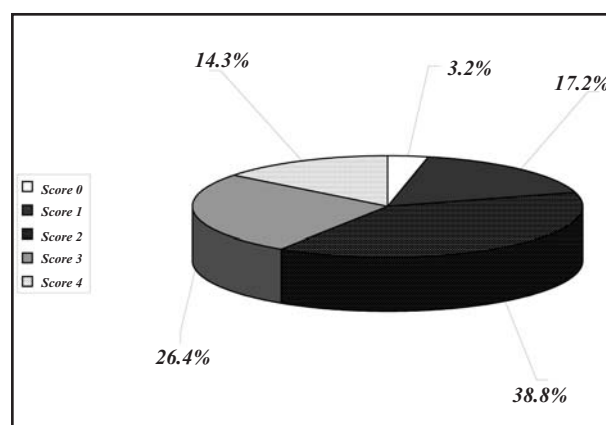


*Fig. 2: Global results: CPI frequency distribution according to the highest score in the mouth*

**TABLE 7. Tooth brushing: Frequency distribution (percentage of individuals in each category evaluated)**

| Frequency per day | GLOBAL n=2525 | REGION | | | | |
|---|---|---|---|---|---|---|
| | | CENTRO n=731 | CUYO n=334 | NEA n=310 | NOA n=913 | SUR n=719 |
| Never | 4.1 | 6.1 | 4.4 | 2.5 | 5.8 | 1.8 |
| Once | 25.5 | 25.4 | 21.2 | 28.0 | 24.5 | 23.6 |
| Twice or more | 71.2 | 68.3 | 74.2 | 69.3 | 69.6 | 74.5 |

**TABLE 8. Dental floss use: Frequency distribution (percentage of individuals in each category evaluated)**

| Frequency per day | GLOBAL n=2515 | REGION | | | | |
|---|---|---|---|---|---|---|
| | | CENTRO n=731 | CUYO n=326 | NEA n=311 | NOA n=913 | SUR n=722 |
| Never | 61.9 | 63.2 | 69.6 | 52.0 | 64.0 | 60.1 |
| Occasionally | 25.0 | 26.8 | 17.1 | 33.1 | 22.3 | 24.9 |
| Once or more | 13.0 | 9.9 | 12.8 | 14.7 | 13.6 | 14.9 |

**TABLE 9. Smoking habit: Frequency distribution (percentage of individuals in each category evaluated)**

| Smoking habit | GLOBAL n=3694 | REGION | | | | |
|---|---|---|---|---|---|---|
| | | CENTRO n=858 | CUYO n=497 | NEA n=439 | NOA n=913 | SUR n=987 |
| Non smoker | 59.5 | 63.4 | 59.4 | 67.2 | 54.3 | 57.6 |
| < 10/day | 18.4 | 19.0 | 18.5 | 14.1 | 21.1 | 17.2 |
| > = 10/day | 16.7 | 15.7 | 16.5 | 12.1 | 15.9 | 20.6 |

**TABLE 10. Global results: CPI frequency distribution according to the highest score in the mouth (number and percentage of individuals).**

| CPI | Number | Percentage |
|---|---|---|
| 0 Health | 120 | 3.2 |
| 1 Pockets < 3.5 mm with bleeding, without calculus | 637 | 17.2 |
| 2 Pockets < 3.5 mm with bleeding, with calculus | 1434 | 38.8 |
| 3 Pockets between 3.5 and 5.5 mm | 975 | 26.4 |
| 4 Pockets > 5.5 mm | 528 | 14.3 |
| **Total** | **3694** | **100.0** |

as the only therapy, while 65.2% needed instruction in oral hygiene and scaling (supra and subgingival) and 14.3% needed instruction in oral hygiene, scaling and complex treatment, following a more exhaustive diagnosis (clinical and radiological).

Figure 4 shows the comparison among the different regions.
The correlation between CPI and age groups (Table 12), showed a statistically significant ($p<0.05$) increase with age of the percentage of subjects with Score 4.
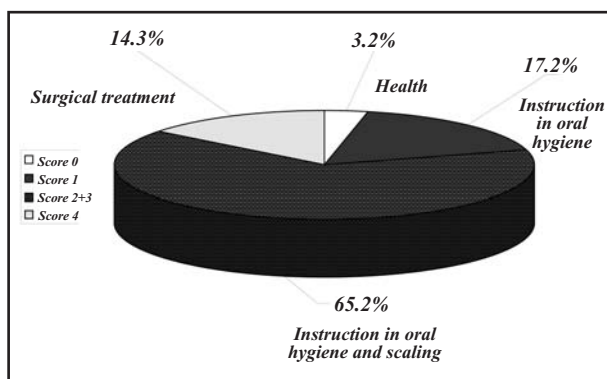
Fig. 3: Global results: CPI frequency distribution according to treatment needs.
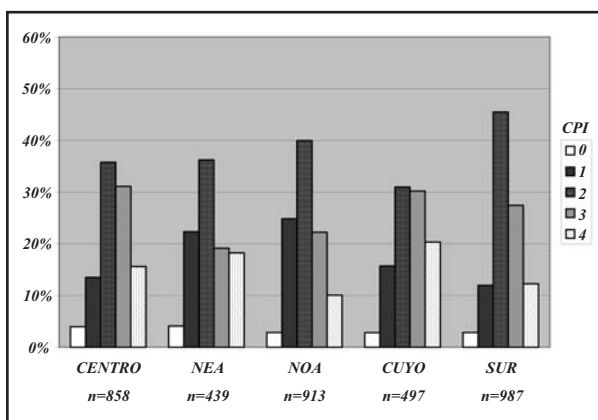


Fig. 4: CPI Score: Comparison among the different regions

The correlation between CPI and reason for consultation (Table 13) showed that 77.7% of the patients who consulted for non-periodontal reasons (caries, pain, aesthetics, infection, etc.) showed Scores 2, 3 and 4, that is, they did need periodontal treatment. When the reason for the consultation was periodontal (bleeding and/or dental mobility) the percentage of patients with score 4 was higher.

**Presence/absence of teeth**
Patients presented an average of 25.4 teeth. This value was maintained throughout geographic regions (Table 14).

| TABLE 11. Distribution (number and percentage) of patients with score 4 according to the number of sextants affected per patient | | |
|---|---|---|
| Number of sextants with CPI= 4 | Number of patients | Percentage of patients |
| 1 | 236 | 44.7 |
| 2 | 119 | 22.5 |
| 3 | 71 | 13.4 |
| 4 | 52 | 9.8 |
| 5 | 25 | 4.7 |
| 6 | 25 | 4.7 |

| TABLE 12. CPI by age groups | | | | | | | |
|---|---|---|---|---|---|---|---|
| CPI | | | 0 | 1 | 2 | 3 | 4 |
| Age groups | 18-34 yrs | n: 1554 | 5.1 | 25.4 | 42.2 | 20.8 | 6.4 |
| | 34-44 yrs | n: 1012 | 2.7 | 13.7 | 43.4 | 25.9 | 14.3 |
| | >45 yrs | n: 1128 | 1.2 | 9.1 | 30.1 | 34.5 | 25.1 |

| TABLE 13. CPI by reason for consultation | | | | | | | |
|---|---|---|---|---|---|---|---|
| | CPI | | 0 | 1 | 2 | 3 | 4 |
| Reason for consultation | Periodontal | n:606 | 6 | 59 | 175 | 183 | 183 |
| | | % | 1.0 | 9.7 | 28.9 | 30.2 | 30.2 |
| | Non periodontal | n:3087 | 114 | 578 | 1258 | 792 | 345 |
| | | % | 3.7 | 18.7 | 40.8 | 25.7 | 11.2 |

| TABLE 14. Mean number of teeth present (SD: Standard deviation) | | | | | | |
|---|---|---|---|---|---|---|
| | | REGION | | | | |
| | GLOBAL | CENTRO | CUYO | NEA | NOA | SUR |
| Mean | 25.4 | 24.8 | 25.5 | 26.2 | 24.9 | 25.9 |
| SD | 5.3 | 5.5 | 5.2 | 5.4 | 5.6 | 4.9 |

The most frequently absent teeth were the third molars, followed by the first inferior molars, premolars and second molars, second inferior premolars, first inferior premolars and finally, inferior incisors and canines. The rate was constant for all of the regions.

## DISCUSSION

This study evaluated 3694 patients and the examination was carried out on all teeth because this method is considered more accurate than the original partial examination index (11, 12).

These results show that a high percentage of the subjects that attend consultation (96.8%) require some form of periodontal treatment. These results are in agreement with 137 studies from 74 countries registered in the OMS data bank (13).

On the other hand, when evaluating the complexity of the required treatments, there is a considerable difference between the various publications (14-21).

These differences could be attributed to the variations in the working conditions, luminosity, probing pressure, teeth evaluated, sample studied, development of the country, race, social-economic level and age.

There is agreement about the fact that the most frequent conditions are Scores 2 and 3 (shallow pockets with calculus and pockets smaller or equal to 5.5 mm) as found in our country. The percentage of individuals with Scores 1 and 4 presents great variation in the different publications.

The description of the results according to the most severe finding may be misleading. A single site with Score 4 determines the classification of the individual in terms of treatment required. Thus, the analysis by sextant must also be considered. Our data agree with numerous studies that report that few sextants per individual present a CPI Score 4 (22, 23).

All the publications agree on the fact that the older the patient, the higher the possibility of presenting Score 4 and younger individuals present Score 2 more frequently (24, 25).

As shown in table 6, only 12.3% of individuals consulted because of gum bleeding. However, of the remaining 88% who consulted for other reasons, 90% presented Scores 1, 2, 3 and 4 (Table 13). These index values reveal gingival lesion, which frequently implies bleeding. This would show that most of the patients were not aware of their periodontal disease. This finding stresses the importance of implementing ways of educating people to recognize the symptoms of periodontal disease, both at individual and community levels.

The identification of the treatment needs of the population under study enables to select the adequate educational preventive strategies to fulfil a specific aim, taking into consideration the social and cultural factors of the Argentine population.

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