

## COMPARATIVE STUDY OF TWO QUANTITATIVE METHODS OF EVALUATION AND CONTROL OF PLAQUE

C. GH. BOITOR<sup>1</sup>, ANCA FRĂȚILĂ<sup>2</sup>, MARIANA SABĂU<sup>3</sup>, D. MĂRIEȘ<sup>4</sup>, O. BOITOR<sup>5</sup>

<sup>1,2,3</sup>University "Lucian Blaga" of Sibiu, <sup>4</sup> Public Health Direction of Sibiu, <sup>5</sup>Student University "Lucian Blaga" of Sibiu

**Keywords:** plaque, evaluation, control, quantitative methods, comparative study

**Abstract:** Following the publication in the medical literature of studies comparing the classical method of assessing the O'Leary plaque with a new method PASS (Assesment Plaque Scoring System) which has a much simpler technique and after the statements the authors, the results statistically insignificant compared to the classical method, we intend to study and we do so. In addition we wanted to compare the results of the PASS method, not only the method but the method O'Leary Silness-Loe, a method recommended by WHO for epidemiological studies. I took the study a group of 34 children, aged 12-13 years, students in sixth grade at a school in Sibiu, which were examined at the same time about 3 hours after the last brushing dental. To determine the index of Silness-Loe plaque O'Leary and I used that card revealed by 2% eosin solution, and the method we used revealed PASS card but have been in contact with the periodontal probe tip tooth surface being gingival sulcus (periodontal probe is only for use to prevent damage marginally periodontium). Results statistically different between the Silness-Loe and O'Leary method raises the question: which method expresses the reality most accurate? Both methods are time consuming, so they are difficult to apply in current practice of a dentist. Overestimation, ultimately, can be considered an error of less than underestimation on plaque control. Therefore we consider that the PASS method can be applied in the dental office usually at the current consultations with the advantage of short execution time and also can be a great way to increase patient motivation to improve dental hygiene - personal oral.

**Cuvinte cheie:** placa bacteriană, evaluare, control, metode cantitative, studiu comparativ

**Rezumat:** În urma publicării în literatura medicală de specialitate a unor studii care compară metoda clasică O'Leary de apreciere a plăcii bacteriene cu o metoda nouă PASS (Plaque Assesment Scoring System) care prezintă o tehnică mult mai simplă și după afirmațiile autorilor, cu rezultate statistice nesemnificative față de metoda clasică, ne-am propus să studiem și noi acest lucru. În plus am dorit să comparăm rezultatele metodei PASS, nu numai cu metoda O'Leary ci și cu metoda Silness-Loe, metoda recomandată de către OMS pentru studiile epidemiologice. Am luat în studiu un lot de 34 copii, cu vârste de 12-13 ani, elevi în clasa a VI-a la o școală generală din municipiul Sibiu, care au fost examinați la același interval de timp de circa 3 ore, după ultimul periaj dentar. Pentru determinarea indicilor de placă O'Leary și Silness-Loe, am folosit ca revelator de placă soluția de eozină 2%, iar pentru metoda PASS nu am folosit revelator de placă ci doar am trecut sonda parodontală în contact cu suprafața dentară vârful acesteia fiind în șanțul gingival (scopul utilizării sondei parodontale fiind doar acela de a preveni lezarea parodontiului marginal). Rezultatele diferite din punct de vedere statistic între metoda Silness-Loe și O'Leary ridică întrebarea: care metodă exprimă cu acuratețea cea mai mare realitatea? Ambele metode fiind mari consumatoare de timp, motiv pentru care sunt destul de dificil de aplicat în practica curentă a unui cabinet stomatologic. Supraestimarea, în ultimă instanță, poate fi considerată o eroare mai mică decât subestimarea în privința controlului plăcii bacteriene. De aceea apreciem ca metoda PASS poate fi aplicată uzual în cabinetul stomatologic cu ocazia consultațiilor curente având avantajul timpului scurt de efectuare și în plus poate fi un mijloc foarte bun de creștere a motivației pacientului pentru îmbunătățirea igienei dento - orale personale.

### INTRODUCTION

Plaque is widely recognized today as the origin of the disease both caries and periodontal disease. Its control is a preventative way, which leads many researchers to study the most feasible methods of detection, control and motivation of patients to render etiopathogenic role of plaque.

### AIM OF STUDY

Following publication in medical literature of studies comparing the classical method of assessment O'Leary plaque with a new method PASS (ASSESSMENT Plaque Scoring

System) which has a much simpler technique after allegations authors, statistically insignificant results to the classical method, we proposed to study this too. I also wanted to compare the results of the PASS method, not only with the method but the method O'Leary Silness-Loe, a method recommended by WHO for epidemiological studies.

### MATERIAL AND METHOD

We studied a group of 34 children, aged 12-13 years, students in sixth grade at a school in Sibiu, which were examined at the same time about 3 hours after the last brushing

<sup>1</sup> Corresponding Author: Cornel Gh. Boitor, 2-4, Hermann Oberth street, Sibiu, Romania; e-mail: boitorcornel@yahoo.com; tel +40-0740175420  
Article received on 28.12.2010 and accepted for publication on 21.03.2010  
ACTA MEDICA TRANSILVANICA June 2011; 2(2)295-297

## CLINICAL ASPECTS

dental. To determine the O'Leary plaque index, Loe and Silness, like we used as a developer of eosin 2% solution, and we did not use the PASS method for revealing but we just went into contact with the periodontal probe tip of the tooth surface being ditch the gum (periodontal probe is for use only to prevent damage to the marginal gingival groove). Representation of materials used is shown in Fig. 1.

**O'Leary method:** drying the dental arches and then staining with cotton balls soaked in the solution revealing. We counted 128 dental surfaces and where was missing teeth, there we counted lower than corresponding areas. Areas considered with plate were taken out regardless of size of the colored plate. O'Leary index I obtained the following formula:

$$\text{O'Leary} = \frac{\text{No. of examined surfaces} \cdot \text{No. of surfaces with plaque}}{\text{No. examined surfaces}} \times 100$$

**Silness-Loe method** consisted of staining the teeth 16, 12, 24, 36, 32 and 44 with the same solution revelation, assigning scores of 1, 2 or 3 for each tooth surface that was 1 / 3, 2 / 3 and above 2 / 3 of tooth surface covered with plaque. To obtain the average plaque for each tooth surfaces we have divided the sum by 4. Silness-Loe index of the patient (IP) is given by:

$$\text{PI patient} = \frac{\text{Pi}(16) + \text{Pi}(12) + \text{Pi}(24) + \text{Pi}(36) + \text{Pi}(32) + \text{Pi}(44)}{6}$$

**Figure no. 1. Plaque marker, periodontal probe and the chronometer used in the study**



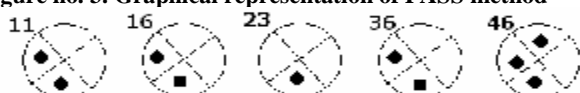
**PASS Method (Plaque Assessment Scoring System)** proposed by Butler in 1996, consisted of visual assessment of plaque deposits, without revealing solution to use at the mere passage of a periodontal probe in contact with the four surfaces of the teeth 11, 16, 23, 36, 46 as shown in Figure 2.

**Figure no. 2. Highlighting plaque through PASS method**



Schematic representation of the index is shown in Figure 3 in which the points we scored the presence of plaque on the surface of the teeth examined.

**Figure no. 3. Graphical representation of PASS method**



PASS index was calculated using the formula:

$$\text{PASS} = \frac{\text{No. of surfaces with plaque}}{\text{No. of examined surfaces}} \times 100$$

If there is no mention of one of the teeth I took into account the nearest neighbor tooth from the missing tooth. Data were recorded in individual files on which I made prevention a table summarizing the 3 methods.

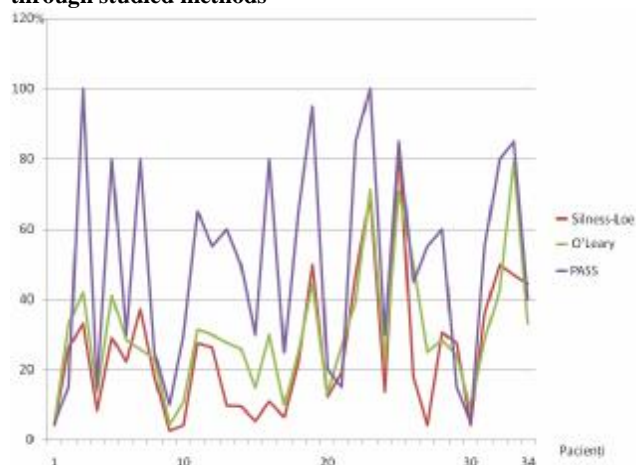
As to the percentage values for O'Leary and PASS methods, we converted the absolute values of the method in percentage values Silness-Loe (I applied a simple rule of three, up three percentage equivalent score 100%). The results obtained by applying the three methods we have expressed graphically as the diagram in Figure 4.

Graphic method for comparing our method, shows large differences between PASS and the other two methods and smaller differences between the method and manner O'Leary Silness-Loe. The data were statistically processing to confirm or refute the statistical significance in Table no. 1. Note that the lowest values for the enamel coating plate were obtained by the method of Silness-Loe.

Being the same group of children examined by three different methods we used for statistical comparison of student test pairs, which states that if there is a statistically significant difference "t<sub>av</sub>" calculated > "t<sub>av</sub>" spreadsheet, and if "t<sub>av</sub>" calculated ≤ "t<sub>av</sub>" spreadsheet, the difference is statistically insignificant. After applying the Student test by pairs, we obtained the following data presented in the table. 2.

## RESULTS

**Figure no. 4. Graphical representation of obtained values through studied methods**



After the analysis, we can say without reservation that between the method and manner PASS Silness-Loe statistically significant differences (6.45 > 2.035). The same statistically significant results we obtained for comparison with the method O'Leary PASS method (6.51 > 2.035) and the Silness-Loe method method O'Leary (6.6 > 2.035).

## CONCLUSIONS

Methods of assessing the degree of coverage Silness-Loe plaque, O'Leary and PASS give different results, the differences being statistically significant. Coverage with plaque expressing the highest percentage when compared to traditional methods PASS method recognized.

Given the complexity of methods Silness-Loe and O'Leary, in the coloration and execution time, we say that the PASS method exaggerated by overestimation but are essentially in line with established methods.

## CLINICAL ASPECTS

**Table no. 1. Obtained values through the 3-methods**

Method	Media	Standard deviation $\pm$	Min value %	Max value %	Variation coefficient %	Work time (minutes)
PASS	45	16.76	5	100	37.24	2
O'Leary	30.3	9.73	4.4	79.4	32.11	8
Silness-Loe	25.29	10.40	2.7	83.3	41.12	11

**Table no. 2. Result of test Student applied through studied methods**

Method	Calculated „ $t_{uv}$ ” value	From table „ $t_{uv}$ ” value	Statistical significance
PASS	6.45	2.035	s
O'Leary	6.51	2.035	s
Silness-Loe	6.06	2.035	s

\*  $\alpha = 0.05$ ,  $v = 33$  degree

Results statistically different between the Silness-Loe and O'Leary method raises the question: which method accuracy expresses the highest reality. "Both methods are time consuming, and are therefore difficult to apply in the current practice of a dentist.

Overstatement, ultimately, may be considered an error less than underestimation on plaque control. Therefore we consider that the PASS method can be applied at the dental office and can be used in the current consultations with the advantage of making a short time and also can be a great way to increase patient motivation to improve dental hygiene - personal oral.

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