

I.

Gas chro -

matography, Halimeter

9 - 13).

In vitro

가

Treponema denticola, Porphyromonas gin - givalis, Prevotella intermedia, Bacteroides forsythus, Fusobacterium

hydrogen sulfide methyl mercaptan

85%

1,2).

3,14 - 16).

가

3 - 8).

가

, VSC

Tonzetich 5) (volatile sulfur compounds ; VSC)

가

가, collagen

가,

, hydrogen sulfide(H₂S), methyl mercaptan (CH₃SH), dimethyl sulfide(CH₃SCH₃) hydrogen

Tonzetich 22 - 23)

가 가

17 - 21).

sulfide methyl mercaptan 90% 가

VSC

cysteine methionine

(),

. Kostlec 24)

VSC가

VSC

. Miyasaki ²⁵⁾
가
가

- 1)
- 2) 6

. Yaegaki Sanada^{7,8)}
VSC 가 8 가
가

- 3) 가
- 4) 25
- 5)
- 2.

VSC 가
, VSC 가
가 , VSC

(plaque control record),
(VSC)
. , 18
4
, 1 VSC

. , Bosy ²⁶⁾

가

1/3

(1) O'Leary Plaque Control Record(PCR)
(DIA PLAG)
가

VSC

VSC
VSC

(tongue scraping)

II.

(2) Periodontal pocket depth

1.

6

(Williams probe ; Hu - Friday)

4mm

25 (29 - 59 ; 12, 13)

3

26

(3) Concentration of volatile sulfur com -

pounds
VSC

4)

Halimeter™(Model RH - 17R,
Inerscan Corp., U.S.A.) VSC
10 1 (parts per billion ;
ppb)

3
24
alcohol
3
air inlet
1.

straw 4cm

11,12),
VSC가

VSC 3

VSC

VSC
VSC
t - test
가

Pearson
. P<0.01

III.

VSC

Table 1
VSC , 29 - 59
12 13
VSC
가

Table 1. Mean values of VSC in experimental group by age and sex

Age	N	VSC concentration(ppb) Mean ± SD	Sex	N	VSC concentration(ppn) Mean ± SD
25 - 34	4	720.25 ± 168.22	male	12	319.41 ± 152.76
35 - 44	6	467.33 ± 218.20			
45 - 54	11	325.45 ± 135.37	female	13	556.23 ± 273.58
>54	4	449.75 ± 253.48			

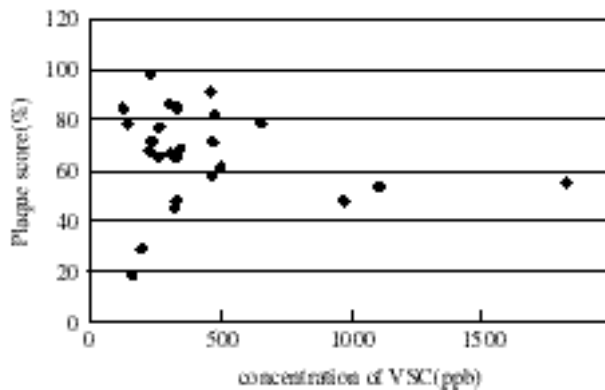


Figure 1. Correlation between VSC concentrations and plaque score (P>0.05)

Table 2. Comparison of VSC values between experimental and control group

group	VSC concentration(ppb) mean ± SD	T value
Experiment (n=25)	442.56 ± 270.61	4.3433**
Control (n=26)	117.81 ± 49.43	

** : P<0.01

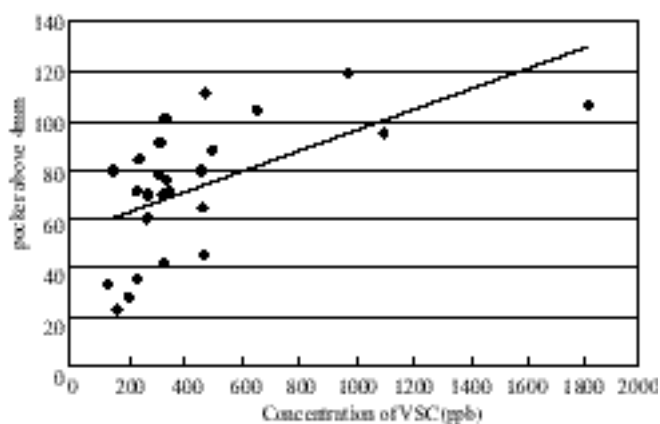


Figure 2. Correlation between VSC concentrations and number of pocket with 4mm or more(r=0.57,

Table 3. Change of VSC values from pre - treatment to post - treatment

Experiment (n=18)	VSC value(ppb) Mean ± SD	T value
Pre - treatment	445.16 ± 109.69	3.2025**
Pre - treatment	145.55 ± 86.04	

** : p<0.01

(P>0.05)(Table 1). VSC
442.56 ± 270.61 ppb 117.81 (P<0.01)(Table 2).
± 49.43 ppb

2. VSC 3. VSC
VSC VSC
270.61 ppb 442.56 ± 117.81 ± 49.43 ppb (P>0.05)(Figure 1).
4

4. VSC hydrogen sulfide methyl mercaptan 12 methyl mercaptan 4mm methyl mercaptan 가 Pearson correlation 0.57 가 가 (P<0.01) (Figure 2). 8,9).

5. VSC methyl mercaptan , Johnson 19,21) CH₃SH 가 DNA 가 가 Table 3 445.16 ± 109.69 ppb CH₃SH (mononuclear cell) IL - 1 lipopolysac - charide IL - 1 PGE₂ 145.55 ± 86.04 ppb (P<0.01). collagenase 가 18).Rizzo^{16,32)} lipopolysaccharide IV. 가 CH₃SH가 lipopolysaccharide . , lipopolysaccharide VSC가 가 VSC 가 가 5-9). Tonzetich 가 (organoleptic assessment) Rizzo²⁹⁾ lead acetate , Gas chromatography H₂S가 VSC 가 Gaffar ³⁰⁾ 가 Halimeter가 H₂S 가 Rosenberg 33). Yaegaki Sanada⁸⁾ Gas chromatogra - methyl mercaptan/hydrogen sulfide 가 가 12) VSC 가 methyl mercaptan 가 VSC 가 Tonzetich Mc Bride³¹⁾ , 가

VSC

.Miyazaki 25)

가 22,36 - 38).

VSC

VSC가 가

가

4). Tonzetich 5)

VSC 가

VSC

VSC 가 6)

. Kostelc

가 가

VSC 가

Yaegaki Sanada7)

8 가

VSC

가

VSC

가

VSC 가

가 VSC

12,26,34,35).

가

VSC

가

가

가

가

8 - 24

V.

가

VSC

25

26

VSC 가 5,7,8,27,28).

가

4mm

VSC 가 가

(P<0.01).

1. VSC

442.56 ± 270.61 ppb,

117.81 ± 49.43 ppb 4 가

- (P<0.01).
2. VSC
(P>0.05
) , 4mm
(r = 0.57 ,
P<0.01).
3. VSC
445.16 ± 109.69 ppb
86.04 ppb
145.55 ±
(P<0.01).
4. VSC
(P>0.05).

VSC 가
가

VI.

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- Abstract -

A Study on the Relationship Between Oral Malodor and Periodontal Disease

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Putrefactive activity within the oral cavity is the principal cause of halitosis. The most common intraoral sites of oral malodor production are tongue, interdental and sub - gingival areas. The other foci may include faulty restorations, sites of food impaction and abscesses.

Periodontal disease frequently involves pathological oral malodor, which is caused mainly by volatile sulfur compounds(VSC), such as hydrogen sulfide, methyl mercap - tan, and dimethyl sulfide.

The purpose of this study is to evaluate the association between oral malodor and periodontal status. Volatile sulfur com - pounds in mouth air were estimated by portable sulfide monitor(Halimeter™).

The results were as follows :

1. The levels of volatile sulfur com - pounds were significantly greater in a periodontitis group than in a control group($P<0.01$). The amounts of VSC in

mouth air from patients with periodon - tal involvement were four times greater than those of the control group.

2. The significant positive correlation was found between VSC concentrations and the number of pocket depth above 4mm($P<0.01$), but correlation between VSC concentrations and plaque score was not statistically significant($P>0.05$).
3. In the periodontitis group, VSC concentrations of pre - treatment sig - nificantly decreased after scaling and root planing($P<0.01$).
4. No statistically significant correla - tion was found between VSC concen - trations and sex / age in the periodon - titis group.

The above results indicate that periodon - tal disease may play a role as an important factor of oral malodor and deep periodontal pockets are a source of volatile sulfur com - pounds.