



## Streptococcal Profile in Oral of Iraqi Addicted

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### Abstract

The current study was included identify bacterial profile of the oral Streptococci associated with abuse substance in addict patients, Seventy oral swabs were collected from addict patients and twenty samples from healthy (control) with age ranged (19-53 ) years. During the period from August (2019) to February (2020) . Abuse substance were detected by using by Immunoassay (*ABON*<sup>TM</sup> Multi-Drug - urine ) which is one step screen test panel used for the qualitative detection of multiple drugs in human urine , Isolation of bacteria was done using the enrichment media , differential media , and selective media , and diagnosed according to some examinations methods which included cultural characteristics , Gram-staining and microscopic examination , biochemical tests , and the final identification was performed with *API-20 Strep.* and *Vitek-2* systems . The results appeared that the *Streptococcus spp.* were predominant in oral cavity , and the *S.mutans* of *Viridans Streptococci* species was more frequent with highest percentage in the addict patients when compared with from the healthy individuals , where the *S. salivarius* was more frequent with highest percentage . The conclusion of this study were the alteration of the normal flora in the oral cavity of addict patients which lead to increased susceptibility to opportunistic infectious pathogens.

**Key words:** Iraqi Addicted, Oral Streptococci, Abuse Substance

مسح المكورات العقدية في الفم للمدمنين العراقيين  
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### الخلاصة

هدفت الدراسة الحالية التحري عن المكورات العقدية الموجودة في الفم للمدمنين ومقارنتها مع الاصحاء . تم جمع 70 مسحة فموية من 70 مدمن و 20 مسحة فموية من 20 شخص غير مدمنين وتم التعرف على حالة الإدمان باستخدام فحص مناعي يتم التحري عن نوع المادة المدمن عليها الشخص . تم زراعة المسحات الفموية على الأوساط الزرعية وتم استخدام أوساط انتخائية وشخصت البكتيريا بالاعتماد على الفحص المجهرية والزرعي والفحوصات الكيمياء حيائية وأكدت باستخدام نظام الفايتهك والبعض شخص باستخدام نظام ابي 21 أظهرت النتائج سيادة المكورات العقدية في تجويف الفم وكانت *S. mutans* , هي الأكثر ظهوراً في المدمنين بينما كانت *S. salivarius* , هي الأكثر تواجد في الاسوياء من هذا نستنتج بان الفلورا الطبيعية في الفم تتأثر بسبب تناول المواد المخدرة

**الكلمات المفتاحية:** المدمنين العراقيين ، المسبقيات العقدية ، المواد المخدرة

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### Introduction

Addiction to drugs and alcohol is a dynamic and multi-faceted disease process in humans, with devastating health and financial consequences for the individual and society at large. The addictive drugs of abuse have marked effects on resistance to in

fectious diseases [1], also there is the view that increased susceptibility to opportunistic infectious pathogens is related to the alteration of immune responses caused by the drug . Forensic microbiology is the advanced methods that assist forensic

science in the gathering of data in the investigation . Due to the ubiquity and diversity of microbes , that could lead to making it a potential source of forensic evidence , and because of the advances in molecular biology and genomics , the forensic potential of microorganisms is becoming more apparent [2] .

Oral Streptococci are in general referred to as *Viridans Group Streptococci (VGS)* , that play important role in health of an individual (host) , considered to be of low pathogenic potential , when the composition of oral micro-flora is in a dynamic balance . But VGS can behave as opportunistic pathogens causing diseases , that range from mild to life threatening infections , when this balance is disturbed , also when they obtain entrance to sites that are usually sterile . Their portal of entry to this sites is oral and gastrointestinal mucosal lesions and intravascular catheters [3 ; 4] . Developed a new method for forensic saliva identification by using three target oral bacteria , *S. salivarius* , *S. sanguinis* , and *N. subflava* as markers , combined with a real-time polymerase chain reaction (RT-PCR) , system called OB mRT-PCR [5] .

Forensic microbiology or microbial forensics is a relatively new field of research , involves microorganisms for the discovery of evidence against "bioterrorism act , biocrime , or inadvertent microorganism / toxin release for attribution purposes", also this field depend on "cultural investigations carried out on internal organs and fluids collected post-mortem, in order to take information which can be useful in a medico-legal contest" [6; 7] . There is much evidence that human microbiome an very diverse and may benefit in determining several important data such as (ethnicity, country of origin, and even personal identity) , also it differs among sites of the body and may benefit for determining the nature of stains such as stains that

forming by saliva and vaginal fluid (it may even be possible to link the stains to the person responsible for them) , also the microbiome present in a soil sample may play important role as indicator of geographic origin or method of linking people, animals, or objects together or to a specific location , as well as microorganisms are essential in the decomposition process and effect the presence and concentration of alcohol, drugs , and other chemicals of forensic relevance [2] .

### Materials and methods

This case-control study was conducted on (90) individuals divided into two groups : patients group (70) and apparently health group (20) , with age ranged (19-53 ) years . The laboratory tests of this study were conducted in Laboratory of Microbiology - Department of Biological-College of Science / Babylon University and Central Public Health Laboratory- Baghdad . Urine samples and oral swabs were collected from both addicted and healthy control . Abuse substance were detected by using by Immunoassay (ABON™ Multi-Drug - urine) which is one step screen test panel used for the qualitative detection of multiple drugs in human urine , this product is used to obtain a visual , qualitative result , and was prepared according to the instructions of the manufacturing company (Abon Biopharm - Hangzhou\ China) .

Seventy oral swabs were collected from addict patients by using sterile dry cotton swabs (sterile transport medium swab) under aseptic conditions between 8.0-11.0 a.m. . After the sample was taken , the tip of the cotton swab was directly placed into a screw capped tube with transport media . All samples were labeled and stored in a cool place , until transported on icebox to the laboratory, for processing and investigation by bacterial culture on differentiated and enriched media

, the same procedure was applied to the oral swabs obtained from twenty healthy persons (control group) .

**Statistical Analysis**

The analysis of the current study was performed by using SPSS (Statistical Process for Social Sciences) version 23 , in order to assess the results of this study . Results were expressed by descriptive data analysis such as tables (Frequencies , Percent-

ages and Cumulative Percentages) . Chi-square (X2) was used to compare between variables distribution in present studied groups

**The Results and Discussion**

The results revealed that (72.9%) and (75%) of oral swabs from addict patients and healthy individuals respectively were give positive bacterial growth on Mitis Salivarius Agar (MSA) , as shown in Table (1) .

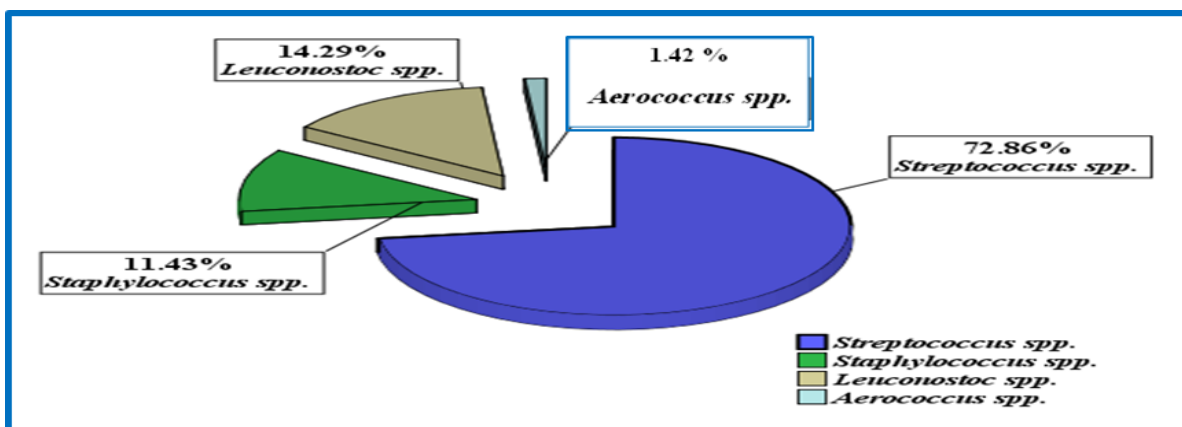
**Table (1) Distribution of bacteria isolated from addict Patients and healthy individuals according to growth on MSA**

Source of Swabs	N	Bacterial Growth			
		Positive		Negative	
		N	%	N	%
Addict Patients	70	51	72.9 %	19	27.1%
Healthy Individuals	20	15	75 %	5	25%
<b>Pearson Chi-Square = 0.037    Significance (2-sided) = 0.848</b>					

Reference : Results of program spss

The results showed that the *Streptococcus spp.* were (72.86%) of isolates from the addict patients and the rest isolates represent (11.43%) *Staphylo-*

*coccus spp.*, (14.29%) *Leuconostoc spp.* , and (1.42%) *Aerococcus spp.* , as shown in figure (1).



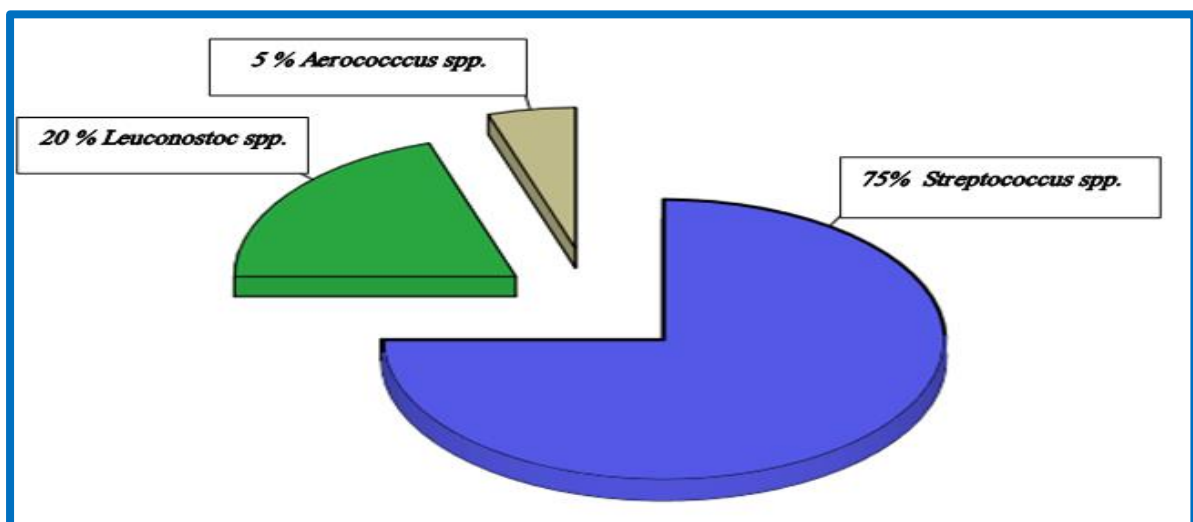
**Figure (1) Distribution of Streptococcus spp. and other bacteria isolated from oral cavity of addict patients**

Reference : Results of program spss

The *Streptococcus spp.* were (75%) of isolates from the healthy individuals and the rest isolates represent (20%) *Leuconostoc spp.* , and (5%) *Aerococcus spp.* , as shown in figure (2). The results revealed that the majority among *Streptococcus* isolated from oral cavity of addict patients , were *Viridans Streptococci* , which represented (84.31%) from *Streptococcus* isolated , while the rest represented non-oral Streptococci as follow : *S. agalactiae* were (1.96%) , *S. equinus* were (3.92%) , *Enterococcus faecium* were (5.88%) , *Enterococcus faecalis* were (1.96%) , and *Enterococcus avium* were (1.96%) , as shown in figure (3). Statistically, revealed were higher significant differences ( $P \leq 0.05$ ) in distribution between *Viri-*

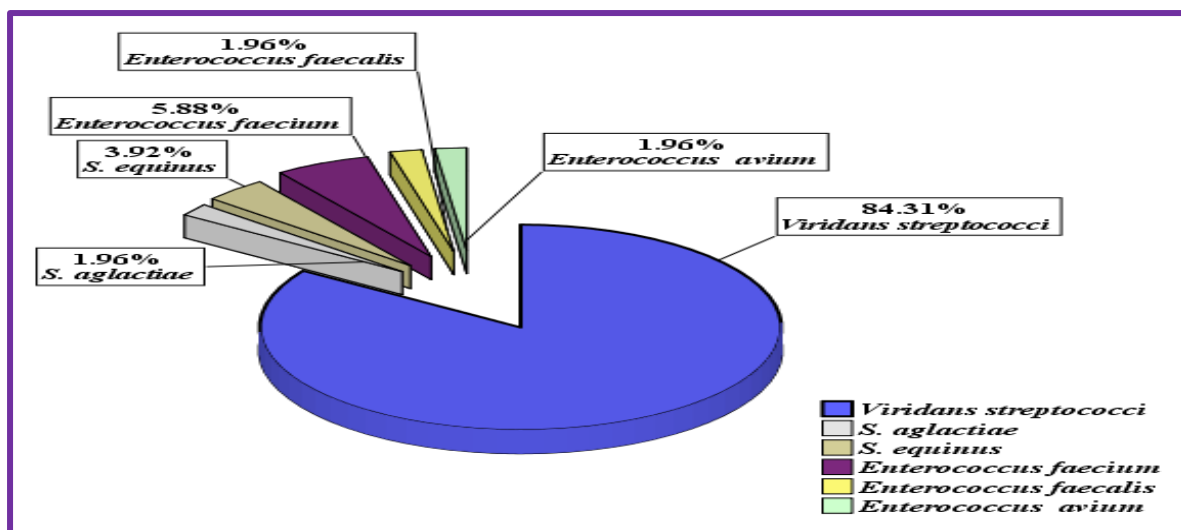
*dans Streptococci* and non-oral Streptococci. While *Viridans Streptococci* represented all the *Streptococcus spp.* isolated from oral cavity of healthy individuals.

The current study showed the distribution of *Streptococcus spp.* and other bacterial isolates were isolates from the addict patients and healthy individuals . The highest percentage of the *Streptococcus spp.* were reported by [8] who found that *Streptococcus spp.* represented the highest percentage of the rates of isolation obtained from the mouths. This results comparable to other studies [9; 10; 11; 12], they found that the *Streptococcus* genus was predominant in oral cavity as in the figure (2).



**Figure (2) Distribution of *Streptococcus spp.* and other bacteria isolated from oral cavity of healthy individuals**

Reference : Results of program spss

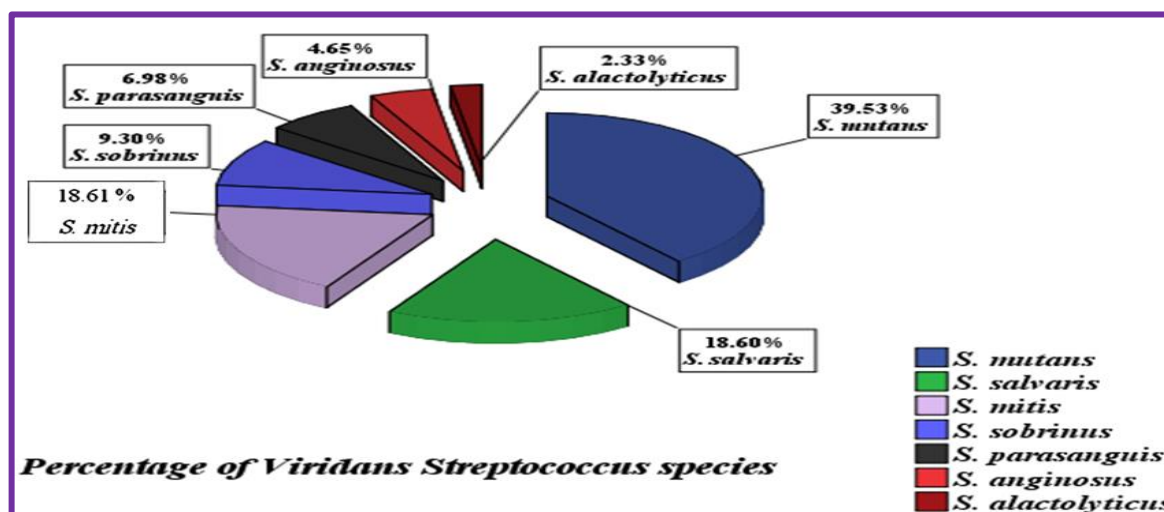


**Figure (3) Distribution of Viridans Streptococci and non-oral Streptococci within total of Streptococcus spp. isolated from addict patients**

reference : Results of program spss

The results showed that the *Viridans Streptococcus* species from the addict patients , were (39.53%) isolates identified as *S. mutans* , (18.60%) isolates identified as *S. salvaris* , (18.61%) isolates identified as *S. mitis* , (9.30%) isolates identified as *S. sobrinus* , (6.98%) isolates identified as *S. parasanguis* ,(4.65%) isolates identified as *S. anginosus* and (2.33%) isolates identified as *S. alactolyticus*, as shown in figure (4) . These results revealed that

the *S. mutans* was more frequent with highest percentage (39.53%) when compared with the other species of *Viridans Streptococci* , while the *S. alactolyticus* was less frequent with the lowest percentage (2.33%) . Statistically , revealed were higher significant differences ( $P \leq 0.05$ ) in distribution between species of *Viridans Streptococcus* isolated from oral cavity of addict patients .

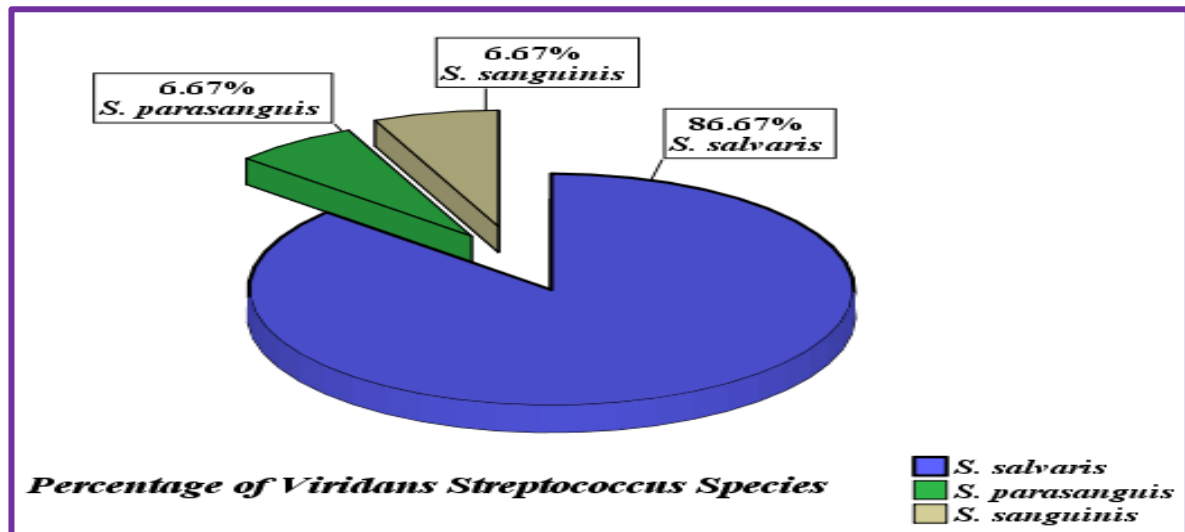


**Figure (4) Percentage of Viridans Streptococcus species isolated from addict patients**

Reference : Results of program spss

The results showed that the *Viridans Streptococcus* species from the healthy individuals, were (86.67%) isolates identified as *S. salvaris* , (6.67%) isolates identified as *S. parasanguis* , and (6.67%) isolates identified as *S. sanguinis* , as shown in figure (5) . These results revealed that the *S. salvaris* was more frequent with highest per-

centage (86.67%) when compared with the other species of *Viridans Streptococcus* . Statistically , revealed were higher significant differences ( $P \leq 0.05$ ) in distribution between species of *Viridans Streptococcus* isolated from oral cavity of healthy individuals.



**Figure (5) Percentage of *Viridans Streptococcus* species isolated from healthy individuals**

### Results of program spss

The results revealed that the majority among *Streptococcus* isolated from oral cavity of addict patients were *Viridans Streptococci* , which represented (84.31%) from *Streptococcus* isolated , while *Viridans Streptococci* represented all the *Streptococcus spp.* isolated from oral cavity of healthy individuals . [13] found that the rate of oral *Streptococcus* was 58% from *Streptococcus* isolated . These differences might be attributed to the different reasons such as change the properties of the ecosystem within the oral cavity with age , gender , changes in saliva flow , life-style and diet . Also , the results of the current study revealed that the *S. mutans* was more frequent with highest percentage (39.53%) when compared with the other species of *Viridans Streptococci* from the addict patients . [14] reported that the *S. mutans* consid-

ered as one of the most important etiological agent of dental caries . This data was similar to that finding of study by [15] in Egypt , and [16] in Kufa city-Iraq , they found that ratio of *S. mutans* in dental caries was (40%) .

The current study revealed that the *S. mutans* was more frequent with highest percentage (39.53%) in the addict patients when compared with from the healthy individuals , where the results revealed that the *S. salvaris* was more frequent with highest percentage (86.67%) . This might be attributed to the abuse substance that might be cause behaviors that have a negative impact on oral health , for example lack of oral hygiene practices , or the abuse substance might have altered bacterial acquisition and oral mucosal colonization in favor of periodontal pathogens .

[17] showed that the group with a high risk incidence of the dental caries are those with poor oral hygiene, those who ate sweets frequently, and those who were of low-socioeconomic class. [18] reported that the highest ratio of severe gingivitis was in ignorant individuals, due to their ignorance of oral hygiene, not using tooth brush and having bad nutrient habit. [19] reported that the oral health reflects the well being of an individual, thus maintaining oral hygiene is important, and the maintenance of proper oral hygiene can reduce oral microbial load and lead to in the control of oral diseases, as well as might be there are factors other than lifestyle may account for their high infection risk, such as the immunomodulatory effects of addictive drugs.

### Conclusion

The Viridans Streptococci represented the majority among Streptococcus isolated from oral cavity of addict patients, while represented all the Streptococcus isolated from oral cavity of healthy individuals. The *S.mutans* of Viridans Streptococci species was highest percentage in the addict patients compared with the healthy individuals. Alteration of the normal flora in the oral cavity of addict patients lead to increased susceptibility to opportunistic infectious pathogens.

### Recommended

Genetic study of Viridans Group Streptococci (VGS) bacteria by performing DNA sequencing of PCR product in the addict patients as compared with healthy control.

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