

RECENT ADVANCES IN PREVENTIVE DENTISTRY:A REVIEW ARTICLE

Najmus Sahar¹, Pradeep Tangade², Ankita Jain³, Vikas Singh⁴

Post Graduate Student¹, Professor & Head², Reader^{3,4}

1-4- Department of Public Health Dentistry, Teerthanker Mahaveer Dental College And Research Centre, Moradabad

Abstract: Oral hygiene is an important part of general health and affects the well being. Oral diseases remain a public health problem worldwide. Recent increase in the research field have increase the diagnostic activity surrounding Dental Caries ,Periodontal disease,Oral Cancer. Dental caries has been considered as prevalent chronic disease worldwide. 90% of people have oral problems or tooth pain caused by caries .Oral Cancer is the eighth most common cancer worldwide and the prevalence of which is particularly high among men. The application of scientific knowledge in the prevention of oral diseases result in the decline of oral diseases.

Keywords: Dental Caries, Oral Cancer, Periodontal Lesions.

Introduction

There is an old saying, but true... **Diseases can rarely be eliminated through early diagnosis or good treatment , but prevention can eliminate disease.**

The Term Prevention originated from a Latin word “*praevenire*” that means to stop something from happening in the field concerned¹. The Preventive dentistry is known as the preventive measures which are necessary to prevent disease and supporting structures.

Prevention is currently receiving much attention and concept of prevention are mainly broad based. There are Four Levels of prevention which can be identified in relation to natural history of Disease. Primordial prevention, primary, secondary and tertiary levels of Prevention.

Primordial prevention consist of actions and measures that inhibit the emergence of risk factor in the form of environmental, economic, social and behavioural conditions and cultural patterns of living.

Primary prevention consists of strategies and measures to prevent the onset of disease,to reverse the progression of the disease, or to arrest the disease process.

Secondary prevention includes actions which halts the progression of a disease at its incipient stage and prevents complications.

Tertiary prevention includes measures that are necessary to replace lost tissues and rehabilitation practices.

The main target of primary preventive dentistry is to focus on the importance of Early diagnosis and prevention of dental problem.

Registered , on date is 8022.0.Thus these Statistical Ratio suggests that there is still not enough number of Dentists in India.

Recent advances in prevention of dental caries plays a very important role especially at the primary prevention level so that the disease can be detected in its earliest stages. The recent advancement in assessing caries is by the use of a cariogram and at the primary prevention level various measures to prevent dental caries are remineralizing agents like fluoride, casein derivatives, beta tricalciumphosphate, pronamel, novamin, enamelon, dicalcium phosphate dehydrate which works to inhibit incipient dental caries it can prevent the activity of cariogenic bacteria.

Similarly, Recent advances in prevention of periodontal disease plays a very important role especially at the primary prevention level so that the disease can be detected in its earliest stages. Recent various methods are available to assess the periodontal risk factors Periodontal assessment tool (PAT) .

The best gold standard method to treat periodontal disease is scaling and Root Planning. But recent technologies have been introduced that not only eliminate the disease but also regenerate the lost tissue and repair it with the help of flap surgeries for the normal masticatory function.

Recent advancement in prevention of oral cancer includes photodynamic therapy based on the principal the photodynamic antimicrobial chemotherapy against various viral, fungal and bacterial infections in the oral cavity.

Early Diagnosis of cancer can lead to better prognosis and less damage by cancer treatment. It consists of screening and detection of cases.

Dentist Population Ratio of National Councils

RECENT ADVANCES IN PREVENTION OF DENTAL CARIES

CARIES MANAGEMENT BY RISK ASSESSMENT

Nowadays, the most accepted treatment is CAMBRA Caries management by Risk management.

Preventive Aspects of Dental Caries

REMINERALIZING AGENTS

Remineralization is a process for non cavitated lesions where phosphate and calcium ions promote the deposition of crystal voids.

1. Flourides

Primary prevention prevents the etiology of disease whereas secondary prevention tends to reduce progress of disease⁶. Enhancement of resistance is by increase use of flourides agents. World Health Organization has shifted its focus from alternative like salt and milk floridation to flouride gels, rinses in 21st century⁷.

Use of flouride varnish reduces caries in school children by 37%. Flouride supplements, flouride toothpaste, flouride rinses, flouride gels are very effective in prevention of Dental disease.

2. Calcium Phosphate Based Remineralisation

Calcium Phosphate based on 4 systems :

Casien Derivatives, Beta Tricalcium phosphate (TCP) , Pronamel , Novamin, Enamelon, Di calcium phosphate dihydrate are very effective remineralising agent to reduce dental caries.

3. Sugar Substitutes

Xylitol is one of the best nutritive sucrose substitute with respect to caries prevention⁸.

It acts by:

- Reduce accumulation of plaque on tooth surface
- Reduces level of streptococcus mutans
- Neutralize the acid by plaque formation
- Increase and stimulate the salivary flow
- It has an antibacterial effect

4. Replacement Therapy

The possible antagonistic organism to prevent pathogen and control Disease is called replacement Therapy. Replacement therapy has minimal immunological effect whereas the probiotic has definite immunological effect.

5. Caries Vaccine

Vaccine is an immunological substance designed to produce specific protection against any given disease⁹. Numerous advancements have been made regarding the caries vaccine, but Mutans streptococcal

glucosyltransferases and gucan binding proteins have received attention as vaccines.

6. Ozone Technology

Ozone has been considered as boon in dentistry. Its application also helps in prevention of Dental caries as a disinfectant. It has antimicrobial , antihypoxic property¹⁰. Some of the studies suggested that Ozone was effective and efficient in treatment of deep carious lesion over the conventional treatment.

7. Atraumatic Restorative Dentistry

Atraumatic restorative dentistry is known as "treatment procedure of dental caries which involve the soft, demineralized tissue by using hand instrument, followed by restrotation of the tooth with restorative material. This is modified by use of rotary instruments¹¹.

8. ROLE OF ALKALI PRODUCTION IN BIOFILMS

The protective action of oral alkali production by the action of oral bacteria was found an application of arginine containing toothpastes in the preventive dentistry. The alkali production affects the ecology of dental biofilms and neutralize the acid production from carbohydrates and plaque¹².

RECENT ADVANCES OF DIAGNOSIS OF DENTAL CARIES

The Early diagnosis and detection is important tool for prevention of dental caries. There are some conventional and advanced diagnostic methods for detection of Dental caries¹³.

These include:

- Conventional Method
- FOTI
- Fiber optic transillumination
- Endoscopy viewed filtered fluorescence
- Intra Oral camera
- Lasers
- Diagnodent
- Cariescan

RECENT ADVANCES IN PREVENTION OF PERIODONTAL DISEASES

1. Periodontal Vaccine: With rapid growth of microbial and cellular biology, we have the capacity to examine all genes from human pathogen. Vaccination is defined as

specific immune response to a viral or bacterial infection. It can be an important adjunctive therapy to mechanical debridement of bacteria to prevent colonization in the future¹⁴. The vaccine development depends upon the identification of antigens that are in vivo and produce the protective response.

2. Chlorohexidine gluconate: Chlorohexidine gluconate is the gold standard chemical agent for prevention of plaque control. Chlorohexidine is bactericidal and considered to be effective against Gram negative, Gram positive bacteria and yeast organism¹⁵.

3. Zinc Citrate Dentrifrice

The presence of some therapeutic agents can be effective in inhibitory action of plaque formation and results in improvement of gingival health. Zinc plays a major significant role in oral hard tissues, enamel formation, dentin formation, synthetic calcium hydroxide. It has an antimicrobial property which can be effective in various microbes and pathogens. Zinc citrate has new era of interest in upcoming future which can be effective in dissolution of enamel and promote remineralisation of dental hard tissues¹⁷.

4. Regenerative treatment

Due to recent research in dentistry, there is more expansion in regenerative treatment, which has the power to restore what is lost. Regenerative periodontics has emerged as upcoming and continuous challenge in the development of what has been lost. Various advances like local delivery, gene therapy and new techniques offer new chances to enhance the development of more biofriendly and advanced bio-friendly regenerative periodontal techniques¹⁷. Guided Tissue Regeneration Periodontics is an effective physical barrier for the treatment of, localized gingival recessions, periodontal pockets and furcation involvement.

5. Bisphosphonates:

It is considered as an effective mechanism for bone formation.

RECENT TRENDS IN DIAGNOSTICS IN PERIODONTAL DISEASE

1. DNA PROBES

DNA probes are found to be newer diagnostic aids in the prevention of periodontal disease. The principle of DNA

probes depends upon the sequencing of DNA. It is considered to be 100% effective in the identification of *A. Actinomyces comitans* and *Bacillus intermedius*. It is the gold standard for the identification of periodontal pathogens¹⁸.

2. IMMUNOASSAY

Neutrophil collagenase -2 immunoassay is found to be very helpful in the rapid screening of target populations.

3. POLYMERASE CHAIN REACTION

Polymerase Chain Reaction is one of the ideal methods for high yield replication of DNA. A modified PCR not only detects specific bacteria but also detects quantification. It is very simple, sensitive, rapid, reproducible and economical method for identification and quantification of cariogenic and periodontal pathogens¹⁹.

RECENT ADVANCES IN PREVENTION OF ORAL CANCER

According to the World Health Organization, oral cancer has been classified as cancer of the lip, tongue, gingiva, floor of mouth and other parts of the mouth.

Tobacco chewing in the form of smoked tobacco and smokeless tobacco is the most common cause of oral cancer. Prevention of oral cancer can be done by primary, secondary and tertiary care. Recent advances which include prevention of oral cancer can be chemoprevention, gene therapy and tobacco cessation methods and initiatives²⁰. It is of utmost need to reduce the mortality and morbidity rate of oral cancer patients if detected at early stages of intervention. It is the primary duty of every dentist to motivate, encourage the patients to quit cigarette and tobacco consumption to prevent oral cancer.

CONCLUSION

It is the upcoming challenge in the future to implement current knowledge in a systematic way to prevent the prevention of dental, periodontal and oral diseases. Dental professionals should encourage health promotion by changing the priority of treatment to prevention. They should encourage the patients to actively participate in the preventive programs.

REFERENCES

1. Hugh R. Leavell and E. Gurney Clark as "the science and art of preventing disease, prolonging life, and promoting physical and mental health and efficiency. Leavell, H. R., & Clark, E. G. (1979). Preventive Medicine for the Doctor in his Community (3rd ed.). Huntington, NY: Robert E. Krieger Publishing Company.
2. Du Min Q, Bian Z, Jiang H, Greenspan DC, Burwell AK, Zhong J, Tai BJ; Clinical evaluation of a dentifrice containing calcium sodium phosphosilicate (novamin) for the treatment of dentin hypersensitivity. *Am J Dent* 2008; 21(4):210-214.
3. Ramya K, Prasad KVV. Public oral primary preventive measures: An Indian perspective. *J Int Oral Health* 2011; 3(5): 8-18.
4. Hausen H, Karkkainen S, Seppa L. Application of the high-risk strategy to control dental caries. *Community Dent Oral Epidemiol* 2000; 28:26-34.
5. Zero DT. Dentifrices, mouthwashes, and remineralization caries arrestment strategies. *BMC Oral Health* 2006; 6:S9-S22.
6. Jeremy A. Horst, DDS, PhD, Jason M. Tanzer, DMD, PhD, DHC, and Peter M. Milgrom, DDS Fluorides and Other Preventive Strategies for Tooth Decay 2018 April ; 62(2): 207-234 doi:10.1016/j.cden.2017.11.003
7. Harsh Priya, Peter S Sequeria, Shashidar Acharya, Meghashayam Bhat, Bharathi Purohit, Manoj Kumar: Recent trends in preventive Dentistry; A Review
8. Riley P, Moore D, Ahmed F, Sharif MO, Worthington HV. Xylitol and caries prevention
9. Bhawna Arora, Vikas Setia, Amandeep Kaur, Mridul Mahajan, Harveen Kaur Sekhon, Harpreet Singh Dental Caries Vaccine: An Overview; DOI: 4103/IJDS.IJDS_128.
10. Tamanna Malik, Sameer Kaura, Prachi Kakria Dental Ozone: A Boon for Dentistry.
11. Fg Nkwocha, Ga Akinyamoju, So Ogbode, Fb Lawal; Management Of Dental Caries With Atraumatic Restorative Treatment Under Field Condition In Primary Schools In Oyo State, Nigeria.
12. Dimitrios Dionysopoulos Phd new Strategies For Caries Prevention. The Role Of Alkali Production In Dental Biofilms doi
13. Adepu Srilatha1, Dolar Doshi, Suhas Kulkarni, Madupu Padma Reddy, Vimal Bharathi Advanced diagnostic aids in dental caries – A review DOI 10.25259/JGOH_61_2019
14. Nitin Kudiyar, Nitin Dani, Swapna Mahale; Periodontal vaccine; A dream or reality DOI: 10.4103/0972-124X.84378
15. Dr. Manpreet Kaur, Dr. Krishan Kumar; Importance of Chlorhexidine in Maintaining Periodontal Health.
16. Tayyaba Fatima, Zubaidah Binti Haji Abdul Rahim, Chai Wen Lin, Zeeshan Qamar ; Zinc, A precious trace element for oral health care?
17. Hunny Sharma, Swati Verma Regenerative periodontics in restoring oral functions: A power to regenerate what's lost. DOI: 10.4103/srmjrd.srmjrd_24_1
18. Vivek Singh, Anuradha P, Sahana S, Manu Narayan, Sugandha Agarwal, Shweta Singh; DNA Probes: Newer Diagnostic Aid in Periodontal Disease doi: 10.21276/jamdsr.
19. Jan Lochma, Martina Zapletalova, Hana Poskerova, Lydie Izakovicova Holla and Petra Borilova Linhartova Rapid Multiplex Real-Time PCR Method for the Detection and Quantification of Selected Cariogenic and Periodontal Bacteria. doi: 10.3390/diagnostics10010008
20. Ummar Mangalath, Sachin Aslam Aslam, Abdul Hafiz Kooliyat Abdul Khadar1, Pulikkan George Francis, Muhamed Shalooob Karimil Mikacha, Jubin Hassan Kalathingal; Recent trends in prevention of oral cancer. DOI: 10.4103/2231-0762.149018

Corresponding Author:

Dr. Najmus Sahar
Post Graduate Student
Department of Public Health Dentistry
TMDCRC, Moradabad
Email: drsaharkhan6973@gmail.com

How to cite this article: Jeevan Josh, Pradeep Tangade, Thanveer K, Supurna Pandit. Fluorides as double edged sword-a review *TMU J Dent*. 2020;7(3):29-32.