Indian Dental Association
Madras Branch

E - MIDAS JOURNAL

"An Official Journal of IDA - Madras Branch"

Chennai/Volume:4/Issue:3/Pages:1-20/September 2017
www.idamadras.com
eISSN 2454 - 8928

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President's Message

Dear Members,

Greetings from IDA Madras Branch!

IDA Madras Branch is the first branch to have been formed, even before independence. We strive to give the best of information and updates to all our members.

I take this opportunity to invite our members to send interesting articles and case reviews. I would like to inform everyone that the National Students Conference is to be hosted by our branch this year. Further updates will follow.

My hearty congratulations to the young and vibrant editorial team led by Dr. C. K. Dilip Kumar, our Editor. I wish the team many more journals to follow.

Dr. A P Maheshwar
President
IDA Madras Branch

Jai Hind !!Jai IDA!!

Dr. A P Maheshwar

Secretary's Message

Dr. H. Thamizhchelvan
Hon. Branch Secretary
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Dr. H. Thamizhchelvan

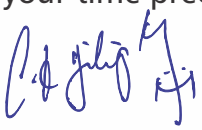
Letter from the Editor

Dr. C.K. Dilip Kumar
Editor-in-Chief
IDA - Madras Branch

IDA Madras branch has done a tremendous team work with Rotary International 3232, Sri Ramachandra University and Colgate to acheive & mark a record in Asia Book of records and India book of records by bringing in 23615 people together in a single venue and making them brush together to create dental awareness among public. oue editorial team whole hertedly wishes the entire team and organisations for their effort in acheiving the milestone, which added another feather to the cap for IDA Madras branch.

" If you love life, don't waste time, for time is what life is made up of ." - Bruce Lee

yes time is precious , to go higher in life one should utilize time to its fullest. so whatever time you get start documenting the cases what you do in your practise, colleges, etc.
the documentation will not go unproductive, it can become precious as time when you record it in history by publishing it in the journals so that your case can educate many others.
so i request all the clinicians, practioners, students, etc to send manuscripts to our journal to make you and your time precious.



Dr. C.K.Dilip Kumar

e-MIDAS Chennai/Volume:4/Issue:3/Pages1-20/September 2017

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Original

Career Satisfaction of Dentists in Thanjavur - A Questionnaire Study

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Abstract

Job satisfaction is vital to survive in this competitive society and to progress in life gradually. The enthusiasm in handling various tasks in a job takes one to the upper level. This applies to dental field also where it requires complete interest and involvement to treat patients. There are several factors, which affects the person's career. The main objective of this research is to evaluate the career satisfaction of dentists practicing in Thanjavur, a town in Tamilnadu through a prepared questionnaire.

Key Words: Dentistry, gender, job satisfaction, work environment factors.

Introduction

In India, dentistry is attractive, interesting but not an easy profession. [1] It has been frequently described as a stressful job and also associated with greater incidence of illness, alcoholism and suicide than other profession. [2] Many studies have shown high preference of physical and psychological illness in dental practice also. Therefore, it is hardly surprising that dentistry has been classified even as hazardous profession. Like other profession dentistry is a rewarding job also. Various elements like autonomy, working hours, social status and many other factors give and increase job satisfaction every day. Thus job satisfaction is the most important factors for successful practice. [1] Job satisfaction has been linked to various aspects of patient care and health system outcomes as well as to general life satisfaction and job performance. Job satisfaction has been discussed in relation issues such as high turnover of dental staff, potential loss of productivity resulting from turnover and movement away from dental field entirely. Changing workplace structure, financial changes and shortages in auxiliary staff, all contribute to the changes experienced in dental workplace and each have implication for recruitment and retention of dentists in active clinical practice. Measures of job satisfaction among dentists may help to solve issues impacting on recruitment and retention of dentists in active clinical practice. This job satisfaction may be an important predictor of movements within the dental profession and intent to change jobs. Levels of job satisfaction among dentists practicing in private and public sectors, between male and female dentists and among dentists of different age group are therefore key issues to be examined. The existence of any systematic variation in levels of job satisfaction between dentists by these factors may give some indication of areas in which dentist's job satisfaction may be improved [3].

The purpose of this study was to examine job satisfaction among dentists in Thanjavur, one of the cities of Tamilnadu with the population of over 24 lakhs. There are about 60 dental clinics in Thanjavur where more than 70 dentists are practicing. Aspects of job satisfaction were examined in order to develop an understanding of specific issues, which impact upon retention of dentists.

Materials and Methods

This questionnaire-based study was conducted among registered dentists in Thanjavur. This questionnaire was given to almost 40 dentists in Thanjavur from which 28 dentists came out with positive responses. The negative responses are mainly due to their busy schedule and unwillingness to participate in the study and disclose details. The questionnaire was not given to all the dental practitioners in Thanjavur due to various constraints of the authors.

Questionnaire

The questionnaire used for this survey is based on a job satisfaction questionnaire developed by L. Luzzi, A.J. Spencer, K. Jones, D. Teusner [3] for dental practitioners in Australia. This questionnaire was divided into 4 parts. The first part consisted of the dentist's' personal data which includes their age, gender, location of the dental practice (Urban / Rural), experience, income etc. It helped in finding out whether their satisfaction level is based on their personal data. The second part consisted of questions based on various aspects of their field. This data mainly helped us to conclude their level of satisfaction in their job. The third and fourth part explained the global satisfaction and helped to ensure their interest in dentistry. The respondents were asked to indicate their level of agreement or disagreement with the statements. Responses to the questions were graded from negative to positive. The positive responses were graded 3 while the negative responses were graded 1. The results were tabulated with their mean scores on each category.

Results

This survey was conducted for 28 dentists in Thanjavur.

Out of 28 respondents, 16 (57.1%) are males and 12 (42.9%) are females. Almost 18 (64.2%) dentists were

working in urban area while 10 (35.8%) dentists were working in rural area. All the respondents studied in India only. Almost 20 (71.4%) dentists were working as general dentists while 8 (28.6%) dentists working as specialists in the appropriate branches (Table 1).

Table 1: Number of Dentists in each Speciality

Speciality	No of Dentistry
General Dentists	20
Conservative Dentistry and Endodontists	2
Oncologists	1
Oral and Maxillofacial Surgeons	3
Orthodontists	2
Total	**28**

Table 2: Overall mean scores for Job Satisfaction

	Mean Score	Std. Error
Autonomy	2.36	0.106
Relationship with Colleagues	2.39	0.119
Relationship with Patients	2.25	0.122
Relationship with Staffs	2.25	0.122
Personal Time	1.86	0.067
Intrinsic Satisfaction	2.36	0.128
Social Status	2.21	0.094
Resources for Infrastructure	2.25	0.098
Working Hours	2.11	0.060
Working Environment	2.86	0.067
Social Security	2.43	0.120

Mean scores for different criteria, which were used to assess job satisfaction, were taken (Table: 2). Mean values greater than 2.25 were taken as the positive response [3]. About 67.8% of the subjects had mean scores greater than 2.25 indicating that the majority of the respondents are satisfied with the various aspects of the job. Apart from personal time, social status, working hours the mean scores of the rest are greater than 2.25. While mean values of the factors such as relationship with patients and staffs were at the limit. Highest mean scores reported were for working environment, social security, and relationship with colleagues. Working environment satisfaction involves the factors relating to the place of employment, such as quality of the air, noise level, adequate parking etc. Social security measured satisfaction related to their confidential level of income. While the relationship with colleagues, measured satisfaction with their relationships to other dentists both personally and in the clinical practice. Factors, which are less satisfied, are personal time, working hours and social status. The personal time and working hours are both related to their inadequate time for family, friends, relatives etc. The satisfaction in social status was measured in relating to their respect in society. From the mean values of job satisfaction, percentage of each category is assessed (Chart 1). The percentages of job satisfaction is more or less the same for all the aspects included in that category.

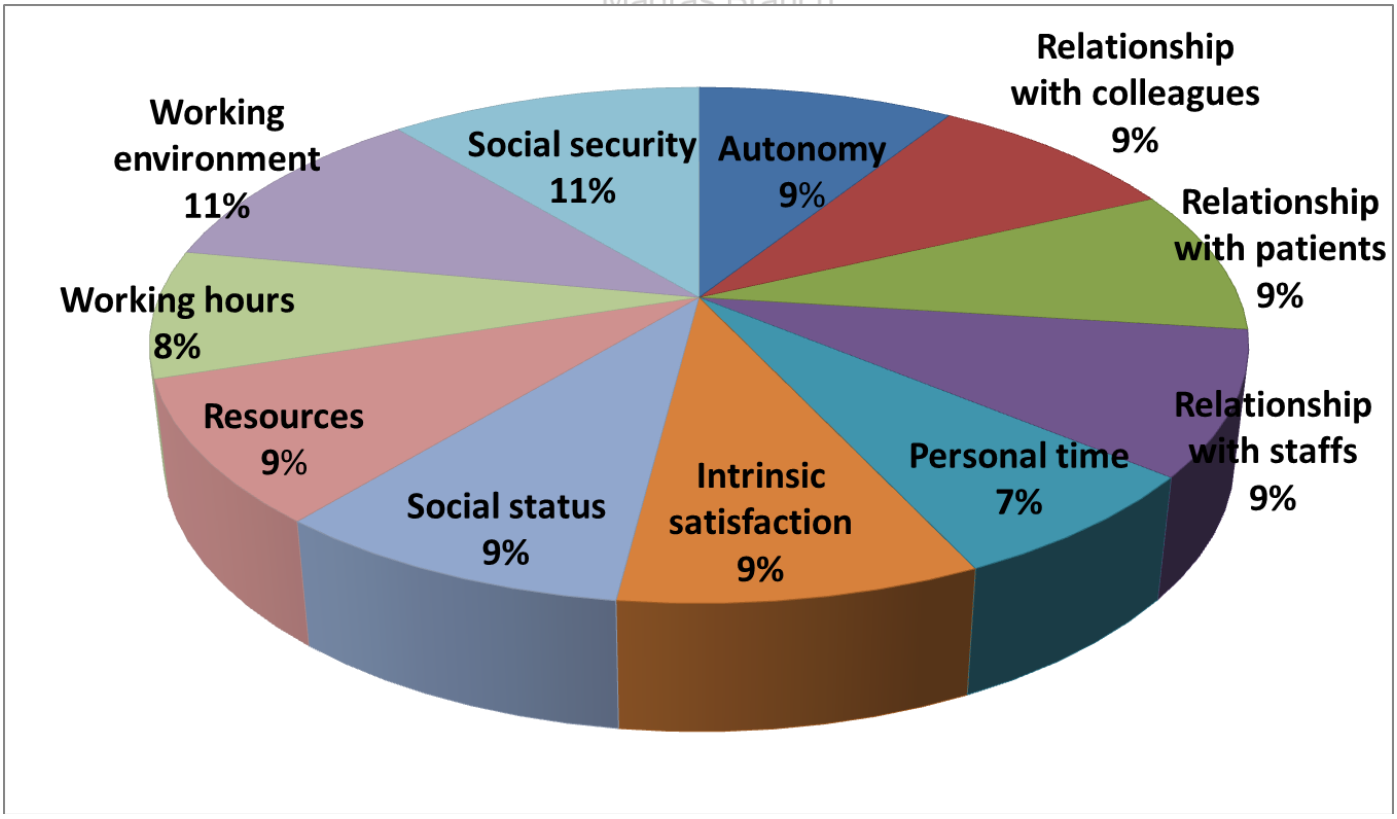


Chart 1: Percentage dimension of job satisfaction in each category

Overall mean scores of the global satisfaction is assessed (Table: 3). The levels of the global job satisfaction of the dentists is as follows:

- 17.8% of the dentists were dissatisfied
- 28.6% of the dentists were slightly satisfied
- 53.6% of the dentists were fully satisfied with their job.

The study reveals that majority of the dentists were satisfied with their job. Mean scores are also greater than 2.25 in the global job, career and speciality satisfaction depicting the dentist's satisfaction in overall dimension.

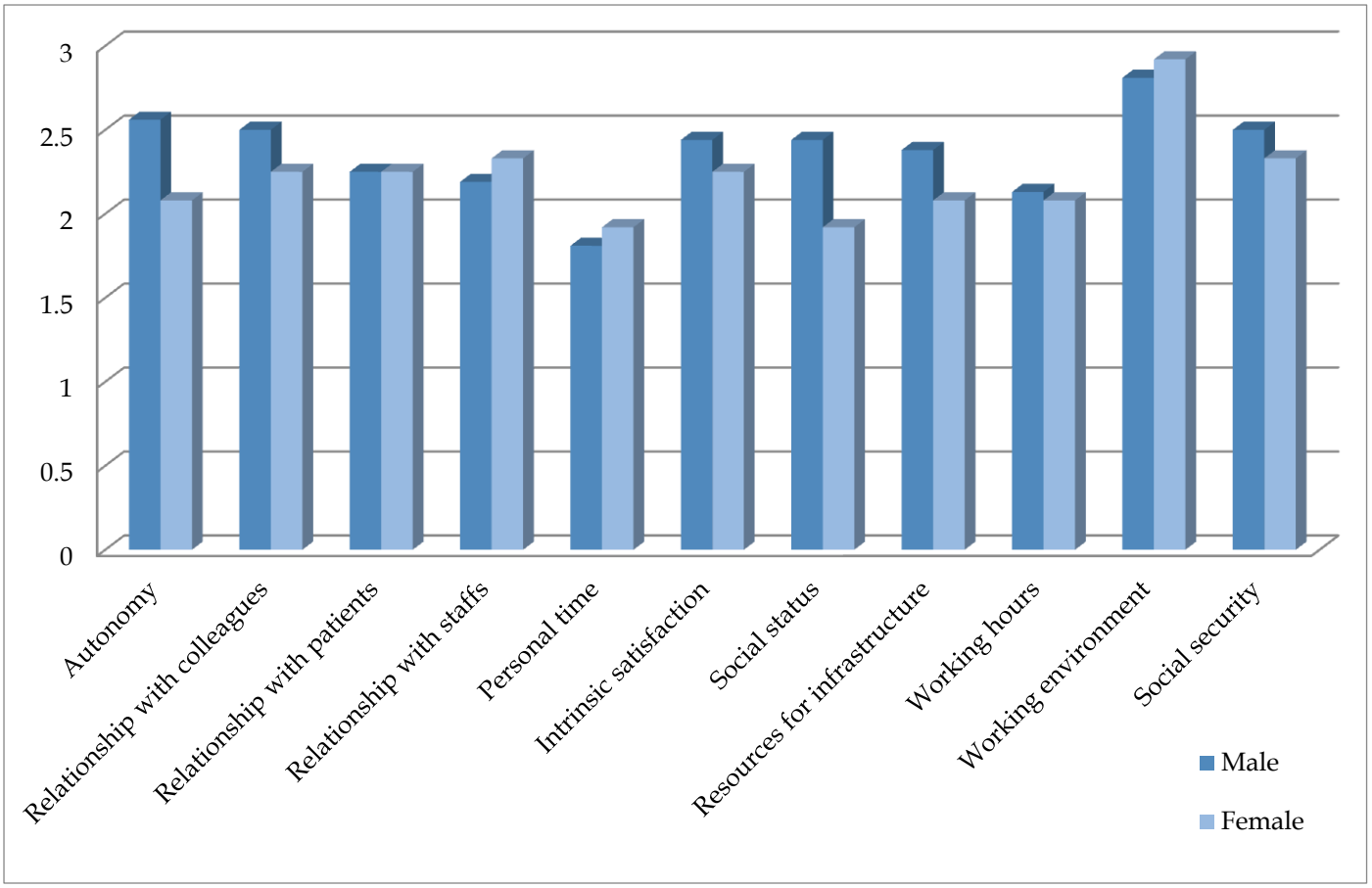
Table 3: Overall mean scores for global job satisfaction

	Mean score	Std. Error
Global job satisfaction	2.36	0.147
Global career satisfaction	2.39	0.149
Global specialty satisfaction	2.39	0.139

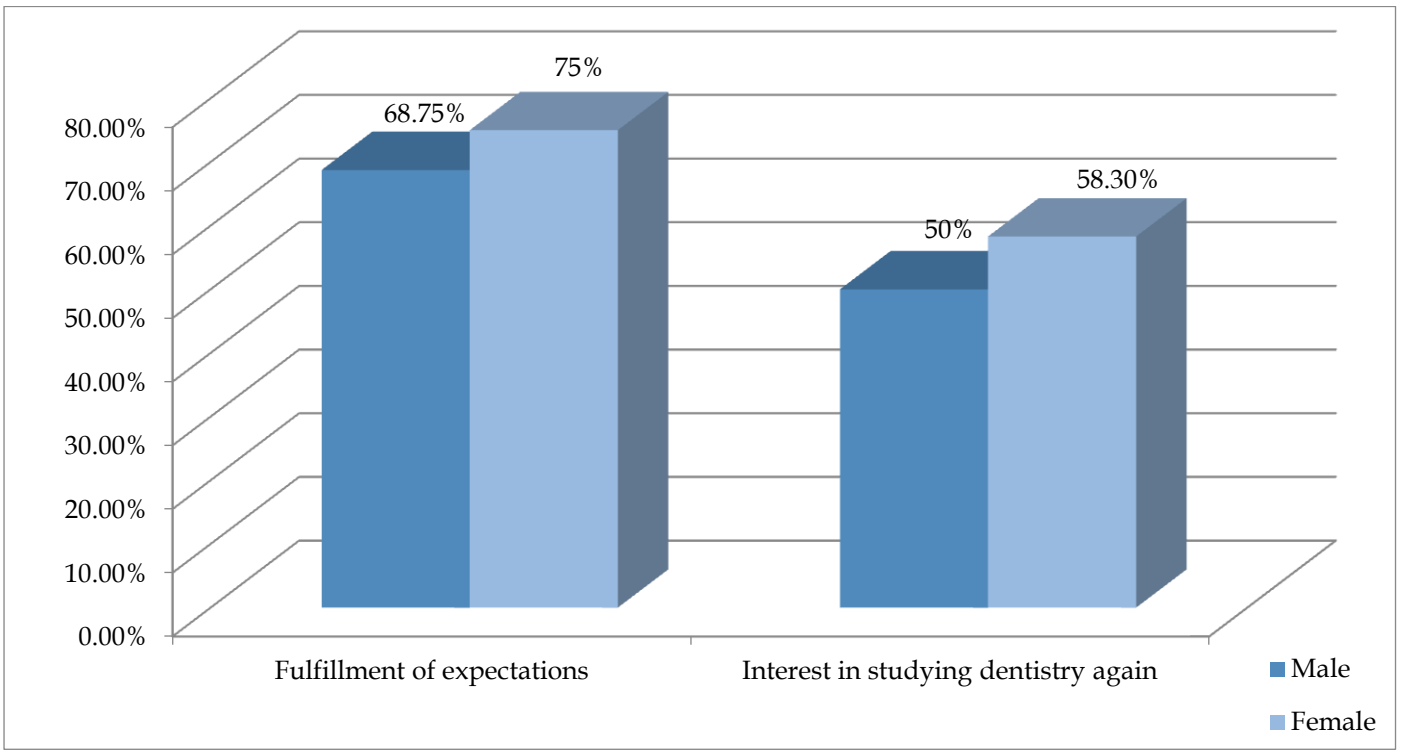
NOTE :
Global job satisfaction - overall job satisfaction as a dentist in his/her clinical work
Global career satisfaction - overall satisfaction with his/her chosen career as a dentist
Global specialty satisfaction - overall satisfaction with his/her chosen specialty

Overall mean scores of job satisfaction by gender is evaluated (Graph 1). Mean scores of males was significantly higher than females with regard to autonomy, relationship with colleagues, intrinsic satisfaction, social status, resources etc. Female dentists reported higher mean values for relationship with staffs, personal time and working environment.

Majority of the dentists (71.4%) reported that their expectations were fulfilled and comparatively many (53.6%) had an interest in studying dentistry again. Overall mean scores for expectations and interests in dentistry is evaluated by gender (Graph: 2). It is clear that male dentists have reported positive responses than female dentists for fulfillment of expectations and interest in dentistry.



Graph 1: Job satisfaction mean scores by gender



Graph 2: Expectations mean scores by gender

Discussion

Before discussing the results it seems better to discuss about the limitations of this study. This study was only taken across the registered dentists working in Thanjavur. This study does not include the dentists who are not in practice. The results which is being provided by this study was only applicable to those registered dentists who participated in completing the survey but does not include other non participating dental practitioners in Thanjavur. Overall this study reveals that most of the dental practitioners in Thanjavur are satisfied with their job. The study also indicates that they are also satisfied with various components of their job like autonomy, working hours, social status, intrinsic satisfaction etc.,. Satisfaction rate were high for all components except personal time, working hours and social status.

Mostly dentists working in urban areas are quite satisfied with their job than those who work in rural areas. This may because of the high number of patients and better facilities in urban areas as compared to rural areas. It may also be due to the lack of awareness of dental diseases in the rural areas.

Most of the dentists who have taken part in the survey have completed bachelor's degree only. But the satisfactory level is more for those who have completed masters. This could because of their ability to perform specialty treatment procedures in addition to the treatment performed by the general dentists.

Other than these components, income and years of practice also have a great impact in satisfaction of dentists. Many gave negative responses to reveal their income but the obtained results shows high income leads to increased satisfaction of the dentists. In this study, the years of practice of the dentists are between 2 and 20 years. Satisfactory level is higher for the dentists whose experience is more than 7 years. The dentists with years of practice more than 15 years reported dissatisfaction in their personal time. This may be due to the increased patient flow because they are more experienced in their field.

Autonomy, social status, infrastructure of clinic, working hours and working environment are moreover satisfactory to all dentists. Only about 3.6% of the respondents reported dissatisfaction in these aspects. While the components like relationship with patients, staffs, colleagues, intrinsic satisfaction and personal time of dentists is relatively dissatisfied by the dentists. These dissatisfaction occurs mainly due to their work loads, job related stresses etc,. This makes them lose involvement in their work, ultimately leading to lack of interest in their work.

Males and females significantly differed in their satisfactory level in various components. In autonomy, social status, infrastructure female dentists satisfaction is quite low than males. However, the satisfactory level of personal time and working environment of female dentists is quite higher than males. This may because of the ability of the female dentists to give time to themselves and to their family.

Dentistry has become a difficult profession with increased competition from fellow practicing dentists and reduced employability for fresh graduates. Job satisfaction is a crucial element in everyone's career irrespective of what profession they choose and dentistry is no exception. It is imperative that as medical professional that we find satisfaction in our jobs and do not feel any kind of undue stress which may affect our personal and professional lives.

Our study is a maiden attempt to assess career satisfaction of dentists in Thanjavur, a town in Tamilnadu. Overall the dentists in Thanjavur are moderately satisfied with their job. However 18% of the dentists are dissatisfied. This dissatisfaction level is less for dental specialists compared to general practitioners. Almost 71.4% of the dentist's job meet their expectations. But the rest have not met their expectations. 54% of the dentists are interested to study dentistry again while the rest are not even ready to study dentistry. It is the duty of the governing bodies to improve the status of the dental profession by bringing in reforms to reduce competition and improve employment, so that dentists can be completely satisfied in their careers.

This study shows that there should be special attention to increase the level of job satisfaction among dentists and thus improve the dental care system. Job satisfaction is the most important factor for successful practice and every dentist aspires to achieve the same.

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Original

Effectiveness of Various Household Methods Used to Disinfect Indian Currency Notes – A Pilot Study

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Abstract

Introduction: Paper currency, like all other materials inevitably becomes contaminated overtime. The possibility that currency notes might act as environmental vehicles for the transmission of potential pathogenic microorganisms was suggested. Disinfection is the process of elimination of most pathogenic micro-organisms (excluding bacterial spores) on inanimate objects.The aim of this study was to evaluate the effectiveness of different household disinfectants on Indian currency notes. Materials and methods: The currency notes were collected randomly from various sources in Chennai city, Tamilnadu and the polythene bags were immediately transported to laboratory of microbiology of Ragas Dental College. The collected currency notes were divided into five groups with three notes in each group. The five various household disinfectant methods like iron box, vinegar, chlorhexidine, sunlight and greenhouse effect were used and the currency notes were examined for bacterial contamination before and after disinfection. Standard loop technique was used to determine the microbial count on Indian currency notes before and after disinfection. Results: Chlorhexidine reduced 70% micro-organisms compared with only 42-45% reduction in micro-organisms present in the currency notes after treatment with sunlight and greenhouse effect. These results will help improve strategies for decontaminating Indian currency notes and thus reduce the incidence of illness caused by these pathogens. Conclusion: Chlorhexidine was the most effective disinfectant producing a greater reduction of micro-organisms than the other method of disinfection. These results will help improve strategies for decontaminating Indian currency notes and thus reduce the incidence of illness caused by these pathogens.

Introduction

Since its origination, currency has become one of the main carriers of our cultural, economic and historical information. Paper currency, like all other materials inevitably becomes contaminated overtime. The possibility that currency notes might act as environmental vehicles for the transmission of potential pathogenic microorganisms was suggested in 1970s.[1] Among the various modes of transmission of infection, fomites are susceptive for the indirect transmission of infection. Multifarious diseases like diphtheria, trachoma, gastroenteritis, whooping cough and pathogenic agents causing diarrhea are known to be transmitted through fomites.[2] Currency might also be a fomite, playing an exceptional role in the transmission of microorganisms and also in the spread of drug resistant strains in the community.

Inanimate surfaces have often been elucidated as the source for outbreaks of nosocomial infections and the most common nosocomial pathogens may well survive or persist on surfaces for months and can thereby be a perpetual source of transmission if no regular preventive surface disinfection is performed.[3] Some simple but prudent practices could save our life like handwashing which is critical after handling money. When planning on saving the paper money or coins as an investment, it is better to clean them.

Disinfection is the process of elimination of most pathogenic micro-organisms (excluding bacterial spores) on inanimate objects. Disinfection of currency is considerably important especially for people who have someone with a compromised immune system in their home, or some other reason to be extra concerned about germs. An ATM was introduced by a company Hitachi in Japan in 1990s that would sterilize bank notes by heating them to 392 degrees.[4,5] But re-contamination of notes occurred as soon as they were touched by human hands. Later few scientists developed a safer money cleaning process which superheats CO2 to 600° at 5,000 PSI[6] wherein it behaves both like a gas and liquid and is able to clean notes without damaging their anti-forgery measures.

Currency paper that is mostly made up of cotton and linen provides a large surface area for organisms and organic debris to collect,[9] playing a vital role in cross-contamination. Hence there should be regular disinfection of currency by using ultraviolet light, fumigation and regular withdrawal of damaged and wornout notes by the concerned authorities. An alternative solution to this issue which can be effective as well as less time-consuming can be use of house-hold products to disinfect currency like use of direct sunlight, greenhouse effect, vinegar, alcohol and iron box.

The purpose of this study was to compare the efficacy of some commonly used household methods for disinfection of contaminated currency notes.

Materials and Methods

A total of 15 samples of Indian currency (Rupees) were investigated. The currency notes were collected randomly from various sources in Chennai city, Tamilnadu and placed aseptically by letting the individuals to drop the paper currencies and coins into a Ziplock cover. They were promptly sealed and the individuals were given a replacement equivalent to what they deposited in the polythene bags. The polythene bags were immediately transported to laboratory of microbiology of Ragas Dental College.

The collected currency notes were divided into five groups with three notes in each group. The five various household disinfectant methods like iron box, vinegar, chlorhexidine, sunlight and greenhouse effect were used and the currency notes were examined for bacterial contamination before and after disinfection. Disinfection with iron box was done in cotton mode for 15 seconds, a cotton pellet was soaked in 5% vinegar and was applied over the currency notes, and the same method was followed for chlorehexidine also. Currency notes of sunlight were kept for 6 hours (10 am to 4 pm).

Microbiological Analysis

Standard Loop Technique

Swabs collected from each rupee note were placed in 1ml of nutrient broth separately and incubated for 15 minutes with vigorous shaking. Using standard loop (2mm), the sample from each tube were planted onto nutrient agar and incubated at 37°c for 24 hrs aseptically. The colonies were counted manually. The counted colonies were expressed in colony forming units (cfu/ml).

Results

Fifteen number of currency notes were subjected to microbiological evaluation before and after decontamination which showed that chlorehexidine group exhibited 70% reduction in microbial count after decontamination and greenhouse effect was found to be lesser effective in reducing the microbial count. Table 1 shows the mean colony forming unit per ml in each groups before and after intervention and reduction percentage.

Table 1: Distribution of mean colony forming unit per ml in each groups before and after intervention and reduction percentage

Groups	Mean±SD		Reduction Percentage
	Before Intervention	After Intervention	
Iron Box	4.09 ± .667	2.50 ± .460	53%
Vinegar	4.29 ± .241	2.76 ± .662	51%
Chlorhexidine	4.48 ±. 000	2.36 ± .318	70%
Sun Light	3.62 ± .290	2.26 ± .241	45%
Green House Effect	3.42 ± .037	2.16 ± .275	42%

Discussion

The bioreceptivity of paper currency to bacterial contamination is due to its hygroscopicity and composition like cellulose, hemicelluloses, lignin, adhesives and sizings. Hence disinfection of paper currency is a prudent precautionary measure that will ensure that contamination will not build up to the point that it becomes an exposure concern.

Despite the efficacy of the other methods of disinfection, the expected 99.9% reduction of bacterial count was not obtained with either of the household method. However, there was 70% reduction of micro-organisms with chlorhexidine induced damage. This was due to its positively-charged molecule that binds to the negatively-charged sites on the cell wall of bacteria wherein it destabilizes the cell wall and interferes with osmosis. The bacterial uptake of the chlorhexidine is very rapid, typically working within 20 seconds which is consistent with previous studies.[10]

Temperature influences the rate of metabolic activity of microorganisms and thus their rate of growth. Heat has been used for ages as a method of sterilization that helps to reduce their moisture content. On the other hand, the exposure to high temperatures can accelerate deterioration rates and cause dimensional changes on paper currency. Sunlight had been shown to kill tuberculous bacteria[11] and also E. coli bacteria in twelve feet of seawater and in waste stabilization ponds.[12,13,14]

The use of high temperatures to eliminate insect pests from heritage objects has been studied by several authors.[15] Literature shows that insect pests are killed by being exposed to 55-60°C for one hour.16 Similarly, the greenhouse effect reduced the level micro-organism but to a limited extent by the use of its latent heat.

When the currency notes were exposed to UV radiation in sunlight, it caused degradation of the genetic material of microbes by forming dimmers

between adjacent thymine nucleotides in DNA chains, which inhibited the correct replication and transcription of this nucleic acid.[11] But due to its low energy content, this kind of radiation has poor penetration power.[15] For sterilization purposes, UV light is used in the range of about 260 nm, since this is the wavelength that causes the highest damage in DNA molecules.[11]

With vinegar, it was observed that the acetic acid content in vinegar can effectively kill mycobacteria by passive diffusion through the bacteria cell wall and internalizing into neutral pH dissociating into anions and protons. Release of the protons caused the internal pH to decrease which exerted inhibitory effects on the bacteria.[16] Vinegar is used for the disinfection of semi-critical articles, control of oral and throat inflammatory processes, and antisepsis of sores.[17]

However, the antimicrobial activity of a microbicide is affected by several factors like, namely the period of contact, concentration, temperature, pH, presence of organic soiling matter and type of microorganism.[18] Knowing the pros and cons of the available methods to disinfect paper allows conscious decisions adapted to different situation.

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Synthetic Gingiva as Good as Real!!!

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Abstract

Thinning of gingival and recession can often be an embarrassing esthetic problem to the patient. We have heard of umpteen restorative techniques using biocompatible grafts. Silicone is tested for its esthetic and functional durability in the human body. Silicone elastomers are used in periodontal esthetic management with great success.

Keywords: Gingival recession, biocompatible grafts, Silicones, Periodontal esthetic management

Introduction

In 21st century we are abide with latest in technologies and research, the field of periodontal surgery also grown with usage of novel materials both natural and artificial. One among the artificial material is the silicone[1] which has excellent usages in periodontal esthetic management. Silicone rubber is an elastomer[2] (rubber-like material) composed of silicone—itself a polymer containing silicon together with carbon, hydrogen, and oxygen. Silicone rubber is generally non-reactive, stable, and resistant to extreme environments and temperatures from -55°C to +300°C while still maintaining its useful properties.

Medical Grade Silicone

Medical Grade Silicones[3] are silicones tested for biocompatibility and are appropriate to be used for medical applications.

Food and Drug Administration (FDA) Center for Devices and Radiological Health (CDRH) regulates devices implanted into the body Medical grade silicones are generally grouped into three categories[4]: non implantable, short term implantable, and long-term implantable. Materials approved as Class V and VI can be considered medical grade.

Role of Silicone in Prosthesis[5]

Silicone elastomers used for prosthetic rehabilitation are soft and resilient material providing comfort (relieving pressure from sensitive areas), aesthetic (restoring the foot length) and provide a psychological sense of wholeness compared to the other materials. The emphasis was always towards rigidity and prosthetic failure which occurred mainly due to skin breakdown.

Role of Silicone in Periodontics

Silicone elastomers are used in periodontal esthetic[6] management with great success.

They are used in various methods like:

1. Gingival veneers
2. Soft tissue ridge expansion.
3. Gingival augmentation.
4. Non resorbable membrane for guided tissue regeneration

Gingival Veneer[7]

A gingival veneer (Fig 1) is a prosthesis worn in the labial aspect of the dental arch, which aims to restore the muco-gingival contour and esthetics in areas where periodontal tissues are deficient. Different materials usually used to fabricate include an acrylic resin (heat polymerized/auto-polymerized porcelain or even resin composites matching the color of the gingiva.

Fig. 1: Gingival Veneer

Gingival Veneer using Silicone Elastomers[8]

Flexible gingival veneers (Fig. 2) are veneers made up of silicone are made to overcome the disadvantage of acrylic veneers of being hard, rigid and difficulty in fitting accurately around multiple teeth. Patients with poor oral hygiene or dexterity are not candidates for acrylic prosthesis. Flexible gingival veneer made of silicone is both comfortable and accurately fitting.

Fig. 2: Gingival Veneer using Silicone Elastomers

Soft Tissue Ridge Expansion using Silicone[9]

Soft tissue expansion is a technique used by plastic and restorative surgeons to cause the body to grow additional skin, bone or the other tissues. Extensive bone augmentation procedures are frequently carried out prior to implant surgery. Tissue expanders[10] (Fig.

3) are used for the reconstruction of soft-tissue, this device consists of silicone elastomer inflatable expander with a remote silicone elastomer injection dome.

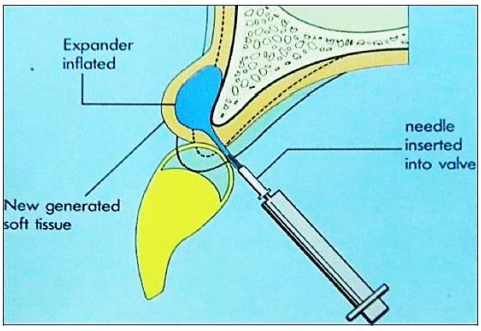

Fig. 3: Soft Tissue Ridge Expansion using Silicone

Gingival Augmentation using Silicone Elastomers [11]

Autogenous soft tissue grafts like free gingival graft and connective tissue grafts are gold standard for gingival augmentation[12]. Due to some limitations such as second site injury, limited availability of donor tissue volume, inadequate or excessive rigidity, donor site morbidity. Autologous grafts (Fig. 4) are now considered for augmentation which include alloplastic[13] dermal matrix made up of collagen and silicone.

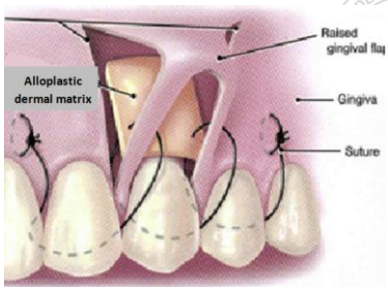

Fig. 4: Gingival Augmentation using Silicone Elastomers

Silicone as Membrane for Guided Tissue Regeneration[14]

Silicone elastomers can also be used as non resorbable membrane (Fig. 5) for guided tissue regeneration due to its many advantages.

1. Cost effective
2. Superior adaptation in the defect areas.
3. Minimal tissue rejection

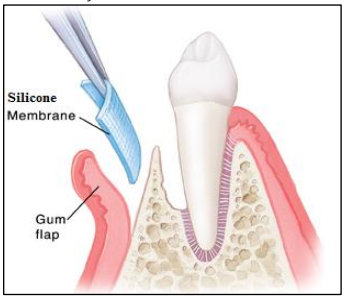

Fig. 5: Silicone as Membrane for Guided Tissue Regeneration

Future Trends

Future studies are made in this field like tissue engineering with nanospheres[15] of silicone injected for gingival augmentation leading to silicone reinforced gingiva.

Conclusion

Thus silicone elastomers occupy the periodontics for its esthetics and functional support. Further researches are required to overcome its drawbacks and make it as a permanent treatment option in periodontal diseases.

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Original

Assessment of Effectiveness of 30% Rock Salt Solution in Toothbrush Decontamination - An In Vivo Study

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Abstract

Introduction: Toothbrushes are the most commonly used intra oral cleaning aids for personal hygiene maintenance. Salt is a time tested natural disinfectant and itfulfills the requirements of a domestic disinfectant. Objective: To assess the effectiveness of domestic ingredient, rock salt in 30% concentration as an antimicrobial agent for toothbrush decontamination. Materials and Methods: 50 samples of toothbrushes with standardized dimensions, brand and bristle hardness and 50 identical dentifrices were distributed to systemically healthy, 18 to 25year old volunteers. Volunteers were instructed to maintain identical oral hygiene practices and storage conditions. The toothbrushes were retrieved after one week in sterilized pouches, randomly divided into two groups of 25 each. Group A was set as Control. Brushes in Group A were immersed in tap water for a duration of 5 mins Group B samples were immersed in 30% rock salt solution for 5 mins. The number of colony forming units of microbes present in Group B was assessed microscopically and was compared with that of the Group A. Results: 78% of samples belonging to Group-A that were immersed in 30% Rock salt solution were completely devoid of bacteria and microbial contamination was evident in all the brushes from control group. To conclude, Addressing issue of toothbrush decontamination with Rock salt is an effective, economical and realistic solution as demonstrated by this study.

Introduction

Health of the mouth reflects that of one's body. Oral Cavity is the entrance to the alimentary canal. It houses multitude of complex microbial communities. Oral microbiota is primarily composed of species of Streptococci, Staphylococci, Lactobacilli, fungi like Candida etc. Balance between host defense and microbial virulence determines the overall health of an individual.

Tooth brushing is a simple procedure performed on a daily basis. It causes gingival crevicular tissue disruption to a great extent thereby increasing the possibility of bacteremia [1]. This simple procedure performed on a daily basis is capable of causing bacteremia to the same extent as dental extraction [2].

Toothbrushes are the most commonly used intra oral cleaning aids for personal hygiene maintenance. Ironically, this device used for oral hygiene maintenance acts a fomite [3]. The bristles and tuft ends of the toothbrushes exposed to environment following usage provide an ideal niche for microbial contamination. When two toothbrushes are placed in direct contact, cross contamination is likely.

Contaminated toothbrushes act as a source for perpetuation of oral and other systemic diseases. Three main pathways linking oral infection to secondary disease were suggested: (1) metastatic infection, secondary to the oral infection, due totransient bacteremia (presumably resulting primarily in endocarditis); (2) systemic inflammation from immunologic injury caused by oral bacteria; and (3) systemic vascular injury due to oral microbial endotoxins [4].

Toothbrushes with antibacterial tufts have been experimented but have proven to be futile. Toothpaste formulations with increased amounts of Triclosan to reduce residual bacterial load on toothbrushes following usage was experimented and did not produce desired results [5,6].

Regular decontamination of toothbrushes in hence indispensable. Various chemical disinfectants like Chlorhexidine, EDTA, Sodium Hypochlorite have proven to be effective [7] but are not available for domestic usage.

There is paucity of data regarding effectiveness of Rock Salt as an antimicrobial agent. The aim of this study is to assess the effectiveness of domestic, economical ingredient, rock salt in 30% concentration as an antimicrobial agent for toothbrush decontamination.

Materials and Methods

44 hostel student volunteers belonging to age group of 18-25 years, who were free of systemic disease were included as participants after obtaining informed consent. Study subjects were restricted to hostel students to standardize the source of water supply. Soft bristled toothbrushes and dentifrices of the same brand were distributed and volunteers were asked to brush twice daily, rinse them under running water and store them outside the toilet open to air.

Ethical consent was obtained from the Institutional Ethical Committee, Sri Ramachandra University prior to beginning the study. The obtained tooth brush samples were analyzed at the Department of Microbiology, Sri Ramachandra University.

Toothbrushes were retrieved following one week of usage in sterilized pouches and were transferred to laboratory within 24 hours. They were then divided randomly into 2 groups of 22 each. Group A as study samples and Group B as control.

Group-A study samples were immersed in 100ml of 30% Rock Salt solution and Group-B in 100 ml tap water using sterilized glass bottles of dimension of 20cm height and 6cm base diameter for 5 minutes.

Tooth brush samples of both groups were then transferred into sterile Mac-Cartney bottles containing 10ml Phosphate Buffer Solution and left for one hour with intermittent mechanical agitation at intervals of 5 minutes.

With the help of standardized 4mm diameter loop, a volume of 0.1ml of Phosphate Buffer Solution was taken from each sample and plated into Trypticase soy agar plates using Zig Zag streaking method for semi-quantification of bacterial count. Plates were then incubated at 37◦C for 48 hours. At the end of 48 hours, readings of plates were recorded and quantified. The colony morphology and count was noted and gram staining was performed from the colony to ascertain grams reaction and further biochemical tests were performed to identify bacteria at the genus level.

Results

Upon microbiological examination of toothbrushes that were collected after one week of usage, 78% of samples belonging to Group-A that were immersed in 30% Rock salt solution were completely devoid of bacteria and microbial contamination was evident in all the brushes from control group. Further, upon Gram staining it was found that contaminant bacterial flora comprised predominantly of Gram Positive Cocci and Bacilli in the control group. In, 22% of study samples that exhibited bacterial growth, Micrococci was isolated.

Staphylococcus (Coagulase positive and negative) was the major contaminant isolated from 11 out of 22 control samples. Bacillus Subtilis was found in 5 control samples and Micrococci in the remaining 6 control samples.

Table 1: Number of Colony Forming Units of Bacteria

S. No	GROUP A	GROUP B
1.	NO GROWTH	100 CFU
2.	NO GROWTH	10000 CFU
3.	1000 CFU	100000 CFU
4.	NO GROWTH	100 CFU
5.	NO GROWTH	10000 CFU
6.	NO GROWTH	100 CFU
7.	100 CFU	100 CFU
8.	NO GROWTH	10000 CFU
9.	NO GROWTH	100000 CFU
10.	NO GROWTH	10000 CFU
11.	NO GROWTH	1000 CFU
12.	NO GROWTH	100 CFU
13.	NO GROWTH	100000 CFU
14.	100 CFU	100000 CFU
15.	NO GROWTH	1000 CFU
16.	NO GROWTH	10000 CFU
17.	NO GROWTH	10000 CFU
18.	100 CFU	10000 CFU
19.	NO GROWTH	1000 CFU
20.	NO GROWTH	1000 CFU
21.	NO GROWTH	100 CFU
22.	100 CFU	1000 CFU

*CFU- Colony forming units

Discussion

Toothbrushes are the most commonly employed devices for oral hygiene maintenance. Since inception, various changes and modification have been incorporated into toothbrushes. Despite various advances, toothbrush maintenance remains a grey area. Cobb C.M et.al reported that toothbrush is a major cause of repeated infections in the mouth [8].

Oral cavity houses multitude of complex microbial communities. Overall health of an individual is consequent with the orchestration of balance between microbial virulence and host defense. Poor oral health can predispose to various systemic conditions. Biofilms constitute an aggregation of organisms that exhibit autopoiesis, homeostasis, synergy and communality [9]. It is this biofilm forming characteristic of Staphylococcus that acts a mechanism of adherence to toothbrushes, (Aguilar et al., 2001) [3].

Salt (Sodium Chloride) is a time tested natural disinfectant. It is found in abundance in nature. Salt in its non-iodized form exhibits antimicrobial effect. The action of NaCl as an antimicrobial agent is based primarily on its plasmolytic effect on microbial cell membrane. High levels of NaCl in culture broths osmotically stress microbial cells resulting to decreased turgor pressure of the cell membrane, release of microbial cytoplasmic water, and cell shrinkage. Dehydration occurs as a consequence and the medium is rendered unsuitable for microbial growth.

In the present study, there was a complete elimination of microbial contamination following one week of usage in 78% of the samples and evidence of bacterial contamination in all the control samples. However, in a study conducted by Farah Rami Saleh [10] it is shown that the microbial contamination ratio was 37.5% when salt water was employed as a disinfectant. Other studies by Bhat S [8], Rajiv Saini [11] demonstrate similar

microbial contamination of toothbrushes as evident in the control samples of this study.

In this study, species of staphylococci were the predominant flora that was isolated from the control group, this concord with findings of study conducted by S. S. Taji [12]. Inhibition of growth of species of Staphylococci by Rock Salt solution observed in the study group is concurrent with findings of study by Monalisa M Bayani [13]. In the present study, the limitations are: Bacterial flora resident in oral cavity is vary greatly between individuals hence, extent of contamination and nature of contaminant is dissimilar across study and control groups and oral hygiene practices are likely to vary between individuals.

Conclusion

Addressing issue of toothbrush decontamination with Rock salt is an effective, economical and realistic solution as demonstrated by this study.

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Correction of Crowding with ClearPath® System

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Introduction

The practice of orthodontics is faced with new trends. Adults are increasingly aware of the influence of appearance in their personal and professional lives. A 1999 study showed that the number of adults seeking orthodontic care has been declining. Furthermore, this study concluded that this trend is not likely to improve without a biological or technological breakthrough.[1] Adults make up only a small percentage of the patients in orthodontic practices in the United States.[2] Possible explanations for the small number of adult patients include fear of pain or discomfort and esthetic concerns associated with general orthodontic treatment.[3] Moreover, hygiene and periodontal health are confounding factors associated with adult treatment.[4] Adults are more likely to have bone and attachment loss than are adolescents. In addition, an increasing number of adults seeking orthodontic care present with relapsed orthodontic treatment. The degree of relapse depends on the normal events of growth and aging after treatment. There is no decisive way to distinguish between normal age-progressive events and those due to relapse.[5,6] Some patients with orthodontic relapse are apprehensive about going back into braces.

Eventually, if the relapse is excessive, fixed appliances are the only option for treatment. However, a new system, Clearpath® Aligner system (Fig 1) has been introduced in 2008 as a new orthodontic tool to treat orthodontic cases.

Fig. 1: Clearpath® Aligner System

The ClearPath invisible appliance involves a series of plastic aligners that are clear, thin and made by advanced 3D techniques involving use of software also. The transparency of these appliances enhances its esthetic appeal for the adult patients as well as aesthetically conscious patients. Each aligner is around 0.7mm thick and is designed to move the teeth by upto maximum of 0.25 – 0.3 mm over a 2 week period. All aligners in CleatPath® system are delivered altogether and worn through a pre-defined sequence all throughout the day.

Case Report

A 40-year-old white man reported to our practice with the chief complaint of anterior crowding and relapse of his original orthodontic treatment, which included the extraction of 4 premolars. Pre-treatment records including panoramic radiograph, lateral ceph, study models and photographs were recorded (Fig. 2). The patient was diagnosed of having a Class II Div 2 Subdivision left side type of malocclusion with crowded upper and lower anteriors.

Fig 2 Pretreatment Records

Treatment Objectives

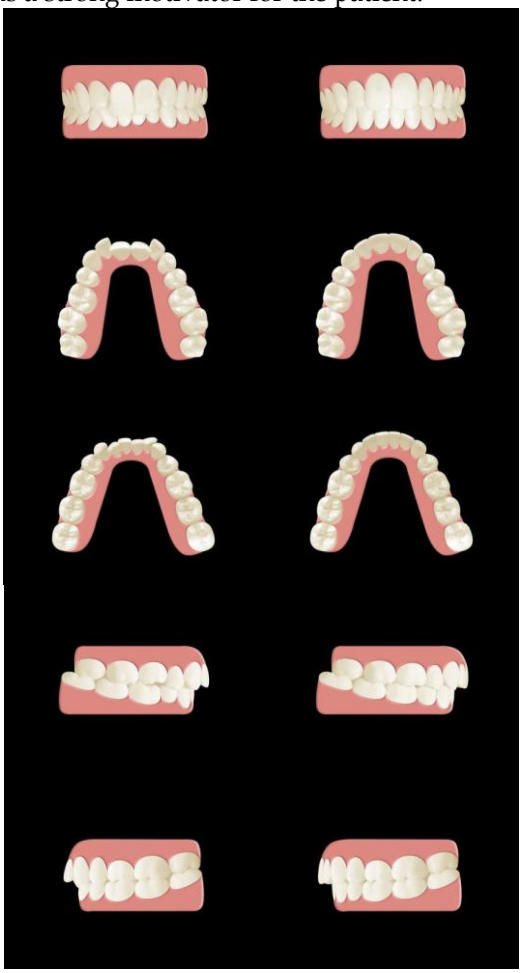
1. Procline the upper and lower anteriors to gain space.
2. Slight expansion to provide space for anterior alignment.
3. Intrusion of upper anteriors.

After approval from ClearPath, we recorded the polyvinylsiloxane (PVS) impressions and PVS bite registration and sent them along with the case analysis form to ClearPath. The final virtual treatment plan was presented in a Virtual Set up file via the Internet to the treating orthodontist (Fig 3).

The Virtual Setup

The virtual setup (Fig 3) of the patient was presented by ClearPath approx 10 days after PVS Impressions & PVS bite were sent. The treatment plan was evaluated and the setup was approved without any modifications. The virtual setup is a very strong

diagnostic tool to visualize your treatment plan, as well as a strong motivator for the patient.



Pre Treatment Post Treatment

Fig 3 – Clearpath Virtual Set Up.
(Source: ClearPath Orthodontics, New Delhi, India)

Aligner Delivery

The patient required a total of 24 UPPER and 24 LOWER aligners. The patient was very satisfied with fit and the invisibility of ClearPath Aligners.

Fig 4 – Fit of the Aligners

Treatment Results

The final treatment result was satisfactory. The treatment progressed smoothly, and got completed in around 12 months. The maxillary and mandibular anteriors were aligned and levelled, and the overbite improved (Fig 5 A and B). Some case refinements were needed and this would have required some extra aligners. However, the patient was extremely happy with his result and did not desire to prolong treatment.

Fig 5 A – Post Treatment Records

Fig 5 B – Post Treatment Records

Pre Treatment Post Treatment

Fig 6 Patient's Smile Close Up

Conclusion

This article discusses a crowding case treated with ClearPath Aligners, a hygienic, removable, and comfortable appliance. With this appliance, the arches were expanded, and the crowding was corrected without reproximation. The treatment progressed with no problems. Other treatment alternatives were considered, but each had disadvantages. Fixed appliances offer better control of treatment but carry the concern for esthetics, hygiene and monthly follow

ups for an adult patient. ClearPath Aligners present a unique mode of treatment for adult orthodontic patients. It removes their esthetic, hygienic, and metalallergy concerns. It also allows treatment to finish in about the same amount of time as fixed appliances. The ClearPath Aligner system does have some limitations. Currently, severe derotations, complex extrusions, and large translations are less predictable with ClearPath Aligner system. The virtual setup is not only a diagnostic aid, but it can also be used as an educational tool for the patient. In addition, patient cooperation is imperative for the success of the treatment.

For this patient, cooperation was not an issue because he was enthusiastic about his treatment. Considering that this appliance is in its development infancy and that this was a moderately severe crowding case, the treatment finished with good results, and the patient was pleased with the outcome.

Disclosure

The author of this paper does not have any direct financial relation with the commercial identities mentioned in the paper that might lead to a conflict of interests.

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