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National Doctors' Day 2020: To Lessen the Mortality of COVID-19

Dr. Neha Vaid 

'Doctors' Day', is celebrated in India on July 1st every year, holds special significance for medical practitioners in India. Just like in Mothers' Day we pay tribute to our Mothers, Fathers' Day to our Fathers, Teachers' Day to our teachers, Children's' Day to children; it is on this day that Doctors' are celebrated for the irreplaceable roles that they play in our lives. From dentists to neurosurgeons, homeopaths to heart specialists, physicians to pediatricians, Doctors' Day is the time to pay tribute to the entire medical profession.

The National Doctors' Day is celebrated to recognize and appreciate the contributions health care professionals make to enhance the lives of individuals as well as communities. The date varies from country to country. In India, it honors Dr. Bidhan Chandra Roy, West Bengal's second chief minister and a legendary physician. Dr. Roy was born on July 1st, 1882 and passed away 80 years later on the same date. He was honored with Bharat Ratna, the highest civilian award in India, on February 4th, 1961.

This special day is an ideal opportunity to remind people of the critical role doctors' play in our lives. Being a doctor is not just a 'job'; it is a challenging commitment to service that requires high levels of skill and precision. To make a tough job even tougher, doctors also have to deal with the reality that even a small professional mistake could drastically affect a patient's life. Doctors' Day is the perfect time for patients to acknowledge the high-pressured job and appreciate their Doctors' ability to comfort and heal. The theme of Doctors' Day this year is to "lessen the mortality of COVID-19." This encompasses spreading awareness about asymptomatic hypoxia and early aggressive therapy. Webinars and virtual meets will be held across the country to mark this day.

This day has special significance this year. Amid the COVID-19 pandemic, doctors and physicians all around the world have been recognized for their selfless service and acts. Working continuous shifts

and putting their own health in danger, this day gives a perfect opportunity to salute their work. The COVID-19 pandemic has caused much morbidity and mortality to patients but also health care providers especially physicians caring for COVID-19-infected patients. To mark this day in a better way we should also focus on the factors associated with higher chances of mortality and morbidity among doctors. Lack of personal protective equipment (PPE) and inadequate PPE were commonly cited as a cause of death especially in developing nations and Italy.¹ During pandemics, hospitals should organize physician shifts with mandatory rest and efforts should be made to get the doctors connected with their colleagues for information and social support. The government should adopt certain policies that may help physicians care for their families, provide lodging closer to the hospital and legislate life insurance enhancements etc. Efforts by the administration to make the life of physicians and their family better will certainly lift the morale of doctors dealing with COVID-19 patients.^{2,3}

If we did not recognize the importance of doctors before, we are certainly learning just how much they contribute to society, amid the coronavirus pandemic. While we are self-isolating, it is the doctors who are constantly fighting for the lives of people who have been infected with the deadly virus. With the number of infected people on the rise every day and hospitals teeming with hundreds of people, it has never been more important to appreciate the efforts that doctors make to ensure that we sufficiently recover from whatever may be ailing us and continue to remain healthy.⁴ Doctors are truly the greatest heroes, of not just the present but of all time.

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The Apocalyptic Triad of Anthropocentric Bigotry, Economic Hyperactivity and Population Overgrowth Will End Up Killing This Wonderful Planet (World Population Day Guest Comment)

Abhay Thakur

What a wonderful world?? It may have been a wonderful world upon a time but let us FORGET for a second - climate change due to human activity. We currently live in a world with worldwide deforestation, soil salinity, collapsing ecosystems. Insect populations like bees, butterflies among others are dwindling due to the overuse of pesticides and herbicides, 67% of animal species are in terminal decline. Overfishing, poisoning with massive amounts of chemical waste and pollutants in our creeks, rivers and waterways. Countless major oil spills, microplastics in our oceans and waterways which is finding its way into the food chain. Worldwide corruption, rising world crime rates, the mass immigration problems, GMO crops. Also, cow 'emissions' being more damaging to planet than CO₂ from cars, and economic hyperactivity (which bears corporate greed). All these problems are real and factual! The list just goes on and me personally, I don't know what the answer is to these problems or what the solution could be.

However, I do feel overpopulation is the root to all these problems or is a major confounder at the very least. Having said that, Solving the population problem is not going to solve everything. But if you don't solve the population problem, you're not going to solve any of those problems I listed; they all go hand in hand. Whatever problem you're interested in, you're not going to solve it unless you also solve the population problem. If overpopulation is not addressed, we will all be in dire straits eventually, it's only a matter of time.

I recently watched a TV documentary on the catastrophic effect on Asian rivers from the throwaway clothing industry which serves the demand in Western countries. We don't need to waste that much. We throw away change-of-fashion clothes, unconsumed food, sometimes even fully functioning electronics because obviously we need the new iPhone. There is NO evidence to show that the newly enriched poor billions will not behave the

same way. Take us Indians as an example, our parents use things judiciously since they did not have a lot to begin with but we the NEW rich are wasteful.

To get ahead, China seeks to compete on price. By doing that, they HAVE succeeded in devastating European, American and Indian manufacturing, but in the process, they often export to us faulty products that fall apart within weeks or months. How wasteful of resources is that, resources that you and I both know are dwindling by the day??? And I feel it all stems from an inherent unsustainable and an uncertain future because of the constant population overgrowth which fuels economic hyperactivity leading to corporate greed.

Another issue is worldwide corruption. Severe poverty in most countries - in ALL countries - is due to the rich exploiting the poor. Africa has huge mineral resources, vast areas of unused land, and a climate in which you can grow practically anything! But what incentive has a corrupt government to educate the poor (something which would reduce the birth rate and nip it in the bud)? The first thing the educated poor do is start a revolution, demanding a bigger share of the wealth. No corrupt government wants to empower the poor and share wealth and power, so they leave them be uneducated.

The only practical/realistic/feasible solution that a layman like me can think of is harsh, but populations that can be characterized as having aggressive demography (like India) must be limited by means that will become ever more restrictive with the passage of time such that the overall population will be made to contract. I would argue that we are already past sustainability in our country and measures should have already been taken, somewhat similar to, yet not as extreme as China's now discontinued one child policy. As nightmarish as it may seem, it is perhaps unavoidable. I don't know if the political will can be found in time to save the planet, but, if that will can be found that too is



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concerning. The other is a 'death rate solution,' in which ways to raise the death rate (- war, famine, pestilence, Covid-19 -) find us.

But hold on, Look at the whole northern, and southern American continent. Only a few live there. Compare this with India, if small landmass as India can support more than a billion people, earth can support at least 20 billion people and more. The entire population of our planet at this moment in

time could fit into Australia, with each person having 1/4 acre of land. But would you want to live in that world?

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Teledentistry: A Novel Tool in our Arsenal to Combat COVID-19

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The prevailing havoc due to rapid spread of COVID-19 has led to an unprecedented impact on dental care delivery. With the postponement or cancellation of all routine dental work, other than emergency care, the dental economy has come to a grinding halt. Aerosols and droplets are generated in many dental procedures, so dental professionals are under an enormous risk of occupational exposure to COVID-19. With no clear forays for the restoration of normalcy, the current crisis poses unique challenges to commence and sustain dental practice. Teledentistry has emerged as a panacea to the delivery of health care, with modified approaches promoting a virtual method of consultations, avoiding direct physical contact. Teledentistry can aid in pre-screening patients for COVID symptoms, inquiring about travel history or a recent COVID-19 test result, that helps in risk stratification and deferring dental care to protect vulnerable and high-risk groups. But, it is improvident to restrict the utility of teledentistry to this time of pandemic only. Proactive integration of teledentistry in dental practice will enhance the virtual care which will change the way in which dental care services are rendered in the future.

KEYWORDS: Pandemics, Infection control, Viruses, Dental Care

INTRODUCTION

Dental practice has been handicapped in the entire globe, entangled by the tentacles spread by the COVID-19 virus, posing unique challenges to dental care delivery. The uncertainty in the future prospective of dentistry, fetched by this virus, has dismayed dental professionals, placing their profession at bay. The scope for sustainable dentistry in the new-normal situation has become doubtful and the mere act of resuming the provision of dental services to the general public creates chaos in the minds of the dental practitioners and the patients.¹

Dental care providers rank the highest among all medical professionals in contracting the disease as the route of transmission of this virus has a significant involvement in dental practice. Aerosols and droplets are generated in many dental procedures which may lead to an easier spread of infections.²

In response to the spread of COVID-19 like a forest fire, lockdown model and obligatory quarantine have been imposed worldwide as an effective means to break the chain of COVID-19 transmission. The recommendations to avoid hospitals, dental clinics, medical offices unless emergency, have been set forth to minimize direct contact between the patients and the doctor.³

The core of the health care system resides in the security and welfare of the health personnel. Pertinent to this idea, teledentistry plays a pivotal role in linking the care provider and the patients at a distance, providing a virtual platform which reduces the risk of clinicians' exposure.^{4,5} The significance of teledentistry is undoubtedly immense in terms of rendering dental care services to overcome the existing pandemic.

TELEDENTISTRY IS MORE THAN JUST A TECHNOLOGY

Teledentistry is an inseparable terrain of telemedicine devoted to dentistry, which has emerged from the coupling of digital telecommunication technology and dentistry.⁶ This pioneering approach was introduced in oral health to surmount the challenges like uneven distribution and shortage of infrastructure and human resources.⁷ The inception of teledentistry as a part of the blueprint for dental informatics, was drafted at a 1989 conference funded by the Westinghouse Electronics Systems Group in Baltimore.^{6,8} Although teledentistry was introduced more than three decades ago, the progress has been comparatively sluggish, despite its invincible potentials.⁹⁻¹¹

This innovative technology completely modifies our traditional approach, promoting a virtual method of



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consultations, avoiding physical contact and direct clinical examination. Distant or isolated patients can be thoroughly screened by professionals even before reaching the hospital.³ Monitoring of post-operative cases can be done effectively after rendering dental treatments. The advantages of teledentistry includes live video, store-and-forward, remote patient monitoring and mobile health service.¹²

The medium for virtual communication can be electronic medical records, videos, digital images, smartphones or webcam-enabled computers. The most relevant equipment in this case is definitely the smartphones with their evolutionary models. Other devices such as tablets and laptops are additionally multifaceted devices which have radically changed the health sector in terms of accessibility and provision of health care facilities. Most of the health centers have promoted their service through electronic documentation for continuous optimal care.⁵

TELEDENTISTRY IN THE AGE OF COVID-19

Health systems globally are now recouring to teledentistry as it has assisted the “Stay home” and “social distancing” polices enabling dental care delivery, keeping patients in their homes. If we are thinking of limiting the utilization of teledentistry to this time of pandemic only, this will just be an indication of our improvident action. The scope of teledentistry includes improved access, early intervention, and health education to enhance the quality, efficiency, and effectiveness of dental health matrices.¹³

In times of this crisis, a large number of outpatients visiting to various dental hospitals and clinics can turn these dental settings to an overwhelming, chaotic place which poses a unique challenge to the maintenance of quality of care. With the use of teledentistry, we can efficiently manage a sizeable portion of the potential patients which minimizes the risk of exposure of patients, clinicians, and the community. Teledentistry is playing a key role in reducing the risk of Covid-19 dissemination.

The idea of “forward triage” was conceptualized for tackling various types of crisis situations in times of pandemics. Forward triage aims at reducing the workload of the care givers by curtailing unnecessary patient visits to dental settings and sorting the patients before they arrive to hospital.¹⁴⁻¹⁶

The tide in the area of virtual medicine has been heightened by the endeavors generated by teledentistry. Teledentistry is definitely here to stay and the future holds an array of opportunities to unravel its actual scope. The area where teledentistry has carved a niche is evidently the conducive maneuver of the health workers, who have been quarantined at home after exposure to COVID-19. In the aforementioned state of affair, the distant teleconsultations prove to be a convenient tool to these health workers, by being actively engaged in the field of teledentistry. In cases of quarantined patient, the perception of satisfaction is fulfilled, through teledentistry, by the apprehension of the fact that they are being constantly monitored and attended. Consequently, the patient compliance is enhanced and a stronger doctor-patient bond is established, the latter playing a crucial role in the overall success of dental care delivery.

RISK STRATIFICATION AND SCHEDULING PATIENTS

The greatest threat posed by this pandemic is the lack of definitive prevention, treatment, and/or vaccine for COVID-19. Our practice has to be redefined with new screening methods. Detailed travel and exposure histories, COVID-19 symptoms, recent COVID-19 test results have to be assessed before intervention. Prescreening patients, through teledentistry, can help the health workers to segregate the patients as COVID, COVID suspicious or healthy patients and decide whether to defer the treatment or refer him/her to COVID-19 dedicated center.

DEFER DENTAL CARE: PROTECT VULNERABLE AND HIGH-RISK GROUPS

It is obvious from our recent experiences with the rapidly emerging COVID-19 that the older adults (over age 60) are the most vulnerable to develop serious illness and complications of COVID-19 leading to loss of their life. In addition, many of the geriatric patients also present with comorbid diseases like hypertension, cardiac disease, diabetes, or are immunocompromised or taking multiple drugs which increase likelihood of an adverse COVID outcome. So, there is an obligation to special consideration with regards to the care and safety of the elderly patients.³ This has direct implications for deferring the appointments for older and fragile patients at this hour of active contagion. Teledentistry can play an instrumental role in evaluating ongoing dental care for older individuals

and critically appraise risks versus benefits of the current dental procedures. We can employ teledentistry to reassure older adults for postponing cosmetic dental procedure or other elective treatment and thus limit their risk of contracting the virus.

TRENDS, CHALLENGES AND OPPORTUNITIES

The greatest hurdle in teledentistry is undoubtedly “the cost factor”. Teledentistry requires the obligatory collage of sources, funding and precise guidelines. The cost of the infrastructure for the telecommunication refrains the developing countries from consuming this versatile technology, although its implications are stipulated. On the other hand, the conservatism of decision makers in developing countries may play a dismissive role in its execution.^{14,15}

But, what about the validity and accuracy of this system? Needless to say, examination in-person and tele-diagnosis are incomparable strategies. The limitations in physical examination with proper instruments is, yet another barrier to its wider use.

Ethical issues imposed by this technology incapacitates the dentists from its maximum implementation. The exchange of personal details of the patient during teledentistry demands the commitment to confidentiality and security from the dental fraternity.¹²

Of course, technology cannot replace humans and it would be a frank fallacy to imagine that teledentistry can replace dental care providers. Teledentistry can only support in reducing the tiring workload of the frontline warriors during this COVID-19 outbreak by diverting them to provide emergency care. However, this mere support proves to be of utmost importance in times of the current pandemic.^{4,14} The power of teledentistry cannot be underestimated by its disadvantages. The cogency of this argument should be evaluated based on the need of the hour to emerge from the current crisis. Rules for monitoring suspicious activities should be developed and the conditions for reimbursement, interstate licensing and data confidentiality issues should be revised.

FUTURE PERSPECTIVES

Proactive use of teledentistry permits forward thinking to reach and assure patients in need of dental care in a new way as current crisis evolves. The gradual advances in dental scientific community has been

possible because of the visionary approach to envisage such adversities as opportunities. The current situation has aided in gaining momentum in novel fields in dentistry that are dedicated to optimal treatment modalities, embracing issues of accessibility, availability and affordability. The booming dental practice, which has incorporated innovations of robotics, sensors, nanotechnology, virtual reality, artificial intelligence, genomics and proteomics, has successfully metamorphosed into the direction of precision dentistry. Teledentistry is bound to make a gigantic leap, considering its aptitude and impact, transcending spatial and temporal affairs, establishing itself as a prime means of connectivity.

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Sports Dentistry: A Narrative Review

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Sports dentistry originated in 1980s. Most of the sports-related injuries are musculoskeletal. There are various factors which are responsible for the sports injury like the age, gender, growth, body size, type of sports, environmental conditions etc. and sports dentistry includes the prevention and management of it. There are various methods for avoiding oral sports injuries like the use of helmets, mouthguards, facemasks etc. The dentist can play an important role in informing coaches and sportspersons about the importance of preventing orofacial injuries. The aim of this review article is to increase professional awareness towards sports dentistry.

KEYWORDS: Injuries, Dentistry, Awareness, Sports

INTRODUCTION

Sports dentistry is the dental branch that was founded in 1958, Brazil at the time of World Cup Soccer. As per International Academy for Sports Dentistry – "Sports Dentistry is referred to as the sports medicine division that deals with the prevention and treatment of dental injury and related oral diseases associated with sports and exercise".¹ It has two major components: The first is the treatment of orofacial injuries and the second is the prevention of orofacial injuries due to sports.²

A specialization is required to meet all these criteria and it seems that sports dentistry is the need of time. Current dentistry has fortunately evolved various methods and devices to help and protect the participants from a number of orofacial injuries.³ Preventive measures such as the use of helmets, mouthguards, and other safety devices have reduced the athlete's impact, thereby reducing the injury.² Studies showed that 13%-39% of all dental incidents were sports-related and 11%-18% of all sports related deaths were from maxillofacial injuries.⁴ Sport-related oral damage is seen primarily in school children aged 7 to 11 years. Dental injuries most commonly encountered during sports are as follows:

1. Soft-tissue lacerations
2. Contusions
3. Dental fractures
4. Root fractures
5. Avulsions

6. Dentoalveolar fractures
7. Mandibular dislocations.⁵

Most of the sports-related injuries are musculoskeletal, and the face is involved in 11-40% of all sports injuries. Males are twice as often traumatized as females, the maxillary central incisor being the most often injured tooth. Age group of 20 and 30 year old individuals are most often affected by jaw fractures, because the maxilla is the facial skeleton's largest component. The most severe forms of facial trauma associated with athletics are soft tissue injury and "T-zone" bone fractures; the nose, zygoma, and mandible.¹ As a result of the potential for pain, psychological impact and economic implications, the impacts of orofacial abuse for children and their families are significant.⁶ Therefore the aim of this review was to assemble the knowledge regarding the epidemiology and prevention of sports related injuries.

SPORTS INJURIES

The face is the body's most vulnerable area, and is normally the least protected. Facial injuries associated with sports account for 8% of all soft tissue injuries to the face. Around 11-40% of all sports injuries include the face. Most injuries can be treated at the sporting event venue, depending on the extent and the forms of damage, with the athlete resuming to play immediately. Particularly vulnerable are three groups:



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children and teenagers, middle-aged athletes and women. Contact sports have inherent risks that place young people at a high risk of serious injuries. Biking is the top most sport related injury which is followed by basketball, playground activities, football and a few other sports. Some sport injuries are caused by accidents; others are caused by poor fitness methods, inadequate gear and lack of preparation or insufficient warm-up and stretch.⁷

PREVALENCE OF OROFACIAL INJURIES

The prevalence of orofacial injuries during various contact sports are shown in table 1.⁸

CONTACT SPORT	PREVALENCE	AUTHOR	YEAR
1. Basket Ball	80.6% (Professionals) 37.7% (semiprofessionals)	Wenli Ma et al.	2008
2. Base Ball	27%	Pasternack JS et al.	1996
3. Foot Ball	16.6%	Esber C, Aglar et al.	2009
4 Handball	21.8%	Galic T et al.	2018
5. Water polo	18.6%	Galic T et al.	2018
6. Swiss Rugby	39.5%	Schildknecht S et al.	2012
7. Hockey	33.8%	Praveena J et al.	2018 ⁸

Table 1. Prevalence of Orofacial Injuries while Playing Contact Sports

EVALUATION OF FACIAL INJURIES

Assessment of facial injuries should follow the principles of trauma assessment and should continue with airways, breathing circulation and disability. Vital sign examination and mental stability are also critical components of initial evaluation. The first and main aspect of assessing trauma patients is called the primary survey. The problems will be dealt with in an ABCDE manner (A- airway, B- breathing, C- circulation, D- disabilities and E - exposed environment control). The secondary survey will begin when the primary survey is complete, resuscitation attempts are well defined, and the vital signs are normalizing. The secondary assessment is a trauma

patient's head-to-toe assessment, including a complete history and physical examination, and reassessing all vital signs. Every area of the body needs to be investigated in full. X-rays are obtained, suggested by examination. If the patient deteriorates at any point during the secondary study, another primary survey will be carried out, as there may be a potential life threat. The patient should be removed from the hard spine board and put on a firm mattress as soon as realistically possible as the spine board can easily cause skin deterioration and discomfort whilst a firm mattress offers equal protection for suspected spinal fractures. All soft tissue trauma and apparent facial contour asymmetries (suggesting structural bony fractures) are recorded once the potentially life-threatening injuries are removed. This is accompanied by a thorough face examination. To provide for a thorough examination, each health care provider must establish a standardized procedure. A common approach starts with the scalp and works downwards.⁷

The face is implicated in about 11-40% of all sports injuries. The intricate facial anatomy poses a challenge for the doctors to diagnose and treat these injuries.⁹ In Austria, Tuli et al. stated that sport accidents are six times more likely to cause facial injuries than accidents at work or accidents at traffic, respectively.

EPIDEMIOLOGY OF OROFACIAL INJURIES

The host - agent - environment can be adapted for understanding the epidemiology of sports injuries.

1. Host Factors: Host factors can be determined by the following:

i). Age: Degenerative changes in the bone, ligaments, and other connective tissues in older players may be an important etiological factor for injury. Primary dentition most often contributes to luxation injuries before the eruption of the permanent incisors. A smaller association of crown to root with denser and more mineralized alveolar bone is apparently leading to this phenomenon.¹⁰

ii). Gender: The evidence supports the fact that boys seem more vulnerable than girls to orofacial injury. This fact is consistent with the National Youth Safety Sports Foundation (NYSSF) 1994 ratio 3:1, which breaks down to 2:2 injuries per 100 girls per season and 3.9 injuries per 100 boys per season for overall injury

risk in organized sports.¹¹ Nonetheless, Pinkham and Kohn say that when taking into account the exposure levels, girls are at higher risk than boys.¹²

iii). Growth: The developing child needs to quickly adjust the learned skills to the changing dimensions of his or her body. A theory suggests that children are at great injury risk at accelerated points in their growth rates as the growth is reflected first in the long bones of the body, then in the muscles. The most frequent cause of overall injury in adolescents may be the loss in flexibility.¹¹

iv). Body size: These include a higher center of gravity, increased leverage due to greater length of limbs and stress on joints due to additional weight.¹²

v). Skilled coaching: An athlete is less able to respond in game situations without proper instruction and guidance or coaching in physical fitness and sporting skills, thereby increasing the risk of injury.

vi). Orthodontic status and history of previous injury: The factors like class II molar relationship having an overjet greater than 4 mm., short upper lip or incompetent lips, and mouth breathing all increase risk for dental injury.

2. Psychological factor: The state of mind during play has a lot to do with the concentration level and the ability to perform in the sports. There is a more risk for injury if the athlete is having more stress or pressure levels.¹⁰

3. Agent factors:

i) Type of sport: It would seem that fast moving sports are predisposed to injury as a result of collisions. Sports that use projectiles such as balls, pucks or some form of a stick are also associated with increased risk involvement. Soft tissue lacerations and contusions as well as displaced comminuted – type fractures are frequently associated with the sports having the use of bats, hockey sticks and other sports having same armamentaria.

ii). Other factors: The playing field conditions and the fit of the safety equipment affect the amount of danger the athlete is exposed to. Lack of regulations or officials' ability to implement them often increases the risk.¹¹

4. Environmental factors:

i) Occasionally, in some of the unforcing situations, environment factors such as light condition (e.g. dull light), disrupted air conditions, humidity conditions, and rain can also cause the sports person to encounter impaired physical and psychological conditions, which can lead to direct or indirect injury.

ii) As explored through discrepancies in urinary catecholamines, children with emotionally stressful conditions face a greater risk of injury to the dentofacial region.¹¹

PREVENTION OF OROFACIAL INJURIES

The main method for avoiding oral sports injuries is to wear mouth guards and headgear consisting of a mask and face protector (Table 2).

1. Mouth guards: The first mouthguard documented was made in 1892 by London Dentist, Woolf Krause.¹³

SPORTS THAT REQUIRE THE USE OF MOUTHGUARDS		
Acrobatics	Handball	Soccer
Basketball	Ice hockey	Softball
Bicycling	Gymnastics	Squash
Boxing	Martial arts	Surfing
Extreme sports	Rugby	Volleyball ¹

Table 2. Sports Requiring the Use of Mouthguards

The American Society for Testing and Materials and mouthguard manufacturers divided the mouthguard into three types:

i). Stock Mouthguards: Stock mouthguards are made from rubber, polyvinyl chloride, or a copolymer of polyvinyl acetate. The advantage is that it is relatively inexpensive and the disadvantage is its availability only in limited sizes.¹⁴

ii) Mouth-formed Protectors: There are two types of mouth-formed protectors: The shell-liner and the thermoplastic mouthguard. The shell-liner type is manufactured by inserting freshly mixed ethyl methacrylate in a hard shell, which is then placed into the athlete's mouth and molded over the maxillary

teeth and soft tissue.¹⁵ The preformed or thermoplastic (also known as “boil and bite”) is immersed in boiling water for 40-45 seconds transferred to cold water and then adapted to the teeth.⁶

iii) Custom Made Mouth Protectors: This is the best of the three forms and the most expensive, it is made of thermoplastic polymer and constructed over a dentition model of the sportsperson and designed by the dentist and matches exactly the fit of the mouth of the sportsperson.¹⁶

2. Helmet: Helmets are designed to avoid abrasions, contusions and lacerations in the scalp and ears. These protect the skull bones against fractures, and the brain and central nervous system against severe concussions, cerebral hemorrhage, unconsciousness, paralysis, brain damage and death.²

3. Facemasks: Facemasks are made from different diameters of plastic or rubber tubing or welded steel or aluminium and are coated with a vinyl plastisol coating. The earliest facemask design introduced into football in the 1950s consisted of a single bar that was contoured. It provides the maxilla with different degrees of defence horizontally from an extended finger, a clenched fist, an forearm or a helmet directed towards the zygomatic nasal pyramid or mandibular arch respectively.¹⁷ One major disadvantage of the facemask is that it has a protruding object within the ready grasp of an opposing player. When an opponent pulls or twists the facemask during a match, serious physical consequences such as damage to the muscle, neck or spinal column will result.¹⁸

SPORTS RELATED DENTAL IMPLICATIONS

- Sports drinks, especially carbonated, are often used by professional athletes and amateur sports people for rehydration and replacement of electrolytes during highly aerobic activities. Such liquids have a negative effect on the teeth due to the low pH and the inclusion of citric acid in its formulation, which, if ingested inappropriately and with high volume, may be highly erosive for tooth tissue.¹⁹
- As the pools are chlorinated to reduce bacterial contamination and algae, the swimming sports person are affected with biocorrosion enamel.¹⁹
- Divers can also experience barodontalgia in relation to water sports, which is known to be an intraoral discomfort evoked by increases in barometric pressure. Most common oral diseases reported as possible sources of barodontalgia: unsatisfactory

dental restorations (30.31%), dental caries without pulp involvement (29.2%), inflammation of the pulp / periradicular necrotic (27.8%), vital pulp pathology (13.9%) and recent dental treatment (barodontalgia postoperatively, 11.1%).^{20,21} In addition to the need for dental care, the possible effects include aspiration or swallowing of the fragment and pain, which may lead to injury or disturbance while diving.²² The dentist should therefore carry out regular examinations and preventive measures for diving patients, including periapical and vitality tests, with special attention to apical pathology, faulty restorations and secondary caries lesions.²³

MANAGEMENT OF DIFFERENT OROFACIAL INJURIES

The management of different orofacial injuries is shown in table 3.

CONCLUSIONS

It is an ancient saying that “Prevention is better than cure”. This holds true for orofacial injuries in sport events. Sport's person will realize that oral security by correctly fitting mouthguards, helmets, and face masks does not hamper their ability to compete.³ It is the dentist's duty as a health professional to stay informed and transfer the knowledge on to the society on sports dentistry issues.⁶ Gone are those days when we had to suffer with the unesthetic profiles, however in today's world we have advancement in dentistry and can provide esthetic look to any traumatic injury. People need to update themselves regarding the handling of such patients and the various treatment modalities. After all everybody's smile is precious and it needs to be protected.

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OROFACIAL INJURY	TREATMENT
<p>1. Abrasion An abrasion is a wound to the skin or mucosa caused by superficial damage. Abrasions occur as a result of friction, such as scraping between exposed skin and an object. Abrasions involving and extending up into the subcutaneous layer are known to be avulsions.</p>	<p>Thoroughly wash with saline. Deeper abrasions can require local anesthetics, and possibly a scrub brush. Topical and systemic antibiotics are also given. Aside from the daily oral hygiene, intraoral mucosal abrasions typically need no care. Maxillofacial surgeon is recommended for deeper abrasions.</p>
<p>2. Contusions A contusion, usually called a bruise, is a tissue hematoma without a surface split. This results from blunt trauma by physical force. Contusions may seem simply a hemorrhage of the soft tissue; nevertheless, evaluation is required for any potential osseous and dentoalveolar injuries.</p>	<p>The swelling is decreased by ice or pressure dressings. The body may resorb the hematoma over time, and the bruise can change colors through the healing process. If the hematoma is expanding, then surgical intervention may be required.</p>
<p>3. Lacerations Some tears in the soft tissue (skin or mucosa) are known as laceration. Lacerations in the skin are extremely common. Lacerations occur from sharp-edged devices, such as a knife, razor or glass, even they also occur from underlying fractures in the bone. Depending on the injury mechanism, lacerations may appear linear, jagged, or stellate. It should be ruled out if there is any damage to deeper structures such as nerves, vessels, ducts, muscles, and glands.</p>	<p>To remove foreign particles the field should be properly washed with copious saline irrigation. Local anesthetics is required, and possibly a scrub brush. Before closure, there should be proper hemostasis. Adhesive is required for small lacerations rather than sutures. Inside out closure is followed. For example, in a through-and-through laceration of the lip closure should be in the following order: (1) oral mucosa first to seal; (2) muscle tissue; (3) subcutaneous tissue; (4) skin. Open drainage is given in grossly contaminated wounds.</p>
<p>4. Dentoalveolar Injuries i) Crown fracture: Crown fractures, which affect the coronal portion of the teeth, can be limited to the enamel or involve the dentin and/or the pulp.</p>	<p>Treatment depends upon the fracture intensity. Simple enamel smoothing and no acute treatment is required in case of enamel fracture. Dentin fracture will likely require restorative treatment and referral to a dentist. Crown fractures extending into the pulp will possibly require root canal therapy, and should be referred to a dentist or endodontist.</p>
<p>ii) Root fracture It involves the root of teeth. This could be impossible to diagnose clinically without radiological analysis.</p>	<p>Root canal therapy, post and core, and a prosthesis is needed if it is near the crown. However if it is in the middle to apical third of the root, repositioning and immobilization is needed for 2 to 4 months. Removal of tooth is required in apical root fractures.</p>
<p>iii) Tooth concussion When the tooth is sensitive to touch and pressure without mobility or displacement, it is called as tooth concussion.</p>	<p>Enameloplasty on the opposing tooth gives a symptomatic relief. Periodic follow-up by a dentist are recommended.</p>
<p>iv) Tooth subluxation When the tooth is loose or mobile in the socket but is not displaced, is called as subluxation.</p>	<p>Similar to tooth concussion, however splinting and immobilization for 7-10 days is required for significantly mobile teeth.</p>
<p>v) Tooth avulsion Tooth avulsion is a complete displacement of the tooth from its alveolar socket; therefore, pulpal function and periodontal function can be substantially affected.</p>	<p>The prognosis for avulsed teeth can vary greatly based on many factors, including out - of-alveolus (extra-alveolar) period, the current periodontal condition, the occurrence of large dental restorations, alveolar socket destruction, gross inflammation, and the method of preservation before reimplantation. There is no need of reimplantation in deciduous teeth.</p>

Extra-alveolar time: The goal is to get the avulsed tooth reimplanted as soon as possible.

The highest prognosis is for teeth reimplanted within 20 minutes and poor prognosis is when reimplanted after 2 hours.

Preservation and handling: In order to maintain the vitality of periodontal ligament (PDL) cells on the root surface, the tooth should only be handled by the crown and not by the root. The best available medium should be used for gentle rinsing of tooth (not scrubbed or brushed). Hanks balanced salt solution (HBSS) or saline solution is the ideal storage medium. However, these solutions may not be available everywhere, in such scenario milk has been considered as the best accessible medium as it is shown to maintain vitality of the PDL cells. Infact patient's own saliva (keeping the tooth in the vestibule of the mouth) is the next best method, but this technique is not advised if a head injury is involved. Because to its hypotonicity, water is the least preferred media, as it causes the lysis of PDL cells. When rinsed gently, the patient must try to re-implant the tooth into the socket and keep it in place when en route to the dentist or emergency room.

vi) Alveolar bone fracture:

Alveolar bone fractures include damage to the alveolar process in the presence or absence of teeth. Other tooth injuries such as tooth displacement, crown fractures, root fractures, and soft-tissue injuries are also associated with these fractures.

The goal is proper repositioning and stabilization. Wire splint, plastic splint, or arch bar ligation may need immobilization for 4–6 weeks to promote osseous healing. Copious irrigation and soft-tissue suturing should be done as needed.²⁴

Table 3. Management of Different Orofacial Injuries

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Study of the Impact of Brain Vascular Accidents on Memorization in Man

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BACKGROUND: The search for disruption of memory in patients with stroke has been performed, in order to better understand the behavior of these patients and optimize their neuropsychological accompaniment.

AIM: To evaluate memory disturbances following stroke in patients; in order to better understand the attitudes of these patients.

MATERIALS AND METHOD: Fifty-five (55) patients with stroke participated in a spatial memory test. This test consists in studying the arrangement, the designation and the evocation of images during learning a spatial arrangement.

RESULTS: Of the 55 patients, 54.54% of patients passed the test but with later learning. And 45.45% failed at different events, they present real memory problems.

CONCLUSION: Our study, confirms that stroke patients face difficulties which often include cognitive impairments, such as memory deficits. Our results indicate that these memory disorders manifest themselves to varying degrees. Indeed, the working memory disorders would be more marked in group II patients than in group I patients or they can be considered transient.

KEYWORDS: Working Memory, Stroke, Learning

INTRODUCTION

Memory can be defined as the function that enables an organism to acquire, then retain, and evoke information or behavior related to a sensory experience.¹ This definition covers both forms of memory and elementary elements such as habituation and awareness, forms and complexes and developed as working memory.² This fundamental function is particularly vulnerable in the case of a stroke. Indeed, stroke is the second most common cause of cognitive impairment and dementia and can significantly affect attention, memory, ability to plan, and other executive functions. Strokes are usually classified into two broad categories: ischemic stroke and hemorrhagic stroke.

The first type of stroke, or cerebral infarction, is due to the obstruction of a blood vessel while the second, or cerebral hemorrhage, causes bleeding in the brain. The stroke is caused by a decrease or even a sudden stop of the blood flow in the branches of the vascular network in connection with the vessel undergoing a rupture of its wall or a blockage by a clot. Thus, the nerve cells fed by these branches are suddenly deprived of oxygen and sugars, causing in a few minutes their deterioration or death. In the hemorrhagic case, the decrease is mainly

due also to a compression of the nerve cells by the hematoma resulting from the bleeding. As a result, axons of neurons can be sectioned by mass displacement of nerve tissue. In Côte d'Ivoire, where stroke is a real public health problem, few studies have documented memory problems associated with stroke. The objective of this study is to evaluate memory disturbances following stroke in patients; in order to better understand the attitudes of these patients in order to optimize their neuropsychological accompaniment.

MATERIAL AND METHOD

Study population: The study described here totalled 75 participants of both sexes. The age of the subjects varies between 30 years and 61 years with an average 45.5 years. They are distributed as follows:

- 20 control subjects with no history of neurological, psychiatric and stroke disorders. They were chosen from the general population;
- 55 patients with stroke were recruited from the Department of Neurology of C.H.U of Cocody-Abidjan (Ivory Coast). Patients had focal brain damage due to



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stroke.

Technical material: To perform the spatial memory test, we had a square frame (400 mm x 400 mm) of dimension where are arranged the 9 images of familiar objects.

Methods: The spatial memory test Fouillot et al., (1993)³ used corresponds to the arrangement, the designation and the evocation of images during learning tests of a spatial arrangement. The subject must learn the spatial arrangement of nine images of familiar objects on the nine equal squares of a square frame placed in front of him. The objects represented are: a bicycle, a tam-tam, a mango, a key, a mask, a canary, a machete, a boubou, and a pig. The disposition of each image is shown to a subject successively for 5 seconds per image. The instruction to remember the place of the image in the frame is clearly given. The delay between the presentation of the images and the start of the recall is three minutes during which the subject performs a simple interfering task to perform (mental calculation or conversation). For the next test (the arrangement), the subject must place each image in its box. For the designation test, the subject is obliged to recognize the box of the object presented by the experimenter. Finally, in the evocation test, the subject must give the name of the object corresponding to the box designated by the experimenter. For each test, the learning criterion of the spatial arrangement is fixed at three successive tests without errors. In case of failure, the test is stopped after ten attempts and considered as a learning failure. After a full description of the subject study, written consent was obtained.

Statistical analysis: For this test, the sample is a series of tests up to a maximum of ten when the memorization is late or has not been established. The character studied is the number of errors per test.

The storage of the spatial position on nine images of usual objects, the maximum number of errors may be nine. For the statistical analysis of the results, the chi-square test of the software statistica version 6.0 was used. Significance was asked for $P < 0.05$. The determination of the percentage of errors is determined as follows:

$$\frac{\text{Number of errors for the trial considered} \times 100}{\text{Maximum number of errors}}$$

$$\frac{\text{Number of errors for the trial considered} \times 100}{9}$$

9

Moreover, for each series of experiments, two groups of subjects are to be compared: control subjects, subjects with stroke. It involves analyzing the overall behavior of each group through their performances and comparing these results. Thus, it is necessary to verify the significance of the probable differences observed between the averages of the errors obtained in each group, i.e. whether for each test the difference in performance between two given groups is significant or not. To do this, a univariate analysis of variance (ANOVA), using the Statistica 6.0 software, made these comparisons possible. Thus, if "p" is less than or equal to 0.05, then the difference between the compared variables is significant. On the other hand, if "p" is greater than 0.05, then the difference between the two variables compared is not significant.

RESULTS

The analysis of the performances performed in the different tests makes it possible to distinguish two groups of patients:

- Group I (n = 30) 54.54% composed of patients having inferior performance to control subjects with later learning;

- Group II (n = 25) 45.45% of patients who failed the various tests of the spatial memory test. The reminder of the spatial arrangement of the nine images was not possible for patients in group II. Indeed, in the agreement test, the comparison of the performances of the subjects of the groups I and the control subjects, reveals a significant difference because ($F(1,46) = 10,04$, $p = 0,0027$). Comparison of the performance of control and group II patients shows a significant difference ($F(1,46) = 8,14$, $p = 0,0065$); finally, there is a significant difference between the performance of Group I and Group II patients ($F(1,46) = 9,14$, $p = 0,0055$). (Figure 1). In the designation trial, the performance of group I patients was significantly different from the controls because ($F(1,46) = 12,76$, $p = 0,0008$). The performance of patients in group II compared to those in control subjects was also significantly different indeed, ($F(1,46) = 4,75$, $p = 0,0344$). There was a significant difference in the performance of patients in group II group I ($F(1,46) = 5,50$, $p = 0,0344$). (Figure 2)

Finally, in the evocation test, the performance analysis of control subjects and group I patients indicated a significant difference because ($F(1,46) = 8,89$, $p = 0,0046$). Similarly, the performance of group II and control patients was significantly different ($F(1,46) =$

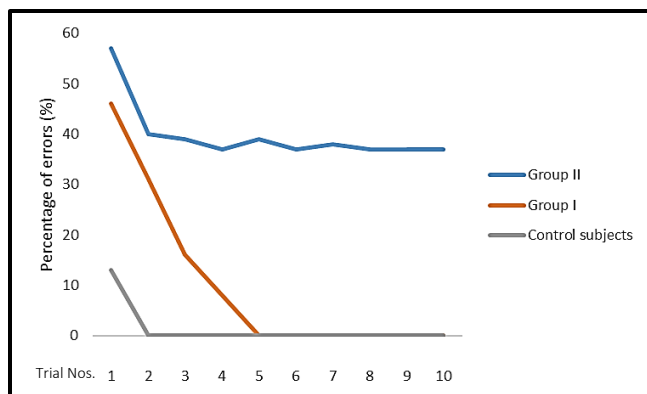


Figure 1. Percentage of subjects' errors based on tests conducted during the arrangement test

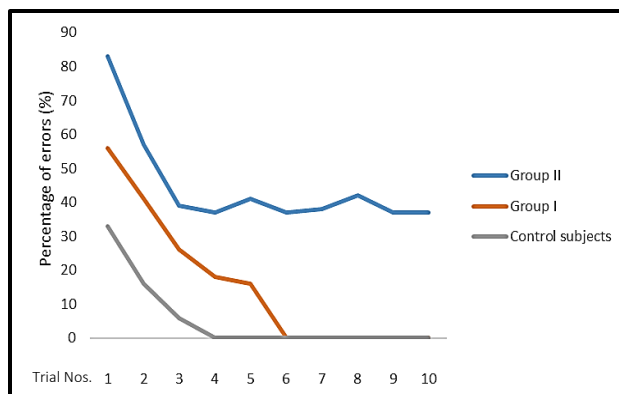


Figure 3. Percentage of subjects' errors based on tests conducted during the evocation test

9.50, $p = 0.0059$). Finally, there is a significant difference between the performance of Group I and Group II patients ($F(1,46) = 10.14$, $p = 0.0025$). (Figure 3)

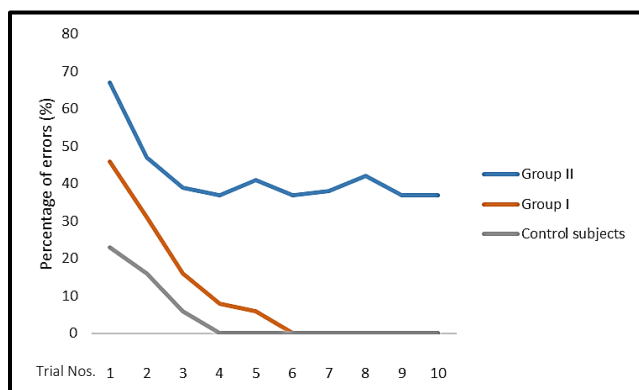


Figure 2. Percentage of subjects' errors based on tests conducted during the designation test

DISCUSSION

According to the literature, stroke patients face difficulties that often include cognitive impairments, such as memory deficits, attention and language difficulties, and mood disorders such as anxiety and depression (Boakye et al., 2019).⁴ 45.45% of our patients had great difficulty in performing a simple test of spatial memory. In fact, patients in group II failed in the various tests of arrangement, designation and evocation of the spatial memory test. They thus presented real disturbances of the memory in the short term. These results confirm the data of Park SH et al., (2017)⁵ who in a retrospective study from 2014 to 2015 obtained 62% of patients with memory deficits following a stroke. These

disturbances in memory are comparable to those obtained by Bakou et al., (2010)⁶ in epileptic patients and Yao et al., (2011)⁷ in subjects three hours after alcoholization with palm wine (koutoukou). Our results are comparable to Zhou et al., (2016)⁸ who obtained stroke and a significant alteration of the spatial memory compared to the witnesses, in the spots of recognition and location of the object in mice. Our results also corroborate previous studies reported by (Karimian et al., 2018 and Oliveira et al., 2001).^{9,10} The first author observed a significant alteration of visual-spatial short-term memory in patients with stroke. The second author noted disturbances in working memory in subjects with stroke in the right hemisphere. Indeed, our tests, in addition to short-term memory, also, of course, test the working memory and its visuospatial register (Adou et al., 1999).¹¹ In addition, patients who have successfully learned the spatial arrangement of nine familiar objects (54.54%), did so late (group I). This result indicates a transient memory disorder in these patients, as observed (Yao et al., 2011)⁷ in subjects three hours after alcoholization with palm wine (koutoukou) subjected to the same spatial memory test. These different memory disorders could be corrected as a result of adapted rehabilitation programs; or lithium drug therapy as Sun et al. (2019)¹² have shown in a population with stroke. On the plan of the mnemonic functioning (encoding, storage, recovery), the results would suggest a lack of encoding of the items presented to the patients during the tests.

CONCLUSION

According to the literature, stroke patients face difficulties that often include cognitive impairments, such as memory deficits. Our study, in addition to confirming this result, indicates that these memory

disorders manifest themselves to varying degrees. Indeed, the working memory disorders would be more marked in group II patients than in group I patients or they can be considered transient. Difficulties with the encoding of information could explain the slowness of learning observed in these patients. Specific memory disorders (spatial memory, working memory) can occur in patients with stroke. Patients and their parents should be well informed about their existence and the nature of these disorders.

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Knowledge Attitude and Preparedness among Different Health Professionals Towards Potential Bioterrorism Attacks

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INTRODUCTION: The threat of bioterrorism, long ignored and denied, has heightened over the past few years. Bioterrorism is the malpractice of microbial agents and their products in-order to create terror or slay humans or animals.

AIM: To assess the knowledge, attitude and preparedness regarding bioterrorism among dental, medical and nursing group of colleges in and around Visakhapatnam, India.

MATERIALS AND METHOD: A descriptive cross-sectional study with structured self-administered questionnaire with 14 validated questions was done among 1,412 health care providers which includes medical and dental interns, postgraduates, nursing third and final year students and faculty that includes both the practitioners and academicians from 6 medical, 2 dental and 3 nursing colleges in and around Visakhapatnam, India. The data was analysed using, Analysis of Variance (ANOVA) test and Tukey's post hoc test.

RESULTS: On overall comparison among the three group of colleges, the knowledge, attitude and preparedness concerning bioterrorism is higher in medical colleges, followed by dental colleges and nursing colleges respectively that are statistically significant.

CONCLUSION: Most of the study population are willing to help the government during the outbreak of bioterrorism but lack of knowledge is hindering them. Hence the curriculum of medical, dental and nursing colleges must be reformed and training courses are to be planned for better knowledge, preparedness and attitude of doctors as well as nurses.

KEYWORDS: Bioterrorism, Health Care Providers, Pandemic, Knowledge

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INTRODUCTION

Terrorism can be defined as “a strategy to use violence, social threats, or coordinated attacks to generate fear, cause disruption, and ultimately leading to compliance with specified political, religious, or ideological demands” and this term terrorism is derived from a French word “terrorisme”.¹ Bioterrorism is the intentional or threatened use of microbes or their toxins to produce death or disease in humans, animals or plants to accomplish political or social objectives.²

Agents of bioterrorism can be coaxed and persuaded to defy modern medications and can be blown out through various sources that are difficult to detect. Rather than atomic or chemical weapons, microbiological instruments pose the utmost risk, and such agents are gaining prominence around the world.³

The history of bioterrorism was started by Assyrians in 600 B.C. when they poisoned enemy wells by a fungus that caused convulsions. During the siege of Caffa in 1346, Tartar forces initiated a plague outbreak that was responsible for the plague pandemic known as the

“Black Death” and was said to be the most devastating public health disaster in history.⁴ In 19th century with new founded knowledge of Koch's postulates and development of modern microbiology, isolation and production of specific pathogens became possible.⁵

Cases of individuals utilizing biological agents for malicious purposes include the 2001 anthrax attack and mailing of letters containing poison ricin to the President, senator, and a local judge in United States in April, 2013.⁶ Maintaining effective disease surveillance and communication systems are fundamental components of an adequate public health infrastructure.⁷ Dentistry can contribute valuable assets, both in personnel, in facilities, and in the immediate response to a bioterrorist attack and its aftermath. Dentists, with their extensive academic training and practical skills, can make a much greater contribution in both the early detection of and response to a bioterrorist event.⁸

As India has a huge population there is every chance for



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quick spread of a pandemic during bioterror attack. But the recommended syllabus given by MCI, DCI and NCI lack the presence of bioterrorism.⁹ Physicians and nurses are integral components of the public health bioterrorism surveillance system.¹⁰ Hence, need was felt to assess the knowledge, attitude and preparedness regarding bioterrorism amongst the medical, dental and nursing colleges in and around Visakhapatnam regarding bioterrorism.

MATERIALS AND METHOD

This is a cross sectional study done in and around the Visakhapatnam district, Andhra Pradesh, India for over a period of 2 months. The study population consisted of 1,412 participants in which 364 participants were obtained from 2 dental colleges, 697 participants were obtained from 6 medical colleges and 351 participants were obtained from 3 nursing colleges in and around Visakhapatnam district. The study sample was chosen using convenience sampling. The purpose of the study was explained to every participant, and written informed consent was obtained.

A structured, self-administered questionnaire consisting of 14 closed-ended questions with 6 questions based on knowledge and attitude each and 2 questions based on preparedness regarding bioterrorism was taken from a previous study.¹ The questionnaire is pretested in a pilot study done on 200 individuals of medical, dental and nursing colleges.

The inclusion criteria consist of: 1) People who are willing to participate in the study from three groups of colleges. 2) Only interns, post graduates and faculty members from dental colleges and medical colleges are included in the study. 3) Third years, final years and faculty members are included from nursing colleges. 4) Participants who gave informed consent.

The questionnaires that are not completely filled and has multiple responses for a question are not included in results.

The collected data were tabulated in Microsoft Excel and subjected to statistical analysis using the Statistical Package for the Social Sciences version 21 software (SPSS Inc., Chicago, IL, United States). The data were analysed using, Analysis of Variance (ANOVA) test and Tukey's post hoc test where P value < 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Bioterrorism is seen as one of the greatest threats to society as it is a covert, unannounced event that involves the release of an organism or toxin without any public notification. Days or weeks may pass before the release is noticed. A cluster of diseases appearing after the incubation period would potentially signal the event. Health care first responders are likely to be the first to encounter these first cases of disease. Thus, they must possess the knowledge and skills to either rule out suspect agents or refer the case to their public or national health laboratory (depending upon the country) for confirmation.³ This study is first of its kind in the literature where study population is taken from medical, dental and nursing colleges to assess their knowledge, attitude and preparedness regarding bioterrorism.

In this present study participants of medical, dental and nursing colleges had mean values of 1.52, 1.35 and 1.25 respectively regarding knowledge about the term bioterrorism and about the fact that terrorists can use biological agents for spreading terror which are in line with the results in studies done by Chaudhari A et al. (2011),¹ Kshirsagar, MM et al. (2017)¹¹ and Bhatt S et al. (2014)¹² regarding dental colleges. The results were in contrast with study done by Moghadam BSA et al. (2016)¹³ where a very low percentage of study participants had knowledge regarding bioterrorism. The difference might be due to the fact that their study has been done on participants who are not health professionals.

The mean values for the knowledge on the categories given by CDC in the three groups of colleges are 2.11, 2.37 and 2.03 in dental, medical and nursing group of colleges respectively. Among the three groups of colleges, more percentage of the study participants among the dental colleges believe that dentists had a role during the event of bioterrorism. The overall knowledge regarding bioterrorism is higher among the medical college participants.

The study participants among the medical colleges has shown statistically significant mean values for observation of oral or cutaneous lesions other than the chief complaint during routine examination and monitoring of unusual signs and symptoms that might be an early sign of bioterror attacks. The study participants of medical colleges are having higher mean

		Health Care Providers					
		Medical		Dental		Nursing	
		n	%	n	%	n	%
No. of respondents	Approached	750	92.93%	375	97.07%	375	93.6%
	Responded	697		364		351	
Gender	Male	279	40%	156	42.9%	139	39.6%
	Female	418	60%	208	57.1%	212	60.4%
Qualification	Postgraduates	83	11.9%	51	14.01%	-	-
	Undergraduates	435	62.4%	166	45.6%	275	78.34%
	Faculty	179	25.6%	147	40.27%	76	21.6%

Table 1. Demographic Data of Study Population

values regarding practice followed by dental and nursing colleges.

In study done by Bhatt S et al. (2014),¹² postgraduate students showed a higher self-perceived knowledge compared to the undergraduates and in study done by Kshirsagar MM et al. (2017)¹¹ the results show that 75.2% of the dentists were confident in recognition of signs and symptoms of bioterrorism-related diseases and 78.3% were aware about the commonly used agents related to it. Results in study done by Chaudhari A et al. (2001)¹ showed that almost 88% of both medical and dental interns do check for intraoral or cutaneous lesion other than the chief complaint and 77% of medical interns can monitor any unusual and unexplained signs and symptoms that may be an early warning or sign of community-wide infections or a bioterror attack while only 50% of dental interns were able to monitor such signs and symptoms.

Most of the study participants are in favour of curriculum development and are willing to undergo additional training programs regarding bioterrorism. The mean values regarding willingness towards additional training programs regarding bioterrorism are almost similar among dental, medical and nursing colleges. Almost 73% of both medical and dental college study population along with almost 57% of nursing college study population are willing for curriculum development and additional training programs regarding bioterrorism. Studies done by Chaudhari A et al. (2011)¹, Bhatt S et al. (2014)¹², Moghadam BSA et al. (2016)¹³, Brown C et al. (2010)¹⁴, Aghaei N et al. (2013)¹⁵,

Sridevi V et al. (2020)¹⁶ are in favour of need for training regarding bioterrorism.

Among the study participants most of the medical and dental college participants followed by the nursing college participants are willing to provide help to the government during the event of bioterrorism. The studies done by Chaudhari A et al. (2011)¹, Katz AR et al. (2006)¹⁷, Bhatt S et al. (2014)¹², also show willingness and positive response to help the government in bioterror outbreak.

The results of nursing colleges regarding the knowledge about the term bioterrorism are in line with studies done by Brown C et al. (2014)¹⁴, Aghaei N et al. (2013)¹⁵, Rebmann T et al. (2010)¹⁸ and Mosca NW et al. (2005)¹⁹ in which results demonstrated that nurses have considerable lack of confidence in their knowledge and skill ability concerning bioterrorism and disaster preparedness. As no postgraduates from the nursing colleges are included in the study, this could have affected the results of nursing colleges regarding knowledge, attitude and preparedness regarding bioterrorism.

The differences among the three group of colleges on knowledge, attitude and practice regarding bioterrorism might be due to the differences in their curricula and different rates of exposure towards the patients. As health professionals play a key role during the event of bioterrorism which is a global health threat, they must possess good versatile knowledge and practice regarding the management of bioterror events.

Questions on knowledge of bioterrorism	Dental Health care providers	Medical Health care providers	Nursing Health care providers	p value
QUESTIONS ON KNOWLEDGE REGARDING BIOTERRORISM				
1. Knowledge on bioterrorism	1.35±0.54	1.52±0.53	1.25±0.62	0.01
2. Awareness on bioterrorism	1.27±0.59	1.31±0.58	1.21±0.67	0.01
3. Anthrax attack in USA (2001)	1.40±0.58	1.51±0.60	1.36±0.63	0.001*
4. Categories given by CDC	2.11±0.91	2.37±0.94	2.03±0.81	0.01
5. Agents	4.05±2.14	4.18±2.2	3.43±2.27	0.01
6. Role of Dentists	1.57±0.73	1.54±0.78	1.41±0.84	0.01
QUESTIONS ON PREPAREDNESS REGARDING BIOTERRORISM				
7. Observation during routine examination	1.57±0.76	1.75±0.79	1.49±0.81	0.000*
8. Monitoring unusual signs and symptoms	1.68±0.78	1.86±0.80	1.55±0.78	0.01
QUESTIONS ON ATTITUDE REGARDING BIOTERRORISM				
9. Confidence level	1.49±0.72	1.78±0.69	1.40±1.51	0.01
10. Curriculum development	1.53±0.64	1.67±0.63	1.38±1.44	0.001*
11. Preparedness and planning for counter-terrorism	1.75±0.66	1.91±0.62	1.51±1.67	0.001*
12. Additional training program	1.48±0.62	1.55±0.59	1.39±1.39	0.001*
13. Help the government	1.44±0.72	1.56±0.66	1.31±0.82	0.01
14. Self-assessment	2.77±0.89	2.91±0.83	2.62±0.82	0.01

Table 2. Mean Values of Knowledge, Preparedness and Attitude among the Three Groups of Colleges Regarding Questionnaire on Bioterrorism. ANOVA with Tukey's Post Hoc test. * Denotes Highly Significant p Value

In order to achieve this, the curricula should to be reformed according to the present situations with the incorporation of bioterrorism. There is a greater need for additional training programs regarding counter terrorism and management for the improvement of knowledge and skills of the health professionals. Continuation of educational programs, webinars are to be taken place on a regular basis through which both the students as well as professionals can gain knowledge regarding bioterrorism.

As there is a limited data in the literature regarding bioterrorism there is need for more studies to be done in future. The limitations of this study are, no post

graduates from the nursing colleges are included in the study and the study is limited to area in and around Visakhapatnam district, India.

CONCLUSION

Most of the study participants are willing to help the government during the outbreak of bioterrorism but lack of knowledge is hindering them. Hence the curriculum of medical, dental and nursing colleges must be reformed and training courses are to be planned for better knowledge, practice and attitude of doctors as well as nurses. Successfully meeting the challenges of bioterrorism requires a multifaceted response. No single approach will by itself be successful.

The key countermeasures for bioterrorism include the act of deterrence, prevention by reducing the opportunity and enhancing intelligence, surveillance and assessment by epidemiological methods and finally medical management through preventive, promotive, curative services, training and education of health care providers.

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Pre-teens, Audio Analgesia and Dental Care: A Cross-Sectional Study

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INTRODUCTION: Research has proven that music plays an important role in alleviating fear and anxiety among patients.

AIM: To assess the effect of audio analgesia in pre-teen children aged 8-12 years undergoing dental restorations.

MATERIALS AND METHOD: Data was collected using a pre-tested and pre-validated proforma filled by the child prior to start of the treatment by circling the number corresponding to the expected pain during the procedure [Ranged 0 (No pain) -10 (Maximum pain)]. Children who reported an expected pain above 5, were enrolled in group 1 (The ones receiving audio analgesia) and group 2 (controls). Children in group 1 were asked to put on their favourite song using noise cancellation headphones and the procedure was commenced. After completion of the treatment, the VAS scale was re-introduced and the children were asked to re-circle the actual pain experienced during the procedure. Data was analyzed using SPSS version 20.0 using the chi-squared test and Pearson's correlation coefficient. A significant value was obtained when $p \leq 0.05$.

RESULTS: Of the total 80 children enrolled in the present study, there were an equal number of males and females (40 each). It was observed that 70.3% of children in group 1 had an increased pain tolerance as compared to only 37.2% of children in the control group ($p=0.01$). Pearson's Correlation revealed a positive and linear association ($r: +0.721$) and a significant relationship ($p = 0.03$) between both groups.

CONCLUSION: Audio analgesia has been proven to a promising alternative to distract the patient from the anxiety faced in the dental setting and is recommended for nervous and anxious patients.

KEYWORDS: Analgesia, Teens, Anxiety

INTRODUCTION

Visiting a dental office for treatment can become an unnecessary source of anxiety and nervousness for a few dental patients. One can describe dental anxiety as "an aversive emotional state of apprehension or worry in anticipation of the feared stimulus of dental treatment" and has been attributed to play a central role in the avoidance of dental treatment.¹⁻³

High levels of dental fear have also been linked to poor oral health habits which, in turn increase the need for treatment and periodic checkups.⁴ The fear among children is even greater and there have been various techniques applied to distract the fear of the patient. In the field of medicine, distraction has been frequently used for pain management, interventions and research.^{5,6}

One such distraction technique is audio analgesia wherein the patient is distracted using some kind of audio, usually music of his/her choice and studies indicate that music reduces anxiety and improves psychological well-being.⁷ Hence, music finds itself as

a potentially viable non-pharmacological treatment for alleviating pain in the medical, dental and related sciences.⁸

Due to the positive effects of audio analgesia, the present study was undertaken to assess the effect of audio analgesia in pre-teen children aged 8-12 years undergoing dental restoration.

MATERIALS AND METHOD

The present study was conducted amongst pre-teens aged 8-12 years in Nasik City, Maharashtra, India using convenience sampling from 01st May 2019 to 30th November, 2019 after obtaining all necessary approvals (including ethical clearance) prior to start of the study.

Data was collected using a pre-tested and pre-validated proforma filled by the child prior to start of the treatment by circling the number corresponding to the expected pain. The ranges of VAS were from 0-10 with 0 indicating no pain and 10 including maximum pain. Only those students were enrolled in the study whose



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treatment protocol included restorations and the written consent of the parents was taken before treatment and after explaining the aims and objectives of the study.

Children who reported an expected pain above 5, were enrolled in group 1 (The ones receiving audio analgesia) while those reporting expected pain under 5 formed the controls. Children I group 1 were asked to put on their favourite song using noise cancellation headphones and the procedure was commenced.

After completion of the treatment, the VAS scale was re-introduced and the children and they were asked to circle the actual pain experienced during the procedure. Data was analyzed in SPSS Version 20.0 using the chi-squared test and Pearson's correlation coefficient. A significant value was obtained when $p \leq 0.05$.

RESULTS

Description of Study Population (Figure 1)

The study population is described in figure 1. Of the total 80 children enrolled in the present study, there were an equal number of males (40, 50%) and females (40, 50%). There were 37 children in group 1 (those receiving audio analgesia) and 43 children in group 2 (control group).

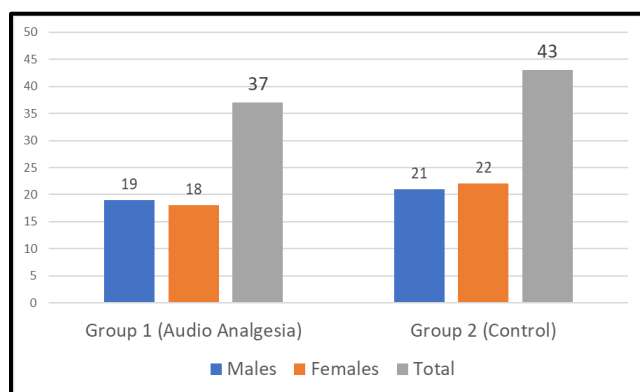


Figure 1. Gender Distribution of The Children Enrolled in The Present Study

Effect of Audio Analgesia on Children (Table 1)

It was observed that there was a 70.3% of children in group 1 had an increased pain tolerance as compared to only 37.2% of children in the control group. The difference observed in pain tolerance in group 1 was also found to be significant as upon comparison with the control group ($p=0.01$).

Group	Increased Pain Tolerance	No Change in Pain Tolerance	P value (From Chi-Squared test)
1 (Audio Analgesia)	26 (70.3%)	11 (29.7%)	0.01*
2 (Control Group)	16 (37.2%)	27 (62.8%)	NS

Table 1. The effect of audio analgesia in children (NS: Non-Significant, * denotes a significant observation)

Relationship between Audio Analgesia and Increased Pain threshold (Table 2)

A positive, linear, great strength of association ($r: +0.721$) and a significant relationship ($p = 0.03$) was found between use of audio analgesia and Increased pain threshold using Pearson's correlation coefficient.

Correlation between	Pearson's Correlation Coefficient	CI	p value
Audio Analgesia* Pain threshold	+0.721	2.3-10.0	0.03*

Table 2. Correlation between knowledge, attitudes and practices using Pearson's correlation test (CI: Confidence Interval, * denotes a significant observation)

DISCUSSION

The results of the present study indicated that audio analgesia increased pain tolerance upto 70.3% in anxious children and it is supported by the case report of Bhagania, M et al. (2011)¹⁰ wherein a 28 year old female patient chose devotional music in place of local anaesthesia and not show any subjective signs of pain or any pain behaviour during the extraction procedure.

The results of the present study are encouraging as the ultimate aim of dentists is to reduce fear and anxiety through behaviour management techniques and leave a positive attitude of the patient towards further dental care.¹¹ We used the age group of 8-12 years as this age group can understand verbal commands correctly as well as communicate their feelings openly. This is supported by various authors who support the fact that behaviour management techniques should be used in children who can understand the situation, as different age groups exhibit different cognitive characteristics and behavioural pattern and hence, require different

approaches towards each age group.^{11,12}

It was observed that although 70.3% of anxious patients exhibited increased pain tolerance, no child reported absence of pain. This is consistent with the findings of Marwah N et al.(2005)¹³, Who reported that audio distraction decreased the anxiety level in the pediatric patients, but not to a very significant level; Instrumental music was the music of choice and despite lack of any relief from pain, there was an overwhelming positive response to the music was requested by the patients in subsequent visits.

The choice of music played also has a very important role in alleviating anxiety of the patient. Various authors have left the choice of music to the patient, while others have not.^{13,14} The option to let the child choose the music was to gain control over the unpleasant stimulus and give them a sense of being in a familiar, safe and secure environment.

As author, we do not rule out the possibility of social desirability bias by the children and difference in pain perceptions among them. However, the results of the present study are generalizable and provide a further avenue for further trials on the use of audio distraction and fear alleviation in the dental patients.

CONCLUSION

Based on the results of the present study, the use of audio analgesia is recommended in patients, especially children with high anxiety levels. Also, we call for trials to further support or reject the use of audio analgesia in the dental setting.

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