

DENTAL 360

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**Prevest DenPro Limited becomes
the first dental manufacturer to
be listed on the Bombay Stock Exchange**

EDITORIAL

A FUTURE OF CHOICE OR CHANCE!

We humans have always been fascinated about predicting the future. But predicting the future in dentistry, is by no means an exact science, instead depends upon several factors and trends.

There have been certain changes over time and it's not just 'new world' but it's the 'rapidly changing world' now, believing "Change is the only constant"! The same implies in our dental practice, but just giving our best and finest service to our patients and expecting our practice to grow makes it bland. It's a veritable steeplechase each day, and for a career in dentistry, to be experienced as an endurance sport, we need to awaken the optimist within us. Certainly we can! Yes, we have to adopt brainstorm ways to improve practice operations and make strength stronger.

With increased competition in dental field, it takes more time and efforts to stay ahead of strife. This demands high emphasis on illuminating blind spots in our dental practice like self motivation, overhead, scheduling, patient's attrition, because only financial performance can not decide future of our dental practice. Hence, we must focus on our own will and also work with financial advisors for plans and follow up.

It is a necessity to operate dental business in marketing now and the general dentist must be prepared for such paradigm shift towards a new era of technology, henceforth must be heedful of new discoveries or techniques that are proven part of evidence based dentistry, so that one holds a platform to stand out in a crowd, which means that each practice must identify the best business model to protect its future rather than only looking at overall changes and being concerned about bottom line.

So, Let's have the vision, courage and commitment to create future of our choice and not wait for the chance!



Dr. Kunjam Sarhney

Guest Editorial

INSTRUMENT SEPARATION IN ENDODONTICS: PREVENTION IS BETTER THAN CURE...

Dr. S. Sai Kalyan

Instrument Separation in Endodontics: Prevention is better than cure

Evolution of rotary endodontics has undoubtedly been one of the greatest innovations in the history of dentistry till date. It has revolutionized the practice of dentistry like never before, but the cutting edge technology comes with its own set of limitations and potential complications. Management of fractured instrument in the root canal has long been a subject of dilemma. There are various schools of thought for managing a separated instrument, with proponents of bypassing, instrument retrieval, leaving it as permanent obturation and so on. No matter what one does after an instrument breaks in the canal, occurrence of such a mishap is unanimously a nightmare for all dentists alike.

The famous saying that prevention is better than cure holds more than good in relation to instrument separation. Given below are a few clinical tips that can significantly reduce if not completely eliminate the incidence of instrument separation in endodontic practice.

1. Preoperative Assessment: Knowledge of normal anatomy of teeth and careful study of preoperative radiographs is must for obtaining success in endodontics. Root canal anatomy must be carefully studied including difficult curvatures, calcifications etc. Instruments are more prone to fracture when used in curved canals.

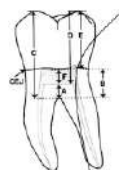


Fig.1: Features of a tooth to be assessed in a pre-operative radiograph

2. Straight line access and glide path: It has been said that access is success. This holds true not only for coronal access but for radicular access as well. It has been well known that instruments separate because of two major reasons: flexural fatigue and torsional stresses. Canal orifices should be enlarged using orifice shapers or Gates Glidden drills to make negotiation of canals easier and unimpeded. Obtaining a straight line access to the root apex avoids flexural failure by removing curves from the canal.



Fig.2: Obtaining a Straight line access to canal terminus and securing a glide path

After a well done access cavity preparation, a definite path must be created into the root canal in which the successive instruments should glide without modifying the original curvature of the canal. Glide path can be secured using hand instruments, files mounted in a reciprocating handpiece and with rotary NiTi files specific for this purpose. The oldest and commonest method to prepare a glide path is with stainless steel K files.

Stainless steel K Files should be used after pre-curving and watch winding or balanced force technique should be employed for curvatures.

3. Reciprocation vs. Rotation: Research has shown that incidence of file fracture is lower when files are used in a reciprocating manner rather than rotation.

4. Crown Down Pressure Less Technique: A crown down technique should be employed so that any obstruction to the apex can be removed. This technique allows less vertical force and torque creation and hence prevents fracture of file at its tip. The force on the handpiece should approximately be equal to the force on a pencil tip while writing. Instruments should be rotating when inserted into the canal and when withdrawn from the canal. This avoids any undue directional changes of file. Files should be used in an insert and withdraw motion with no more than one mm increments.

5. Choice Of File System: There are a plethora of rotary systems available in market today but none that recommends exclusive use of rotary files. It must be noted that rotary files are not here to substitute hand files. Amongst rotary files, material aspect, cross sectional diameter of the file, taper etc influence the proneness to fracture. Be it any file system, it is advisable to follow the sequence and do not jump the sizes. In narrow and curved canals, 4% tapers are preferred over large tapers.

6. Torque And Speed Control

Files are known to fracture mainly because of two reasons: one is cyclic fatigue and the other is torsional failure.

Cyclic fatigue occurs when instrument encounters a curvature. Here the instrument witnesses compressing forces on one aspect and stretching forces on the other leading to cyclic fatigue failure and hence breakage.

Torsional failure occurs when the tip or any part of the file is locked or bound within the canal, while shaft continues to rotate.

For optimal usage, manufacturer's instructions should be followed and torque and speed values recommended with a particular file system should be adhered to. Complex curvatures attract lower speeds and lower torques.

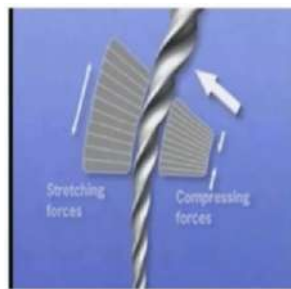


Fig.3(a): Cyclic fatigue failure



Fig.3(b): Torsional failure

7. Work in a wet Environment: The importance of working in a wet environment is double fold in that it not only provides lubrication for delicate endodontic files also allows elimination of debris from the root canals towards the coronal orifice, which otherwise accumulate contributing to resistance to rotation of file. It has been found that working in a wet environment prevents creation of higher torque thus preventing torsional fracture.

8. Clean and Inspect File After Every Use: Remove any visible debris from the surface of the file and inspect for any surface changes or breakage before reinserting it into the canal.

9. Discard as Deemed Necessary: Improper use and overuse of the instrument appear to be the most common reason for instrument separation. There is no magic



Fig.4: Inspection of files for unwinding of flutes after repeated use

number as to how many times a file can be used safely without fracture. Frequency of safe usage of file varies with file design, complexities of canals treated before etc.

10. Practice To Expertise:

As with most of the procedures in dentistry, hands handling the armamentarium are more important than the armamentarium itself. Even experienced clinicians witness instrument separation but to a lesser extent. It is suggested that beginners should first practice on preclinical models and/or extracted teeth to expertise the technique.

To conclude, little caution exercised during rotary instrumentation can go a long way on path of safe and sure endodontics.



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ROBOTICS- A FUTURE REVOLUTION IN DENTISTRY

Dr. Shiva Gupta

Abstract:

Technology has become an integral part of our day to day life. In the recent times, Dentistry too has witnessed emergence of new technologies which have the potential to transform dental practice in many ways. **Dental robotics** is the next generation technology which opened new pathways for it to expand and explore the various areas of dentistry and it also helps in fulfilling tasks which is difficult for the dental clinician to achieve. Dental robots have various application related to teaching dental students, endo micro robot, arch wire bending and dental implantology. This focused review aims at application of robotics in various specializations in dentistry.

Keywords- Robotics, Endo-microrobots, Dental Nanorobots, Surgical Robots

Introduction:

The simple act of smiling sends a message to our brain that we're happy. And when we're happy, our body emits feel-good endorphins. When we have good dental care, we tend to smile more often, thereby making our life pleasurable. Now, dentists are utilizing robots to help keep us smiling. Robots, the most wonderful invention of human being, have made their way into dentistry. Robotics is the branch of technology that deals with the design, construction, operation, and application of robots as well as computer systems for their control, sensory feedback, and processing the information. The term robotics was introduced by writer Isaac Asimov in his science fiction book, "I Robot", published in 1950. According to the Robot Institute of America a robot is defined as "a reprogrammable, multifunctional manipulator designed to move materials, parts, tools or specialized devices through various programmed motions for the performance of a variety of tasks".

Footsteps Of Robots In Dentistry

Dental Patient Robot-

Dental therapy dexterity mainly depends on the ability and expertise of clinicians and it is certain for them to have ample experience using methods and models that precisely reflect actual treatment procedures and conditions. Currently, the concept of dental patient robot is named as phantom heads which consist of simple functional cephalic region with an arrangement of teeth much different from actual patients. The concept of phantom heads was initiated in Japan.

Showa Hanako

Tokyo's Showa University engaged robotics company Tmsuk to manufacture the realistic robot which is designed to simulate a number of typical patient gestures and responses, allowing dental students to experience what it's like to work with a real patient. The robot is also capable of simulating a gag reflex, which is frequent during dental procedures, it can blink, roll its eyes, sneeze, shake its head, cough, move its tongue and even get tired when having to keep its mouth open for too long.

Geminoid Dk

This robot is a realistic android designed for research into human-robot interaction. It is modelled after Danish professor Henrik Scharfe, who remotely operates the android as his robotic surrogate. The Geminoids can be controlled, being equipped with advanced motion-capture technology.

Simroid

It is a super realistic dental teaching robot for clinical training at dental schools created by Kokoro Company Ltd. It is actually an upgrade to Simuloid, a less sophisticated dental training robot created back in 2007. This robot is loaded with sensors that give feedback to dental students. It can express pain when poked hard; it grimaces to show pain; and it also moves its hands and eyes to say that it is hurt.

Endo Micro Robot-

Success of endodontic treatment depends on the clinician's knowledge, expertise including his/her tactile sense and judgment. To help with this, endo-microrobots were fabricated. It consists of a visually guided robotic system will be mounted on the teeth within patient's mouth, while a robotic controller and a root canal image processor share control over its motion. With online monitoring and positioning control, the multipurpose robotic system will perform automatic treatment procedures, including probing, drilling, filing, cleaning and filling. This robot consists of a micro position and orientation adjustment device, an automatic feed rate and travel distance controller, micro sensors and apex sensors.

Dental Nanorobots-

Nanorobots are miniature devices measured on the scale of nanometers (1n equals one millionth of 1 millimeter) constructed with nanoscale or molecular components. A dental nanorobot have a nano computer on board which store and performs pre-programmed actions and processes signals and external stimuli. The possible treatment options of using nanorobots may include the application of nanotechnology to local anesthesia, dentition renaturalization, the permanent cure of hypersensitivity, complete orthodontic realignment in a single visit, covalently bonded diamondized enamel, and continuous oral health maintenance using mechanical dentifrobots.

Surgical Robots-

The intervention of robotics into surgery has allowed surgeons to create a new kind of environment in the operating room. Robotic technique is being used for milling of bone surfaces, drilling of holes, deep saw osteotomy cuts, selection of osteosynthesis plates, bending and intraoperative positioning in defined position, and orthognathic surgery planning.

Sensor-equipped Implant Setup-

Dental implants are long-lasting tooth replacements that use Titanium screws embedded directly into the alveolar bone. Recently a new system of computer assisted surgery

for implants has been developed consisting of preoperative and intra operative stage. The preoperative stage, uses the 3D views obtained from the raw images of the patient before surgery followed by the intra operative stage, which it shows 3D orientation of surgical instrument position and trajectories which are displayed on the monitor within a patient's 3D imaging data.3"Yomi" (FDA Cleared) is robotically assisted dental surgical system for implant placement. It is used to plan a procedure based on patients' CT scan.

Robotic Dental Drill-

It is a recent advancement, developed by Tactile Technologies, consists of immobilizing the jaw of the patient and suspending thin needles which can penetrate the gum and determine the location of the bone. This whole unit is connected with a wireless connection to a PC and joins with the CT scan data thereby producing a set of drill guides. Once activated, these are self-directing and can be altered by the clinician as per the requirement.

Tooth Arrangement Robot-

It is a single system used for the manufacturing of upper and lower complete dentures. The various functions of this software is to choose and create medical history files of the patient followed by drawing a jaw arch and dental arch curves and finally, adjustment of the dental arch curve as per the jaw parameters. This system aids in adjusting the tooth arrangement initial position for the robot, creates control data profile and controls the robot for tooth arrangement operations. The manufacturing of complete dentures takes only 30 minutes using this robot system and the precession and accuracy of each robotic system is measured.

Dental Implantology Robot-

This system mimics the mandibular movements and occlusal contact forces in order to make it possible for various implant designs and procedures to be tested and evaluated before animal testing or clinical human trials. This method consists of forming pre-programmed software which is used to work with CT scanner data. Neocis, a Precision HealthCare Robotics company, has introduced an FDA-cleared computerized navigational system (robot) intended to assist in both the planning and surgery of dental implants. The YOMI® robotic arm provides an enhanced level of precision and control while using haptic guidance and multisensory feedback to perform dental implant surgery. The robotic arm helps the surgeon to achieve the correct location, angulation, and depth when placing dental implants through its sensors, producing true and unique guidance.

Orthodontic Arch Wire Bending Robots-

This new bending apparatus is known as "Sure Smile arch wire bending robot." The apparatus comprises a robot mounted to a base or table support surface with 2 gripping tools. The tools incorporate force sensors which are used to determine over bends to get the desired final shape of the arch wire. They may also include a resistive heating system in which current flows through the wire while the wire is held in a bent condition to heat the wire and thereby retaining the bent shape of the wire.

Conclusion:

The intervention of robotics in the field of dentistry can offer improved accuracy, predictability, safety, quality of care and speed of treatment. With the emergence of new technologies, future of dentistry is unpredictable. Main concern lies in the vision and feasibility of adapting these technologies in day today teaching and clinical practice.

References:

- <http://oxforddictionaries.com/definition/english/robotics?q=robotics>
- <http://www.robots.com/education>
- Kumar PY, Dixit P, Kalaivani V, Rajapandian K. Future Advances in Robotic Dentistry. J Dent Health Oral Disord Ther 2017;7(3): 00241.
- Rawtiya M, Verma K, Sethi P, Loomba K. Application of Robotics in Dentistry. Indian J Dent Adv 2014; 6(4): 1700-170.
- Schulz MJ, Shao VN, Yun Y. Nanomedicine Design of Particles, Sensors, Motors, Implants, Robots, and Devices, Artech House, London, UK, 2009 p. 1-10.
- Lumbini P, Agarwal P, Kalra M, Krishna MK. Nanorobotics in dentistry. Annals of Dental Specialty 2014;2:95-96.
- Bansal A, Bansal V, Popli G, Keshri N, Khare G, Goel S. Robots in head and neck surgery. J Appl Dent Med Sci 2016;2:168-75.
- Zhang Y, Ma J, Zhao Y, Peijun L, Wang Y (2008) Kinematic analysis of tooth-arrangement robot with serial-parallel joints. IEEE, Hunan, China, 624-628.



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CLINICAL GUIDELINES FOR TOOTH WHITENING

Dr. Varun Kumar

Introduction

Discolouration of the tooth is one of the most frequent reasons why a patient seeks dental care. Tooth discolouration is usually aesthetically displeasing and psychologically traumatizing. The etiology of tooth discolouration is multifactorial. The correct diagnosis for the cause of discolouration is important and has a profound effect on treatment outcome.



Causes Of Discolouration Of Teeth

Pre Eruptive

Alkaptonuria is a recessive genetic deficiency resulting in incomplete oxidation of tyrosine - and phenylalanine, causing increased levels of melanin acid. It is also known as phenylketonuria and ochronosis. The condition can cause a dark brown pigmentation of the permanent teeth.

Congenital Erythropoietic Porphyria -

Porphyria is a rare condition. This deficiency leads to hemolytic anemia, photosensitivity, blistering of the skin, and deposition of red brown pigments in the bones and teeth.

Congenital Hyperbilirubinemia

The teeth can develop a green color, due to the bilirubin deposition. This intrinsic pigment keeps teeth permanently pigmented. Follicles are the source of nutrients for the ameloblasts to synthesize the tooth enamel.

Genetic Causes :

Amelogenesis Imperfecta

This condition causes teeth to be unusually small.

Dentinogenesis Imperfecta

This condition is a type of dentin dysplasia that causes teeth to be discoloured.

Medication

Tetracycline stains has the ability to chelate calcium ions to form a tetracycline calcium orthophosphate complex, causing discolouration of dentition when administered during tooth development.

Environmental Factor -

Fluorosis is a chronic condition caused by excessive intake of fluorine compounds, marked by mottling of the teeth and, if severe, calcification of the ligaments.

Indication:

- Mild generalised staining
- Age related yellow discolouration
- Mild tetracycline staining
- Very mild fluorosis staining
- Acquired superficial staining
- Tobacco related staining

- Food related stains due to absorption of coffee and tea
- Root canal treated teeth that has discoloured or discolouration due to trauma.

Contraindication:

- Severe tetracycline and fluorosis staining
- Hypoplastic teeth
- In young patients with large pulp chambers
- Patients who cannot comply with treatment regimen
- Teeth with inadequate restorations
- Teeth with surface loss like due to attrition, abrasion or erosion
- Management of discolouration

How Can You Prevent Discoloration?

- Care for your teeth after eating pigmented foods. If you're planning to consume pigmented food or drinks, Samadder recommends brushing and flossing as soon as you've finished.
- Practice good oral health. Kalasho recommends brushing your teeth at least three times per day, flossing daily and also using a water flosser, as well as a whitening toothpaste.
- Modify your habits. If you smoke or chew tobacco, talk to your doctor about a cessation program to quit.
- Aging : In geriatric patients, an increased yellowing or greying of the teeth can be observed. This is partially due to internal changes and partially due to surface morphology changes. As the patient ages, the incisal edges wear and become less translucent, the enamel thins, and the dentin thickens, also resulting in a more yellow and a more dense appearance.
- Traumatized Permanent Teeth or Teeth with a history of trauma : According to Plotino, trauma- or necrosis-induced discolouration can be successfully bleached in about 95% of the cases, compared with lower percentages for teeth discoloured as a result of medicaments or restorations.

One treatment option for darkened teeth is veneers (in mild cases) or crowns. But a less invasive option for teeth that have been endodontically treated is to bleach the tooth using external bleaching, an internal "walking bleach" method, or a combination of the two.

Recent Techniques:

Jun-Ichiro Kinoshita et al. Vital Bleaching of Tetracycline-Stained Teeth by Using KTP Laser: A Case Report. European Journal of Dentistry. July 2009 - Vol.3 KTP (Karium-Titanium-Phosphoric acid), which is a type of Nd:YAG laser, seems to be appropriate for bleaching of tetracycline-stained teeth. KTP tends to penetrate into dentin with less damage. This laser does not increase temperature much. Its photons have high energy that facilitate the chemical and photodynamic reactions without damage to both hard and pulp tissues. Canals, 4% tapers are preferred over large tapers leading to cyclic fatigue failure and hence torques.

Example: Lumineers by Cerinate Lumineers are an improved variant of the porcelain veneer. They have the same function as the porcelain veneers and provide the same benefits to the patient. The placement of lumineers doesn't involve removal of tooth enamel and therefore

might be a better long term solution than veneers. When placing lumineers, the structure of the tooth remains unchanged.

Resin Infiltration Technique

The loss of mineralized layer creates porosities that change the refractive index of usually translucent enamel. A new minimally invasive technique for treating white spot lesions is by caries infiltration by resin, "The resin completely fills the pores within the tooth, replacing the lost tooth structure and stopping caries progression. After conditioning of lesions using 15% hydrochloric acid gel, desiccating the tooth with ethanol is performed, which allows easy penetration of resin into the porous tooth. The resin penetrates into the lesion by capillary forces.

Novel treatment of white spot lesions: A report of two cases. Journal of conservative dentistry. This technique prevents further progression of initial enamel caries lesions and occludes the microporosities within the lesion by infiltration with low-viscosity light-curing resins that can rapidly penetrate into the porous enamel. Borges AB et al in 2015; in a case series presented that the resin infiltration technique can be successfully used to mask fluorosis and hypomineralised areas of enamel.

Conclusion

In the management of patient's with discoloured teeth, an understanding of mechanism behind the discolouration is of relevance to the dental practitioner. The increasing

demand for tooth bleaching has driven many manufacturers and researchers to develop new products, however this procedure involves risk. The use of bleaching agents provides an effective and conservative approach to the removal of unesthetic discolorations from vital & non-vital teeth. As with all therapeutic modalities, proper diagnosis and planning is essential.

References

- Ingle's endodontics 6th edition
- Grossman's endodontics 13th edition
- Operative dentistry Vimal Sikri 3rd edition
Essential of operative I Anand Sherwood
- The bleaching of teeth: A review of the literature. Andrew Join journal of Dentistry 34 (2006) 412-419
- Tooth bleaching procedures a review by Mohammed Q Alqahtani, Saudi dental journal, 5 January 2014
- Journal of the College of Physicians and Surgeons Pakistan 2015, Vol. 25 (12): 00



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MR. ATUL MODI

**MANAGING DIRECTOR
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PROFILE OF THE MONTH

Mr. **Atul Modi** is the Founding chairman and Managing director of Prevest Denpro Limited. A mechanical engineer by profession, Mr. Atul graduated from Bhopal University in 1976. He has a rich experience in the medical device industry and served as an active researcher for over 35 years. He was instrumental in setting up an Independent factory in Industrial Complex, Digiana in the year 1985 to manufacture chemical products and diversified into manufacture of special type of gypsum plaster for dental use. He visualized the business scope in the oral healthcare field and started a new journey of manufacturing products for oral healthcare. He founded a new company under the name of Prevest Denpro Limited and started the production of few products in a small workplace at Industrial Estate Digiana, Jammu. With his focus on global market and quality, Prevest DenPro today operates from a state of the art manufacturing unit at Bari Brahmana and exports products to more than 85 countries. As a person who's guided by his instincts he always found new ways of bridging the

existing gaps in the scientific arena. Mr. Atul Modi's personal interaction with academicians and customers opened several avenues for new product development. He continually attempts to optimize his work and he tries out new ideas. His believes that constant improvements and changes has to be the backbone of any successful company.

Mr. Modi is a Result oriented Director, driven to manage costs and establish strategic, mutually beneficial partnerships and relationships with users, vendors, and service providers. Creating strategic alliances with organization leaders to effectively align with and support key business initiatives. His personality and a constant thirst to innovate has driven Prevest to the top position within the first 15 years of incorporation. As it is said "If your **thirst for knowledge** is strong enough, you will find the waters to satisfy it.". Mr. Atul Modi's entrepreneur journey has always found new waters and reached newer heights and his entrepreneurial abilities will surely inspire the new generation.