

## **Interdisciplinary Dentistry – Practice Made Perfect With Scientific Aids**

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**Abstract:** Dentistry has evolved a lot since its inception. There has been a gradual transition from a general dental practitioner to a specialized dentist and now to an interdisciplinary approach. The dental treatment now aims for a comprehensive treatment in order to achieve maximum patient satisfaction. This has been possible with the aid of the immense scientific development that has enabled us to achieve the maximum results in the minimum time. This article highlights the contribution of science and technology in the evolution of interdisciplinary dentistry.

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### **I. Introduction**

With the advent of the modern and recent advances in the field of dentistry, the focus has shifted from a unilateral line of treatment to a comprehensive treatment modality. Rather than focusing on a single problem we have integrated the multiple lines of treatment aiming at a full mouth rehabilitation. A patient walking into the dental office often presents with a single complaint but if met with a comprehensive treatment leaves with more satisfaction. . Each time a thought takes birth in the mind it takes the shape of a new research, a new result that paves the way for a more concrete path to a comprehensive treatment. As said by Einstein,

‘The whole of science today is nothing more than a refinement of everyday thinking.’

New science and technologies are already making their way into all aspects of dental practice and have changed traditional approaches to diagnostics, risk assessment, prevention, and many procedures in clinical dentistry.<sup>1</sup>

Dentistry has evolved with many specialities catering to the specific treatment needs. Different branches viz. Endodontics, Prosthodontics, Periodontics, Orthodontics and others have progressed aiming at the improvement of the overall oral health of the patient. There are many areas in dentistry that have benefitted from the interdisciplinary treatment protocol. These include smile designing, implants, perioesthetic surgeries, treatment of fractured teeth, facially generated treatment planning, gingival addition and subtraction procedures among others.

Information technology has become an important tool in all aspects of health care. These advances have accelerated progress in areas leading to improved diagnosis, patient care and management, and basic and applied research. The importance of this area to dental education is recognized by the establishment of accreditation standards for dental education programs by the Commission on Dental Accreditation (CODA) of the American Dental Association (ADA).<sup>2</sup>

### **II. Approaches in Interdisciplinary Dentistry**

#### **(A)DECIPHERING THE DIAGNOSIS**

Efficient treatment planning starts with a correct and accurate diagnosis. The diagnosis of dental pathologies earlier relied on purely traditional diagnostic aids like visual and tactile examination, hard and soft tissue examination and others. This has now been supplemented with recent diagnostic aids. Interdisciplinary dentistry has benefitted from the revolutionary development of diagnostic tools that are able to analyse our physical condition with ever-greater precision.

There are now commercially available kits related to diagnosis, risk assessment, and prognosis for caries/periodontal disease based on genetic polymorphisms, biomarkers, and principles of cell biology. In fact, the recent development of saliva as a diagnostic medium has placed dentistry at the forefront of monitoring systemic health and disease.<sup>1</sup>

Advanced digital imaging tools are now available that allow a better visualization of the oral tissues. One such device is Canary which incorporates an electric toothbrush sized device that emits red laser light during a three second scan. It helps in detecting caries and cracks that are so minute that they go undetected on regular x rays. Lasers are being used in diagnosis. According to area of interest, now various options are available with soft tissue lasers focussing on areas like minor gum surgery. Hard tissue lasers can replace the conventional handpieces. The time is not far when even these lasers will be handled by automated computerized devices. Futuristic research include **nanobots**. Some of these microscopic machines might restore or straighten teeth, deliver anesthesia during oral surgery, diagnose diabetes and other diseases, or treat oral cancer.

### **(B)THE PERIODONTAL THERAPY**

Gingiva was considered the sole domain of the periodontist with gingival procedures for pocket elimination and periodontal therapy being done. Now, gingival addition and subtraction procedures are being done in other specialities also. The gingival architecture can be restored by procedures like gingivectomy and osseous contouring. To replace tissues lost due to pathosis, grafts have become popular. Autografts, allografts and xenografts have become popular with their increased usage in every field. Scientific advances improve dental practice by paving the way for evidence-based decision making.<sup>3</sup>

### **(C)SCIENCE AND TECHNOLOGY IN IMPLANTS**

Replacement of missing teeth has revolutionized with the advent of implants. Implants provide the natural appearance of tooth emergence from the socket and eliminate the hassle of prosthesis dislodgements. A modern alternative to ill- fitting dentures are the fast and fixed techniques. **FAST AND FIXED** is a revolutionary new procedure for providing a new set of fixed teeth in a single day. This process uses All-on-Four and All-on-Six dental implants to secure a full set of new teeth on a fixed bridge in a short time.

### **Bioprinting**

The fabrication of prostheses has become easier with the Computer aided designing and Computer aided milling (CAD CAM). This helps in milling a tooth from a three dimensional scan. 3 D printing is the next step in this technology.

### **(D)BIOMIMETIC MATERIALS**

Pharmacogenomics and pharmacogenetics provide new insights into how human genetic variations influence individual drug absorption and utilization during therapy (Evans and Relling, 1999). Biomimetics refers to human-made processes, substances, devices, or systems that imitate nature and describes the new scientific opportunities based upon the recently discovered rules of biology.<sup>4</sup> The advent of biomimetic materials has increased the success rates of procedures like perforation repair, periodontal surgeries and others.

### **(E)SCIENCE AND TECHNOLOGY IN SMILE DESIGNING**

A pleasing smile is the gateway of any communication. Today, science has enabled us to create beautiful smiles. The tools of smile designing include techniques like veneers, studs, gingival contouring and others. Zirconia veneers have come in use that simulate tooth anatomy combining a prosthodontist's expertise and an endodontist's insight for esthetics. Black triangles in the dentition give an unsightly appearance. These can be eliminated by a periodontist's skill for gingival contouring leading to a beautiful smile. Papilla reconstruction has become possible with surgical and conservative methods. These include surgeries like free gingival and connective tissue flaps, pedicle flaps and others. One such procedure for papilla reconstruction is Beagle's technique which combines Abram's roll technique for ridge augmentation and Evian's papilla preservation technique.

Now, **digital smile designing** has replaced the conventional procedures. These allow preparation of a digitally simulated mock up that can allow the patient to visualize the corrected smile before the actual procedure. This enhances patient compliance and allows an interactive treatment. Intraoral video camera, **digital impressions** have been introduced to allow capturing images and impressions within seconds.

A system for occlusal evaluation has also been introduced. **Digital occlusal analysis system T scan** allows pressure mapping, force measurement and tactile sensor. This enables proper diagnosis and treatment of occlusion discrepancies. Patient can correlate the forces he feels with the bite registration values. This allows treatment of occlusal discrepancies in a more accurate way.

### **(F)SCIENCE AND TECHNOLOGY IN REGENERATIVE THERAPY**

Stem cells are the pioneers of treatment of regenerative therapy. The modern treatment protocol has shifted its focus from replacement to regeneration. Sustaining what is living is more important than its artificial replacement. Stem cells allow regeneration of periodontal space, bone, cementum and pulp. Many delivery systems have been introduced for carrying stem cells to the area of interest. These can be synthetic or natural. These include porous ceramics of hydroxyapatite and beta tricalcium phosphate loaded with autologous stem cells. Procedures like apexification and apexogenesis utilize the regenerative potential of these stem cells. They are present in body in areas known as stem cell niches and can be stored artificially in stem cell banks.

Recent findings and scientific research articles support the use of mesenchymal stem cells autologously within teeth and other accessible tissue harvested from oral cavity without immunorejection. A future development of the application of stem cells in interdisciplinary dentistry requires a comprehensive research program.<sup>5</sup>

Future developments will take place at the interfaces among various disciplines. New skills will be needed to bring these emerging developments into practice.<sup>6</sup>

### **III. Conclusion**

Interdisciplinary dentistry is the need of the hour. A comprehensive treatment plan in interdisciplinary dentistry allows the most impeccable treatment plan to be formulated. Endodontist visualizes the esthetic and endodontic results. Periodontist maintains the periodontium in a healthy state. A prosthodontist replaces what is missing in the most natural way.

Interdisciplinary dentistry has paved the way for the most suitable treatment for the patient and this would not have been possible if not for the technological innovations that have always helped us.

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