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Editorial

3D Printing Technology: Where are We Now???

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In the past few decades, the world has experienced a gradual shift from the conventional to the digital means. This trend has been seen everywhere particularly, medicine and dentistry fields has experienced a great digital revolution.

The use of technology has actually helped the operator to provide a better means of handling thereby eliminating the so-called conventional means. In the earlier times and even now, the term "digital workflow" is used a number of times and has been popularly used as CAD CAM which helps to design and mill the prosthesis by means of subtractive manufacturing. Alternatively, the most commonly used techniques i.e. "additive manufacturing" and "rapid prototyping," have been replacing the manufacturing previously performed by subtractive manufacturing.

Additive manufacturing is defined by the American Society for Testing and Materials (ASTM) as "the process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies". Additive manufacturing or 3D printing or Rapid Prototyping (RP) has been known by a number of different names. RP technology is becoming an alternative to subtractive manufacturing i.e. CAD CAM being used for various aspects in medicine as well as in dentistry. There has been tremendous research going on in this particular field.

The majority of the raw materials for additive manufacturing used for dental and medical purposes may be grouped the same way as we broadly classify the dental materials i.e. polymers (including resins and thermoplastics), ceramics, and metals.

Materials like cobalt chromium, still lack sufficient research and still further research is needed to prove its existence as a suitable material for Additive Manufacturing. However, additive technique used for this material namely DMLS i.e. Direct Metal Laser Sintering is quite often used for the fabrication of metal ceramic restorations with promising results.

Keeping in view the additive or layered process for manufacturing, it has been found in the literature that RP technology saves a lot of material unlike in CAD CAM that uses subtractive manufacturing which makes it suitable in fabricating structures particularly cobalt chromium. Apart from this, there is a wide range of availability of these machines used for various purposes and its passive nature also helps to prevent wear of the milling machines (often seen in subtractive milling machines).

The main limitations of this technology include the number of steps being used in fabrication of a particular prototype, equipment used, technicalities, cost and even difficulty in fabrication of materials like ceramics where it can produce some porous structures unlike pre-sintered blocks used in CAD CAM, and staircase phenomenon.

Since, the number of advantages outweigh the limitations, it's always encouraging to use the additive manufacturing technology over CAD CAM technique of manufacturing. Further research is also needed in this regard to prove its suitability to use particularly in the dental field.

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