Removable Partial Dentures Are Still Used Today For Several Reasons

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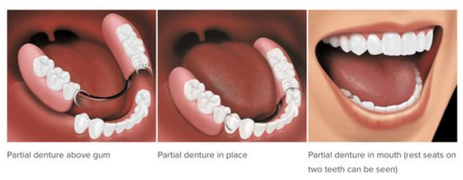
Abstract:

Removable Partial Dentures are dental prosthesis designed to replace multiple missing teeth for dental patients.This type of dental treatment is safe and efficient and with the new advances in dental materials and fabrication methods they are much better prosthesis designed to replace multiple missing teeth for dental suited to restore patients' oral function and esthetics.

Removable Partial Dentures can have advantages which are widely used in clinical practice. Though, due to the obvious harmful effects associated with current RPDs, there is an urgent need to enhance materials and fabrication procedures. To better care for the rising partially edentulous population, RPD techniques must continue to innovate and improve. When it comes to caring for partially edentulous patients, a combination of improved materials, digital design, research, and education aims to improve their quality of life. This presentation gives an overview of the RPD and the new innovations, the advantages, and disadvantages.

What are the RPD's and how they work?

The RPD are a solution to treat people that have large edentulous (missing teeth) areas, but they still have some of their natural dentition, by inserting a dental appliance that replaces the missing teeth. This type of appliance is customized for each patient, and it can be removed by them for cleaning and hygiene purposes.

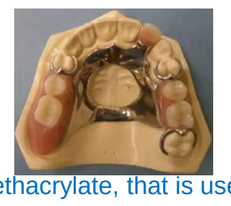


PROBLEMS:

Some of the problems with the partial dentures are:

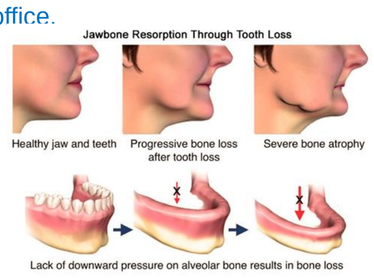
1. The dental materials used for fabrication the Removable Partial Dentures can induce adverse reactions in patients and present health hazard for dental technicians working with these materials, such as:

- Framework – is the substructure which needs to be rigid and provide good bonding with the other materials. Usually is fabricated using non-precious dental alloys such as: cobalt-chromium (Co-Cr) or nickel-chromium (Ni-Cr), which may contain Beryllium. Beryllium is used in the Nickel alloy to help the metal flow better during the casting procedure, but it is a toxic metal, many patients suffering from allergic reactions. Even though the non-precious dental alloys are light weight and have low density and thermal conductivity, and they are cheaper versus the semi-precious alloys, they are difficult to grind into shape and may present low resistance to corrosion. Some patients complain about altering their taste.



- Acrylic material, Methyl Methacrylate, that is used to mimic the soft-tissue or the gums and the artificial teeth. The dental acrylic material (self-polymerizing) is made of polymer (powder) and monomer (liquid) which are mixed right before is processed into the framework. The monomer presents a health hazard for dental technicians because it is highly flammable and if there is long contact with skin can lead to dermatitis and, also due to its strong odor, can produce irritation of the respiratory track.

2. Another problem with partial dentures is the fact that in time the patient's alveolar bone is shrinking because of the loss of natural dentition, therefore, the partial denture will be loose. To compensate for this the partial denture needs to be refitted or relined, which means more patients visit the dental office.



3. The design of the framework is very important in providing partial denture stability in the patient's mouth; therefore, the dentist or dental technician must be well educated in the different components that are part of the framework. Some of the most important components in framework design are the major connectors, which connects all parts of the prosthesis, saddle mesh that covers the large edentulous areas, and retentive elements such as clasps, that wrap around the adjacent teeth. The poor selection of clasps' design can lead to adjacent teeth (anchor teeth for the partial) to become loose and in some instances need to be extracted.

4. The delivery time for the partial denture can be longer based on the design and fabrication methods.

SOLUTIONS:

The new advances in dental technology and materials offer a few solutions, such as:

1. Using dental implants either to replace the missing teeth by fabricating fixed protheses (crown & bridge) or using the dental implants as a retentive element for the partial dentures (a cheaper treatment versus the fixed bridge).

It is a viable solution that has the potential to last longer, and it is better adaptable to oral function, but this type of dental restoration is not applicable to everyone because many patients might not be good candidates for dental implants, due to their medical condition and medication (diabetes, hemophilia, compromised immune system, etc.), or because the quality of the bone where the implant should be place is poor.

Also, because this is a more invasive procedure it is more expensive, and many dental insurances do not cover the costs. This type of treatment can take longer time because after the implants are placed the patients need to heal and to allow for the implants to be osseointegrated.



2. The new dental digital technology allows for the introduction of new dental materials that are more biocompatible, reduced delivery time and offers flexibility to modify and re-fabricate the protheses using the existing patients' digital file.

3. New dental materials, such as:

- Polyetherketoneketone (PEKK) is a thermoplastic high-performance material, free of methacrylate, light and it can be fabricated by using the CAD/CAM or digital technology by milling. Because this material is a polymeric material the bonding with the artificial teeth is strong. Its biocompatibility is increased because is does not contain methacrylate.


- Titanium dental alloys used for the framework, which is a light and strong metal, has excellent biocompatibility properties and is durable. In fact, Titanium dental alloy is used to fabricate the dental implants, due to its mechanical, physical, and non-reaction with oral cavity environment.
- Valplast dental material is a type of superpolymides (almost pure nylon), which has high biocompatibility (monomer free), it is a light material and very flexible.


3. Flexibility to use different CAD/CAM systems and methods of fabrication either by 3D printing or milling. The milling process is referred as subtraction of material from a block or disc versus the #D printing process which is based on adding material layer by layer. The latest advances in 3D printing for partial denture is the fact that now the Valplast material, which used to be utilized for hands-on method only, can be printed, leading to faster delivery time and constant quality of the finished partial dentures.

CONCLUSION:

The current trend in the dental industry is to introduce the CAD/CAM technology as a method of fabrication for Removable Partial Dentures, using new dental materials that are well tolerated by patients, are cost-effective and maintain constant quality of the finished products.

Since some patients, especially older ones, cannot benefit from dental implants treatment to replace their missing natural dentition, the partial dentures are still one of, if not the only solution at this time.

Furthermore, the use of the CAD/CAM technology allows for better collaboration and communication between the dental team leading to increased quality of life for patients by maintaining their health and well-being.

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