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PROVISIONAL RESTORATIVE MATERIALS IN ESTHETIC DENTISTRY, FROM PAST TO FUTURE: A LITERATURE REVIEW

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ABSTRACT

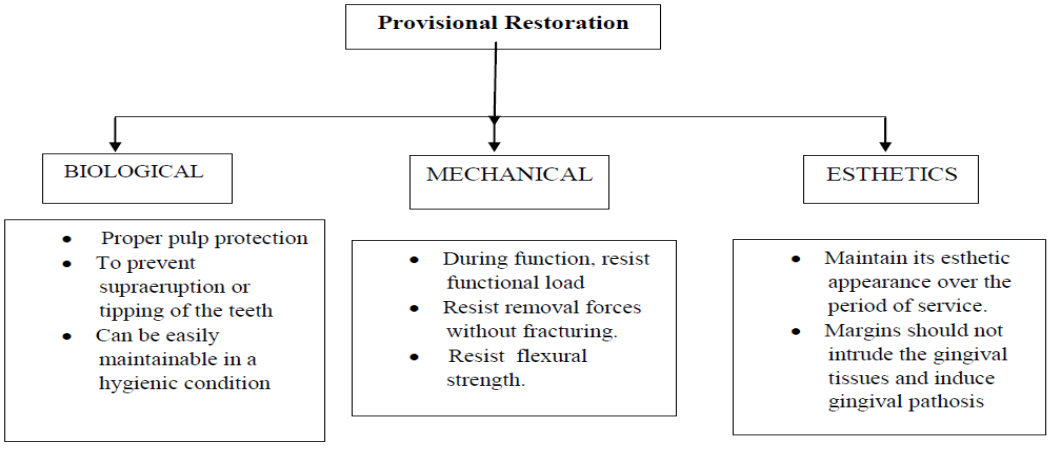
One of the most important and challenging aspects of dental profession is to provide a predictable outcome to any oral rehabilitation, and the use of the provisional restoration is a critical phase in the treatment. Polymethylmethacrylate based materials have long dominated the arena of provisional restorative materials, but the advent of newer resin based materials with superior handling characteristics has broadened the spectrum of temporization Provisional restorations quite often need alterations and adjustment to the new requirements, so it's important to comprehend the compositional properties of the base and repair materials to make a reliable bond between them. The aim of this review is to discuss ideal requirements, different materials of provisional restorations, possible failure and complications.

KEYWORDS: Provisional restoration, Interim restoration, Polymethyle metacrylate.

INTRODUCTION

During the time between tooth preparation and placement of the final restoration Provisional or interim restorations are commonly used.[1] The provisional restorations have become a valuable tool for better esthetic and functional diagnosis in dentistry these provisional restoration have become more valuable and by handling this intermediate stage of treatment practioner can gain their patients' confidence successfully, achieving the necessary predictability for a successful final restoration.[2]

Ideal requirments



MATERIALS

Polymethylmethaacrylate

Currently, it is one of the material of choice for fabrication of provisional restoration. Acrylic resins have been successful because of their ease of processing, low cost, light weight, and color matching ability; however, acrylic resin are low in strength, brittle, and low in thermal conductivity.

Figure 1: Chemical Structure of (a) PMMA and (b) MMA.

Whereas it also has certain drawbacks like significant amount of heat given off by exothermic reaction, high degree of shrinkage, objectionable odour, short working time, hard to repair and radiolucent. Plant et al. found that the intra-pulpal temperature rise associated with the polymerization of methyl methacrylate materials could be up to five times that associated with the normal consumption of thermally hot liquid.[3]

Poly ethyl methacrylate

With the aim of overcoming the disadvatges of polymethyl methacrylate, a self curing material named Ethyl methacrylate was introduced in the 1960 s, which is available as a powder liquid formulation.[4]

The liquid consists of predominantly ethyl methacrylate whereas the powder is predominantly a polymer and benzoyl peroxide.[5] It is a bettersuited material for direct interim prosthesis fabrication, due to a lower exothermic setting reaction, deeming it kinder to the pulp when large volumes are being cured intra orally.[6] PEMA exhibits a low polymerization shrinkage compared to PMMA.[7]

Main drawbacks include the surface hardness, fracture toughness and transverse strength of poly ethyl methacrylate is lower than polymethyl methacrylate, questioning the function in high stress areas. The wear resistance and color stability are inferior to the newer materials, thus making it a poor choice for long-termprovisionals.[8]

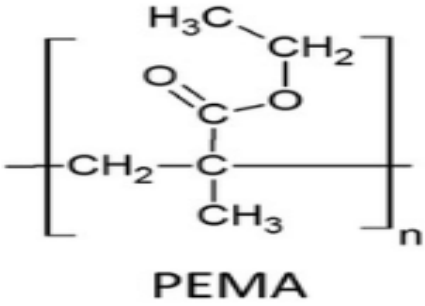


Figure 2: Chemical Structure of PEMA.

Vinyl ethyl methacrylate

Vinyl ethyl and butyl methacrylate are chemically similar materials, falling in the same broad category, and displaying comparable clinical behavior to poly ethyl methacrylate. It exhibits a lower exothermic reaction while setting, making it friendlier to the pulp.[9]

Bis-acrylics

They are dimethacrylate materials and can be categorized into two groups: UDMA and bisphenol A-glycidyl methacrylate it is a hydrophobic material similar to bis GMA.[10]

Advantages are very low exothermic reactions, Bis-acrylics offers better marginal fit as it produces less heat and shows less polymerization shrinkage compare to other materials.[11] The downsides of this material are they are brittle in thin sections, they stain easily and only few shades are available. Esthetically they are reasonable, an unpolymerized layer remains superficially which should be removed by alcohol and polishing this will reduce staining of the temporary. They are more color stable and have better flexural strength than PMMA materials and can be selected as a material of

choice to make temporary restorations that require considerable time intra orally.[12]

Visible light cured resins

A visible light cure denture base material was introduced onto the market in the 1980's. The material is made up of urethane dimethacrylate (UDMA) and the main reason for its introduction was to eliminate methyl methacrylate.[13]

Fillers like microfine silica are incorporated to reduce polymerization shrinkage. The setting reaction does not emanate residual monomer, unlike methacrylates, causing decreased tissue toxicity.[14]These materials have good mechanical properties and good color stability. A variety of shades are available for this material making it esthetically appreciable also the marginal fit is good as there is less polymerization shrinkage.

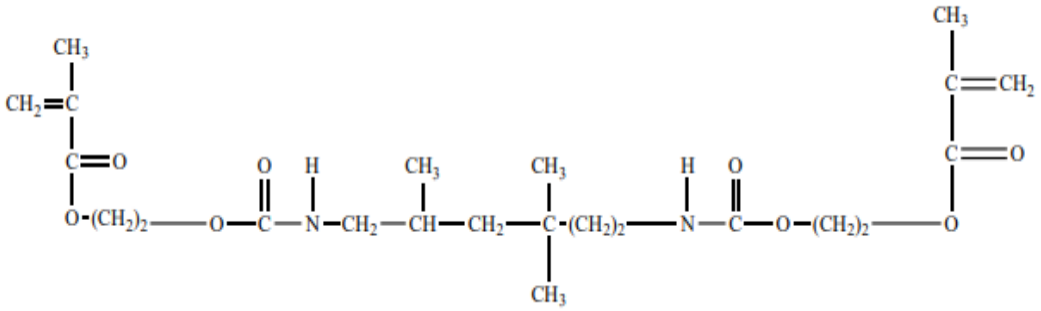


Figure 3: Chemical Structure of Urethane dimethacrylate (UDMA).

In a study, **Haddix** claimed that visible light cured materials produce provisional restorations with a quality similar to heat curing, laboratory fabricated restorations, but the time and expense involved are less.[15]

DISCUSSION

Various factors are responsible for the choice of a material for a provisional restoration. Meeting the functional and the esthetic demand is one of the most important aspects of making a provisional restoration, also the provisional material should be capable to meet this requirement. Bis-acryl resin is the most commonly used material for provisional restorations, but for restorations of three units or more, assistant-made PMMA shells lined intraorally with PEMA to provide more strength and color stability. In cases of full mouth rehabilitation cases and cases involving more than 5 unit bridges, the material of choice is heat polymerizing PMMA for better strength and occlusal stability.

CONCLUSION

Provisional restorations are important during the rehabilitation process, knowledge of the mechanical properties of the available materials allows us to predict their clinical performance. These materials should not only satisfy the mechanical requirements such as strength and resistance to wear but also meet the biologic and esthetic demands. It serves to maintain gingival health and contour while providing for an esthetic and/or functional interim restoration. Provisional crown should also be easy to clean and not impinge on the tissues. Most importantly maintains interocclusal and intra-arch tooth relationships.

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