Super Dentures

Eliminate Breakage in Removable and Fixed Detachable Prosthetics
Strong, Esthetic and Reliable

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Patients presenting with limited vertical space, cross bite, parafunctional habits, or especially implant supported and retained prosthetics provide challenges to dental professionals. Patients will break or fracture prosthetics, leading to a loss of faith in the restorative team as well as non-revenue time.

The shift from teeth to implants as abutments needs to be taken into consideration. Teeth have periodontal ligament (to protect the abutments) and proprioseption so patients know when they have exceeded physiological limits. Implants do not, thus today's implant supported and retained prosthetics allow patients to generate greater destructive forces to acrylic and teeth, and opposing dentition.

The introduction of modern reinforcement materials, such as polymer impregnated e-glass fibers, allows the dental professional to provide a light, thin, strong, highly aesthetic prosthesis.

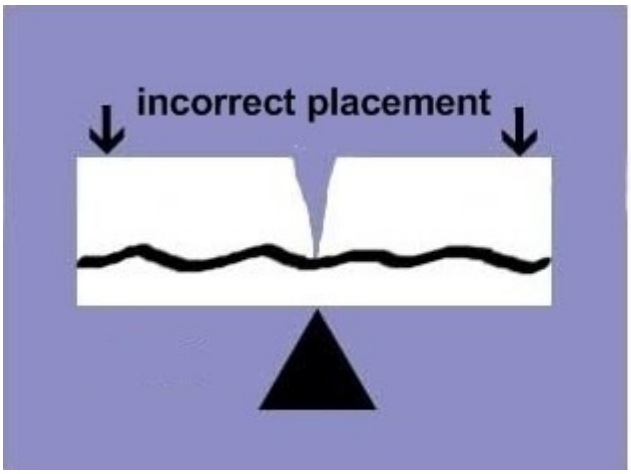
No longer does reinforcement require esthetic trade-offs or patient annoying rough surfaces.

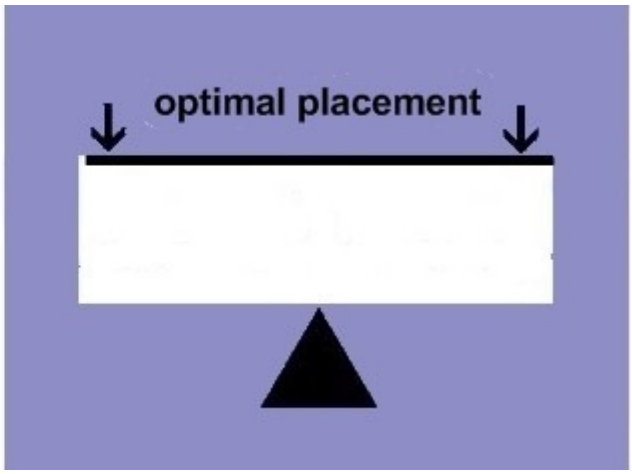
Reinforcing new prosthetics using unidirectional e-glass fibers is a very simple but very effective way to increase both flexural strength and fatigue resistance in removable and fixed polymer prosthetics.

The three major factors of reinforcement are bonding, position/placement, and direction.

The goal of dental polymer reinforcement is to stop fractures before they begin. The strongest metal or Kevlar will stop bullets, but since these materials do not bond to dental polymers, a "sandwich" effect is created wherein the thin layers of polymer are actually weaker than before and do not stop the stress fractures from starting— these materials simply hold a prosthesis together after it breaks. Pre-impregnation of the fiber matrix is key and allows for covalent adhesion bonding and a successful integration of fiber and polymer.

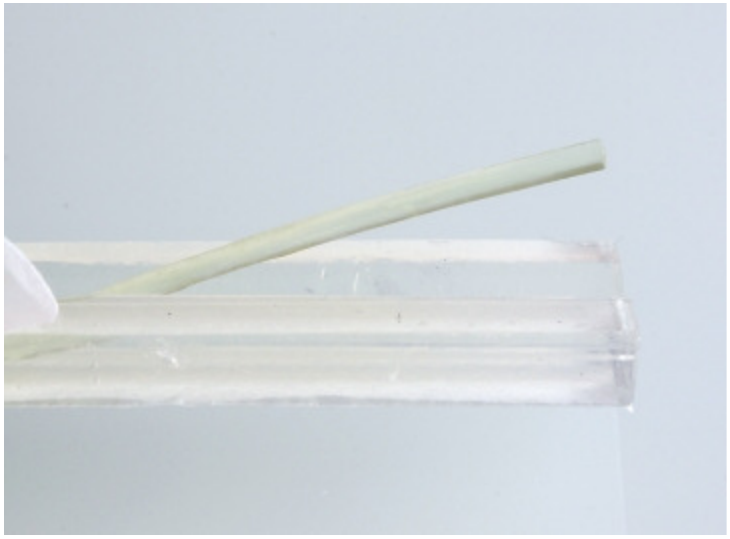
The reinforcement should be **placed on the tension side of the prosthesis, as close to the surface as possible**. This strategic placement of reinforcement on the side in tension **stops the fracture before it begins** and increases the load to initial and final failure.



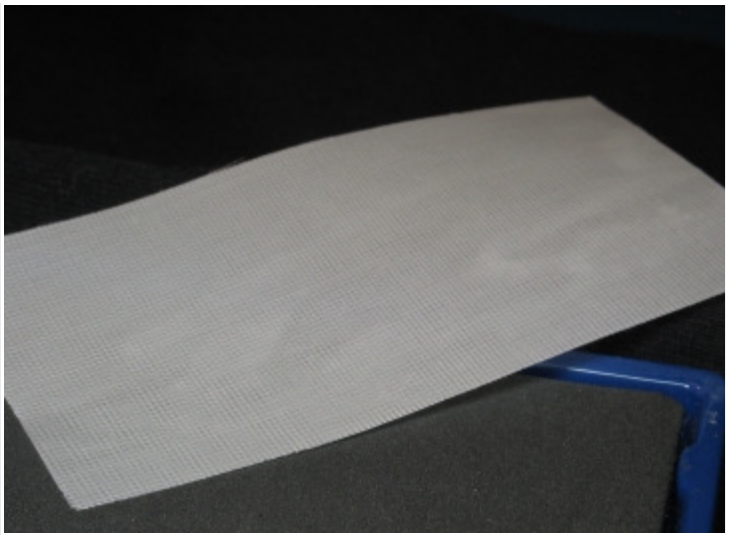


When the direction of forces or loads is known, unidirectional fibers are placed perpendicular to these forces to

provide the highest tensile strength. Weaker multi-directional fibers, such as mesh, are used when the forces are parallel or unknown. Since the direction of forces on a full denture is usually known, unidirectional fiber is the best option.

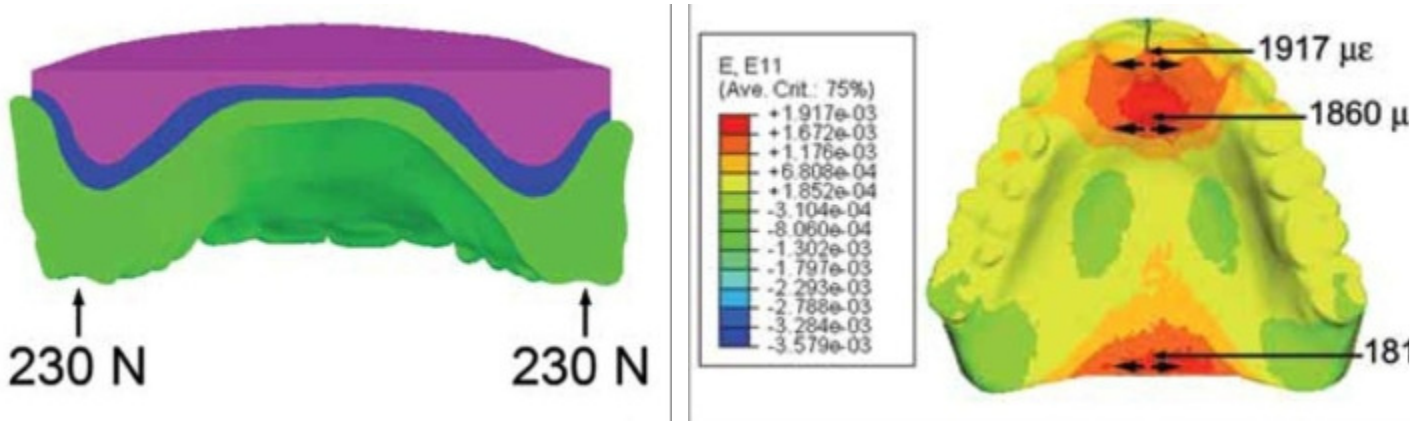


unidirectional eFiber



multi-directional Perma Mesh

eFiber is used due to its unique characteristics that allow for maximum strength and esthetics as well as strategic and intelligent placement. eFiber is a BIS-GMA and PMMA impregnated e-glass fiber that bonds to all acrylics and composites. The material is translucent, easy to grind, adjust, and polish, and easy to handle with no special tools required.



The destructive forces (in red) on a maxillary denture when loaded with 230N of force

Studies and experience show that the fracture forces on a denture are greatest in the incisal notch, or midline area. Since the goal is to strengthen the weakest area, and stop the fracture before it begins, unidirectional eFiber (the strongest directional material) is chosen and will be used at the junction of the denture teeth and acrylic (position) and bonded to both the denture teeth and acrylic.

We are often asked "why don't I just place a piece of mesh in the palate?"

The answer is twofold. First, remember that mesh (multidirectional fiber) is not nearly as strong as eFiber (unidirectional).

Second, placing mesh in the palate is not intelligent or ideal placement. The goal of reinforcement is to stop the break before it begins, therefore we want to reinforce the area of the prosthesis under the greatest tension, where the fracture propagates--the midline area at the junction of denture teeth and acrylic resin. Placing mesh in the

palate is better than not reinforcing at all, but the fracture will still start and the mesh will hold the fractured prosthesis together.

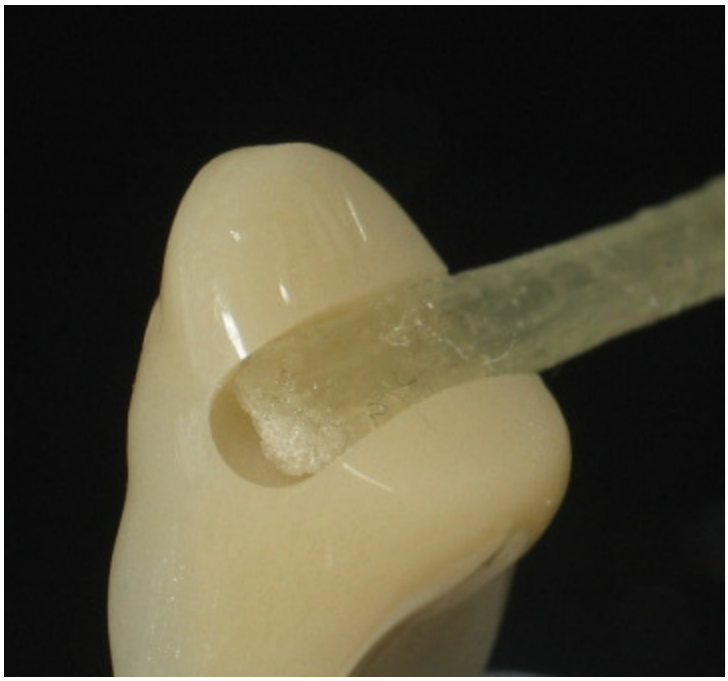
The technique is very simple to reinforce a new denture. Grooves are cut in the ridgelap of the acrylic or composite denture teeth to receive the fiber reinforcement. eFiber is bonded to the denture teeth. Bonding the fiber to the acrylic or composite denture teeth accomplishes the goal of placing the fiber in the proven optimal position—the tension side of the prosthesis—at the junction of denture teeth and acrylic.

A secondary benefit of bonding eFiber to the denture teeth is increasing the bond strength of the denture base resin to the bonded denture teeth. The PMMA in eFiber allows for great bond strength with denture base resin.

Another benefit of bonding eFiber to the denture teeth is splinting the denture teeth together for increased denture tooth retention. The grooves in the denture teeth may be cut during denture tooth setup (preferred), or after the denture is invested, boiled out, and wax is removed.

For traditional dentures, preparing the six anterior teeth for reinforcement is recommended since most fractures occur in the midline area.

The reinforcement grooves should be extended to the posterior teeth for removable dentures with posterior attachments, for all fixed detachable cases, or when maximum strength is indicated.



Ideally, the groove should be cut aggressive enough so that the eFiber 1.6mm may be fully placed inside the contours of the denture tooth.

Place one continuous piece of wax rope or dental floss into the grooves in the teeth in order to measure the length of eFiber needed.

Remove the fiber from the protective foil, and cut a length of the eFiber and clear silicone matrix.

Protect the fiber from the light.

After investment and wax removal, and the grooves are in the denture teeth, paint eFiber bonding agent on the bonding surfaces of the denture teeth.

Wait for the bonding agent to dry.

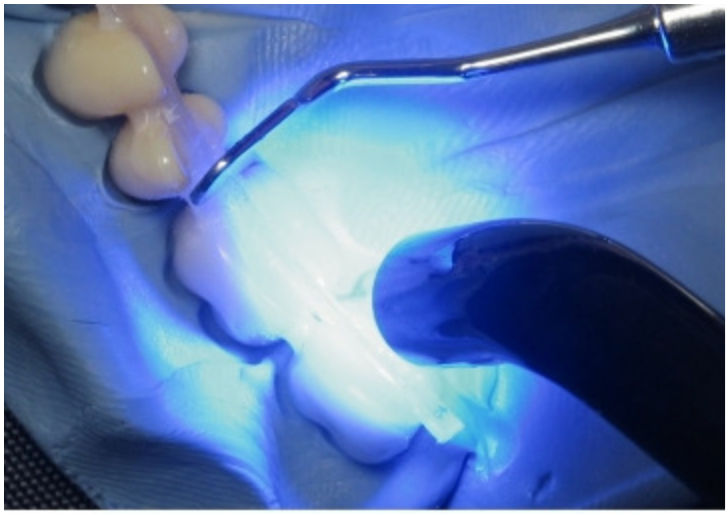
Prior to curing, eFiber is very flexible and pliable.

It is very easy to adapt eFiber to accommodate each individual patient's arch.

Start with the most posterior tooth, and press the fiber into the groove in the denture tooth.

The clear silicone matrix may be used to hold the fiber in place when curing.

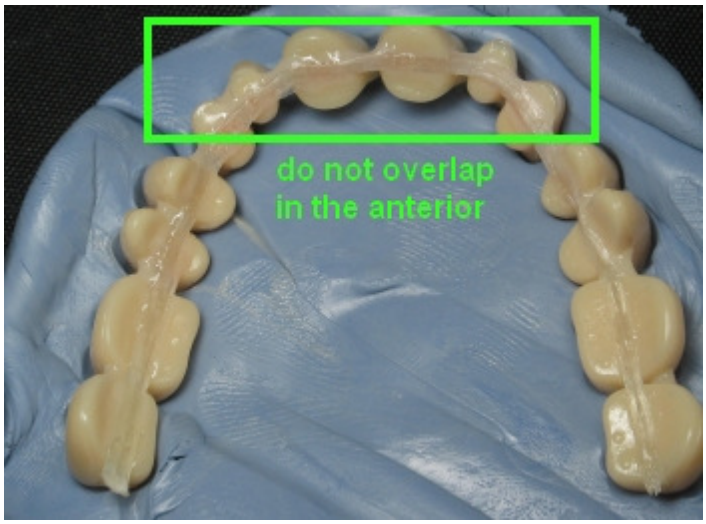
Use a hand held light to quickly (3-5 seconds) bond the fiber to each tooth.
A wax spatula or eFiber Stepper tool is used to protect the uncured fiber from prematurely curing



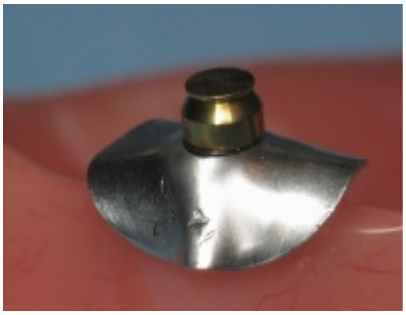
If multiple pieces of eFiber are needed, gently overlap the two sections and press together prior to curing.

Take care to have one continuous piece of eFiber in the midline/incisal notch area.

It is best not to overlap in the anterior.



If Perma Mesh hoods are indicated to reinforce any attachment areas or thin areas of acrylic, bond the cured Mesh hoods to the eFiber.



Alternatively, Perma Mesh may be placed in the two small tension areas of the (anterior and posterior) palate at this time as well.

Once the fiber has been initially bonded to all the teeth, fully cure the fiber, either with a hand held light or curing unit.

Proceed with normal acrylic processing procedure of choice.

If for any reason the eFiber or Perma Mesh is exposed outside of the acrylic, grind and polish the fiber just like you would flash acrylic. The material is unique in that it will not fray.

The final result is an extremely strong, esthetic patient pleasing prosthesis.