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# The Interesting Types of Plastic of Invisible Retainers

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## Opinion

After the completion of orthodontic treatment, one of the most crucial objectives is keeping the finished result. It was detailed that around 70% of orthodontic treatment result in retention failure [1]. The causes of relapse are due to several distinctive factors. Gingival and periodontal tissue fiber affected by orthodontic treatment need time for reorganization and adaptation into new position of the teeth [2,3]. Moreover, after treatment, all teeth will be unstable, the force from soft tissue such as lip, cheek, or tongue can cause undersigned tooth movement and in case of growing patient, growth may change orthodontic treatment result [4]. Recently, more choices for orthodontic maintenance have been presented aside from the conventional Hawley retainer. The retaining wire and holding wires may impact the quality of life since full-time wearing is needed especially after finish orthodontic treatment. Thermoplastic clear retainers which is a type of removable appliances have dramatically increased in popularity as a result of their esthetic and translucent properties [5,6]. The fabrication is also easy and fast in process. Nowadays, there are many brands try to lunch out the plastic products for vacuum-formed retainers such as Essix® from Raintree Essix Inc., Zendura® from Bay Materials LLC, USA, and Vivera® from Align technology. The properties and appearances of each material are different and interesting.

### Essix®

- i. **Essix A+:** polyethylene copolymer is the base material of this Essix type. It has wide range of thickness which is approximately 0.03 - 0.12 inches. It is good in esthetics due to the clear sheet and has pleasurable flexibility [7]. But it is prone to crack, and it has low wear resistant. Unfortunately, this Essix type may not appropriate for bruxism.
- ii. **Essix C+:** it was made up of polypropylene/ethylene copolymer material. The thickness is 0.04 inches or 1 mm. This is the option for bruxer who who want to avoid wearing a retainer with a visible wire. Due to its strength, it can withstand the bite force. Unfortunately, this plastic has lower light transmittance comparing to others.
- iii. **Essix ACE:** Copolyester is the main ingredient. Ninety-five percent is polyethylene, and another 5 percent is a secret material. It comes with transparent and durable qualities. Primary use is for aligner and retainer. It also can be use as the temporary bridge at the anterior teeth. the thickness that they provide are 0.03, 0.035, and 0.04 inches.
- iv. **Essix PLUS:** Same as Essix ACE, the key material is copolyester. Generally, it is the material of choice for retainers and bruxism appliances. The brand claims that the Plastic is effortlessly removed from models and trims with ease. Two thicknesses are available (0.035 and 0.04 inches)

### Zendura®

- i. **Zendura A:** A classic plastic type from clear correct that is a rigid polyurethane material. Polyurethane has many good properties such as high load bearing capacity, flexibility, and abrasion and impact resistance. Zendura A is recommended for retainer due to the shape memory ability (available in 0.025 and 0.03 inches).
- ii. **Zendura FLX:** Similarly, Zendura FLX is polyurethane, abrasion-resistant and elastic, with a high shear strength and good transparency, it is one of the most versatile engineering thermoplastics [8]. But the main function is as an aligner. Surprisingly, a unique Trilayer structure that has a elastomeric middle layer and covered with dual shell can move the teeth in proper way. Due to the elasticity, it rebounds to both lateral and rotation force. The brand claim that the elastomeric inner layer and the rigid outer shell of Zendura FLX provide the capacity to rebound and recover from mechanical deformation, resulting in up to 150 percent greater teeth movement force than comparable materials over a 7-10 day wear period. A study showed that Taglus®, Essix ACE®, and Zendura A® all had similar force decay properties, Zendura FLX exhibited the least amount of force decay [9]. (available in 0.03 inches).

### Vivera®

Vivera retainer was introduced in 2008. It is polyurethane base plastic. Vivera® retainers employ the same 3D digital imaging cast fabrication technology as Invisalign® aligners. Basically, five steps have to be followed (intraoral scanning, model fabrication, thermoplastic forming, gingival trimming, and polishing). More than 90 percent is robot work which can reduce human error. The fingerprint-like pattern is unique for Vivera because it is able to grab and hug teeth perfectly. The thickness is thicker than Invisalign 0.01 inches (0.04 inches)

## Conclusion

There are many factors to choose the type of clear retainer. Especially, initial malocclusion and intraoral function are the keys. Finally, to know the main materials and their physical properties can help us to select the proper retainer.

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