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Thermosealed retainer

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In contemporary orthodontics the role of plastic materials is ever increasing.
As a result, it is useful to broaden our knowledge of these materials especially as they relate to retention procedures.

Plastic is a synthetic material based on carbon chemistry. Different polymers can be obtained according to the length of the carbon chain.
Celluloid, a polymer containing cellulose nitrate and camphor, was the first plastic invented in 1856 by Parkes. It was used instead of ivory for manufacturing billiard balls, piano keys and combs. Celluloid's high inflammability limited its field of usage to cinematography until it was replaced by a less volatile polymer: cellulose acetate.
In 1909 Leo Baekeland invented "bakelite" phenol-formaldehyde by simply heating and mixing phenol and formaldehyde.
Shortly before World War II a number of synthetic polymers were created such as nylon, polyester, vinyl, polystyrene and polyethylene. These were followed by epoxies such as polycarbonate, teflon, silicones and polysulfones.
The versatility and bonding properties of carbon chemistry have allowed the development of numerous materials. These have been created by the addition of various elements such as hydrogen, oxygen, nitrogen, chlorine, fluorine and occasionally sulphur and silicon. In order to overcome the limitations of plastics, different fillers and strengthening fibers constituting composite materials were considered.

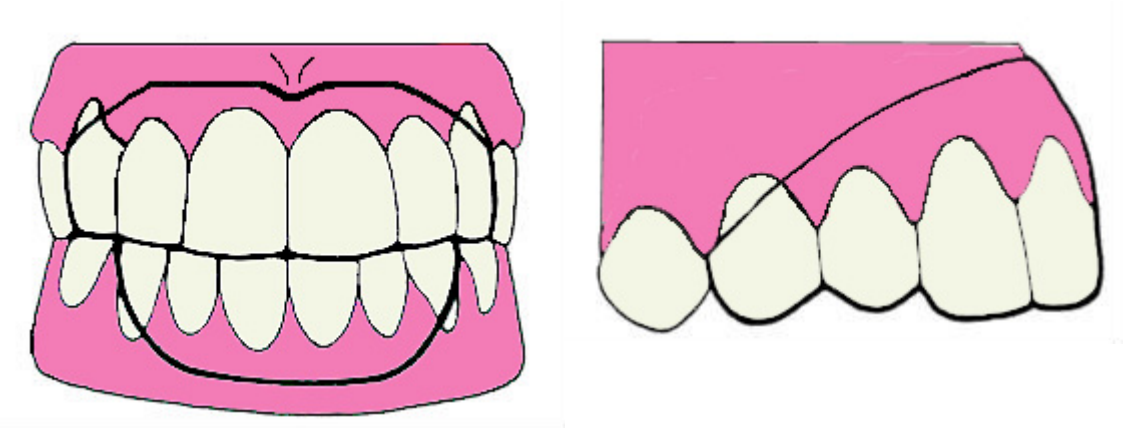
All polymers are composed of repeating chemical units called monomers. In the case of polyethylene, ethylene is derived by dehydrogenation of ethane. In a process known as polymerization, ethylene molecules bond to one another in the presence of a catalyst. It is not necessary for all the monomers in a polymer to be identical. A copolymer is the union of two different types of monomers. For example, ABS plastics a fully grown copolymer from **A**crylonitrile, **B**utadiene, and **S**tyrene.

There are two distinct types of plastics. **Thermoplastics** such as polyethylene can be repeatedly softened by heat whereas thermosetting plastics cannot be modified once they have been heated. **Thermosetting** plastics are bound in linear chains by a bonding agent, generally oxygen, in a rigid three-dimensional complex rendering them more fragile.

Polyesters are thermosetting plastics, though they also exist as thermoplastics, are widely used in dentistry. In a very short time thermosetting of polycarbonate has become the method of choice for the fabrication of numerous active and passive orthodontic

appliances. Its success is due to the simplification of the procedures and the characteristics of the finished material. With adequate equipment and in a few minutes it is possible to fabricate aesthetic appliances with uniform and precise thickness as well as notable mechanical characteristics.

The Essix retainer



The thermosetting copolyester retainers are slowly replacing the retention plates of Schwartz and Hawley made in the 1920's for moving rather than retaining teeth.
The fabrication of the retainer calls for impressions taken with a quality material such as polyvinylsiloxane or a polyether, poured up in extra-hard plaster. It is important to mention that the retainer should not be worn 24 hours a day but only during the night.
The patient must be informed that in order to prevent relapse, the appliance must be worn every night. Any lost hours during the night should be made up for during the day.
the elasticity of this appliance only allows the correction of minor irregularities.

In the patient who bruxes the retainer must be remade at least two times a year in order to protect the enamel.
In cases of loss of incisors or while waiting for an endosseus implant, the retainer can also serve as a prosthetic appliance with the simple addition of resin to the retainer.
The temporary crown has good esthetic characteristics, even though the brightness of the material causes some reflection. It has the advantage of being removable, hygienic, and it doesn't require any preparation of the adjacent teeth.
The thermosetting retainer is less bulky, doesn't have any metal, doesn't require activation, is hygienic, and is an excellent appliance for the patient who bruxes in order to prevent parafunctional habits.

Even though scientific literature has not yet confirmed these results, clinically such retainers offer many advantages to both the patient and the practitioner.
Some of these are increased comfort, esthetics, low costs, and rapid and simple fabrication.
A long-term study with a large sample size is desirable to verify the stability of results in deep bite and open bite cases in order to predict possible relapse.

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without mentioning any specific names of products.

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V.J.C.O.

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