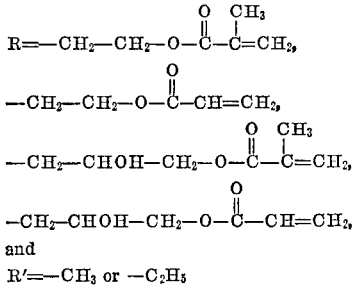
where:

n=1–5,
m=1–5, and
p=0–4;



and

R′=—CH_3 or —C_2H_5

The preferred products of the present invention are:

(I) 2-methacryloxyethyl vanillate
(II) 2-methacryloxyethyl p-hydroxybenzoate
(III) 2-methacryloxyethyl gallate

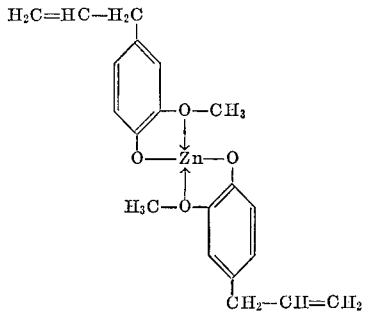
and the most preferred is I above.

FREE RADICAL POLYMERIZATION

Polymerization reactions such as those of the present invention are catalyzed by initiators useful in the type of polymerization described in Encyclopedia of Polymer Science and Technology 7, 368 (1967) Wiley. Preferred combinations are the amine-peroxide combinations such as a benzoyl-peroxide system with an amine and preferred amines are N,N-dimethyl-p-toluidine and N,N-dimethyl-sym-m-xylidine.

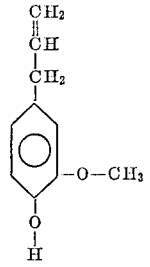
COMPARISON WITH ZOE

It can be seen in a foregoing reference (Peyton, 1964, page 183) that eugenol reacts with zinc oxide to form a compound referred to as zinc eugenolate:



which is believed to crystallize and by combination of exhaustion of the liquid eugenol and possibly a cementitious characteristic of the zinc eugenolate forms a hard material containing unreacted zinc oxide particles. This hard material is referred to as zinc oxide-eugenol (ZOE) in the dental literature and has had widespread use as a base material to underlie other restorative materials, as temporary filling materials, as temporary cementing media, and for other purposes. However, it is not very strong nor durable; it disintegrates readily in the challenging environment of the oral cavity. One of its major advantages is that it is not acidic and is not irritating to the soft tissues of the mouth or to the dental pulp of the tooth. It appears to have no measurable adhesion to the hard tooth tissues or to other solid surfaces, at least after exposure to moisture.

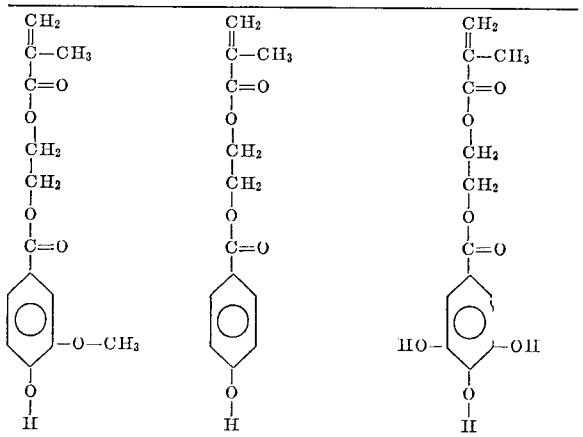
The reaction between eugenol and zinc oxide is believed to form a chelated reaction product involving two eugenol molecules and one zinc atom (as is illustrated on page 183 of Peyton, F. A. et al. Restorative Dental Materials, 3rd edition, C. V. Mosby Co., St. Louis, 1968). The structural formula of eguenol is:



It is readily apparent that the structure of compound (I) of Table 1 also has the hydroxy and orthomethoxy groups (believed to be the moiety that forms the zinc oxide chelate) in the same configuration as does eugenol. Thus, under similar reaction conditions it would be expected that compound (I) of Table 1 would likewise react with the zinc oxide. However, in contradistinction to eugenol, the compound of Table 1 contains a reactive methacrylate group that can polymerize by a free radical mechanism, thus producing a high polymer having a continuous carbon to carbon backbone chain. This can account for the higher strength obtained from reaction products of compound (I) of Table 1

TABLE 1

Condensation-reaction products of 2-hydroxyethylmethacrylate with vanillic acid (I), with p-hydrobenzoic acid (II), and with gallic acid (III), respectively



when compared with zinc oxide eugenol formulations and even with formulations of zinc oxide and eugenol containing EBA (ortho-ethoxy benzoic acid) and reinforcing fillers; strength properties for these materials are compared in Table 1A.