

## **Root End filling material summaries (45 – 60)**

### **46 – Omnell 1959**

They describe a single case where radiolucent material was found around the end of a root following root resection. This material was surgically removed and then subsequently reappeared. It was discovered to be Zinc Carbonate, which was thought to be derived from the amalgam used as the retrograde root filling, deposited due to an electrolytic process. Or it may have been derived from the metal post. This was the only such case noted from hundreds of cases.

### **47 – Moodnik 1975**

They looked at 4 root end amalgam fillings with an SEM. They saw large defects between the amalgam and the prepared root surface, measuring between  $6\mu$  and  $150\mu$ . They speculated that the defects may harbour bacteria

### **48 – Oynick 1978**

They described the use a new material in retrograde root filings, called Stailine Super EBA Cement. They found it to adapt better than amalgam and does not expand. It also appeared to allow collagen to grow into cracks in it, proving it to be biologically acceptable.

The problems with using amalgam were cited as;

- toxicity when in direct contact with periapical tissues
- the cavity has to be made to be retentive due to lack of adhesion
- it requires a dry field
- has been seen to be successful and then fail after a number of years

ZOE had been used as an alternative to amalgam but the material could be resorbed.

Stailine Super EBA cement, combined ZOE and a silicone dioxide mixed with ethoxybenzoic acid (EBA). It's advantages were cited as;

- easy manipulation
- it's adhesive to dentinal walls, so doesn't require a retentive cavity
- doesn't need perfectly dry conditions
- good working time
- high compressive and tensile strengths
- neutral pH
- low solubility and radiopaque

#### **49 - Liggett 1980**

A study to investigate the bone response in rats to implanted zinc and nonzinc amalgam implants. The specimens were examined using the light microscope, or SEM and x-ray microprobe analysis.

The results showed that the amalgam was well tolerated by the rat osseous tissue, with no difference between the Zn and Zn free amalgam. Bone adjacent to the amalgam contained tin and sulphur with both types of amalgam, showing that these elements appeared to migrate into the surrounding bone tissue from the filling.

#### **50 - Tanzilli 1980**

They compared the ability of root-end filling materials to adapt to the dentine wall, using an SEM.

They compared; amalgam, heat-sealed GP and cold-burnished GP.

Amalgam has been shown in a number of study to have poor marginal adaptation with the dentine.

Heat-sealed GP provided even worse marginal adaptation than amalgam with various types of voids.

Cold burnished GP gave by far the best adaptation, 90% smaller voids.

They accept that just burnishing the cut end of the GP already present in the canal does nothing to remove microbes already in the canal and they cite a study being carried out which uses cold burnished GP being used as a root-end filling following root-end preparation.

#### **51- Bondra 1989**

An in vitro leakage study to compare the sealing ability of; high copper amalgam, copalite, IRM and EBA cement.

They used India ink as dye

The results showed that IRM and EBA cement leaked significantly less than amalgam or copalite. There was little difference between IRM and EBA.

#### **52 - Minnich 1989**

Looked at the seal created by cold burnishing the GP exposed after apical root resection, in both well and poorly obturated root canals (all cold lateral GP).

They reported that;

- in well condensed canals, cold burnishing resulted in a poorer seal, whereas
- in poorly condensed canals, the seal was improved by cold burnishing

### **53 - Dom 1990**

Retrospective success-failure study of amalgam, Super EBA and IRM.

The reported success rates were;

- Amalgam 75%
- IRM 91%
- SuperEBA 95%

Concluding that both IRM and SuperEBA provided significantly better success rates than Amalgam.

### **56 - Frank 1992**

Retrospective success-failure study of surgical endodontic cases treated using amalgam.

The average period of time following surgery was 15 years.

Success was based on the tooth being comfortable, functional, having no clinical symptoms, and the lesion having healed clinically or the apical lesion being explained as scar tissue.

58% were considered to be successful with 42% as failures.

### **57 - Andreasen 1993**

Presents 2 human cases where dentine bonded composite filling material was used as the root-end filling material.

Histological and SEM examination revealed- reformation of periodontium adjacent to the composite, including reformation of the lamina dura, inserting Sharpey's fibres and cementum deposited in intimate contact with the composite. This indicates that tissue regeneration including cementogenesis can take place on composite material forming a biological closure of the root canal.

### **58 - Torabinejad 1994**

First introduced the use of MTA, in a dye leakage study comparing it to amalgam, SuperEBA and IRM.

He reported that MTA leaked significantly less than the other materials

### **59- Crooks 1994**

They compared the effect of varying the Powder to Liquid ratio of IRM on the seal provided. The ratios tested were 2 to 6 g/ml.

They concluded that changing the ratio had no effect on the seal and therefore IRM of higher P:L ratio could be used which has the advantage of increased ease of placement and decreased setting time, toxicity and solubility.

### **60- Pitt Ford 1995**

Looked at the effect of using SuperEBA cement as a root-end filling in teeth before replantation in monkeys.

After 8 wks, the surrounding tissues were histologically examined. They found only a very mild response around 3 of the 8 roots.

This is similar to that reported from previous studies using IRM and considerably less than the severe response reported with using Amalgam.