

### Clinical Significance

The failure rates associated with implants were significantly lower than those associated with root canal treatment. However, multiple factors contribute to the outcome in each case. Two factors that adversely affect the outcome are older age and anxiety. Clinicians should take these into account when determining whether to treat the tooth with root canal therapy or extract it and replace it with an implant.

treatment failure. Having root canal treatment, older age, and anxiety remained significantly associated with failure.

## DISCUSSION

Patients who had root canal treatment had a significantly higher likelihood that they would experience failure than those who had implant therapy. Older patients had a higher risk of failure with both methods of treatment. In addition, anxiety had a significant effect on the outcome.

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# ULTRASONIC INSTRUMENTATION

## Enamel damage



### BACKGROUND

Periodontal therapy is designed to remove the dental biofilm, calculus, and any bacterial toxins present. Scaling is the method by which this is achieved and can be done either with hand instruments or with ultrasonic scalers. The ultrasonic devices are being used more frequently because they increase working efficiency for the hygienist, decrease chair time for the patient, and offer ergonomic benefits for clinicians. The primary mechanism employed by ultrasonic scalers is the mechanical chipping action of the oscillating scaler probe against the tooth surface. A risk of damaging the tooth surface exists with these devices. It's also possible that teeth with defects that can't be visualized clinically, such as enamel cracks and early caries, may be damaged to the extent that dentin and cementum are lost. Patients may develop hypersensitivity as a result. Composite resin restorations can also be difficult to visually distinguish from sound enamel, and ultrasonic scaling may damage the marginal integrity of cervical restorations. A study was conducted to identify the degree of enamel damage caused by ultrasonic scaling on teeth with various enamel conditions that can be difficult to visualize.

### METHODS

One hundred twenty extracted teeth were analyzed using a quantitative light-induced fluorescence-digital system, which can detect enamel defects, such as cracks, dental caries, and calculus. The 120 tooth surfaces were then divided into experimental groups based on enamel condition, as follows: sound enamel, enamel cracks, early caries, and resin restoration.

Early carious lesions were subdivided into those with carious opacity in the enamel when air-dried and those with a more extensive distinct visual change detected either when wet or dry. The ultrasonic scaling was done by an experienced hygienist under standardized conditions: a 15-degree angle or less between the scaler tip and tooth surface and lateral pressure of 40 to 80 g at the rate of 12 times/10 seconds. After the specimens were scaled, the depth of enamel damage was observed using a scanning electron microscope (SEM) and measured using a surface profilometer.

### RESULTS

Significantly deeper damage was found in the enamel cracks and early caries groups than in the sound enamel group. No significant differences were noted between the cracks and early caries groups. The sound enamel group showed no clear difference between the scaled and the untreated areas. The resin restoration group did not differ significantly from the other groups.

The damage depths were 37.63  $\mu\text{m}$  for the enamel cracks group, 26.81  $\mu\text{m}$  for the early caries group, 18.63  $\mu\text{m}$  for the resin restoration group, and 17.00  $\mu\text{m}$  for the sound enamel group. The SEM clearly showed the loss of enamel in the enamel cracks, early caries, and resin restoration groups.

## DISCUSSION

Damage to tooth surfaces is a possibility when ultrasonic scalers are used on teeth that have visually indistinguishable

### **Clinical Significance**

Dental hygienists often begin ultrasonic scaling without visually examining all the surfaces they will be working on. It's important to use some type of optical detection device to identify areas that have defects or calculus deposits before scaling. This will help to minimize any damage done during scaling and avoid complications such as hypersensitivity.

defects, such as early caries or enamel cracks, and with resin restorations.

Kim S-Y, Kang M-K, Kang S-M, et al: Effects of ultrasonic instrumentation on enamel surfaces with various defects. *Int J Dent Hygiene* 16:219-224, 2018

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