Kenneth Serota continues his look at the Endodontic Implant Algorithm

Dent is the most abundant mineralised tissue in the human tooth. In spite of this importance, over half a century of research has failed to provide consistent values of dentin’s mechanical properties. In clinical dentistry, knowledge of these properties is pivotal to any number of variables ranging from innovations in preparation design to the choice of bonding materials and methods.

The Young’s modulus (the measure of the stiffness of an isotropic elastic material) and the shear modulus (modulus of rigidity) are diminished by visco-elastic behaviour (time-dependent stress relaxation) at strain rates of physiologic (functional) relevance. The reported tensile strength data suggests that failure initiates at flaws. These flaws may be intrinsic, perhaps regions of altered mineralisation, upon tooth strength as a function of these altered forms of dentin is not well understood.

The long-term predictability of residual coronal tooth structure to function in a manner commensurate with the demands of the orofacial ecosystem, may need to be reassessed in light of observations that sclerotic dentin, unlike normal dentin, exhibits no yielding before failure and that the fatigue lifetime is deleteriously affected at high stress levels (18). Mechanisms for energy dissipation and crack growth resistance present in young dentin are not present in old dentin. Restorative methods and techniques, particularly as it relates to ferrule creation for endodontically treated teeth, may need to be amplified to address the fact that fatigue crack growth resistance of dentin decreases with age (19) (Fig 5).

There are primary causes that predispose teeth to fracture and secondary causes that predispose fracture after a period of time (20). Studies suggest that there are at least two forms of transparent or sclerotic dentin; a form associated with caries and a form associated with age-related changes in the root. The impact of altered forms of dentin is the sine qua non of the anatomy of the tooth. Any combination of vectorial stress concentration and high tensile stresses will predispose these teeth to fracture without an adequately engineered restorative design.

Addressing clinical problems

Understanding the mechanical properties of teeth is essential in order to address the most common clinical problem affecting all endodontically treated teeth, fracturing, which in spite of even minimal loss of tooth structure may be severe enough to necessitate removal (21-24). The hypothesis that dentin brittleness increases with diminished moisture content has been debunked; conserving bulk dentin is the sine qua non of fracture prevention.

Kutler et al reported that dentin thickness correlates inversely to post space diameter in the distal roots of mandibular molars (25). A #4 Gates-Glidden drill caused strip perforations in 7.5 per cent of canals studied. The authors recommend that Gates-Glidden drills no larger than a size #5 be used. After endodontic treatment, the forcuton side dentin thickness was less than 1mm in 82 per cent of the distal roots studied (Fig 4).

Back to the Egg; Part II

‘There are primary causes that predispose teeth to fracture and secondary causes that predispose fracture after a period of time’ (26). Ultimately, the shape of the post, the adhesive strength at the crown-tooth, core-tooth, and core-post interfaces, the magnitude and direction of occlusal loads, the amount of available tooth structure and the anatomy of the tooth. Any combination of vectorial stress concentration and high tensile stresses will predispose these teeth to fracture without an adequately engineered restorative design.

Reengineering

Reengineering negative treatment outcomes is a significant part of the contemporary endodontic oeuvre. The presence of apical periodontitis may or may not affect the outcome of initial endodontic treatment (27); however, there is a general consensus that apical periodontitis...
Toroidal and current studies (27-30) on the beneficial effects of bacterial interaction with dentin (31) and the effects of endodontic irrigants and medicaments on dentin, the variables associated with a successful outcome of periapical surgery (32, 33) and the etiology is independent of the root canal system, surgery is the most beneficial treatment (34). Non-surgical retreatment may still be indicated in these cases, especially when intracanal infection cannot be ruled out. Time constraints or financial pressures, should never be a factor in making surgery the first treatment choice (Fig 7).

Other options

The variables associated with non-surgical retreatment are myriad and treatment outcome studies in endodontics have been egregiously abused by those wishing to diminish the value of re-engineering natural teeth. Many studies have categorised material choice for the restoration as technical expertise. Evidence for surgical therapy appears to be more percolated by the literature. Surgical failure. The failure rate itself is high and predictable. While others have shown positive outcome studies should conclude based or controlled best evidence as technical expertise. Evidence is not to diminish the value of re-engineering natural teeth. Many studies have categorised patient, UK.
Flexibility is our Strength
Dispel the myths of flexible dentures and discover the truth with Valplast®

The real alternative to rigid partials and bridges

No tooth prep required
Thin cross-section
Metal and Acrylic free
C€ Class II Marked
Valid Statement of Conformity

- less chair side time
- Totally Non-invasive
- More patient affordable
- More aesthetically pleasing
- Hypoallergenic

Valplast® Alternate

The Valplast Alternative

FDC Flexible Denture Cleaner with disinfectant

Ideal for all acrylic appliances

ValClean Conventional Flexible Denture Cleaner

FREE Practice Innovation Pack
valplast.com

Life-time guarantee against breakage of the base material in normal use
The patient guarantee given with every genuine Valplast® Flexible Appliance is your guarantee of quality

On-line Patient Guarantee Registration

REFERENCES