Dentists in the know use Septodont Needles

The UK’s leading supplier of dental anaesthetic, Septodont, already bring you the high quality Septoject and Septoject XL needles and would now like to introduce a new development to Ultra Safety Plus.

Ultra Safety Plus syringe is a sterile, disposable and self aspirating syringe system with a pre-mounted needle. Its use means needle stick injuries can be virtually eliminated. With the option of a NEW single use handle (non sterile), Ultra Safety Plus is now 100% disposable.

For more information please handle (non sterile), Ultra Safety Plus.

Back to the Egg; Part II
Kenneth Serota continues his look at the Endodontic Implant Algorithm

Dentin 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 (20). 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 (21) (Fig 5).

There are primary causes that predispose teeth to fracture and secondary causes that predispose fracture after a period of time. (Fig 5). Endodontics is a component of an interdisciplinary process and a chain is only as strong as its weakest link.

Subsequent to any endodontic procedure, intensity of stress concentration and tensile stresses within an endodontaically treated tooth will depend upon (1) the material properties of the crown, post, and core material chosen, (2) the shape of the post, (3) the adhesive strength at the crown-tooth, core-tooth, and core-post, post-tooth interfaces, (4) the magnitude and direction of occlusal loads, (5) the amount of available tooth structure and (6) the anatomy of the tooth. Any combination of vectored 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 (3); however, there is a general consensus that apical periodontitis

or extrinsic, caused by cavity or post channel preparation, wear, or damage. There have been few studies of fracture toughness or fatigue (22-24). Finally, little is known about the biomechanical properties of altered forms of dentin subsequent to decay, the influence of irrigants, chemicals and the choice of curing techniques used for bonded restorations (25).

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 these forms of dentin is evidenced at the root–post, post–tooth interfaces, the adhesive strength at the ferrule, the amount of available tooth structure and the anatomy of the tooth. Any combination of vectored stress concentration and high tensile stresses will predispose these teeth to fracture without an adequately engineered restorative design.

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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. Fracture in spite of even minimal loss of tooth structure may be severe enough to necessitate removal (26).

The hypothesis that dentin brittleness increases with diminished moisture content has been debunked; conserving bulk dentin is the sine qua non of fracture prevention.

Kuttler et al reported that dentin thickness correlates inversely to post space diameter in the distal roots of mandibular molars (20). 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 #3 be used. After endodontic treatment, the forcution side dentin thickness was less than 1mm in 82 per cent of the distal roots studied (Fig 4).

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Fig 3. Two different retreated teeth, two different potential treatment outcomes. The root canal system of both teeth has been reengineered in its anatomic entirety; however, the treatment outcome after restoration for both is unlikely to be the same. Regenerative technologies incorporating mesenchymal stem cells derived from dental tissues may one day obviate the concerns.
torical and current studies (18-20).
Apical surgical “correction” of intracanal infections may iso-
late, but not eliminate, the re-
sidual microflora of the root ca-
nal space. It should therefore be
limited to situations where non-
surgical retreatment is judged
impractical.

With the range of sophisti-
cated equipment and material
in the conventional endodontic
armamentarium, this is a remote
consideration at best. When the
t echnique is independent of the
 root canal system, surgery is the
most beneficial treatment (18).
Non-surgical retreatment may
still be indicated in these cases,
especially when intracanal in-
f ection cannot be ruled out. Time
constraints or financial pres-
sures, should never be a factor
in making surgery the first treat-
ment choice (Fig 7).

Other options
The variables associated with
non-surgical retreatment are
myriad and treatment outcome
studies in endodontics have been
greviously abused by those
wishing to diminish the value
of re-engineering natural teeth.
Many studies have categorised
t eeth with caries, fractures, peri-
odontal involvement and poor
 coronal restorations as negative
for retreatment as a function of
the size of the lesion treated (18).

Levels of apical resection
(18) and the type of root end fill-
ing material make a difference in
 surgical treatment outcome
success (18); however, the dentin
 bonded composite technique and
the use of composite materials
has not been widely reported.
As these techniques d ome the
restored root face, sealing o f
the cut tubuli, they may prove to be
the most effective retrograde sur-
gical protocols of all. In regard to
periapical re-surgery, the litera-
ture is unclear.

Gagliani et al. (39) compared
periapical surgery and re-sur-
gery over a five-year follow-up
period. Using magnification and
microsurgical root-end prepara-
tions, the positive outcome for
primary surgery was 86 per cent
and 56 per cent for resurgery.
While others have shown posi-

Fig 5. Primary causes of fracture include
eccentric stress or loss of true
unbowed water from the root canal
lumen and dentinal tubuli, age induced
changes in the dentin and restorations
and restorative procedures. Secondary causes
of fracture include the effects of endodontic
irritants and medications on dentin, the
effects of bacterial interation with dentin
substrate and bio-corrosion of metallic
post cores.

Fig 6. A) Less porous, less hydrated and highly mineralised outer dentine. B) Pulp canal space. C) More
porous, more hydrated and less mineralised inner dentin.

Sensodyne Rapid Relief – rapid* and long-lasting**
relief from the pain of dentine hypersensitivity1,2

The strontium acetate formulation of Sensodyne
Rapid Relief forms a deep occlusive plug within
the dentinal tubules1,2 providing:

• Clinically proven relief.1,2
  Works in 60 seconds*2
• Proven long-lasting relief
  with twice daily brushing1
• A deep, acid-resistant occlusion1,2
• Fluoride to strengthen tooth enamel

The robust occlusion formed by Sensodyne Rapid
Relief is still maintained after an acid challenge4

Unoccluded
dentine
After treatment
and a 30 second
acid challenge
After treatment
and a 10 minute
acid challenge

In vitro study of dentinal tubule patency following an acid challenge (immersion in grapefruit juice, pH 3.3) applied after dabbing and massaging for one minute with Sensodyne Rapid Relief. Adapted from2.

Recommend Sensodyne Rapid Relief for rapid relief
from the pain of dentine hypersensitivity

* when directly applied with finger tip for one minute ** when used twice daily

Sensodyne and The Rings Device are registered trade marks of the GlaxoSmithKline group of companies.

J Clin Dent 2010. Accepted for publication.

“Give me something that works fast and I might be interested”

Patient, UK

Fig 4. A) Less porous, live hydrated and highly mineralised outer dentin. B) Pulp canal space. C) More
porous, more hydrated and less mineralised inner dentin.
The real alternative to rigid partials and bridges

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FDC Flexible Denture Cleaner with disinfectant

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A recent article by Assuncao et al (2009) describes engineering methods used in dentistry to evaluate the biomechanical behavior of osseo-integrated implants. Photo-elicitacity is used for determining stress concentration factors in irregular geometries. The strain-scan gauge methodology on dental implants provides both in vitro and vivo measurement strain under static and dynamic loads. Finite element analysis can simulate stress using a computer-created model to calculate stress, strain, and displacement. An analysis of the impact of mechanical/technical variables on osseo-integrated implant-supported reconstructions are beyond the scope of this publication; however, the replacement of lost teeth by implantation without exemption, provide a feeling of restitutio ad integrum. The means by which the restoration of the original condition at the “crown/root” interface is idealized will be detailed.

The structure and composition of teeth is perfectly adapted to the functional demands of the mouth, and are superior in comparison to any artificial material. So first of all, do no harm..." Anonymous

The final part of Kenneth Serota’s paper will be published in a future issue of Dental Tribune U.K.

References