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Frequently Asked Questions

Speaker: Professor Paul Abbott

Topic: Pulp responses following trauma and prevention of external root resorption

Q. How often does Transient Apical Breakdown occur, and what injuries are associated with this?

Transient Apical Breakdown (TAB) is not very common but probably occurs in around 5-10% of teeth that have had luxation injuries – with the number varying for different injuries. It probably occurs more often than we know because it can be difficult to distinguish between TAB and a tooth with an infected root canal system and apical periodontitis – since their radiographic appearances are very similar. Hence, some dentists may do root canal treatment instead of waiting and re-assessing the healing response over time. TAB tends to occur more often with lateral luxation – likely because of the nature of the injury and the way the apical part of the root scrapes across the bone where the alveolar cortical plate fractures however, it can occur with other luxation injuries also.

Q. Do we need to do root canal treatment when we see the pulp canal calcifying?

NO – calcification of the root canal is a very positive sign that the pulp has recovered after the trauma, and it is functioning normally. Calcification can only occur when the pulp is alive. The best way to think of pulp calcification is that it is a normal physiological response of the pulp to the injury.

Q. If a tooth does not respond to pulp tests after trauma, why do we not start root canal treatment?

It depends on the timing – that is, when the pulp tests are done. If done immediately after an injury, then the lack of response may be due to the injury – it has been compared with "shock". The neuro-vascular supply to the pulp is often damaged – especially if the tooth has been displaced (i.e. luxated). The neuro-vascular tissues can recover if the tooth is repositioned correctly and stabilized – plus if the tissues are given time to recover. The neural tissues are much slower to heal than the vascular tissues – hence, the response to pup tests may not return to normal for many months yet the pulp's blood supply has recovered, and the pup is functioning normally.

Q. Can other root canal medicaments be sued to prevent external inflammatory resorption (i.e. other than Ledermix Paste)?

Ledermix paste is the only corticosteroid-antibiotic paste medicament that has been researched and the published papers show that it is effective in preventing external inflammatory resorption if used immediately after the specific injuries discussed in the lecture. No other root canal medicaments have been researched for this aspect so it is not possible to say whether they will be as effective as Ledermix paste. However, if they do not contain the tetracycline (i.e. have another antibiotic), then they may not be as effective because the tetracyclines have some anti-resorptive activity. The main anti-resorptive action comes from the corticosteroid so other medicaments with the same corticosteroid (i.e. triamcinolone) may have some similar anti-resorptive activity but we do not have the evidence for this at this stage. The other root canal medicament that is commonly used is calcium hydroxide – but, as discussed in the lecture, this should not be used as the initial medicament due to its

tendency to lead to ankylosis and replacement resorption because the osteoclasts dominate rather than healing of the periodontal ligament via the fibroblasts.

Q. Why is the Ledermix paste left in the canal for long periods when trying to prevent external inflammatory resorption?

Periodontal ligament (PDL) healing takes at least 3 months – hence, the Ledermix paste is used until the PDL healing is likely to be complete, or close to completion. This reduces the chances of getting ankylosis followed by replacement resorption.

Q. Why do we need to change the Ledermix paste after 6 weeks in fully developed teeth, or after 4 weeks in incompletely developed teeth?

Studies on the diffusion of the Ledermix paste components (i.e. the corticosteroid and antibiotic drugs) have shown that after these periods of time there are insufficient amounts of the drugs being released from the remaining paste and diffusing through the dentine to reach the PDL – especially, the corticosteroid component which is essential for its anti-inflammatory and anti-resorptive activity. Diffusion through the dentine is more rapid in incompletely developed tooth roots due to the wider dentine tubules. The wider apical foramen also allows greater release to the periapical tissues so the supply of the paste in the canal is reduced more quickly. Hence, the medicament needs to be changed after 4 weeks rather than 6 weeks in these incompletely developed teeth.

Q. If a patient is having orthodontic treatment at the time of trauma, what should the Orthodontist or dentist do with respect to the orthodontic management of the patient?

It depends on the nature of the injury. If there is only a crown fracture, then there is no need to stop the orthodontic treatment. However, you would need to be very certain that there has not also been at least a concussion or subluxation injury of the tooth – since these injuries can affect the neuro-vascular supply to the pulp. In such cases, the orthodontic treatment should be stopped and not re-commenced for at least 3-4 months. The same applies to any tooth that has been displaced (any form of luxation or avulsion) – that is, stop all orthodontic treatment on that tooth for at least 3-4 months to allow time for the periodontal ligament to heal. I prefer to wait even longer – such as 6 months to ensure complete PDL healing and to be able to evaluate the tooth for any signs of resorption. If any resorption is occurring, then the entire treatment plan for that tooth (and patient) need to be re-evaluated – that is, the orthodontic treatment plus the endodontic, periodontal, restorative, etc. treatment.