Cleaning canals

Dr Michael Sultan discusses how sodium hypochlorite is his irrigant of choice

There are now so many systems for better faster and more efficient preparation of root canals that sometimes the real biological focus of treatment is somehow overlooked.

The issue is not how quickly a canal can be prepared using the latest Nickel-Titanium (NiTi) systems but whether the canals are actually clean. It is very easy to get seduced by a beautiful shape on a radiograph but if the canal was not fully disinfected first the whole system will fail. The purpose of root canal treatment is to remove the inflamed tissue and ultimately to seal the canal system. Treatment is more complex in a non-vital tooth where the bacterial control is the key to success.

Pleasing the patient

When patients come to see me with a failing root canal, they are often disappointed and want to know how and why their dentist has failed. I usually show them the excellent program tooth atlas (www.toothatlas.com). This shows three-dimensional images of teeth gained from micro scanning. It highlights to them that canals are not simply straight tubes going from the crown to the apex but are complicated structures often interlinked with multiple branches. Looking at these images, I am sometimes amazed that the success rates that we quote to patients are so high when these canals are so difficult. I also think that if the patients were forewarned and advised that the prognosis of a tooth was 80 per cent and not 100 per cent a lot of problems could be avoided.

Relying on irritants

Looking at the shape of canals, it becomes clear that there is no way a stainless steel file can ever make a start in preparing it fully. Even the nickel titanium files will be ineffective, so we must rely on our irritants to really clean canals. They do this by dissolving the organic pulp tissue, killing and removing bacteria and dissolving the inorganic blockage. They ensure making space for our irrigants to get in.

Use of a rubber dam is mandatory, not only for medicolegal to prevent inhalation of files and protect the airways, but to aid in maintaining a clean and dry field. The whole purpose of root canal treatment is to clean the canals, therefore fighting with a large tongue in a field soldered with saliva is a waste of time. A mouthful of bleach is also not particularly desirable either.

The irrigant of choice is still sodium hypochlorite. This is a very cheap solution which has the effect of dissolving pulp tissue and killing the bacteria however just as important is the flushing effect which will help in the removal of debris and stop canals getting blocked during instrumentation. This by itself will prevent ledging and other procedural errors so that the canals can be really cleansed.

Bleach concentration

There has been much debate over the years as to the concentration of bleach that should be used. The Scandinavians have traditionally gone for concentrations of 0.5-1 per cent as they are very cautious of the tissue toxicity and possible problems of bleach whereas the Americans have gone for 5.25 per cent arguing that this is the most effective solution as a tissue solvent. We generally use 2.5 per cent (British sense of compromise), but can really increase its effectiveness either by using ultrasonics or by heating it. Normally we keep the bleach in a bottle warmed and pressure flush the solutions rather than letting the solutions passively sit in the canals.

The bacteria in a canal are not static, so flushing will not remove them but are found in biofilms-organised plaques of tissue. These biofilms need to be disrupted so we need to actively plane the canal walls with instruments whilst getting in large volumes of irrigants ideally activated by ultrasonics.

Using NiTi instruments

One of the problems of using NiTi instruments is the false sense of security it gives us by so rapidly enlarging canals. Firstly, it doesn’t mean that oval canals are fully prepared as the NiTi instrument tend to be quite centred so much of the canal walls are untouched and secondly the preparation is so fast that our irrigants have not had time to work. Ideally the minimum soaking time with sodium hypochlorite should be 30 minutes to ensure that the tissues have been dissolved from all the nooks and crannies of the tooth and the bacteria killed.

Don’t make mistakes

It must not be forgotten that sodium hypochlorite is a very toxic fluid that if extruded out of a canal can cause severe complications. It is uncommon following a lecture to get a phone call from one of the audience in a panic saying that the patient is in severe pain and is having an allergy to the hypochlorite. What has normally happened is the sodium hypochlorite has been forced out of the canal into the surrounding tissues.

The result can be startling and dramatic. The patient might well scream out in pain and there will be a profuse bleed there is a possibility of paraphresia and later very marked bleeding. Management is very much to stay calm and to make sure that will be the only one in the room doing so. Local anaesthetic has to be topically applied and in some cases mid-sedation may be required. Ideally the canal should be rinsed out with saline and the contents aspirated to dilute the irritants. Antibiotics are seldom required but are recommended if the canal was very infected and had been anaerobically prepared. The patient should be advised about pain control and the most effective is alternating 400mg Ibuprofen with 500mg Paracetamol Shurly. The patient should also expect severe bruising and should be advised the use of ice packs.

Down to poor management

I have known of patients leaving practices due to hypochlorite accidents but most of the problems are due to poor management. The effects of the sodium hypochlorite is self limiting with return to normality at about two weeks and there are cases studies which detail the effect of when an Inferior Dental block was inadvertently given with bleach rather than with local anaesthetic.

The initial problem occurs when using the high concentrations of hypochlorite 5.25 per cent. This we need for its tissue dissolution affect but it is highly toxic. In addition we know that fluids do not flow very well around a root canal so to get a good flow in the apical area the needle has to be within 2mm of the apex. Some precautions therefore have to be taken.

Firstly, the needle should never bind in the canal but should be kept moving. This prevents wedging and possibly forcing the fluid through the apex. Ideally the needle should be safe ended and exiting to stop apical flow. Leuer locking needles are vital as we have all seen needles fly off syringes under pressure - bleach coming in contact with expensive clothes can be costly at best and at worst bleach in contact with eyes can be very irritating. Knowledge of the needle diameter is also important - 25 guage is equivalent to a size 60; 27 to a size 40 and 28 to a size 30.

Take it slow

The bleach should always be injected slowly and some advo- cate using the forearm rather than the thumb as they feel that less pressure is exerted by this means. I am always very cautious with short teeth and immature teeth with open apices, and tend to place a rubber stop on the needle so that I always know where I am. Often we treat very sclerosed teeth and I am cautious if I think I have gone off target in searching for a canal and see bleeding. Rather than reach for irrigant, I usually check with an apex locator to check that the something is coming from a true canal and not one of my own making. Sodium hypochlorite is still the irrigant of choice but it must be used with care and caution and as always avoidance of any problem is better than having to manage the sequelae.