Understanding sonic-powered irrigation

By Dr Vittorio Franco, Italy

Thoroughly irrigating the entire root canal system—including isthmi and lateral canals—is important for success of endodontic treatment. Research has shown that sonic activation of irrigants offers significant improvement in cleaning efficacy, since it removes considerably more debris and smear layer than needle irrigation. Besides cleaner root canals, it increases the effectiveness of disinfectant solutions to support long-term success. We spoke with leading Italian endodontist Dr Vittorio Franco about his daily irrigation protocol, passion for endodontics and experience with EDDY, a sonic-powered irrigation tip.

What do you like most about endodontics? Nothing is clearly visible in endodontics, so one has to constantly adapt one’s strategy. In the end, one must discover the anatomy, understand the difference between one's imagination and reality, and find a good treatment solution. Many recent dental studies have confirmed the importance of retaining the natural dentition and thus of endodontics as opposed to implantology. Now is the right time to be an endodontist. We now have more possibilities for preserving natural teeth and that is a wonderful thing.

Why is proper rinsing so important, and how can one see when the canal has been cleaned properly? I think that the cleaning of the canal is the most important aspect of an endodontic procedure. Of the three major steps, shaping and obturation are less important than eliminating bacteria from the root canal. The main purpose of endodontic treatment is to clean the canal. Otherwise, root canals can become a good environment for bacteria to grow in. If the dentist retains vital tissue that will then become necrotic, it will facilitate bacterial growth. The main reason for retreatment is the presence of an infection due to poor cleaning in the first place. There are many published studies on the time required for proper irrigation. We have many variables to consider—contact time, refreshment of the solution, amount of tissue/bacteria, volume, temperature, shear stress and so on—so we cannot standardise this process and final result. There are studies that say one needs 30 minutes to achieve the complete elimination of bacteria, but they did not consider activation possibilities. If you ask me how I decide when irrigation has been sufficient, from my point of view, the only clinical way to determine whether the irrigating solution is working is from seeing bubbles in the solution. That means that the solution is reacting with something inside the root canal system—obviously if there is no communication like a large foramen or perforation.

If bubbles stop being produced, the clinician can stop cleaning the canal.
because the sodium hypochlorite is probably no longer reacting. There may still be something inside the canal, but the solution has achieved its best result. That would be my only suggestion.

What is your irrigation protocol?
I start with 5 per cent sodium hypochlorite, which I use for the entire shaping procedure. At the end, I use 17 per cent EDTA, activate it and remove it quickly. Then I use sodium hypochlorite again and activate it up to four times depending on the case. For necrotic cases, I wait until I see the reaction of the irrigant and the substrate. After removal of the sodium hypochlorite, I use 95 per cent ethanol to dry the canal. I do not use citric acid and chlorhexidine, but prefer EDTA to remove the smear layer.

How did you activate the irrigant before you began using EDDY?
I tried all activation tools before EDDY, as irrigation activation has been one of my favourite methods ever since I was introduced to it. Before EDDY, I used passive ultrasonic activation and still use it sometimes in my Italian practice. Now, I use EDDY for most of my cases.

How important is it to have a flexible tip?
EDDY is quite different from passive ultrasonic tips. With EDDY, one can combine two different things. First, one has an activation protocol that some studies have shown is at its best result. Second, one has a gentle mechanical action on the canal walls. This is why I love EDDY. One can work on the wall and the shear stress seems to be impressive when using it. It is also very safe.

What do you think about the polyamide material from which EDDY is made?
It works very well. It is a very good material for working after shaping, as one cannot damage the canal wall. Also, the possibility of tip fracture is low if one works inside the canal.

How did you learn about EDDY?
I tried everything in terms of activation. The manufacturer asked me to test it before its impending launch in Italy and I was happy to do so. At first, I tried it with great care—and it instantly proved to be effective. I inspected the walls of the canal and was impressed by the level of the cleanliness of the walls. With EDDY, one can work in all canals, and sometimes I like to work only with the tip in large and wide canals. I do not use a shaping instrument, but just one file for length determination and then continue with EDDY. One can also remove debris and the smear layer easily by activating the solution through the device. Every dentist will appreciate how EDDY works under the microscope.

How does EDDY work, and how long does the activation need?
I use EDDY in the same way as passive ultrasonic irrigation, applying three to four cycles of 30 seconds for each canal. I help the EDTA to contact the dental surface with EDDY for 15–20 seconds. After this, I activate every sodium hypochlorite rinse for 30 seconds. The number of cycles depends on the kind of canal. If I think that there is some necrotic tissue or a complicated anatomy, I use more than three cycles. If it is an easy case, I still use three cycles of activation.

Would you recommend EDDY?
Absolutely. It is a great solution, being inexpensive, easy to use and effective. One can effectively promote the contact of the irrigant with the dental tissue. This is one of the main ways in which the irrigating solution should work. One can achieve a very impressive shear stress so that is one of the best ways to activate the solution and clean the canal.

EDDY requires an air scaler. Should this be an obstacle to making the switch to this device?
Honestly, buying an air scaler is not a high-cost investment. As a general practitioner, one can use an air scaler for a number of applications, including prophylaxis, endodontics, periodontics and minimally invasive therapy. Personally, I use it for bone surgery. It is not as expensive as a piezoelectric surgery unit or a laser. I think that the cost benefits of EDDY and an air scaler are fantastic.

Thank you very much for the interview.
Single Visit Endodontic Treatment for Calcified Lower Centrals

By Dr Mostafa Anwar, Egypt

Single visit root canal treatment (RCT) is becoming more popular and achievable among patients nowadays. Lots of reasons lie behind, such as new advances in tools and devices used for RCT, advanced techniques in activation of irrigation for proper disinfection, decreasing incidence of post operators, lack of time due to work responsibilities by patients who can’t come several times, as economically efficient solution for both dentist and patient, among others. This leads to a high demand for single visit treatment which is becoming a trend among patients, especially professionals.

This case report shows how single visit treatment can be done easily, even in complex cases, as long as the proper tools, devices and equipment are available.

First Contact with the Patient

A 57 years old female came to our dental clinic seeking for a smile makeover due to protruded upper and anterior teeth. The patient was advised to opt for orthodontic treatment at first, but refused due to special reasons. The patient decided to go for aesthetic treatment, which will be crowning the upper and lower anterior teeth. After performing a smile analysis and reviewing the required radiographs, the prosthodontist referred the case to my clinic for doing RCT of the lower anterior teeth. An IOPA Radiograph (Fig. 1) was taken using CDRe lite by FONA for the lower anterior region, but focusing on the lower centrals which seems to be the challenging case here, not to mention that the patient had a shallow floor of the mouth. Note that there is a Type III root canal morphology, according to Vertucci’s classification (1 canal coronally then 2 canals creating dentin island, then rejoined to a single canal at the apical third of the canal), as shown in the figure, where this configuration will be noticed later in tooth 31.

Endodontic Treatment

Before starting this treatment, it was planned that the Lower Lateral and Canines will be done first, then continue the treatment, leaving the lower two centrals for the last stage. This decision was confirmed during the access cavity step, where the two canals showed calcification at the coronal third and no canal negotiation could be done, as illustrated in Figures 2 and 3 with the help of a clear radiograph.

Using Unitek Loupes of Magnification x4, it was again confirmed that these two teeth will need more steps for RCT, so now the case was confirmed radiographically and clinically under magnification. The decision was taken and RCT was done for the lower laterals and canines on both sides using X-Safe files by Micro Mega for mechanical preparation and using a standard rinse protocol of 3% NaOCl, 17% EDTA and 2% CHX, with agitation of irrigation using passive ultrasonic irrigation.

Once the RCT of the above-mentioned teeth was done, negotiating the canals of the lower centrals started. Newton ultrasonic device by Acteon and E200 tip were used to locate the calcified canals and explore the floor of the pulp chamber but there was still no sign of the canal, although the tip was nearly 5 mm below the cervical line. So, I decided to go for canal negotiation guided by radiography, where I take OPTA X-ray with 2 differently-sized sharp explorers placed in 2 different directions (labial and lingual) to decide where the ultrasonic tip will be directed. As the rubber dam was already in place, it was challenging to know if the proposed direction of the ultrasonic tip is in the right path or not, due to the superimposition of the clamp on the tip of the explorer. Here, I decided to remove the clamp while keeping the rubber dam sheet in place, tied by dental floss for better radiographic interpretation, as shown in Figures 4 and 5.

Now, the procedure became easier. According to the radiographs taken (Fig. 5 I found that I have to trough in the middle, between the tips of the two sharp explorers. More thorough was done and the canals were negotiated and prepared, using 3Shape rotary system till TS2 (for negotiating the mechanical preparation of the canals, the type III canals of each mandibular central joined and became a single canal. Then a master cone X-ray was taken before the obturation step and the clamp was put back in place, as shown in Figure 6.

In the next step, the teeth were ready for obturation, which was done using TotalFill bioresorbable sealer by FG and gutta-percha cones of size 25/0.06. After obturation, a post-operative radiograph was taken to confirm the quality of the RCT, as shown in Figures 7-8.

Result

The patient had her RCT of the lower anterior teeth completed in a single visit. Analyses were prescribed for the patient in case of post-operative flare up. Then, she was referred to the prosthodontist who will further complete the treatment plan. She was satisfied with the RCT and was happy that all teeth were done in such a short time.

Conclusion

This clinical case shows that if we have enough knowledge of the latest dental trends and advanced equipment, we can provide our patients the required treatment in one visit, even in the complex cases that would otherwise require multiple appointments.

CDRe lite helped diagnose the case correctly first, allowing to go through the next steps of the RCT quickly and smoothly. Moreover, the tools provided in the FONA imaging software aided in getting more enhanced images with minimal radiation dose, especially in this case where many radiographs were taken for diagnosis and treatment.

The New Swiss Endo Academy Training Centre

FKG Dentaire is proud to announce the opening of its new Training Centre in Dubai

By FKG Dentaire

FKG Dentaire SA (La Chaux-de-Fonds, Switzerland), leader in innovation and production of high-tech rotary Ni-Ti systems, is highly committed in worldwide Continuing Education for dentists. After having set up its Training Centre in 2014 (Swiss Endo Academy), based at the company’s headquarters, FKG Dentaire is proud to announce a new Continuing Education Centre, located at its representative office, FKG Dentaire DMCC (Dubai, UAE).

This Centre exhibits the latest generation of high-end equipment (operating microscopes, phantom heads, ) and offers a real simulation laboratory, allowing general dentists and specialists, to enhance their clinical experience while exposed to the latest endodontics Ni-Ti systems, more particularly to 3D Ni-Ti treatments range: the XF-Endo® system.

The centre of the Swiss Endo Academy in Dubai has been inaugurated on February 5th, just before the AEEDC congress, in the presence of the top management of the mother company and the entire SHDA team of FKG Dentaire.

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The New Swiss Endo Academy Training Centre

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Practice Limited to Micro-Endodontics
As a practicing endodontist and a clinical endodontic educator for more than 30 years, the most frequent question I am asked about technique is: “Is it predictable?” While every dentist wants his or her endodontic treatment to be easier, more efficient, simpler, and profitable, in the end, it is predictability that trumps all considerations.

When I am asked the question “Rotary vs Reciprocation: How Do I Choose?” my answer is “Rotary and Reciprocation,” because the predictability of both methods is similar; they are just different in sequence, purpose, and motion. This article should help to explain these critical distinctions of Rotary vs Reciprocation so that the clinician is aware of these differences, understands his or her options, and makes the best choice for his or her particular practice and patient needs. It is an invitation to be self-educated about your best way to produce endodontic preparations that can be easily obturated.

### Rotary vs Reciprocation: “How Do I Choose?”

#### Rotary

**Definition:** “Inside-out” concept: e.g., ProTaper Gold® systems. Relies on the clinician’s commitment to progressing through a sequence of shaping and then fining instruments.

**Sequence:** ISO standard to colour agency is followed with optional sequential generators.

**PurPOSE:** PFS (F) is pulled out away with the debris to the coronal third. PFS to F (subsequent) cuts away remaining paper in the root apical, and PFS to G (yellow) curve the perfect shape in the apical third. Followed by PFS to G (yellow) with rotary movements.

**Motion:** Shape the “Y” by changing the “Y” direction, in the loop, and the exposure of the Sharpe, “Y” and “Y” motion, to length. The “Y” shows the cutting area and the “Y” length.

**Advantages:** The “Y” shows the length of the file, the “Y” shows the exposure of the file, the “Y” shows the cutting area, and the “Y” shows the “Y” length. All the “Y” shows the “Y” length.

#### Reciprocation

**Definition:** “Counterclockwise” concept: e.g., WaveOne Gold®外形 uses a single file to produce a similar predictable treatment sequence.

**Sequence:** Only the file (WaveOne Gold) is used in a repetitive sequence.

**PurPOSE:** The main idea is that it has a radial geometry to PFS (G) into the entire length of the root canal preparation using a multipurpose technique.

**Motion:** Shape the “Y” by changing the “Y” direction, in the loop, and the exposure of the Sharpe, “Y” and “Y” motion, to length. The “Y” shows the cutting area and the “Y” length.

**Advantages:** The “Y” shows the length of the file, the “Y” shows the exposure of the file, the “Y” shows the cutting area, and the “Y” shows the “Y” length. All the “Y” shows the “Y” length.

The Greatest Variable

In all of dentistry, the greatest variable is always the clinician. While product and operatory infrastructure play a significant role, the answer to rotary vs reciprocation depends mostly on technique, and technique depends on the clinician’s skill, care, and judgment.

**Q: How Do I Choose?**

**A: Take the Challenge**

Here is a simple and revealing test for each clinician to determine his or her own preferred “Rotary vs Reciprocation” choice. Speak to your local Dentsply Sirona sales representative and explain to them that you want to do this “challenge” test: Purchase enough Rotary files (ProTaper Next® or ProTaper Gold™) and enough Reciprocation files (WaveOne® Gold) to treat 10 endodontic patients with Rotary and 10 patients with Reciprocation. You could treat every other patient alternately with Rotary and Reciprocation, or you could treat 10 patients in a row with Rotary and then 10 with Reciprocation. Reverse the order if you prefer. You can use this same telltale test for comparison with your current preferred system.

Take good notes about what worked and did not work. Your answer for Rotary vs Reciprocation will be right in front of you!

Closing Comments

Using predictability as your critical benchmark distinction, your own testing will reveal your best choice of “Rotary vs Reciprocation.” The result: clinical confidence, consistency, and control. The marketplace has actually already answered the question of Rotary vs Reciprocation. The market’s answer: “Rotary and Reciprocation.” Those clinicians who have done their own in-house, controlled homework and testing will be happy with their answers. Now it’s your turn!

Dr. West is a co-inventor of the ProTaper® and WaveOne® Gold endodontic shaping systems.

### References

http://www.dentistrytoday.com/articles/63-articlesmagazine/Endodontics/xor6-rotar

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Founder and Director of the Center for Endodontics, Dr. John West, is recognized as one of world’s premier educators in clinical & interdisciplinary endodontics.