Some of the major advancements in Dentistry took place in the 1960s and 1970s. It was shown that gingivitis and periodontitis were diseases caused by bacteria (SA) from the bacterial plaque, which is nowadays referred to as biofilm. In its initial phase, it is a reversible disease, and it can also be treated in more developed stages. Also, in certain situations, periodontal tissue can even be recovered.

In the 1970s, studies showed that acidogenic bacteria, particularly streptococcus mutans, caused caries. It was also concluded that in order for carious lesions to occur, the presence of three factors was necessary: acidogenic bacteria, saccharose (sugar) and caries-sensitive teeth.

Researchers also observed that fluoride alone, when incorporated to teeth in the form of fluoride apatite, could make them resistant to carious lesions. From then, a crusade began to provide fluoride to the population, either by means of fluoridated water supplies, fluoridated toothpaste or dental surgeons themselves, who began to apply fluoride on their patients’ teeth.

Based on these scientific findings, large equipment manufacturers began to develop research on biofilm and dental calculus removal, so as to make it fast, safe, efficient and always based on biosafety principles.

In the 1980s, DABI ATLANTE began its research for the production of an ultrasound scraper, PROFILAT, a machine that rendered important services to Brazilian dentistry. However, the company wanted to produce a type of equipment that could remove biofilm even more easily. Many different methods were studied and the sodium bicarbonate jet was chosen as the best option. After the publication of more than twenty scientific studies on air pressure, water and bicarbonate flow, Profident was launched. Right at the first CIOSP, the equipment became a market leader due to its efficiency, practicality and low operational cost based on biosafety concepts.

Later, Profi was launched, and periodontists were the ones who became most interested in the equipment. In that decade, they were mostly in charge of removing calculus and bacterial plaque as well as teaching clients how to brush their teeth. Nevertheless, there were exceptions, such as general practitioners and dental pediatricians who were interested in this aspect of prophylaxis and prevention.

The ultrasonic equipment Profilat used the magnetostrictive system as a system for ultrasonic vibrations. It consisted of copper plates that were parallelly welded on the handpiece. When submitted to an electric field oscillating at 25,000 cps, such energy was mechanically transmitted to the equipment’s tips.

Research led DABI to use ceramic pads, which, under high pressure, could more efficiently and constantly change the energy from a magnetic field into mechanical vibrations at the active tips of instruments. Such phenomenon, which is referred to as piezo-electric, has been used in submarine sonars and other types of machines since World War II.

Further research on this system led to the development of new ultrasonic equipment. DABI ATLANTE then launched Profi II Ceramic, which has been highly efficient up to this day. With new features, Profi III Bios is then developed and made available on the dental market. The major alterations were: the use of a peristaltic pump, the endodontic function and the equipments digitalization, which enabled the use of barriers and
Contribute to biosafety in the dental office.

At the beginning of the present century, all dental surgeons began to dedicate to and care about calculus removal and biofilm control in their patients. Periodontists were most concerned about such issue due to periodontal diseases and periodontal sacs that must be eliminated. Subgingival calculus is more difficult to be diagnosed and removed, but all dental professionals are alert since these bacterial deposits on the teeth interfere with the result of all types of treatment, regardless of their area of specialty.

In 2008, DABI innovated again and presented its new Profi line. The same excellence level that has always been a feature of its equipment and that is a reference for quality on the dental market, but now with more resources, technology, precision and efficiency for use in all fields or modern Dentistry.

The new line comprises models PROFI NEO and PROFI CLASS, which, in addition to the ultrasound and the bicarbonate jet, also have a peristaltic pump and a coupled irrigation solution reservoir, a resource that improves the post-operative period. Model PROFI CLASS features, as another differential item, a membrane-type digital keyboard with programmable power and irrigation solution outflow as well as the exclusive “Diamond Function” key for use of Dabi Restoration Tips (diamond tips), for maximum productivity of such tips and tooth preservation.

**SODIUM BICARBONATE JET APPLICATION**

The sodium bicarbonate jet initially aims at removing and controlling non-mineralized supragingival biofilm in prophylaxis procedures. Application must be performed after coating bacterial biofilm, as for instance, using malachite green or another marker selected by the dental professional. The new Profi line provides a more concentrated bicarbonate flow, which makes it more efficient. The jet can be correctly directed to the area from where biofilm must be removed without discomfort to the patient’s soft tissue during prophylaxis.

The jet must be directed at a distance ranging from 4 mm to 1 cm and at an angle of approximately 45 degrees in relation to the tooth’s surface. Never position the jet at a larger distance than that, otherwise it will lose its efficiency and spread strong spray in the dental office, thus impairing suction by the auxiliary unit.

**ULTRASOUND APPLICATION**

The ultrasound is a piece of equipment that easily removes calculus; nevertheless, students beginning to use it may make mistakes that will apparently not compromise the procedure, but which will delay work and sometimes make the procedure difficult and even inefficient.

For educational purposes, the subject can be divided in three basic points:

1. **Supragingival Calculus**: it is usually whitish in smokers and dark in circumstances resulting from diet type. By using the correct tip indicated for supragingival calculus (Perio Supra Tip, for instance) and by applying the active tip on the limit between the calculus formation and the tooth surface, calculus will be removed without any difficulty.

2. **Subgingival Calculus**: it is usually dark and more adhered to the teeth. The subgingival tip (Perio Sub Tip, for instance) is used, and it is also applied between the tooth and the mineralized deposit. In this circumstance, a novice professional may face some difficulty since the contour of such calculus formation is not always visible. Hence, the application of the active tip does not reach the limit area between the calculus and the tooth, which may hinder and even prevent the professional from effectively removing the calculus formation.

3. **Pain when applying the ultrasound**: If the patient feels pain during ultrasonic application, which occurs particularly in the case of girgival retraction and subgingival calculus, the patient can be anesthetized. In order for a professional to develop good supra and subgingival calculus removal skills, it is essential that the patient remain comfortable and keep his/her head still. The difference between the points from which calculus is easily removed and those that are slowly worn out by the professional can be measured in millimeters.

Hence, firstly training on an appropriate manikin is advised. Also, when performing on patients, calculus removal should always take place under direct view.

In order to remove subgingival calculus without direct view and in a closed field, a lot of skill and experience is required so one can notice the limits of the tooth and the limits of calculus by touch. Under these circumstances, the most delicate tips in the collection supplied by the manufacturer must be used.

Such sensitivity to touch would not be effective to any professionals if it were necessary to apply a lot of strength on the handpiece for calculus removal, that is, it is not the professional’s strength that removes calculus, but rather the power of ultrasonic vibration.

A simple test to confirm the abovementioned information is taking an empty can and applying the ultrasonic tip on its surface. In a few seconds, the tip will perforate the can.

**PERIODONTOLOGY**

Ultrasound has been used in periodontology since the 1960s. It all began when with the well-known Cavition, but that equipment was criticized by many periodontists, who never stopped using their manual scrapers.

In fact, DABI and its researchers did not launch Profilti in the 1980s with the purpose to replace manual scrapers, but with the purpose to replace manual scrapers, and allow the surgeon to work in a semi-automatic mode, with a lot of comfort and a lot of efficiency.
Ultrasound has been researched, used and discussed in endodontics since the 1950s, when the first ultrasound devices were launched. It has been discussed since last century because endodontists have always wanted to count on resources that can make clinical work easier and faster. Ultrasound is one of the technological solutions for such desire. These professionals use their valuable time to find openings to root canals, enlarge and widen root canal ducts and properly clean them, particularly those that are curved or atresic. Nowadays, time is a luxury and, therefore, a machine that can help them save time is of utmost importance.

Dabi Atlante, which has always followed the desires and anxieties of endodontists, launched Profi Neo and Profi Class in 2008, two pieces of equipment that have brought encouragement to daily practice. Profi Neo and Profi Class feature a complete endodontics system which allows for time saving, ergonomy and, above all, quality of work and life. These equipment items can be very easily used as their panels are simple and the functions are clear. Both of them enable the dentist to control work power as well as the presence and amount of irrigation solution. It is also possible to interchange the four tips (metal tips), each of which has a specific purpose.

**Power**

Ultrasound power consists in the electromagnetic field power that is generated on the ceramic pads inside the handpiece. This effect, denominated as piezoelectric, moves the tip. The higher the selected power, the greater the vibration power; however, work must be performed within the biological limits of such canals, which are generally curved or atresic. The physical limits of files must be respected, and remember that the vibrational effect of tips will produce heat within the canals. Therefore, in order to clean canals, power of approximately 30% of the equipment’s capacity must be used with abundant irrigation so as not to heat their interior (possible injury to periodical tissue) and to prevent files from breaking.

For lateral condensation in root canal filling, the equipment’s power must be kept at approximately 30% or 40%, since slight heating is desirable, but not overheating, which would hinder filling.

**Irrigation**

One of the greatest advantages of ultrasound is the cavitational effect that has already been mentioned by Dr. Sergio Lima. The cavitational effect occurs when ultrasonic waves, in a liquid medium, generate such fast mechanical waves that micro bubbles are formed. These micro bubbles break so quickly that they lead cells, bacteria, DNA, hemoglobins, etc to break, thus strongly reducing the number of microorganisms. Additionally, these waves exert a dissolving action on the surfaces with which they make contact. The cavitational effect increases the dissolving power of sodium hypochlorite fivefold.

Profi Class and Profi Neo feature a coupled solution reservoir and functions for selecting the solution amount to be used (levels 1, 2, 3 or without irrigation). This allows the professional to choose which irrigation solution will be used and what its amount will be.

The literature reports that the abundant irrigation obtained from the ultrasound is one of the major advantages of this technique. By associating irrigation abundance with the abovementioned effects, it is concluded that excellent cleaning of the root canal system can be achieved by using the ultrasound.

**Biomechanical Preparation**

Biomechanical preparation by ultrasound is performed using the Endo G tip (insert picture) to which a file is adapted. This process is relatively simple and inexpensive. Conventional Flexofiles can be used by removing their cables and and adapting them to the tips during the procedure. It is fundamental to remember that the files used in ultrasound devices must always work freely inside the canals and that they do not produce the opening in depth, but always in laterality. During biomechanical preparation, ultrasonic files are only used after the initial widening and odontometry. A conventional number-15 file should be used, always with abundant irrigation.

Some advantages of the biomechanical preparation cited in the book Endodontia: tratamento de canais radiculares: principios técnicos e biológicos (Mario Roberto Leonardo & Paulo Azevedo: Artes Médicas, 2005) are: removing the pre-dentin layer and debris from inside the canal, allowing better cleaning of root canals; reducing working time, hence reducing operator fatigue; achieving greater wearing of dentin walls, thus allowing greater root conicity and facilitating filling.

**Filling**

By using the Endo G tip (insert picture), a new resource for lateral condensation of gutta-percha cones is obtained. By interrupting irrigation, which is possible for Profi Class and Profi Neo, space is laterally created in order to place accessory cones with the advantage of creating heat through the tip, thus laterally condensing gutta-percha cones in a compact, homogeneous and radio-opaque fashion.

**Removal of poles e crowns**

In order to remove posts or metallic cores, the Endo N tip, will work with medium high ultrasonic power and abundant irrigation. This will help the dental surgeon since the ultrasonic vibration will take cement to the fracture, thus facilitating post removal without heating it. For crown removal, the Endo C tip will work in a similar fashion and break cement adherence.

**Re-Treatment**

By using the Endo G tip (picture), it is easy to remove gutta-percha cones. When this tip is applied with high power and is activated inside the canal, it creates space in the filling material for placing other instruments and dissolving. Work time is reduced and treatment quality is improved.

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**ENDODONTICS**

Drª. Carolina D. Lima

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IMPLANTOLOGY, SURGERY AND PROSTHESIS

There are numerous situations in which implantologists and prosthodontists have to perform procedures in a patient’s mouth prior to its being submitted to appropriate antisepsis for such procedures. Various studies have shown that only mouthwashing with antiseptic solutions is not enough to achieve the higienization levels required by major procedures to be performed on surgery patients. Such studies have shown that not only the use of antiseptic solution is required, but so is the discerning removal of biofilm (bacterial plaque) and subgingival and supragingival calculus in order to accomplish ideal prophylaxis in the mouth and the safe performance of all surgical and prosthetic procedures. The new Profi line has been designed to give support to implantologists and surgeons in all phases of their work.

Prior to beginning anesthesia for surgery, it is necessary to coat the biofilm by using malachite green, for instance, since it would be fearful to expose bone tissue to a contaminated area during implantation. Therefore, in case biofilm exists, it is necessary to use the sodium bicarbonate jet. In the new Profi line, the flow is more concentrated, which prevents dispersion in the operating room. The use of antiseptic solution in the reservoir is always recommended so as to enhance the antibacterial action of the sodium bicarbonate jet, enhance the ultrasonic effect as a factor for calculus removal as well as its antibacterial effect and reduce the effects of contaminating spray in the operating room. The presence of an antiseptic agent in the irrigation solution inactivates most of the bacterial flora in the biofilm.

In general, after completely removing biofilm (bacterial plaque), there is always a calculus deposit that must be removed by using the ultrasound and the PERIO SUB or PERIO SUPRA tips, depending on calculus position. Once the operating field is completely clean, incisions for transplantation or other procedures required by patient’s treatment can be safely performed. It must be clarified that having the surgeon’s instruments, gloves and other essential items sterilized is not enough. Fundamentally, the operating field must also be submitted to rigorous prophylaxis. The professional must be very careful so as to never force the tip on the implant or prosthesis, since that could cause micro-irregularities on those surfaces or even chip the porcelain. The ultrasound must always be applied on implants and prostheses by using the tip’s ends and lateral parts, but never its top. Immediately after prophylaxis, the tissues already present a different aspect.

THE CASE OF PATIENT WITH IMPLANTS

Six years without any maintenance

This is the case of a patient with implants who had no maintenance for 6 years. He attended our dental clinic due to a problem in another tooth on the upper arch. During clinical examination, a large amount of biofilm and calculus was found on the implants and pontics. However, prior to any other treatment, prophylaxis of the fixed prosthesis on the implants was begun.

The existing biofilm and calculus can be seen in Fig. E. There is no doubt that the retractions occurring on the implants were caused by the presence of this biofilm on the prosthetic pieces and on the implants. Tip Perio E was used in order to adequately reach the prosthetic spaces and niches. The ultrasound power virtually “dissolves” the calculus deposits, which can be observed in Fig. F (red arrow).

A CASE FOR THE EXTRACTION OF A SEMI-EMBEBBED THIRD MOLAR (38)

It is very common for specialized dental surgeons to receive patients from colleagues for the performance of various types of interventions: extraction of embedded and semi-embedded third molars, interventions on tooth apexes, bone grafts and even periodontal treatments. Many specialists expect patients to come to their offices with their mouths ready to be submitted to such interventions. Nevertheless, that, unfortunately, does not take place in most cases. The patients come with their mouths full of supra and subgingival calculus and a large amount of biofilm (bacterial plaque).

Many studies have shown that there is no biosafety if intervention is performed under such circumstances. Therefore, the removal of bacterial material adhered to the teeth and mouth tissues is essential as a measure to control postoperative infection.

In this case, the patient presented a large amount of calculus on all teeth. However, the lower right third molar was very painful and needed to be extracted since it was embedded and there were no feasible recovery conditions. Prior to extraction, comprehensive prophylaxis was performed in the patient’s mouth. At first, the bicarbonate jet irrigated with an antiseptic solution was used, which was followed by calculus removal using the ultrasound.

It is noteworthy that the new Profi line makes these procedures fast and safe and that such prophylaxis more objectively aims at the biosafety of the procedure rather than at the treatment of periodontitis presented by the patient. For fast and effective calculus removal by the ultrasound, its is important that the vibrating tip always be applied at an angle of approximately 45° in relation to the tooth’s surface and on the limit between the tooth and the calculus deposit. The high-power aspirator, used in all surgeries, must be well positioned in order to maximally reduce spray dispersion in the environment.

A lot of time is wasted while trying to destroy the whole calcified mass by applying the active tip on distinct and random points of its surface. In the case of dark subgingival calculus, if the limit between the calculus and the tooth’s surface is not localized, a lot of time is spent on the elimination of such mineralized biofilm, but when Profi is appropriately used, the whole calculus mass on the inciseal mesial area comes off in a few seconds following the application of ultrasound. This technique, in combination with antiseptic irrigation, takes very little time. It must also be pointed out that it is not the strength applied to the ultrasound that will remove calculus. When used inappropriately, the equipment may lose its efficiency.

Finally, the tooth (38) was removed and the tissues were saturated. The patient’s postoperative discomfort was minimal since no secondary contamination of the surgical wound occurred.

PERISTALTIC PUMP AND COUPLED IRRIGATION SOLUTION RESERVOIR

All interventions in a patient’s mouth must be preceded by rigorous antisepsis, which is a simple and practical way to reduce the number of microorganisms present and spray contamination. By reducing the patient’s oral microbiota, the professional will achieve more reliable results as well as greater safety for the therapeutic procedures to be performed. As regard the spray, the use of IPE, that is, Individual Protection Equipment by the professional and his assistant is very important. They all must wear protection goggles, including the patient. Upon procedure completion, such goggles must be disinfected.
**NEW USES OF PROFI WITH DABI ATLANTE DENTISTIC TIPS**

Innovative solution for dental treatment, Dabi Aesthetic Tip Line features a unique diamond piece produced in accordance with Chemical Vapor Deposition technology, that covers the active molybdenum tip. This innovative technology was firstly conceived by researchers for use in air space applications at Instituto Nacional de Pesquisas Espaciais - INPE (National Institute for Air Space Research). The high adherence between the diamond end and the tip's body allows for a new set of possibilities for prophy application.

The Dabi Aesthetic Tip Line is an alternative for cavity preparation according to the precepts of new dentistry. Its high cutting precision and efficiency enables the association of maximum preservation and minimum restoration concepts which are necessary for less invasive dentistry.

**Indicated Anti-Septic**

<table>
<thead>
<tr>
<th>Cetylpyridinium Chloride</th>
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<td>25% - 125 ml of the product and 375 ml of drinkable water</td>
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<td>0.6 ml of the product in 454 ml of drinkable water</td>
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* Reservoir capacity in the Profi line is of 500 ml.

**Possible Concentration of Solutions used in Profi Line**

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**Functioning of Dabi Dentistic Tips**

The handling of Dentistic Tips is not like that of other tips or high-speed devices. For this reason, attention is required so that the tips can provide optimal efficiency. The habits that must be changed are as follows:

- Replace pinching by continuous contact. When using high-speed devices, it is necessary to pinch in order to prevent teeth from overheating, which does not occur under the action of ultrasound. Moreover, continuous contact must be used in order to compensate for its cutting speed.
- Replace the extremely firm hand in order to allow small movements. The high cutting speed of high-speed devices makes the professional keep a firm hand so as to prevent unintentional movements that may damage or cut beyond the necessary point. With the ultrasound, cutting speed is much smaller and the risk of cutting beyond the necessary point is almost inexistent. Additionally, speed reduction helps the dental surgeon make small movements that increase cutting precision.
- Reduce pressure on the tip while cutting. The pressure necessary for ultrasound cutting is much smaller than that using high-speed devices. On average less than one third of that pressure is necessary. Since the cutting speed of ultrasound is smaller, professionals tend to apply more pressure when they first use the equipment as if they were using a blind drill, and this inhibits the vibration movement. Cutting is efficient only when very slight pressure is applied and when the tip vibrates freely.
- Avoid cutting with the lateral part of the tip. The best cutting position is achieved by using the top of the cosmetic tips on the tooth's surface. The lateral areas cut less and must be used for finishing work.

**Vibration of the Dabi Dentistic Tips**

Dabi Dentistic Tips have a characteristic fold that forms a 60° angle in relation to the handpiece’s axis. Such fold provides better access to the area to be treated, thus offering a better ergonomic condition for most operations required by cavity preparation.

Additionally, such fold provides a tip vibration condition that characterizes the operation of the Dentistic Tips. Under the ultrasound action and due to the fold, the active region vibrates forwards and backwards, that is, in the antero-posterior direction, on the same plane defined by the tip.

This antero-posterior movement allows the lateral surfaces of the active tip to have distinct areas.

The front part and the back part cause an impact on the surface to be cut and, for this reason, are good for cutting. Due to the angle formed, the back part is more efficient.

No impact occurs on the two lateral surfaces as they are on a parallel plane in relation to the antero-posterior movement. This movement is characteristic of scraping or smoothing, with ideal cutting power for finishing work.

**Why does it cause less pain?**

- It produces less heat to the tooth
- The vibration movement does not cause the hydrodynamic suction of odontoblasts.
- The slight pressure that is applied prevents pain.
Dabi Aesthetic Tip Line

**DENT A1**
- **Indications:** pediatric dentistry, compound resin finishing, removal of excessive restorative material, interproximal, supra- and sub-gingival; and preparation of grooves with incipient lesions.
- **Maximum recommended power:** 30%

**DENT C1**
- **Indications:** removal of tartar and stains, supra- and sub-gingival, removal of old restorations, finishing, beveling, occlusal adjustment, preparation in grooves with more advanced lesions, gingival scaling (2nd phase of gingival scaling).
- **Maximum recommended power:** 70%

**DENT C2**
- **Indications:** Preparations that require parallelism, angle preparation, beveling, more extensive preparations, posterior.
- **Maximum recommended power:** 70%

**DENT C3**
- **Indications:** Pediatric dentistry (baby-bottle caries), removal of old resin and alloy restorations, removal of temporary cement, removal of decayed tissue, mechanical micro-retentions, preparation in regions with demineralized enamel.
- **Maximum recommended power:** 90%

**DENT C4**
- **Indications:** Papillary contour, roof and floor preparation in proximal cavities, tunnel preparation, access to anterior teeth, decayed tissue removal.
- **Maximum recommended power:** 50%

**DENT C5**
- **Indications:** Pediatric dentistry (baby-bottle caries), removal of old resin and alloy restorations, removal of temporary cement, removal of decayed tissue, mechanical micro-retentions, preparation in regions with demineralized enamel.
- **Maximum recommended power:** 50%

**DENT C6**
- **Indications:** Paring of large areas, with flat faces, interproximal access, apical surgery, cavity enlargement.
- **Maximum recommended power:** 80%

Lines PERIODONTICS / ENDODONTICS / RETROSURGERY

**Periodontics**

**Perio E**
- **Indicated for removal of tartar from the buccal, lingual and cervical faces of the anterior teeth.**

**Perio Supra**
- **Universal tool indicated for removal of tartar from all tooth surfaces, especially for posterior teeth plus all axial angles.**

**Perio Sub**
- **Universal tool indicated for subgingival removal of hard tartar, in bifurcations and the removal of pins, cement. Etc.**

**Endodontics**

**Remo C**
- **Indicated for removal of prosthetic and temporary crowns.**

**Remo N**
- **Indicated for metallic core.**

**Endo L**
- **Indicated for instrumentation and irrigation of root canals, removal of foreign bodies from root canal interior.**

**Endo G**
- **Indicated as an auxiliary tool during root canal filing, gutaperch plasticizing and opening of lateral spaces.**

**Retrosurgery**

**Retro A3**
- **Indicated for retro cavity preparation in periodontic surgeries, specially anterior teeth.**

**Retro A5**
- **Indicated for retro cavity preparation in periodontic surgeries, specially for the anterior teeth.**

**Retro R3**
- **Indicated for retro cavity preparation in periodontic surgeries, especially indicated for the posterior teeth.**

**Retro R5**
- **Indicated for retro cavity preparation in periodontic surgeries, specially indicated for the posterior teeth.**