Minimally invasive periodontic therapy.

- Effective cleaning of pockets, up to a depth of 9 mm
- Protection of collagenous soft tissue and root surfaces, from injuries
- Improved bacterial control

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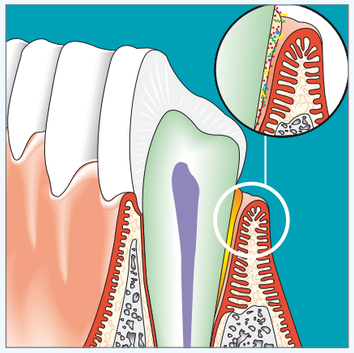
Minimally invasive periodontal therapy with the KaVo SONICflex® paro tip system.

Scientific basis and basic principles of non-surgical treatment procedures.

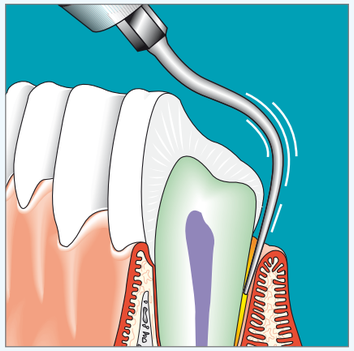
Mechanical plaque and calculus removal is the basis of successful periodontal treatment. In the light of research into the origins and causes of periodontal disease, in recent decades there has been a move away from primarily surgically-orientated treatment methods, to less invasive, closed procedures (4). The primary objective of modern therapy is supra- and subgingival removal of bacterial biofilm (plaque), in a way that is at the same time thorough, but gentle on dental tissue surfaces. It is also important to address the issue of plaque-preventive factors, such as roughness of the root surface and the presence of calculus.

The specific removal of cement or dentine is



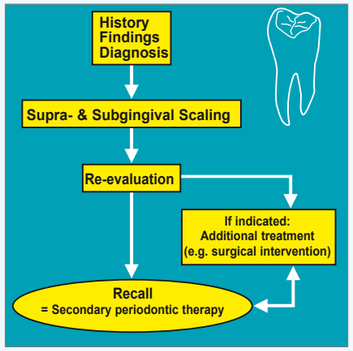
Marginal periodontitis results from infection by pathogenic microorganisms, whose presence can be demonstrated in the subgingival plaque.

no longer regarded as necessary, for creating a biocompatible root surface, because bacteria and their toxins are only lightly attached to the root surface (14, 17). Therefore the specific removal of granulation tissue with a curette, is also regarded as outdated.



The primary objective of periodontal therapy, is the removal of subgingival plaque, also known as biofilm, in a way that conserves healthy tooth tissue.

Systematic periodontal therapy is broken down into several phases (2). A diagnosis is formulated on the basis of the patient's anamnesis and results from radiography. This is followed by initial, non-surgical primary therapy, for pockets with probe depths beyond 3 mm. This "closed" supra- and subgingival scaling is usually performed under local anaesthesia. Four to six weeks after completion of therapy, a re-evaluation of the results of the non-surgical treatment is performed. If required, assuming the periodontal state is sufficiently inflammation-free, further periodontal surgical measures or the use of topical antimicrobial agents are considered. An important component of periodontal therapy as a whole, is always ancillary periodontic therapy, also described as a "recall" appointment. Due to constantly recurring bacterial recolonisation of gingival



Systematic periodontal therapy is broken down into several phases. Due to bacterial recolonisation of pockets, secondary periodontal therapy ("recall appointment"), is one of the most important aspects of treatment.

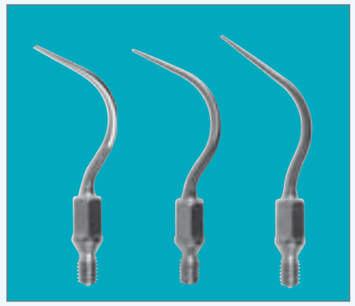
pockets (16), this "recall" should include regular supra- and subgingival plaque removal (generally possible without local anaesthesia), at three- to six-monthly intervals, thus assuring the long-term success of the therapy.

Thus, the number of pathogenic microorganisms in the pocket can be permanently reduced, so that no further loss of attachment occurs in the majority of patients (18). This however means that patients with periodontitis, will remain dependent on professional care for the rest of their lives.

Since the development of narrow, extremely fine working tips for pneumatically-driven sonic scalers such as the KaVo SONICflex, this handpiece is now accepted as a superior alternative to treatment with manual instruments. The successful use of pneumatically-driven sonic scalers, both in primary and secondary periodontal therapy, has been convincingly demonstrated in clinical studies (11, 12).

The new KaVo SONICflex® paro tips have been especially designed in this regard, for subgingival application in pockets with a probe depth of up to 9 mm.

Regardless of the pocket depth to be treated, these tips are set apart by the optimum match they provide between the instrument's geometry and the various root surfaces. Furthermore, in comparison with manual instruments, surfaces such as furca-



Due to their particularly delicate shape, KaVo SONICflex® paro tips effectively and gently remove plaque, even from deep periodontal pockets.

tions that are otherwise inaccessible, can be relatively easily reached. Another advantage is the consistent, even-rounding over the entire length of the working surface, that prevents clinically significant damage when the instrument is being properly used (10).

Only two instrument tips are required for thorough treatment of all the teeth: a tip with a left-deflected (No. 61) and right-deflected (No. 62) working end.

In addition, the straight universal tip (No. 60) is available. No time-consuming instrument exchanges between a multitude of different tips is required with the KaVo SONICflex system.

Mode of operation of KaVo SONICflex® paro tips

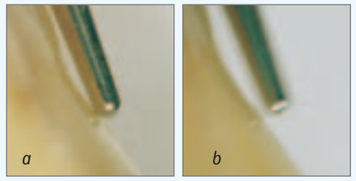
The basis for the use of the working tips is the KaVo SONICflex 2003 L or 2008 L airscaler handpiece. This is simply clicked onto

a KaVo MULTIflex coupling, attached to the unit's handpiece tubing, meaning that there is no need for an additional foot control or the need to make separate power or water connections.

The working tips screwed into the KaVo SONICflex 2003 L or 2008 L airscalers, oscillate in the frequency range up to 6,000 Hz, irrespective of the compressed-air drive-pressure. In the process, the distal end of the scaler tip describes an approximately elliptical course, with an amplitude of 120µm to 240µm (8). If the working tip is then brought into contact with the surface to be treated, a gentle "tapping" rhythm is generated, regardless of the orientation of the tip to the tooth (6).

Local plaque and calculus on the tooth surface is detached and removed by this tapping action and is washed out of the pocket by a cooling fluid, fed to the distal end by an integrated, irrigation channel.

The rinsing, performed in parallel to the processing, promotes the reduction of inflammation (1). However, another important function is the prevention of thermal

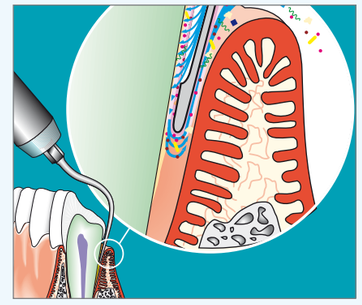


Tip correctly aligned with respect to the root surface at a shallow angle (< 20°), at rest (a) and activated (b). The movement of the active tip is readily apparent from the elliptical reflection (magnified approx. x25).

damage, as the cooling fluid reliably removes the generated frictional heating, assuming the correct application of aspiration techniques.

For supra- and subgingival scaling, the practically bacteria-free water from the cooling system of the dental treatment centre, can be used without reservation. An adapter piece that can be installed between the handpiece and tip, also enables an external supply of sterile coolant media, e.g. for operating theatre use of the KaVo SONICflex 2003 L or 2008 L. The addition of antimicrobial rinsing solutions such as chlorhexidine digluconate, does not offer any clinical advantages, compared to the use of sterile water (3).

The tip's integrated cooling water outlet port, is indicated by the water drop.



Plaque and calculus particles detached by the mechanical action of the oscillation tip, are washed out of the pocket by the cooling fluid.

The efficiency and indeed also any damage from sonic scalers, largely depends on their correct operational use. The removal of calculus from dentine is determined to the same extent by the application angle of the tip to the root surface, the application force

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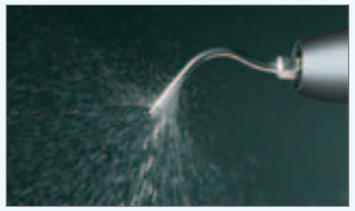


The internal ducting of the cooling water spray to the tip, reliably ensures maintenance-free, accurate alignment, excellent distribution of the cooling water and prevention of subgingival heat damage.

used and the drive air-pressure (5, 6). Especially in the case of "recall" therapy, the focus is on the removal of plaque and unnecessary damage to the root surfaces can be avoided, by not exceeding an application pressure of 100g (= 1 N, for comparison tooth cleaning = 2 N) and by maintaining an acute angle between the tooth and working tip.

Calculus that is firmly attached to the root surface, may be efficiently removed by the use of greater forces. To preclude the possibility of irreversible damage to the root surface, especially in closed use, both clinical experience and appropriate training are absolutely essential, as within a very short time, an abrasion depth in the dentine of up to 150 µm might be achieved (5).

With correct operation, periodontal therapy with KaVo SONICflex® paro tips that is both thorough and conservative, may be achieved in a manner that is pleasant for both the dentist and the patient.

Correct clinical application of the KaVo SONICflex® paro tips

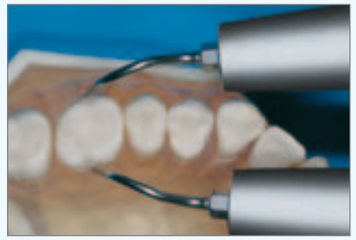
Operational technique and systematic approach

Careful subgingival processing of root surfaces in a manner that conserves tooth material, is one of the most technically-demanding activities for the dentist or dental hygienist. The lack of direct view of the surface to be treated and obstructed access to posterior dentition, in conjunction with frequently variable root geometries, demand sure and precise guidance of the instrument. For optimum use of SONICflex® paro tips, one must ensure that the tip deflected towards the respective tooth surface to be treated, is selected.

This means that in a jaw with a full complement of teeth, the designs of the SONICflex® paro tips implies four different operating zones.

The first quadrant to the central incisor is processed with the left-deflected tip (No. 61) with a buccal approach, then the anterior teeth, the premolars and molars of the second quadrant are cleaned palatally. However the greatest risk of overlooking calculus, is below the contact-point, roughly at the level of the enamel-cement boundary (9).

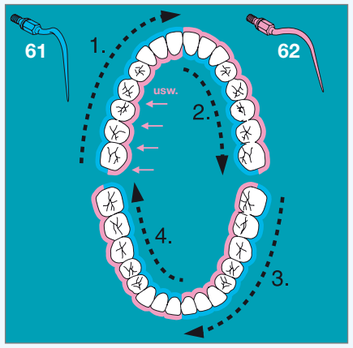
Therefore in order to improve the cleaning result, the interdental areas of previously



When working with SONICflex® paro tips No. 61 (see Fig. above) and No. 62 (see Fig. below), the tip inclined towards the respective tooth surface to be processed, should always be used.

palatally cleaned teeth, should also be buccally and palatally/lingually treated, with a horizontally introduced tip, held at an angle.

After the cleaning result has been examined with the help of a syringe spray and a fine probe, tip No. 62 is used in the same way, but from the opposite side, so that complete processing of the root area is ensured.
The straight tip
No. 60 can, if required, be used for additional processing of smooth surfaces.



Only two instrument tips are required for thorough treatment of all the teeth: a tip with a left-deflected (No. 61) and right-deflected distal end. For optimum use of SONICflex® paro tips No.s 61 and 62, it should be ensured that the tip deflected towards the respective tooth surface to be treated, should be used.

Treatment of the root surface

The required tip is screwed into the handpiece with the supplied torque wrench, until

To improve the cleaning result, the interdental areas should be treated with a horizontally introduced tip, held at an angle.

the wrench's clutch clicks audibly. The tip is now securely attached to the handpiece. If the handpiece is to remain on the treatment centre with tip attached, it is recommended to leave the torque wrench in situ, so that there is no risk of injuries to third parties.

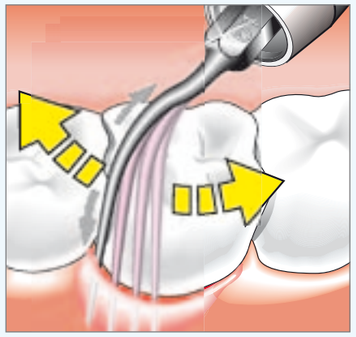
The use of sonic scalers differs significantly from manual instruments that rely on the entire cutting edge sliding over the root surface: in the latter case, each stroke results in a strip-shaped cleaned area (15).

Due to their round cross-section, the SONICflex® paro airscaler tips are usually in point-contact with the tooth.

Therefore it must be ensured that the entire surface to be cleaned is covered with careful, overlapping 'snaking' movements, whereby it may be assumed that the most distal one to two millimetres of the tip, is actively involved in the abrasive process.

In this regard, a careful technique plays a key role. It is easy to get an impression of complete cleansing after just dealing with the coronal aspect of a tooth. At all times one should be mindful of plaque and calculus which present sub-gingivally, towards the apical zone. Only complete subgingival scaling can produce the desired clinical success (7).

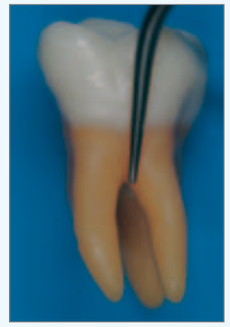
After supra- and subgingival scaling, the accessible roughened tooth surfaces should be carefully polished. The enamel zone



Schematic presentation of the method for using SONICflex® paro tips.

The smooth surfaces of the roots should be worked carefully, with overlapping, snaking movements of the active tip. In the process, the instrument is held against the root surface at a shallow angle (<20°).

lends itself to the use of the KaVo PROPHYflex. On the root surfaces or exposed dentine, polish with a prophy cup and polishing paste. Excellent cleaning results that are gentle on the surface can also be achieved with SONICflex® clean brushes (13).



Always when working in furcation zones, the tips should be held at an acute angle (< 20°) with respect to the root surface, this prevents perpendicular application (angle = 90 °) of the tip, to the furcation floor.

For the prevention of infections in members of the dental team, as for all other treatments in a dental practice, when using KaVo SONICflex® paro tips, gloves, facemask and protective goggles should always be worn.

On completion of treatment, the handpiece, tips and torque wrench should be sterilised in an autoclave. Regular processing in a KaVo QUATTROcare is the only regular maintenance that is required for the SONICflex 2003 L or 2008 L handpiece. On completion of the sterilisation cycle, the KaVo SONICflex system is then ready for the next patient.

Subject to the adoption of correct application techniques, KaVo SONICflex® paro tips enable successful periodontal therapy, as evidenced in scientific studies and with their wide range of clinically relevant advantages (see page 9), compared to other systems.

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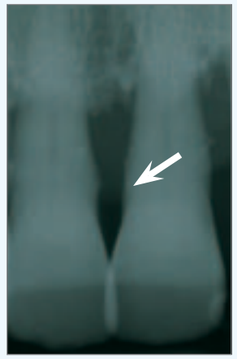
Example of application Subgingival scaling

1. The initial finding in tooth 21 in a patient with severe, generalised chronic periodontitis (pocket probe depth 5 mm, bleeding and suppuration).



2. Severe horizontal bone loss and clear subgingival calculus deposits can be seen from the initial radiological examination.

3. The working tip is laid flat (angle < 20 °) against the root surface. (For the sake of clarity, the distal end has been laid against the gingiva).

4. The tip is fully inserted to the base of the periodontal packet and correctly aligned with respect to the root surface.

5. The entire subgingival area should be carefully worked, with continuous, overlapping movements. To improve the field of vision without adversely affecting cooling, the suction cannula is held 1-1.5 cm from the tip.

6. The calculus particles detached by the SONICflex® paro tip, are washed out of the pocket by the flow of coolant water.

7. On completion of the subgingival scaling, no traumatisation of the gingiva by the tip is evident.

8. Four weeks post subgingival scaling, the gingiva is inflammation-free and the pocket probe depth has been reduced to 3 mm.

Advantages in application of SONICflex® paro

- Area of application in primary and secondary periodontal therapy.
- Major reduction in workload for dentist and dental hygienist, with powered instruments.
- Reduced investment in capital equipment, plus tried, tested and trusted mechanical components in handpiece.
- Completely rounded tips, for efficient removal of plaque and calculus in pokkets, with probe depths of over 9 mm.
- Thorough cleaning even of inaccessible areas, such as furcations, thanks to fine tips.
- Only two tips required to reach all subgingival areas.
- External cooling fluid can be supplied if required, however no need to separately buy rinsing or abrasive media.
- Simple and economic extension to the instrument range with the SONICflex® root planer tips, for use in periodontal therapy.

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Deliverable forms

SONICflex® paro tip	0.571.0371
3 SONICflex® paro tips (No.s 60, 61, 62)	
SONICflex paro tip set A	1.006.2020
3 SONICflex® paro tips (No.s 60 A, 61 A, 62 A)	

SONICflex®paro single tips and accessories:

Tip No. 60, straight	0.571.7402
Tip No. 60 A	1.006.1935
Tip No. 61, left-deflected	0.571.7412
Tip No. 61 A	1.006.1935
Tip No. 62, right-deflected	0.571.7422
Tip No. 62 A	1.006.1936
Torque wrench for changing tips	1.000.4887
Adapter piece cooling	0.571.6841
Adapter piece A	1.006.5966
Wrench for adapter piece	0.411.0892
Case for tips sterilisable up to 135°C	0.411.9101

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