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Prophy for Professionals by W&H

Prophy for Professionals

Clinically based practical application

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Prophy for Professionals

»Proxeo – Prophy for Professionals« is the caption W&H uses for its range of instruments for powered mechanical removal of calcified and soft deposits. W&H offers a range of customised, patient-oriented and user-friendly solutions for professional cleaning and periodontal treatment.

Why polish teeth with rotary polishing instruments?

Tooth polishing as a means of removing plaque was already known to the Greeks and Romans [1] and has remained a proven treatment for aesthetic and medical indications throughout the centuries [2, 3]. In addition to caring for the teeth at home, the European Federation of Periodontology (EFP) recommends the mechanical removal of calcified and soft deposits as an essential component of dental care. According to these recommendations [4], professional mechanical plaque removal (PMPR) of soft and calcified deposits can contribute significantly to reduce the development of gingivitis or mucositis and subsequent periodontitis or periimplantitis.

PMPR is also one of the main pillars of successful tooth cleaning or periodontal therapy [5] and its post-treatment. Rotary polishing instruments, such as those already manufactured and marketed by W&H for many years, effectively remove plaque, biofilm and stains with the appropriate Prophy Cups and Brushes. They therefore comply with the recommendations of the EFP.

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Fig. 1:
Very pronounced bacterial plaque and significant gingivitis are clearly visible.

Oral health for patients – clinically proven
Regular removal of biofilm

Risk factors and other causes, such as systemic diseases, inadequate dental care at home and specific eating habits, are a significant factor in increasing the bacterial load in the biofilm. This poses a very high risk of dysbalance and as a result may cause not only oral but also systemic diseases. Many of these diseases (such as diabetes, cardiovascular and respiratory diseases) are suspected of being caused or at least exacerbated by pathogenic biofilm bacteria entering the bloodstream [6].

The regular removal of biofilm helps to reduce the development of a bacterial load. With severe bacterial colonisation, the biofilm may become unbalanced with pathogenic germs gaining the upper hand and greatly increasing the risk of disease. Fast re-colonisation after the removal of biofilm has been known for many years; it happens in a very short time [7]. Hence, regular mechanical checking of the biofilm is an important part of preventing gingivitis, mucositis, periodontitis or even periimplantitis.

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Delayed re-colonisation of biofilm on smooth surfaces

The adhesion of bacteria can be influenced by a wide range of related microbiological, physical and chemical parameters [8, 9, 10, 11]. Many studies show that biofilm returns within a very short time after removal [7].

Various studies demonstrate a significant connection between rough surfaces and the capacity of bacteria to adhere to them [12, 13]. The morphology of the surface also plays a significant role. Wang et al. have been able to prove that bacteria attach more easily as the roughness and the morphological changes of the surface increase [14]. The conclusion appears to be that the smoother the surface, the less able the bacteria are to adhere to the surface. At the same time, there appears to be a threshold value for bacterial adhesion; above a lower roughness of an Ra value (mean roughness) less than 0.2 to 0.3 µm, the adhesion capacity of the bacteria increases again [14, 15, 16].

Smooth surfaces are created by rotary polishing with a polishing paste individually matched to the patient. The resulting smoothing of the tooth surface delays rapid reattachment of the bacteria and thus results in a lower bacterial load.

The rotary polishing process removes only an extremely small amount of tooth enamel. Study results and reviews indicate that this abrasion in the area of coronal polishing of the dental enamel has no significant clinical relevance [17].

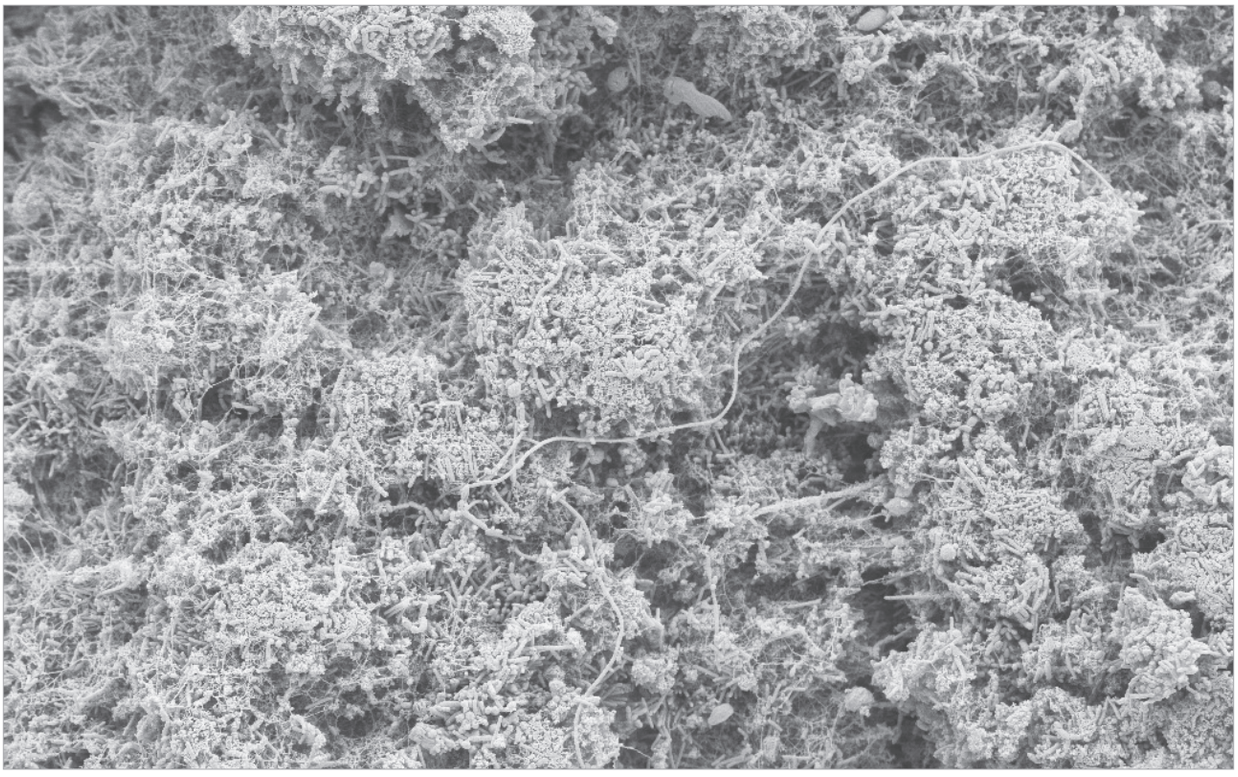

Fig. 2: The SEM image shows the bacterial re-colonisation of a dentine disc. (Image courtesy of Prof. S. Eick, University of Bern, Dental Clinics; Dr. S. Nietzsche, Jena University Hospital, Germany)

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Strengthening the teeth: mineralisation and caries prophylaxis

A healthy tooth is characterised by its natural resistance and hardness. The inclusion of mineral substances and salts, such as phosphates, hydroxyapatite and fluorides, contributes to the hardness of the tooth substance by what is referred to as mineralisation by incorporation. Remineralisation of the tooth substance can be reinforced by using polishing pastes containing xylitol, sodium, calcium, phosphate apatite or hydroxyapatite [18, 19, 20, 21].

This can support the structure of the enamel and reduce the growth and metabolism of cariogenic bacteria. Pastes enriched with fluoride contribute to caries prophylaxis and could therefore eliminate the additional step of fluoridation of the tooth [22].

Fig. 3: Comparison before and after treatment with rotary polishing instruments.

Aesthetics: removing stains

Exogenic stains, developing as a result of the individual's dietary habits and presenting as areas of green, orange, brown and black discolouration, can be effectively removed with rotary polishing [23, 24].

In addition to removing stains, plaque and biofilm, the selection of a suitable polishing compound also affects the protection of the remaining enamel and dentine [2].

The most efficient removal of discolouration in combination with the best possible preservation of the remaining enamel and dentine depends on the polishing speed, in other words the revolutions per minute (rpm), among other factors. The W&H Proxeo handpieces and contra-angle handpieces can easily reach and maintain the optimal speed for rotary polishing, ranging from 2,500 to 5,000 rpm, recommended in the international literature [25, 26].

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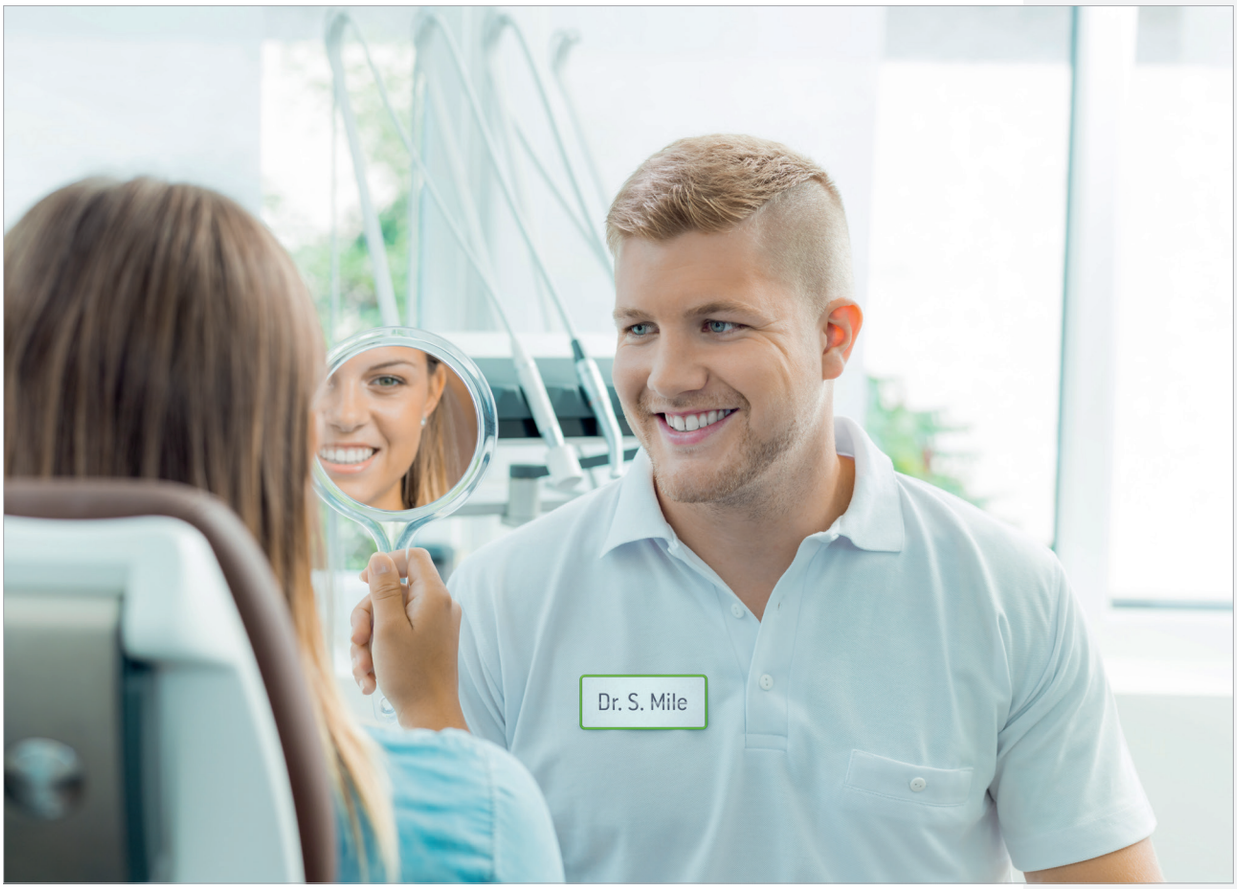

Feel-good factor and motivation for the patient

Polishing with rotary polishing instruments is often the most comfortable step in successful teeth cleaning or periodontal treatment for the patient. Smooth freshly polished tooth surfaces make for a feeling of clean, well-cared-for and healthy teeth.

This motivates the patient to pay more attention to thorough tooth care at home. Since rotary polishing does not require cooling with water, the result is a very good view of the treatment site and a significantly reduced aerosol load, particularly for risk patients who are sensitive to large volumes of aerosol.

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Prophy for Professionals –
applied tooth polishing in practice

Every professional tooth polishing treatment involves selecting the potential applications and the appropriate products. Instruments, polishing media and pastes are explained step-by-step below.

Tips for the professional use of rotary polishing instruments

The instruments and polishing media (such as cups and brushes) should be individually selected for each patient and in accordance with their medical history. Allergies, such as to latex, must be considered when selecting the polishing media.

1.

The correct speed:
The speed is an important factor when selecting the rotary polishing instrument. If the speed is too high, the pulp may be overheated by friction, resulting in damage to the tooth. Excessive speeds frequently also cause spattering of the paste.

The optimum speed for rotary polishing recommended in the international literature is specified as 2,500 rpm on average [25].
The new W&H Proxeo instruments can operate in these speed ranges. For atraumatic treatment, the speed selected should be as low as possible.

2.

Settings on the motor:
At the point of contact with the tooth, an average 2,500 rpm should be used. Many motors do not offer this low speed. An appropriate contra-angle handpiece equipped with a 4:1 transmission ratio achieves the corresponding speed on the tooth. Very important: The motor setting should be selected accordingly, because the speed applied to the tooth will be reduced by a factor of four.

3.

The right pressure for polishing the tooth:
The pressure applied for polishing with brushes or cups should be equivalent to that exerted by a standard toothbrush. In technical terms, this is equivalent to a pressure of 1.5 Newtons or a weight of 150 grams. It is easy to check how this actually feels: press the instrument on a letter scale until it shows a weight of 150 grams. This is the recommended application pressure of a rotary polishing instrument with a cup or brush [28].

4.

Duration of polishing:
Contact with the tooth should not exceed a period of 2–3 seconds [25]. In the absence of water cooling, treatment times should be kept short in order to prevent possible overheating of the tooth and potential irritation of the pulp.

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Fig. 4: The LatchShort technology of the Proxeo TWIST and its corresponding Prophy Cups make for easier access to hard-to-reach tooth surfaces. Additionally, the 4 mm shorter head offers more comfort for patients with a smaller mouth or impairment of the mandibular joint.

Recommendations

The following recommendations [27] indicate cases in which treatment with rotary polishing instruments should only be carried out after consultation with the patient's dentist.

Potential contraindications: dry mouth, xerostomia, incipient caries, enamel dysplasia, exposed tooth neck or roots, allergies (latex, constituents of polishing pastes).

Is treatment with rotary polishing instruments suitable for all patients?

Rotary polishing instruments are used primarily for professional tooth cleaning. Generally speaking, all patients can be treated with rotary polishing instruments to remove stains and deposits caused exogenically. See the section on recommendations for exceptions.

Patients who suffer from specific respiratory diseases, risk patients, patients who cannot be treated with powder spray units (high aerosol load) particularly benefit from treatment with rotary polishing instruments.

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Selection of the polishing paste – simply a matter of taste?

Different polishing compounds with different degrees of abrasiveness (RDA: Radioactive Dentine Abrasion) are available for rotary polishing depending on the appearance of the biofilm or the stains. The hardness of the tooth substance and any restoration materials that are present must be taken into account, as they have different abrasive properties.

Pastes are generally classified as coarse, medium and fine abrasives. The polishing process for removing deposits starts with a coarse abrasive paste and finishes with a fine abrasive paste to produce the smooth, glossy surface.

All-in-one or two-in-one pastes gradually reduce their particle size during use and thus combine the various steps of the polishing process to eliminate the need for a second or third polishing stage.

Ingredients	Potential effect – advantages
Feldspar	Can be used on tooth surfaces and restoration materials
Pumice	Can be used on tooth surfaces and restoration materials
Perlite	Abrasive agent reduces particle size from coarse to fine during use, contains fluorides
Aluminium silicate	Outstanding polishing and spot removal properties, contains fluorides, easily rinsed away
Zirconium silicate	Smooths the tooth surface
Amorphous calcium sulphate	Smooths the tooth surface
Products containing xylite	Stimulates production of saliva, relieves dry mouth [29], reduces acids (induced by caries) and formation of biofilm [30], also gluten-free, can be used with children, available as fine, medium and coarse paste
Products containing Novamine	Tooth desensitisation, sealing of tubules and removal of deposits [30]

Tab.1: Examples of components of polishing pastes and their effects [27].

A prophy paste can be selected specifically for the patient based on the medical history and the patient's wishes. Prophy pastes are now available in many different flavours, as well as suitable for patients with allergies and for vegans.

A wide range of active ingredients is added to pastes, which should support tooth mineralisation and provide protection against caries. Therefore, various pastes that contain minerals such as hydroxyapatite or fluoride are also available. Pastes can range in consistency from coarse and crumbly to soft and creamy.

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Polishing instruments and polishing media from W&H:

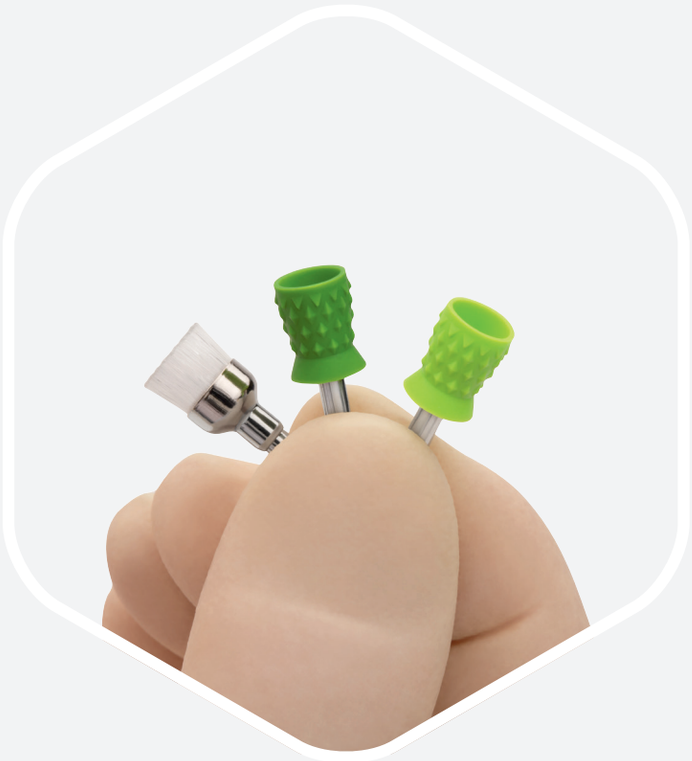

Fig. 5: In addition to the usability of all common screw-in caps, brushes and snap-on adapters, W&H also offers its own cups and brushes specifically adapted to the challenges of rotary polishing.

Fig. 6: The W&H Proxeo handpieces and contra-angle handpieces support efficient treatment through their ergonomic design, with a small head and optimum speed directly on the tooth.

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Pictures are for illustrative purposes only. Additional equipment and accessories shown are not included as standard.

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